Islamic Law and Investments in Children: Evidence from the Sharia Introduction in Nigeria

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Abstract

Islamic law lays down detailed rules regulating children's upbringing. This study examines the effect of such rules on investments in children by analysing the introduction of Sharia law in northern Nigeria. Triple-differences estimates using temporal, geographical and religious variation together with large, representative survey data show decreases in infant mortality. Official government statistics further confirm improvements in survival. Findings also show that Sharia increased vaccination rates, duration of breastfeeding and prenatal health care. Evidence suggests that Sharia improved survival by specifying strict child protection laws and by formalising children's duty to maintain their parents in old age or in sickness.

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1 Introduction

Sharia law, Islam's legal system, is applied to varying degrees in around 40 countries. Economists acknowledge that religious rules or customs can influence individual or collective behaviour significantly (Iannaccone, 1998; Iyer, 2016). Empirical evidence further points to strong relationships between religion and outcomes related to children such as fertility (Iyer, 2002; Norris and Inglehart, 2004) or health (Bhalotra et al., 2010) in particular. Yet, there is little evidence on the causal impact of religious law on parental decisions.

This study estimates the effect of Islamic law on investments in children by exploiting a natural experiment. In 2000, the 12 northern states of Nigeria introduced Sharia law (Sharia states) for their Muslim citizens; the other 24 states maintained secular legislation (non-Sharia states). Sharia law contains very precise provisions codifying the safeguarding of children and also formalises children's responsibility to maintain their parents in old age. These rules are enforced via strict penalties and can thus affect the costs and returns parents associate with their children. The first part of the paper uses large, representative survey data and finds that Sharia decreases infant mortality. The second part of the paper carries out an exploratory analysis investigating various mechanisms of impact such as child investments, law enforcement and supply side aspects. The research design exploits the unique temporal, geographical and religious variation caused by the sudden introduction of Sharia (for Muslims only). Moreover, I use the fact that application of Islamic law varies by exposure to Islamic police and discontinuously at state borders.

To estimate the reduced form effect of the Sharia introduction, I use a triple-differences framework that compares—over time—Muslims in Sharia states (the treated) to Muslims in non-Sharia states and then juxtaposes these differences with changes for Christians across the same regions. Difference-in-differences estimates from the 1999 and 2003 Nigerian Demographic Health Surveys (DHS) show that infant mortality decreases by around 5.6 percentage points (corresponding to 36 percent of the pre-treatment mean for the treated). The estimates are robust to the inclusion of mother fixed effects. The triple-differences specification rejects the hypothesis that the estimates are the same as for the Christian placebo sample, for which I find no effects.

After presenting the main mortality estimates, I address various identification concerns. Analysing the exact timing of child deaths, I document parallel trends for Muslims in Sharia and non-Sharia states before the Sharia introduction. Moreover, I address the concern of unobserved factors in Sharia states by comparing Muslims and Christians in those states only and find very similar effects. I also address the concern of reporting bias by re-estimating Sharia's effect using official vital statistics I digitised from Nigerian National Population

Commission reports on deaths and find reductions in mortality comparable to the DHS estimates. Finally, I explore the possible role of confounding factors such as civil unrest, violence and migration and also carry out a battery of robustness checks.

Since Sharia regulates many different aspects of Muslim life, the second part of the paper explores various mechanisms through which Islamic law might affect infant mortality. First, I consider investments in children. Sharia legally recognises children's duty to maintain their parents in sickness or old age thus potentially increasing economic returns parents expect from their children. Consistent with an increase in the demand for child quality, I find that Sharia increased the probability of young children receiving vaccines by around 20 percentage points (corresponding to roughly 30 percent of the pre-treatment average) and increased the duration of breastfeeding by around 2 months (12 percent of the pre-treatment average). Peri-natal health behaviours such as take-up of antenatal care or birth assistance also improve. Compatible with an increase in demand for child quantity, the results show marked increases in both self-reported desires for more children and observed birth rates. Moreover, I find that the improvements in survival are more pronounced for boys (albeit not statistically significantly), who under Islamic custom are the main caretakers of parents in their old age.

As a second pathway of impact, I examine the importance of Islamic child protection legislation and its strict punishments for offenders. Evidence from law reports shows marked increases in the number of parents convicted of child neglect thus suggesting that, for some parents, the change in law was binding. Moreover, I estimate whether Sharia's impact is stronger in states that introduced stricter child protection laws. Using the precise wording of legislations, I divide the 12 Sharia states into *high penalty* (where punishments are stricter) and *low penalty* states (where penalties are more moderate) and find considerably larger effects for the first set of states. Geospatial discontinuity estimates comparing individuals either side of state boundaries confirm these findings.

Connected to this, I examine the relative importance of Islamic law enforcement and of exposure to Islamic values. In an approach similar to Fafchamps and Moser (2003), I approximate exposure to Sharia law by the geographical distance between households and Islamic police stations. Before Sharia, infant mortality rates for children living in proximity to or at some distance from police stations show parallel trends. Once Sharia is introduced, however, decreases in mortality are significantly stronger for children living within walking distance of a police station suggesting law enforcement as a probable pathway of impact. By contrast, I find that Sharia's impact does not vary by proximity to mosques, a likely proxy for exposure to Islamic values (Becker and Woessmann, 2009; Michalopoulos et al., 2018). Moreover, using attitudinal data collected before and after the Sharia introduction, I find no

effect on two proxies for exposure to Islam: self-identification with Islam and seeking out of religious leaders. Together, these result suggest that the increased salience of Islamic values is an unlikely mechanism of impact.

Finally, I examine whether Sharia's effect could be the result of other, secular mechanisms. I investigate whether the Sharia introduction led to a change in the profile of children, who were born, which, in turn, could affect their survival chances. However, I find no evidence of such selective responses. Moreover, I examine the role of state-specific policies. Using official data on state accounts, I cannot detect any change in policy expenditures by individual states. Neither do I find an effect of state-sponsored vaccination initiatives.

The results presented in this paper aim to further our understanding of how exposure to religious laws affects parental decisions. Research increasingly indicates that religion interrelates with socio-economic outcomes such as sanitation (Geruso and Spears, 2018), economic productivity (Andersen et al., 2017), happiness and economic growth (Campante and Yanagizawa-Drott, 2015), insurance (Dehejia et al., 2007), women's rights (Meyersson, 2014), attitudes (Clingingsmith et al., 2009; Guiso et al., 2003), public goods (Berman and Laitin, 2008) and coping mechanisms (Binzel and Carvalho, forthcoming). This paper complements these studies by highlighting a scarcely documented determinant of child welfare for the world's fastest growing religion (Pew Research Center, 2011). The paper also speaks to studies estimating the effect of ramadan fasting on early life outcomes and adult health (Almond and Mazumder, 2011; van Ewijk, 2011; Jürges, 2015; Savitri et al., 2019). In fact, in an overview article Iyer (2016) highlights the links between religion and demography as being under-researched. Moreover, early childhood experiences have been documented to have long lasting impacts (see Yi et al., 2015; Gensowski et al., 2019; for examples).

The analysis is also relevant to studies pertaining to the trade-off between child quantity and quality (Black et al., 2005; Qian, 2009; Jensen, 2012). By linking Islamic laws to child outcomes, this analysis moreover relates to studies documenting the social (La Ferrara et al., 2012; Bassi and Rasul, 2017), historical (Dell, 2010), economic (van den Berg et al., 2006) and policy (Komro et al., 2016; Buisman et al., 2018; Daysal et al., 2019; Bharadwaj et al., 2020) influences on child survival, welfare and family related decisions.

The next section outlines the introduction of the Sharia and presents the data. Section 3 lays out the empirical strategy, discusses the results and identification issues. Section 4 explores various pathways of impact and section 5 concludes.

2 Background and Data

2.1 The introduction and enforcement of Sharia law in Nigeria

The Sharia introduction. In 2000, 12 states (Bauchi, Borno, Gombe, Jigawa, Kaduna, Kano, Katsina, Kebbi, Niger, Sokoto, Yobe and Zamfara state) introduced Islamic *criminal* law by enacting Sharia Penal Code (SPC) (Ostien, 2011b)—see figure 1. In line with the Nigerian constitution, Sharia law applied to Muslims only and Christians were exempt. The Sharia introduction was mainly a top down political process driven by state assemblies, which started in the northwestern state of Zamfara. Appendix A provides details on Sharia's introduction including data on Islamic judges and judgements. Section 4.2 investigates Sharia's enforcement in detail.

A comprehensive analysis by Oxford University shows that in the majority of cases, Sharia law was not forced upon Christians, states remained secular, and harsh punishments were almost never carried out.[1] Moreover, women were the major beneficiaries with over 70 percent of complaints heard by courts made by women, mainly regarding issues related to children and marriage. Due to their fast, non-technical workings, the Sharia courts received high satisfaction ratings by women of 52 to 89 percent (Tabiu and Bello, 2016).

Islamic laws regarding children. The Sharia introduction led to two key changes in legislation regarding children: i) the formalisation of children's duty to maintain their parents in old age and ii) strict rules protecting children from neglect. See appendix A for details.

Secular laws protecting children: Secular laws were in force in Sharia states before 2000 and were applied in non-Sharia states throughout. According to this set of rules, parents would lose custody if they abandoned or neglected their children (see Uzodike, 1990). For instance, in Williams v Williams after the court decided that the care of the mother was superior to the one of the father custody was transferred to the mother but no party was punished.[2] If the neglect results in harm, parents are liable to one year of imprisonment. NGO reports suggest that pre-2000 national policies had no significant impact.[3]

Islamic laws protecting children: The SPC introduced in Sharia states in 2000 classifies neglect of and misbehaviour towards children as *qisa* or related offences. This implies that retaliation is a permissible form of punishment (see Ostien, 2011b). Laws protecting the welfare of children can roughly be grouped into three categories: abandonment, neglect and harm of young children (see appendix A for a schematic outline).

[1] See `https://www.qeh.ox.ac.uk/content/exploring-15-years-sharia-implementation-northern-nigeria`.
[2] Theresa Temitayo Williams v Rasheed Ahmet Williams SC 171/1985 in All Nigeria Law Reports, 1987.
[3] See `http://www.crin.org/en/docs/resources/treaties/crc.13/Nigeria_CWL_NGO_Report.pdf`.

Child abandonment is defined as exposing a child under the age of 15 or leaving them in a place with the intention of abandoning them. Any parent found guilty of abandoning a child is liable to be incarcerated for a term of up to three years and to up to 40 lashes.

Children below the age of 15, have the right to be looked after, protected, fed and clothed. The punishment for neglecting children consists of imprisonment of up to one year, a fine or both. If the neglect of parents causes the health of the child to suffer, the punishment increases to up to five years imprisonment and a payment of diya (of value 100 camels, 1,000 gold dinars; Ostien 2011b). Sons and daughters should be treated equally.

Islamic laws protecting parents in old age: The SPC also codifies obligations of children towards their parents. After reaching adulthood, when parents are unable to sustain themselves, children are required to maintain their parents. Offenders are liable to up to two years imprisonment and caning of up to 50 lashes. See appendix A for details.

2.2 Conceptual Framework

The Sharia introduction can potentially change the costs and returns parents associate with their children. One way to conceptualise the resulting changes in parental investments in children is the model outlined by Schultz (1997) and Joshi and Schultz (2007).

In this two period model, parents work in the first period and retire in the second. During the first period parents can invest in assets (A), child quantity (N) and child quality (Q). In the second period parents live off returns to these investments. Parental lifetime utility (V) is a linearly separable function of consumption in each period (C_1, C_2), leisure (L), the number of children (N) and child quality (Q). Utility in the second period is discounted by δ. The budget constraint for the first period states that earnings from work ($(1-L)w$) and returns to inherited assets ($r_a A$) must equal consumption (C_1) and savings (S). Consumption in period 2 must equal to returns to child quantity ($r_N P_N N$), child quality ($r_Q P_Q Q$) and assets ($r_A(A+s)$). As such, parents solve the following utility maximisation problem

$$\begin{aligned} \max \quad & V = U_1(C_1, L, N, Q) + \tfrac{1}{1+\delta} U_2(C_2, N, Q) \\ \text{s.t.} \quad & (1-L)w + r_a A = C_1 + S \\ & C_2 = r_A(A+s) + r_N P_N N + r_Q P_Q Q \end{aligned} \tag{1}$$

where P_N and r_N refer to the price of and returns to child quantity (N) and P_Q and r_Q to the price of and returns to child quality (Q).

This paper examines three mechanisms through which the Sharia introduction can affect parental investments in children: i) the legal recognition that children must support their parents in old age increases the expected returns to both child quantity (r_N) and quality

(r_Q), which is expected to lead to more investments in the quantity and quality of children; ii) the severe punishments for child neglect decrease the relative price of child quality (P_Q) thus likely increasing parental investments in child quality (Q); iii) the Sharia introduction could increase the salience of Islam's high regard for children, which can alter parental utility ($U_1(\cdot)$ and $U_2(\cdot)$). Section 4 explores these mechanisms in detail.

2.3 Data, Sample and Measurements

This study uses two separate and independent data sources. The main estimates use two rounds of the Demographic Health Survey (DHS) for Nigeria, which are nationally representative surveys of Nigerian households. The 1999 DHS interviewed 8,199 women aged 10 to 49. The 2003[4] DHS surveyed 7,620 women aged 15 to 49. Among other things, the surveys collect information on all children's survival status and information on a variety of health investments for children born in the five years prior to the survey. See appendix B for the location of clusters.

Panel A of table 1 reports the summary statistics. Around half of interviewed women, 47 percent, are Muslim, 61 percent of women have completed primary education and at the time of the survey each woman has 2.6 children on average.

Panel B of table 1 shows summary statistics on child survival. For the whole country, the proportion of children dying within the first year of life (infant mortality) is 0.135. This number is considerably higher in Sharia than in non-Sharia states (see columns 2 and 3). The neonatal mortality (probability of dying within the first month of life) figures show similar patterns. Early neonatal mortality (probability of dying within the first week of life) rates are more stable across the country.

Panel C shows various investments in children. For the whole of Nigeria the proportion of children having received at least one vaccine, the proportion of mothers having visited antenatal care and having assistance at birth are all lower in Sharia states. The average duration of breastfeeding, by contrast, is higher.

To assess whether the DHS results are skewed by reporting bias, I complement the analysis with official vital statistics data I digitised from reports by the Nigerian National Population Commission (NPC), which is responsible to provide Nigeria's official vital statistics. The NPC is independent of the DHS and collects information from hospitals, funeral associations and registrars to officially register the total number of child births and deaths for each of the 36 states from 1994 to 2007 (NPC, 2008).

[4]The data are publicly available at `https://www.idhsdata.org/idhs/` and `measuredhs.com`, respectively.

3 Reduced form effect of Sharia on infant mortality

3.1 Empirical methodology

Difference-in-differences and triple-differences. The first model is a difference-in-differences specification, which compares—over time—Muslims in Sharia states (the treatment group) to Muslims in non-Sharia states (the control group) as follows

$$y_{ist} = \gamma_s sharia_s \times post_t + X_{ist}\beta_{dd} + \phi_s + \tau_t + \epsilon_{ist} \tag{2}$$

where y_{ist} denotes outcome y for individual i in year t in state s, $sharia_s = 1$ if individual i resides in a state that introduced the Sharia and $post_t = 1$ if individual i was born at a time, which exposes them to the Sharia (depending on the outcome, typically from 1999 onwards). Furthermore, X_{ist} consists of time-varying covariates for the individual[5]; ϕ_s and τ_t are state and year fixed effects. Standard errors are clustered at the state level of which there are 38. Columns 1 and 2 of appendix E test for bias in the standard errors due to a reduced number of clusters.

By comparing Muslims in Sharia and non-Sharia states over time specification 2 differences out time-invariant differences between between Muslims in both regions of the country. As such, the difference-in-differences estimator removes many confounding factors commonly associated with religious practices, such as long-standing cultural practices or history, for instance. Any time varying differences between these two groups, however, would erroneously be attributed to the Sharia introduction. To address this concern, I take advantage of the fact that Christians were exempt from Sharia. As a placebo, I re-estimate equation 2 for Christians only. To test whether the coefficients are statistically different between the Christian and Muslim sub-samples, I pool all observations in a triple difference framework and estimate

$$\begin{aligned} y_{ist} = \gamma_m muslim_i &+ \gamma_{sp} sharia_s \times post_t + \gamma_{mp} muslim_i \times post_t + \gamma_{sm} sharia_s \times muslim_i \\ &+ \gamma_{smp} sharia_s \times muslim_i \times post_t + X_{ist}\beta_{dd} + \phi_s + \tau_t + \epsilon_{ist} \end{aligned} \tag{3}$$

where $sharia_s \times muslim_i \times post_t$ is the triple interaction between individual i residing in a state that introduced Sharia ($sharia_s$), them being Muslim ($muslim_i$) and being born at a point in time that exposed them to the Sharia ($post_t$).

[5]Covariates include a rural dummy, mother's year of birth, a dummy for the observation being drawn from the 2003 round and dummies for child's year of birth and gender.

Identification issues. The identifying assumption in the triple differences framework relies on the absence of time varying differences between individuals in Sharia and non-Sharia states, which affect Muslims and Christians differently. I address a number of such possible concerns.

To address the possible presence of time varying factors affecting Muslims in Sharia states, I examine pre-trends in three ways. First, I scrutinise the exact timing of changes across Sharia and non-Sharia states in a conditional event study framework. Using their date of birth, I group children into 6 month birth cohorts and I re-estimate equation 2 substituting the $post_t$ dummy with indicator variables for these cohorts. If Sharia in fact improves infant survival, one would expect parallel trends before its introduction and a marked decrease in mortality thereafter for Muslims. Christians, by contrast, should remain unaffected. Second, I report the raw infant mortality means for Muslims and Christians in Sharia and non-Sharia states. Third, I statistically test for parallel trends by choosing children too old to be affected by the Sharia and interact the treatment dummy ($sharia_i$) with a linear time trend for the child's month of birth.

Another possible identification concern is that unobservable factors specific to Sharia states are driving the estimates (rather than Islamic laws themselves). This concern is partly addressed by estimating equation 2 for Christians. Any unobservable factors in Sharia states would likely lead to significant estimates for Christians. Nevertheless, I examine this possibility further by comparing Muslims and Christians within Sharia states only using a specification similar to equation 2 (the difference-in-differences estimator in this case is the interaction between the post dummy and an indicator variable taking the value 1 if child i is Muslim: $muslim_i \times post_t$). By comparing Muslims and Christians over time in Sharia states, this specification differences out any time-invariant differences between individuals belonging to these two religions in the northern states.

To address the possibility of reporting bias, I complement the analysis with official data on deaths at the state level I digitised from the National Population Commission (NPC). It is possible, for instance, that fear of punishment may have led Muslims in Sharia states not to report child deaths and thus biasing the estimates. The NPC reports are based on official registrations and hence unlikely to be affected by reporting bias (see section 2.3 for details).

I also examine the importance of social pressures, unrest and migration. Using ACLED data, I estimate whether the Sharia introduction increased incidences of conflict. Moreover, using migration histories contained in the DHS, I investigate whether selective migration may bias the results. Finally, I carry out a number of robustness checks including re-estimating equation 2 using a different control group, analysing different sub-samples, and testing hypotheses using simulation methods.

3.2 Sharia's effect on infant mortality

The dependent variable takes the value 1 if a child died within the first year of its life (defined as infant mortality). The sample is drawn from the 1999 and 2003 rounds of the Nigerian DHS and consists of 17,917 children born 1991-2002. Due to censoring I drop children aged less than 14 months at interview. Since children are potentially still alive at the Sharia introduction, $post = 1$ if the child is born after January 1999. The results are robust to different cut-offs. The pre-period mean in Sharia states is 0.156.

Difference-in-differences and triple-differences: Column 1 in table 2 estimates equation 2 for Muslims and shows a decrease of 5.6 percentage points corresponding to around 36% of the pre-treatment mean for the treated. Column 2 estimates equation 2 for Christians, who were exempt from Sharia. Accordingly, I find an equally precisely estimated effect of zero. Column 3 estimates equation 3 and shows that the difference between the two sub-samples is a statistically significant 6.2 percentage points (39%). These effects are comparable in size to a recent study (Bhalotra et al., 2020b), which estimates the effect of inheritance rights on infant mortality using Indian DHS and finds changes between 32% and 42%. The magnitude of the effects is also similar to a recent study analysing future costs of children, via dowries, in India (Bhalotra et al., 2020a).[6] Columns 4 and 5 re-estimate equations 2 and 3 including mother fixed effects and find similar results.

Event study: To show the exact timing of effects, I estimate a conditional event study similar to equation 2 where I substitute the *post* dummy with 6-month birth intervals. The estimates shown in panels a and b of figure 2 show that before 1999, Muslims in Sharia and non-Sharia states exhibit remarkably parallel trends. For children born after 1999, the trends diverge markedly. The coefficients are jointly significant with a p-value of 0.046. By contrast, the placebo treatment using Christians shows no discernible pattern with an insignificant p-value of 0.493. The raw means in appendix D confirm this pattern.

Additional specifications: Column 1 in appendix C re-estimates equation 2 using a different control group: all individuals in non-Sharia states and the results remain similar. Column 2 compares Muslims and Christians in Sharia states only (using the interaction $muslim_i \times post_t$) and again show similar effects. In order to investigate the mechanisms at play, columns 3 and 4 of appendix C estimate the effect of Sharia on neonatal mortality, which mostly reflects in-utero choices made by parents. The estimates for dying within the first week (early neonatal) and the first month (neonatal mortality) show decreases of 1.1 percentage points. This corresponds to around 24% and 16% of the pre-treatment means for the treated (4.6 and 6.9 respectively). None of these estimates, however, is statistically

[6] In order to change mortality by 38%, the gold price would have to change by around 30%, which is around half the size of the most recent price increase in 2019.

significant. I investigate early life investments in detail in section 4.1.

National Population Commission (NPC) estimates: To address the concern of misreporting in child deaths, I re-estimate equation 2 using official, state-level NPC data (see section 2.3 for more details). The estimates in column 5 of appendix C suggest a decrease of around 400 deaths, roughly equal to 4 percentage points, which is in line with the estimates in column 1 of table 2. The similar results in the DHS and NPC data are reassuring.

3.3 Threats to identification

The causal interpretation of the triple-differences estimates relies on the assumption that—after accounting for unobservable state and time characteristics—there are no time varying factors specific to Sharia states occurring around 2000, which affect Muslims and Christians differently. This section uses new data sources to address various identification concerns.

Pressures to act in accordance with Islam and social tensions: Although the Boko Haram insurgency started well after the time window considered here, in 2009, it is possible that the Sharia introduction led to social pressures or civil unrest. I test this by using Armed Conflict Location and Event (ACLED) data to construct a panel, which sums violent incidences for each Nigerian state and by estimating equation 2. The results in Appendix F show no effect on Sharia or even in high and low penalty states and also no changes over time.

Migration: A further concern is that the introduction of Sharia induced some individuals to migrate in or out of the 12 Sharia states. I address this concern in three ways. First, using past migration histories contained in the 2003 DHS, I construct a panel for each woman for the years 1997 to 2003 and estimate whether the Sharia introduction impacted the probability of the woman migrating. Appendix G shows no effect and parallel trends. Second, I re-estimate the effect of Sharia dropping individuals who migrated after the introduction of Sharia. Columns 7 and 8 of appendix E show that the impact of Sharia is robust to the exclusion of such migrants. Third, I use the Migration and Remittances Household Surveys (MHS) carried out by the World Bank in 2009/10 to investigate intra-state migration patterns.[7] Using information on migration histories, I construct a panel where each household contributes three observations (one for the years 1990-95, 1995-99 and 2000-05) and find no effect (see panel C of table in Appendix G). The MHS also inquires about the reasons for migration. As appendix I shows, no respondent reported Sharia law.

Robustness: I subject the estimates to a battery of robustness checks and find that the results are stable throughout. I start by investigating whether the number of clusters (38, one for each state) is small enough to bias the results. In columns 1 and 2 of appendix E, I test

[7] See `http://microdata.worldbank.org/index.php/catalog/402/related_materials`.

the hypothesis that Sharia's effect is zero using two additional methodologies: Wild Cluster Bootstrap and Randomisation Inference. Throughout, I am able to reject the hypothesis that effects are equal to zero. Moreover, appendix E estimates equations 2 and 3 in various combinations, which include i) dropping Zamfara state where the Sharia started, ii) dropping northern states with a significant Shia, minority (Kano, Katsina, Kaduna and Sokoto), and iii) restricting the sample to the years 1995-2002 and 1996-2001 from the 2003 DHS only. Moreover, I formally test for parallel trends in the pre-period for a number of control groups by interacting a linear timetrend with the treatment dummy. As appendix D shows, the estimates are very small and statistically indistinguishable from zero.

4 Mechanisms of Impact

Sharia law regulates many different aspects of Muslim life. As such, the introduction of Islamic law can decrease infant mortality through a number of different mechanisms. This section explores the following pathways of impact: i) child investments, ii) law and enforcement, and iii) secular mechanisms.

4.1 Child investments

In many low-income countries, parents invest in their children to be supported in sickness and old age (among many other reasons). By formalising children's duty to support their parents, the Sharia Penal Code likely increases the perceived likelihood of future transfers by children (see appendix A). In terms of the theoretical model in section 2.2, children's obligation to support their parents increases both the expected returns to child quality (R_Q) and quantity (R_N) thus potentially acting as a strong incentive for parents to invest in their children. In fact, Islam and its laws have acted as legitimising mechanisms for more formal investments (Michalopoulos et al., 2018). This section provides evidence that Sharia increased health investments in children and fertility rates (proxies for child quality, Q, and quantity, N, in section 2.2, respectively).

Health investments in children. To estimate Sharia's effect on investments in child quality (Q), I focus on four health investments, which have been linked with improved survival chances: vaccinations, breastfeeding, antenatal care and assistance at birth (see special issue in *The Lancet* on child survival, for instance: Black et al., 2003; Bryce et al., 2003). Combining both rounds of the DHS, renders a sample of children born between 1996 and 2003. Since each of the four dependent variables relates to a different life-cycle states of

children, the post dummies and censoring variables vary across outcomes.[8] I specify these values in each subsection separately. The results show significant improvements across all four measures, which might explain the relatively large size of the reduced form effects in section 3.2.

Vaccinations: The dependent variable takes the value 1 if the child received at least one vaccination. Since children born before the Sharia can be vaccinated until after its introduction, the *post* dummy takes the value 1 if the child is born after 1998. Due to censoring I drop children born within 14 months of the interview (the results are robust to different values). The pre-period mean in Sharia states is 0.72. The difference-in-differences estimates based on equation 2 for Muslims in column 1 of panel A in table 3 show an increase of 22 percentage points, corresponding to around 30 percent of the pre-mean for the treated. The same estimation for Christians, by contrast, shows no effect (column 2). The difference between both coefficients estimated via equation 3 is statistically significant (column 3). The event study estimates for Muslims in figure 3a) show parallel trends before 1998 when children are unaffected by Sharia. Between 1998 and 1999, as children are increasingly exposed to Sharia (denoted by two vertical lines), the figure shows marked increases. For Christians no such change occurs (appendix J).

Breastfeeding: The dependent variable for breastfeeding is the number of months a child is breastfed for. As children born before the Sharia can be breastfed after its introduction, the *post* dummy takes the value 1 if the child is born after 1998. Due to censoring I drop children born within 20 months of the interview (the results are robust to different values). The pre-period mean in Sharia states is 17.4 months. Estimating equations 2 and 3 shows that the Sharia introduction increases breastfeeding for Muslims by around 2 months but has no discernible effect for Christians, columns 4 and 5 of table 3. Again, breastfeeding trends for Muslims are parallel before Sharia (figure 3b). Between 1998 and 1999, as children are increasingly exposed to Sharia (denoted by two vertical lines), the figure shows marked increases. I cannot detect any change for Christians (appendix J).

Antenatal care (ANC): The dependent variable takes the value 1 if a mother attended at least one ANC visit before birth and The *post* dummy takes the value 1 if the child is born after 2000. the pre-period mean in Sharia states is 0.41. Columns 1 to 3 of panel B in table 3 are based on equations 2 and 3 and show a significant increase in the incidence of ANC visits for Muslims of 0.18 percentage points, which corresponds to around 42 percent of the pre-treatment mean for the treated. This estimate differs statistically from the Christian

[8]For instance, since children can be vaccinated after birth, the post dummy for vaccination rates takes the value 1 for children born after 1998. By contrast, antenatal care is received before birth and the post dummy, therefore, takes the value 1 for children born after 2000.

sample, for which I cannot detect any change.

Assistance at birth: The dependent variable takes the value 1 if either a doctor, a nurse or another person was present at the birth of the child and the pre-period mean in Sharia states is 0.52. The *post* dummy takes the value 1 if the child is born after 2000. Columns 4 to 6 of panel B in table 3 report estimates based on equations 2 and 3 and show a significant increase in the proportion of women, who had help during their births of 0.1 percentage points, which corresponds to around 20 percent of the pre-treatment mean. This estimate differs statistically from the Christian sample, for which I cannot detect any change.

Fertility. I document that Sharia also increased parental investments in child quantity (Q): the results show substantial increases in both desired and actual fertility. Moreover, Sharia's effect on mortality is stronger for boys, who are typically parental care-takers.

Desired fertility: The DHS records whether a child or a pregnancy is in line with the wishes of the respondent. It also inquires about the ideal number of children. The estimates in columns 1 and 2 of table 4 show that the Sharia introduction increased desired pregnancies and wanted births. Moreover, column 3 shows a significant increase in the number of ideal children by almost one child.

Observed fertility: To investigate Sharia's effect on fertility, I use the complete birth histories of the 1999 and 2003 DHS to construct a panel for each woman for the years 1995 to 2003.[9] The dependent variable takes the value 1 if woman i gave birth in year t[10] and I select women aged between 14 and 40 at the time of interview. I include relatively young women because teenage pregnancies are common: 55% of 15-19 year olds in the North West have had at least one child or a pregnant (National Population Commission, 1999). I then estimate equation 2. The sample consists of 13,102 women and before the Sharia introduction, 16 percent of whom give birth every year.

The results in column 4 of table 4 show that Sharia increased birth rates by around 4 percentage points. In column 5, I estimate whether the impact of Sharia on fertility varies by the number of children born before its introduction. For this, I estimate a triple-differences framework where I interact the $sharia_s \times post_t$ interaction with $nochild_i$, a dummy equal to 1 if woman i did not give birth before the beginning of the sample period. I also control for the relevant double interactions $sharia_s \times nochild_i$, $nochild_i \times post_t$ and $sharia_s \times post_t$. The estimates show that the increase in fertility is 2 percentage points larger for childless women.

[9]The 1999 DHS contributes the years 1995 to 1999 and the 2003 DHS the years 1997 to 2003. The results are robust to different cut-offs.

[10]For the years 1999 and 2003, I use information on the exact duration of current pregnancies and code the dependent variable as 1 in the year 1999 or 2003 if woman i is pregnant during the interview and is due to give birth before the end of the calendar year.

Nevertheless, the effect on women with children, denoted by $sharia_s \times post_t$, remains a large and significant 5 percentage points. The event study estimates in figure 3c) shows parallel trend before 2000. Due to 9 months of pregnancy, no changes are observed in 2000 (denoted by two vertical lines) followed by a marked increase in birth rates.

Heterogeneity in maintenance laws: To further examine the role of Sharia's formalisation of children's duty to maintain, I exploit the fact that these legislations vary amongst the Sharia states. The SPC identifies 4 states that formalise laxer laws to maintain one's parents (Bauchi, Kaduna, Kano and Katsina, which are different from the *high penalty* states in section 4.2). I define these as *low maintenence* and the eight remaining Sharia states as *high maintenance* states. As column 6 of table 4 shows, the effect of Sharia on fertility is stronger in the latter group of states.

Gender differences and birth order: Although the Sharia explicitly states that boys and girls should be treated equally, other aspects of Islamic laws may introduce gender differences in the returns parents associate with their children. For example, brides move with the husbands after marriage. Any assistance to her birth family might be vetoed by her husband and in practice women often take care of their parents in law. Consequently, sons are often the main caretakers of their parents. Column 7 of table 4 shows that the decrease in mortality is stronger for boys than for girls although this difference is not statistically significant. Moreover, I distinguish the first birth since return to firstborns are particular high. I find stronger effects for firstborns, albeit not statistically significant (column 8).

4.2 Law and enforcement

Another possible mechanism through which Sharia can decrease infant mortality is by precisely specifying children's rights. The Sharia Penal Code clearly defines child neglect and lays out strict punishments for offenders (see appendix A). In terms of the theoretical framework in section 2.2, these laws decrease the relative costs of child quality (P_Q) thus potentially acting as a strong incentive for parents to invest in their children.

Three separate pieces of evidence suggest that the enforcement of Islamic laws plays a relevant role. First, crime data show that the Sharia introduction led to a marked increase in judgements against child neglect. Second, I find that improvements in survival are more marked in states, which specify stricter child protection legislation (which is also confirmed by geospatial discontinuity estimates). Third, the results show that proximity to Islamic police stations increases Sharia's impact whereas vicinity to mosques does not matter.

Islamic law judgements. I digitised data from the Nigerian Department of Justice (NBS, various years) and compare Sharia and non-Sharia states over time a difference-in-differences

specification analogous to equation 2, which shows large and significant increases in the number of court judgements convicting parents of child neglect.

Column 1 of table 5 indicates that Sharia increased the number of prisoners by around 15% (compared to the pre-treatment average). Since all legally binding judgements are based on the Koran, all new incarcerations are the result of *Islamic criminal* judgements. Column 2 shows that the number of adjournments decreased by around 100% of the pre-2000 mean. Adjournments are commonly interpreted as an inefficiency of the judicial system. Hence the results suggest that the Sharia caused courts to decrease delays and pass more judgements.

Crucially for this analysis, the Sharia states are found to have strongly enforced judgements regarding children. Column 3 of table 5 reports the number of instances a court ruled for a child to be considered as abandoned. The estimates suggest an increase of 5 judgements per state per year, corresponding to 50% of the pre-2000 mean. Column 4 shows the number of instances that courts ruled for child defilement. The estimates suggest an increase of 6 judgments per state per year, which is more than 90% of the pre-treatment mean (only 11 or 12 of Nigerian states report their crime statistics in the National Abstract for Nigeria).

Inter-state heterogeneity in Islamic law. To provide further evidence for the importance of Islamic law enforcement, I exploit the fact that the exact wording of child protection legislation varies amongst the 12 Sharia states and find stronger infant mortality decreases in those Sharia states that specify stricter child protection laws.

Out of the 12 states, four specify markedly laxer child protection laws. These states also codify significantly reduced penalties for parents found to have harmed their children (Jigawa, Kaduna, Kebbi and Sokoto). For example, Kaduna decriminalised child abandonment. In Sokoto corporal punishment for this crime is abolished and the prison sentence decreased from three years to one. Jigawa and Kebbi, in turn, decreased penalties for the harming of children. Both states abolish the prohibitively high diyah and Jigawa also decreases the prison sentence from five to three years (see Ostien, 2011b). I define these 4 states as *low penalty* and the remaining 8 as *high penalty* states (note that these are different from the high and low maintenance states in section 4.1).

To estimate whether the impact of Sharia varies between high and low penalty states, I interact dummies for high and low penalty states with a post indicator ($high_s \times post_t$ and $low_s \times post_t$, respectively) and estimate a specification analogous to the one in equation 2. To address the concern that high penalty states introduce stricter child protections due to diverging underlying preferences, I test for parallel trends between high and low penalty states and the rest of the country. Column 1 of table 6 uses NPC data and shows that Sharia's effect is larger in high than in low penalty states. Column 2 uses DHS data and

shows a similar pattern. In neither case, however, is the difference statistically significant.

I also estimate a spatial discontinuity model. As laid out in appendix K, I use the geographical coordinates of respondents in the 2003 round of the DHS to select individuals living at different distances to the high-penalty border. I then compare children's infant mortality rates over time whilst controlling for distance to border (see map in appendix B).

Columns 3 to 5 of table 6 compare Muslims at three distances (100km, 75km and 50km) either side of the *high penalty* state border and show a decrease of between 4 and 6 percentage points. For Christians, by contrast, no change occurs (columns 6 to 8). In appendix K, I also report additional results where I i) decrease the time window around the Sharia introduction, ii) compare Muslims in *high* and *low* penalty states only, iii) use a quadratic term for distance to border and iv) interact the post dummy with distance to border. Throughout, the results remain robust.

Proximity to Islamic police and to mosques. I explore the importance of law enforcement further and compare it to the role of Islam's salience by estimating whether Sharia's impact on infant mortality varies by proximity to Islamic police or by closeness to mosques.

Motivated by previous studies (such as Fafchamps and Moser, 2003), which show that proximity to police facilities improves the effectiveness of law enforcement, I estimate whether Sharia's impact varies by exposure to Islamic police, so-called hisbah patrols. When the northern states introduced Sharia, they assigned responsibility of enforcing the newly established laws to hisbah officers (Ostien, 2007). This new cadre of civil servants was the first point of contact between citizens and the justice system and, as such, hisbah officers would work alongside and together with the federal police (Adamu, 2008). Hisbah officers patrol the streets and can be approached by anyone with a complaint (Mustapha and Mustapha, 2016). The issue would then be forwarded to the Sharia courts. Both legally and practically, hisbah officers are a key institution for implementing Sharia and a major determinant of the efficacy of law enforcement (Ostien, 2011a). Hisbah patrols were particularly important for safeguarding women's rights (Nazir, 2007). However, due to limited funds, the coverage of hisbah officers remained irregular.

To approximate exposure to hisbah patrols, I use the geographical distance between individuals' residences and the closest police station. For this, I digitised the geographic coordinates of hisbah stations, police sites and other law enforcement facilities in the 12 Sharia states.[11] Using this information, I calculate the geographical distance between DHS respondents and the closest Islamic police station and divide individuals into two groups:

[11] I combined data from GRID3, programme (`https://grid-nigeria.org`) with data from Oak Ridge Laboratory (`nga.geopode.world`). See map in appendix B for locations of hisbah stations.

children living within 30 minutes walk ($close_{police_i}$=1) and individuals living further than 30 minutes walk (far_{police_i}=1).I define 30 minutes walking as 2.75km, in line with most walking speeds reported around 3.4 miles/hour. Around a quarter of respondents live within 30 minutes walk from a police station. The results are stable to using different cut-offs.

To test whether the impact of Sharia varies by proximity to Islamic police stations, I re-estimate equation 2 distinguishing individuals living close to and far from police stations (by using the interaction terms $close_{police_i} \times post$ and $far_{police_i} \times post$). I focus on high-penalty states only since, they strictly enforce child protection rights. Since the 1999 DHS does not contain geo-coded data, I only use the 2003 DHS for this analysis. Columns 1 and 2 of table 7 show that Sharia's impact on infant mortality is substantially larger for individuals living in close proximity to police stations than for individuals living further away. For Christians, by contrast, I find no differences (column 5).

I also explore whether Sharia's introduction improved child survival by increasing the salience of Islam and its values, which place great importance on child welfare. In terms of the theoretical framework in section 2.2 this corresponds to changes in U_1 and U_2. In an approach analogous to the one laid out above, I overlay the geographical coordinates of DHS respondents with the locations of mosques or Islamic social clubs (drawn from `https://grid-nigeria.org`, see map in appendix B) and divide households into those living within and more than 30 minutes walk from the closest mosque ($close_{mosque_i}$ and far_{mosque_i}, respectively). In contrast to before the distance to the closest mosque does not affect Sharia's impact, see columns 3 and 4 of table 7.

To investigate the possible role of Islamic values further, I estimate the effect of Sharia on two proxies for exposure to Islam: self-identification with Islam and contacts to religious leaders, such as Imams. I draw data from the 1999 and 2003 rounds of the Afrobarometer for Nigeria, a large, representative attitudinal survey and estimate a difference-in-differences model as in equation 2 for Muslims. As columns 6 and 7 of table 7 show, the Sharia introduction did not affect the proportion of respondents *identifying as Muslim*; neither did it increase seeking out of religious leaders with small but rather imprecisely estimated coefficients.

4.3 Secular mechanisms

This section addresses the possibility that Sharia changed child survival via mechanisms that are independent of religious law. I focus on two possibilities: selective responses and secular state policies and find no evidence for either.

Selection. An alternative channel through which Sharia can affect infant mortality is by altering the profile of children who are born. It is possible, for instance, that more educated or wealthy mothers increase their fertility disproportionately as a response to Sharia. As a result children born after the Sharia would have higher survival chances simply because they were born into low-mortality households. To investigate this possibility, I follow the approach taken by Bharadwaj et al. (2020) and re-estimate equation 2 using the following maternal and child characteristics as outcome variables: maternal education, age of mother at birth of each child, wealth quintile of household, rural location and gender of the child. As table 8 shows, the Sharia introduction did not change the composition of children significantly. The estimates are small in size and and statistically not significantly different from zero.

Secular policies. The Sharia introduction could also have decreased mortality via changes in the supply of health care. It is possible, for instance, that the 12 Sharia states introduced lay policies aimed at improving the supply of health services or infrastructure. Evidence from state-specific vaccination initiatives and states' policy expenditures both suggest that supply side changes are not important mechanisms of impact.

To analyse the importance of vaccination programmes, I use information contained in the DHS, which records whether a child has been vaccinated as part of a targeted programme or specific initiative. Column 1 of table 9 shows a precisely estimated effect of zero.

I also examine whether the Sharia introduction changed expenditure patterns of states. For this, I digitised expenditures for each Nigerian state from Annual Reports of the Central Bank of Nigeria (Nigerian Central Bank, various years) for the years 1996 to 1998 and 2001 to 2003. Estimating equation 2, I find no effect of the Sharia introduction on recurrent, capital or total state expenditures (columns 2 to 4). Neither do I find an effect on the number of health facilities per inhabitant. See Appendices G and H for more details.

5 Conclusion

The evidence presented in this paper suggests that the introduction of Islamic laws in northern Nigeria led to marked decreases in infant mortality. The results also show significant improvements in early life investments such as vaccinations, breastfeeding, antenatal care take-up and birth assistance as well as increases in fertility rates. These findings may be of interest to policy makers in as far as they shed further light on how exactly parents in low income countries make decisions regarding their children. Taken together, the results in this paper illustrate how changes in the religious environment can influence parental behaviour. This insight is important for anyone interested in designing policies aimed at improving

child welfare. The results presented in this paper may also serve as an invitation to involve religious leaders in family related policies.

Finally, although these findings pertain to one particular case study, there are reasons to believe that the results may also be relevant to other contexts. The Islamic laws introduced in Nigeria are based on the Maliki school (Ostien, 2007). Sharia laws in the majority of countries in North and Western Africa are based on the same doctrine and thus likely to have common aspects. In any case, this paper has argued that Sharia increases infant survival by specifying the precise rights and obligations children have. This importance of child welfare is a central feature of many Islamic societies around the world irrespective of history or geography.

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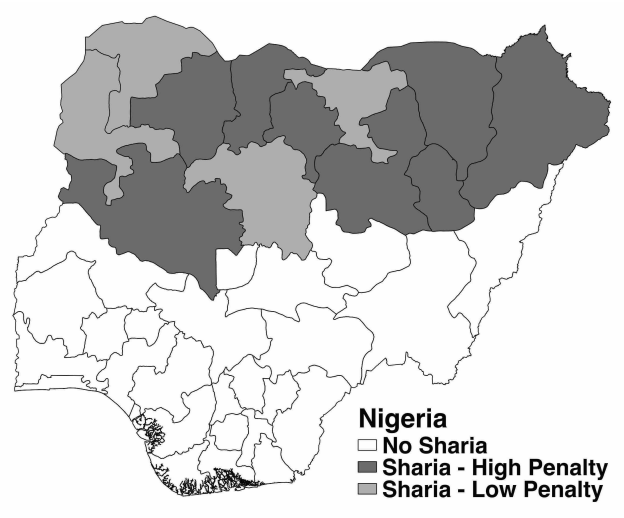
Figures

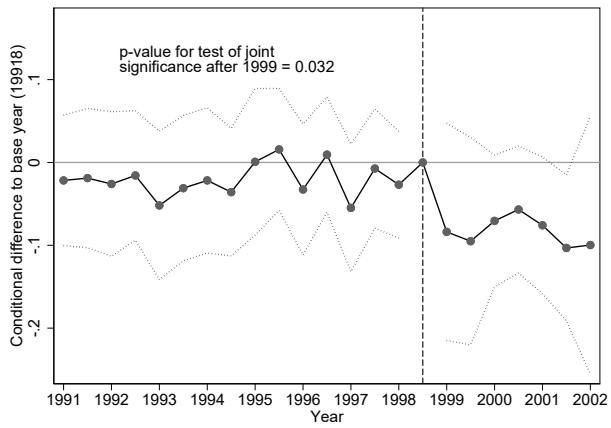
Figure 1: Nigeria - administrative borders



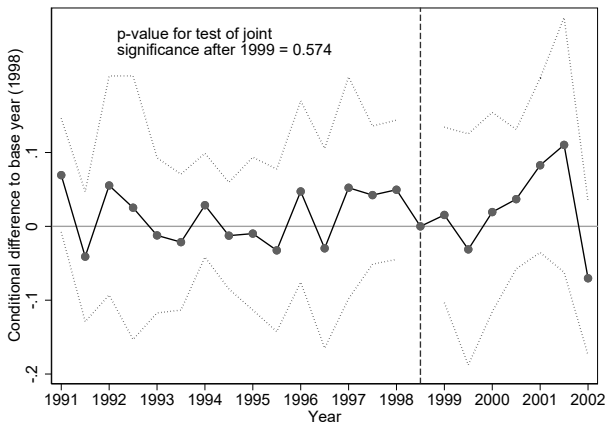
Notes: The map shows the 36 states of Nigeria; states adopting Sharia in the year 2000 (the Sharia states) are in grey; *low penalty states* are in light grey, these are Jigawa, Kaduna, Kebbi and Sokoto: *high penalty states* are in dark grey, these are Bauchi, Borno, Gombe, Kano, Katsina, Niger, Yobe and Zamfara.

Figure 2: Infant mortality over time in Sharia and non-Sharia states

(a) Treatment group: Muslims



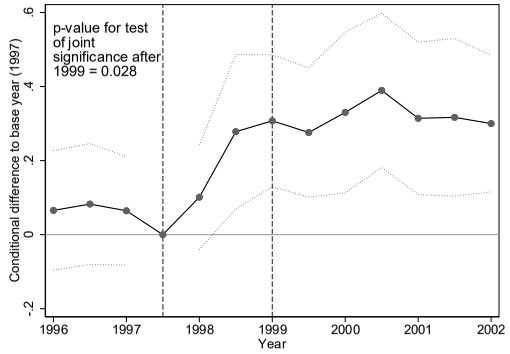
(b) Placebo: Christians



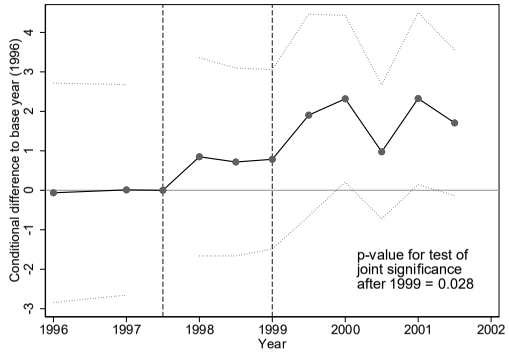
Notes: This figure plots interaction coefficients and confidence intervals from a regression where year of birth dummies (in 6 month intervals) are interacted with the Sharia dummy. Dependent variable = 1 if child died within first year of life. Regressions are OLS and based on 1999 and 2003 rounds of DHS. As children born before the Sharia turn year of age after its introduction, the post period starts in January 1999.

Figure 3: Vaccinations, breastfeeding and fertility over time for Muslims

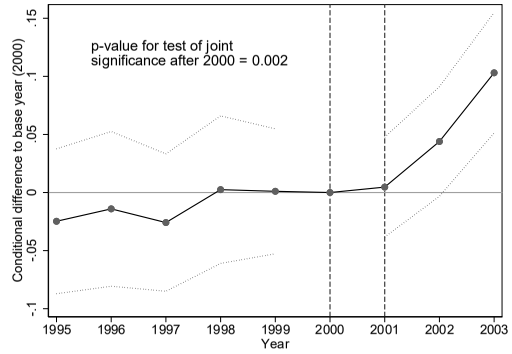
(a) Vaccinations



(b) Breastfeeding



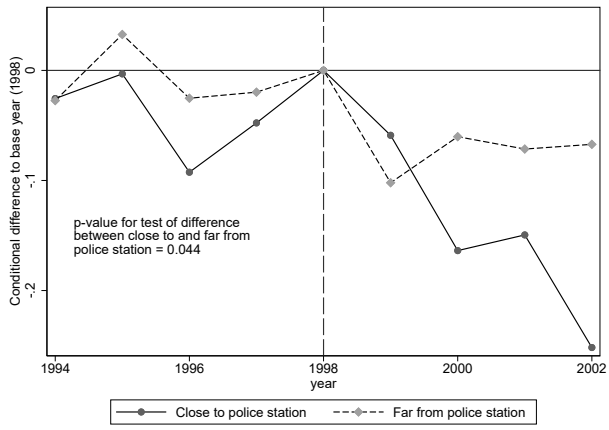
(c) Fertility



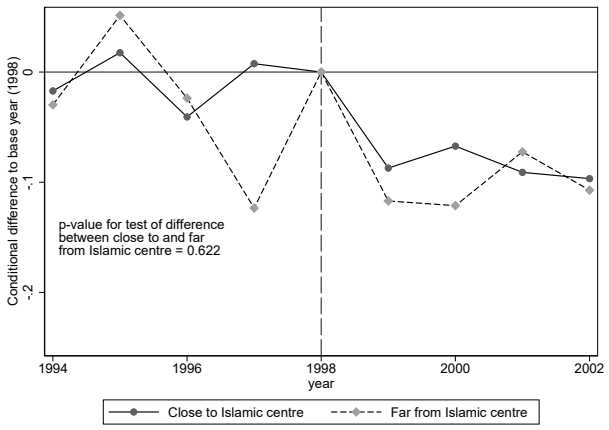
Notes: This figure plots interaction coefficients and confidence intervals from a regression where time dummies are interacted with the Sharia dummy. Samples consists of Muslims only. Dependent variable in panel a) = 1 if child was ever vaccinated. Two vertical lines denote period from which children are affected by Sharia. Dependent variable in panel b) is number of months child is breastfed for. Two vertical lines denote period from which children are affected by Sharia. Dependent variable in panel c) = 1 if woman gives birth in year t.

Figure 4: Infant mortality over time by distance to Islamic police stations and mosques

(a) By distance to closest police station



(b) By distance to closest mosque



Notes: This figure plots interaction coefficients from a regression where year of birth dummies are interacted with with dummies for respondents living close to or far away from police stations (panel a) and from mosques (panel b). Panel a: distinguishes individuals living less than 30 minutes walk from the closest police station (solid line) and individuals living more than 30 minutes walk from the closest police station (dashed line). Panel b: distinguishes individuals living less than 30 minutes walk from the closest mosque (solid line) and individuals living more than 30 minutes walk from the closest mosque (dashed line).

Tables

Table 1: Summary Statistics

	(1)	(2)	(3)	(4)	(5)
Sample	Whole Nigeria	Sharia states	non-Sharia states	Muslims	Christians
	Panel A: Maternal characteristics				
Children born (before 2000)	2.6	3.2	2.1	3.0	2.2
Percent Muslim	47	88	20	100	0
Percent with primary education	61	30	81	34	85
Wealth quintile	3.1	2.7	3.3	2.8	3.3
Sample	7,620	3,065	4,555	3,601	4,019
	Panel B: Child survival				
Child died within first year	0.116	0.131	0.111	0.127	0.101
Child died within first month	0.059	0.062	0.067	0.073	0.054
Child died within first week	0.049	0.048	0.049	0.050	0.047
Sample	17,917	8,694	9,223	10,140	7,777
	Panel C: Health investments				
Child received vaccine	0.761	0.647	0.870	0.661	0.889
Sample	5,286	2,589	2,697	2,969	2,317
Nr of months of breastfeeding	16.9	18.1	15.7	17.9	15.5
Sample	4,708	2,362	2,346	2,700	2,008
Mother received ANC visit	0.539	0.410	0.659	0.427	0.680
Sample	4,752	2,282	2,470	2,662	2,090
Birth was attended	0.662	0.524	0.802	0.547	0.821
Sample	6,807	3,422	3,385	3,945	2,862

Notes: Table reports summary statistics by location of residence; all figures are drawn from the 1999 and 2003 rounds of the Nigerian DHS; column 1 refers to the whole of Nigeria, column 2 to states that introduced the Sharia, column 3 to states that did not introduce the Sharia, column 4 refers to states that introduced the Sharia and strict child protection laws, column 5 to states that introduced Sharia and laxes child protection laws.

Table 2: Effect of Sharia on infant mortality

	(1)	(2)	(3)	(4)	(5)
	Dependent variable =1 if child died within first year				
Post × Sharia	−0.056 ∗ ∗	0.006	0.007	−0.063 ∗ ∗	0.010
	(0.025)	(0.016)	(0.016)	(0.028)	(0.022)
Post × Sharia × Muslim			−0.062 ∗ ∗		−0.074 ∗ ∗
			(0.028)		(0.035)
Children	10,140	7,777	17,917	10,140	17,917
State fixed effect	yes	yes	yes		
Mother fixed effect				yes	yes
Sample:	Muslims	Christians	All	Muslims	All
Mean dep var in pre-period:			0.156		

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. Standard errors clustered by state in parentheses. All regressions are OLS and are based on 1999 and 2003 rounds of DHS, unless otherwise indicated. Dependent variable = 1 if child died within first year of life, its mean in the pre-period for the treated (Muslims in Sharia states) is reported. Columns 1, 2, and 4 estimate equation (2) and columns 3 and 5 estimates equation (3). Sample in columns 1 and 4 is Muslims only, in column 2 Christians only and in 3 and 5 whole of Nigeria. Columns 1 to 3 include state fixed effects and columns 4 and 5 include mother fixed effects.

Table 3: Mechanisms: Sharia's effect on health behaviours

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Post-natal health behaviours					
Dependent variable	=1 if child received vaccine			Nr of months of breastfeeding		
Post × Sharia	0.217 * *	−0.048	−0.049	2.057 * *	−0.709	−0.253
	(0.088)	(0.052)	(0.042)	(0.745)	(0.668)	(0.652)
Post × Sharia × Muslim			0.260***			2.388 * *
			(0.085)			(1.004)
Children	2,969	2,317	5,286	2,700	2,008	4,708
Sample	Muslims	Christians	Nigeria	Muslims	Christians	Nigeria
	Panel B: Pre- and peri-natal health behaviours					
Dependent variable	=1 if mother received ANC			=1 if birth was attended		
Post × Sharia	0.178***	−0.018	−0.009	0.107*	−0.045	−0.027
	(0.046)	(0.087)	(0.085)	(0.062)	(0.033)	(0.029)
Post × Sharia × Muslim			0.201 * *			0.138 * *
			(0.094)			(0.065)
Children	2,662	2,090	4,752	3,945	2,862	6,807
Sample	Muslims	Christians	Nigeria	Muslims	Christians	Nigeria

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. Standard errors clustered by state in parentheses. All regressions are OLS and are based on 1999 and 2003 rounds of DHS. Columns 1, 2, 4 and 5 estimate equation (2) and columns 3 and 6 estimate equation (3). Sample in columns 1 and 4: Muslims. Sample in columns 2 and 5: Christians. Sample in columns 3 and 6: whole of Nigeria. Panel A: Dependent variable in columns 1-3 = 1 if child received at least one vaccine. Dependent variable in columns 4-6 is months child was breastfed for. Panel B: Dependent variable in columns 1-3 = 1 if child's mother attended at least one antenatal care visit during pregnancy. Dependent variable in columns 4-6 = 1 if either doctor, nurse or another person assisted birth of child.

Table 4: Mechanisms: Sharia's effect on desired and actual fertility

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dependent variables							
	=1 if Child was wanted	=1 if Pregnancy was wanted	Ideal nr. of children	=1 if woman gave birth in year t			=1 if child died within first year	
Post × Sharia	0.032***	0.040**	0.677**	0.043**	0.048**		−0.022	−0.030**
	(0.008)	(0.018)	(0.255)	(0.017)	(0.022)		(0.021)	(0.015)
Post × Sharia × no children					0.023			
					(0.019)			
Post × High maintenance						0.051***		
						(0.018)		
Post × Low maintenance						0.037*		
						(0.019)		
Post × Sharia × boy							−0.026	
							(0.027)	
Post × Sharia × first child								−0.011
								(0.030)
Observations	15,957	7,894	1,178	35,364	35,364	35,364	10,140	10,140
Sample	Muslims	Muslims	Muslims	Muslims	Muslims	Muslims	Muslims	Muslims

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. Standard errors clustered by state in parentheses. All regressions are OLS based on equation 2 and using 1999 and 2003 rounds of DHS. Column 1: dependent variable = 1 if mother reports that she wanted the child. Column 2: dependent variable = 1 if mother reports she wanted the current pregnancy. Column 3: dependent variable is the total number of children as reported by respondent. Columns 4 to 6: dataset is a yearly panel for years 1995 to 2003 where dependent variable = 1 if woman gives birth in year t. Columns 7 and 8: dependent variable = 1 if child died within first year.

Table 5: Mechanisms: Effect of Sharia on law enforcement

	(1)	(2)	(3)	(4)
	Dependent variables: number of:			
	Prison inmates	Adjournments by courts	Judgements on abandoned children	Judgements on child defilement
Post × Sharia	196.8∗	−1,018.1∗	5.39 ∗ ∗	6.40 ∗ ∗
	(111.1)	(587.6)	(1.84)	(2.37)
States	36	37	11	12
Year dummies	yes	yes	yes	yes
State dummies	yes	yes	yes	yes
Population controls	yes	yes	yes	yes

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. Standard errors clustered by state in parentheses. All regressions are OLS and are based on data digitised from reports by the Nigerian Ministry of Justice reported in the National Abstract of Nigeria. All columns estimate equation (2). Dependent variable in column 1 is the number of prison inmates, in column 2 the number of cases adjourned at the instance of court, in column 3 the number of times courts judged a child to be abandoned, in column 4 the number of times courts judged a minor to be defiled. Years in column 1 are 1995 to 2006, years in column 2 are 1995 to 2004, years in columns 3 and 4 are 1996 to 1998 and 2002 to 2003.

Table 6: Mechanisms: Punishment for child neglect

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Estimator	DiD	DiD	RD	RD	RD	RD	RD	RD
	Dependent variables							
	Child Deaths	=1 if child died within first year of life						
Post × High Penalty	−427.11 ∗ ∗	−0.062 ∗ ∗	−0.055∗∗∗	−0.053 ∗ ∗	−0.039 ∗ ∗	−0.018	0.016	0.012
	(170.46)	(0.024)	(0.018)	(0.019)	(0.015)	(0.045)	(0.035)	(0.036)
Post × Low Penalty	−349.61	−0.039						
	(120.58)	(0.030)						
Observations	504	10,140	3,985	3,290	2,794	803	710	533
Sample	Everyone	Muslims	Muslims	Muslims	Muslims	Christians	Christians	Christians
Distance to border:			≤100km	≤75km	≤50km	≤100km	≤75km	≤50km

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. Standard errors clustered by state in parentheses. All regressions are OLS. Dependent variable = 1 if child dies within first year of life, unless otherwise stated. Column 1 estimates equation 2 and is based on National Population Commission data and dependent variable is number of child deaths. Column 2 estimates equation 2 and is based on 1999 and 2003 round of DHS. Columns 3 to 8 estimate equation shown in appendix K and are based on 2003 DHS. Regressions control for distance to *high penalty* border and select individuals 100km (columns 3 and 6), 75km (columns 4 and 7) and 50km (columns 5 and 8) either side of the border.

Table 7: Mechanisms: Sharia's effect by proximity to Islamic police and mosques

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent variable = 1 if						
	child died within first year					Respondent identifies as Islamic	Respondent sought out reli. leader
Post × Close to Police	−0.106***				−0.028		
	(0.028)				(0.057)		
Post × Far from Police	−0.073***				0.011		
	(0.021)				(0.018)		
Post × Close to Mosque			−0.080***				
			(0.023)				
Post × Far from Mosque			−0.087***				
			(0.031)				
Difference between close and far		−0.032*		0.007			
		(0.018)		(0.031)			
Post × Sharia						0.023	0.014
						(0.125)	(0.084)
Observations	4,167	4,167	4,167	4,167	3,535	2,540	2,553
Data source	DHS	DHS	DHS	DHS	DHS	Afrobar	Afrobar
Sample	Muslims	Muslims	Muslims	Muslims	Christians	Muslims	Muslims

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. Standard errors clustered by state in parentheses. Columns 1 to 5 are based on 2003 round of DHS and dependent variable = 1 if child died within first year of life. *Close to Police* and *Close to Mosque* = 1 if respondent lives in high penalty state and within 30 minutes walk of a police station or mosque, respectively. *Far from Police* and *Far from Mosque* = 1 if respondent lives in high penalty state and more than 30 minutes walk of a police station or mosque, respectively. Columns 6 and 7 are based on 1999 and 2003 round of Afrobarometer. Column 6: dependent variable = 1 if respondent identifies as Islamic. Column 7: dependent variable = 1 if respondent sought out religious leader.

Table 8: Mechanisms: Selective survival

	(1)	(2)	(3)	(4)	(5)
	Dependent variables				
	Mother's education	Age at birth	Wealth quintile	Rural location	Girl dummy
Post × Sharia	−0.033	0.499	−0.012	0.044	−0.028
	(0.031)	(0.347)	(0.043)	(0.048)	(0.030)
Observations	10,140	10,140	5,382	10,140	10,140
Sample	Muslims	Muslims	Muslims	Muslims	Muslims

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. Standard errors clustered by state in parentheses. All regressions are OLS based on equation 2 and using 1999 and 2003 rounds of DHS. Dependent variables are: dummy for mother having at least primary education (column 1), mother's age at birth (column 2), family's wealth quintile (column 3), dummy for household being located in rural area (column 4), and dummy for child being female (column 5).

Table 9: Mechanisms: state expenditures and programmes

	(1)	(2)	(3)	(4)
	Dependent variable			
Dependent variable	=1 if child vaccinated during campaign	Recurrent per cap. expenditures	Capital per cap. expenditures	Total per cap expenditures
Post × Sharia	0.056	−7.85	−6.95	−51.53
	(0.075)	(93.0)	(66.2)	(146.6)
Children/States	1,489	30	30	30

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. Standard errors clustered by state in parentheses. All regressions are OLS based on equation 2. Column 1 is based on 2003 DHS and dependent variable = 1 if child received a vaccine as part of a state-specific vaccination campaign. Columns 2 to 4 are based on data digitised from state expenditure reports as reported in National Abstract for Nigeria. Dependent variables are recurrent per capita state expenditures (column 2), real per capita state capital expenditures (column 3) and real total per capita state expenditures.

A Additional details about the Sharia in Nigeria

A.1 The introduction of Sharia in northern Nigeria

In 1999, Nigeria established its fourth republic, which granted considerable autonomy to each of its 36 states. In 2000, 12 states[12] introduced Islamic *criminal* law by enacting Sharia Penal Code (SPC) (Ostien, 2011b)—see figure 1. The SPC is based on the Maliki school, which is also the foundation of Sharia laws in many other countries in North and Western Africa. Sharia criminal law covers a variety of aspects such as, for instance, homicide, breach of trust, criminal intimidation or forgery. In line with the Nigerian constitution, Sharia law applied to Muslims only and Christians were exempt. A comprehensive analysis by Oxford University shows that many concerns regarding the creation of an Islamic state or the application of harsh punishments remain largely unfounded.[13] In the majority of cases, Sharia law was not forced upon Christians, states remained secular, Sharia courts worked satisfactorily and harsh punishments were almost never carried out.

The Sharia introduction was a top down political process driven by governors or state assemblies, which started in Zamfara state, in the very northwest of the country. Zamfara's governor Sani announced the Sharia on October 27^{th} 1999 and implemented it on January 27^{th} 2000. Encouraged by Sani, 11 other northern states followed soon after (Boer, 2007).[14]

Appendix A.3 shows that the number of Islamic criminal judgements—including judgements related to family matters—increased considerably after 2000 (Weimann, 2007; 2010). Moreover, evidence collected by Ostien (2011b) shows a marked increase in the number of judges from 1992 to 2008. Section **??** carries out a detailed analysis regarding the enforcement of Sharia law using digitised crime and judgement data from the Ministry of Justice.

The only Islamic regulations applied in northern Nigeria before 2000 were Islamic family law. Nevertheless, these provisions had no effect on young children's rights for two reasons. First and most importantly, child protection legislation in the Sharia falls under *criminal* law and not family legislation. Family law as practiced in northern Nigeria pre-2000 essentially focused only on marriage, divorce and inheritance. Before 2000, no Islamic criminal law was implemented anywhere in Nigeria whatsoever (Ostien, 2007). Second, before 2000 Islamic family law judgements were not final and could be overturned by secular courts. k Secular judgements, by contrast, could not be changed by religious courts (Ostien, 2007).

[12]The states adopting the Sharia are Bauchi, Borno, Gombe, Jigawa, Kaduna, Kano, Katsina, Kebbi, Niger, Sokoto, Yobe and Zamfara state.

[13]See `https://www.qeh.ox.ac.uk/content/exploring-15-years-sharia-implementation-northern-nigeria`.

[14]For instance, in Bauchi the Sharia bill was read by the House of Assembly for approval (see Boer, 2007).

A.2 Islamic and secular laws

The table below lays out the changes in child protection laws induced by the Sharia outlined in section 2.1.

Offence	(1) **Punishment**	(2)
	Secular law	**Sharia ciminal law**
Foundation	English common law	Koran and hadiths
Application	Northern states: $\leq$ 1999 Southern states: throughout	Northern states: $\geq$ 2000 Southern states: never
1. Child abandonment	Loss of custody of child	3 years imprisonment + 40 lashes
2. Child neglect		
In general	Loss of custody of child	1 year imprisonment + fine (unspecified amount)
If resulting in harm	1 year inprisonment	5 years imprisonment + fine of 100 camels ($\approx$ USD13,700 - 54,800)

Notes: Nothern states are Bauchi, Borno, Gombe, Jigawa, Kaduna, Kano, Katsina, Kebbi, Niger, Sokoto, Yobe and Zamfara state; southern states are all remaining states; sources for punishments in column 1: Uzodike (1990) source for punishments in column 2: Sharia Penal Code reported by Ostien (2011)

Further aspects of Sharia law that may be of interest are:

- Islam encourages marriage and sees it as an integral part of life.[15] Whilst married, the husband is obliged to maintain his wife to the same standard of her native family. The punishments for neglecting to maintain one's family are codified as *Ta'azir* offences.

[15] *And marry those among you who are single and those who are fit among your male slaves and your female slaves; if they are needy, Allah will make them free from want out of His grace; and Allah is Ample-giving, Knowing.* (Surah an-Nur, 24:32).

Individuals who are able to but choose not to maintain their family (including wife) are classified as an *idle person*. This offence is punishable with imprisonment of up to one year and liable to caning of up to twenty lashes. The punishments for re-offenders are a prison sentence of up to two years and up to 50 lashes.[16]

- Sharia law does not specify any number of children a couple should have. Islam, however, places a high value on children[17] and views them as a significant part of marriage.[18] Abortions, moreover, are forbidden.[19] The specified punishment are a fine (*ghurrah*) of 5 camels, 50 gold dinars or 600 silver dirhams and/or lashes and/or an imprisonment of up to three years.[20]

- Although under Sharia law both sons and daughters are equally responsible for their parents, Islamic marriage rules imply that sons are more likely to maintain their parents than daughters. After marriage, a woman leaves her parental family to move with her husband's and requires his permission before transferring any resources to her parents. The daughter's husband may thus veto her sustaining her parents. Moreover, a married woman is integrated in the family of her husband and takes over many caring duties for her in-laws.

- Islamic inheritance rules are multifaceted and are laid out only shortly. After the death of the husband, the wife inherits a quarter of his property if she is childless. After funeral expenses and any remaining debts have been settled. If the couple had children, the wife receives an eight. Most of the remaining estate is divided amongst the children of the deceased. When allocating inheritance, male sons receive twice the share of females.*Allah commands you regarding your children. For the male a share equivalent to that of two females*, Koran (4:11).

[16]Ostien, 2011b; §376.

[17]For instance: *O my Lord! Grant me from You, a good offspring.* (Koran 3:38).

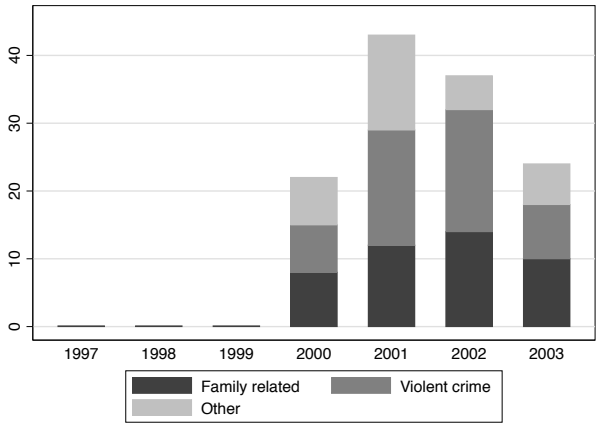
[18]For instance: *We indeed sent messengers before you (O Muhammad), and We assigned them wives and children* (Koran 13:38).

[19] *Whoever voluntarily causes a woman with child to miscarry, shall, if such miscarriage be not caused in good faith for the purpose of saving the life of the woman, be punished*, Ostien 2011b; SPC §206.

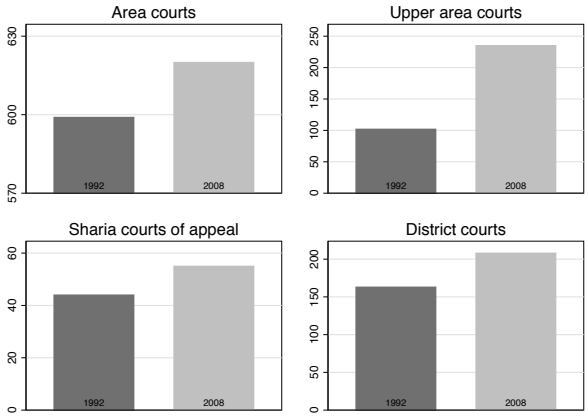
[20]Ostien, 2011b; §209.

A.3 Islamic and secular laws

(a) Number of Sharia criminal judgements by year



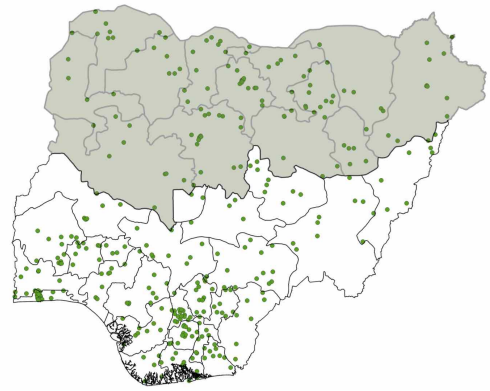
(b) Number of judges by court type



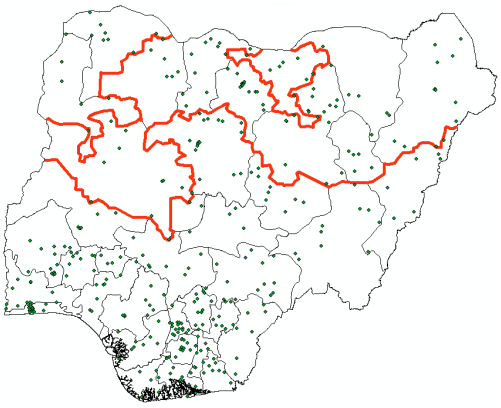
Notes: Figures report legislative information on introduction of Sharia. Panel a: figure reports number of Islamic criminal judgements in Sharia states for the years 1998 to 2003; information is drawn from Weimann (2007; 2010), who uses sources such as as articles from print media; Panel b: figure reports number of judges employed in area courts, upper area courts, Sharia courts of appeal and district courts in Sharia states for the years 1992 and 2008; information is drawn from Ostien (2011b).

B Additional maps

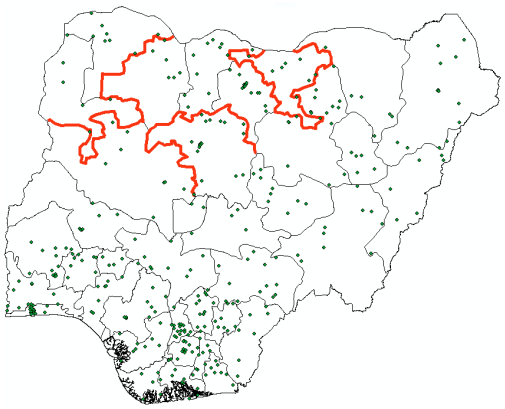
(a) Clusters of 2003 DHS



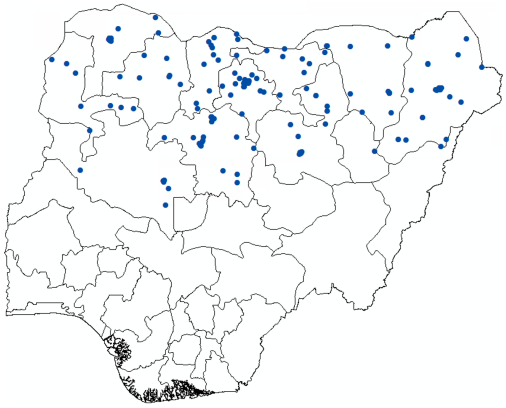
(b) High penalty border



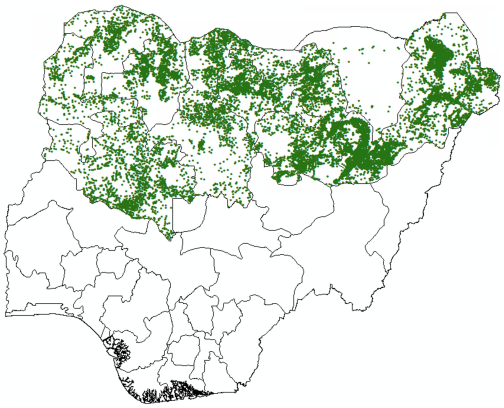
(c) High penalty border for Sharia only



(d) Law enforcement facilities in Sharia states



(e) Islamic centres in Sharia states



Notes: Maps report location of clusters used by the 2003 Nigerian Demographic Health Survey; Panel a all clusters of 2003 Nigerian DHS; Panel b clusters of 2003 Nigerian DHS and border between *high penalty* and other states in red; Panel c clusters of 2003 Nigerian DHS and border between *high penalty* and *low penalty* states in red; Panel d shows the geographical locations of law enforcement facilities such as hisbah stations and police stations, Panel e shows the geographical locations of Mosques and other Islamic centres in Nigeria.

C Additional estimates

	(1)	(2)	(3)	(4)	(5)
Dependent variable		=1 if child died within			Total
	year 1	year 1	week 1	month 1	deaths
Post × Sharia	−0.035 ∗ ∗		−0.011	−0.011	−401.36 ∗ ∗∗
	(0.013)		(0.007)	(0.010)	(124.63)
Post × Muslim		−0.032∗			
		(0.016)			
Observations	17,049	8,694	11,559	11.559	504
Unit of observation:	Child	Child	Child	Child	State
Sample:	Nigeria	Sharia	Muslims	Muslims	Nigeria
Data source:	DHS	DHS	DHS	DHS	NPC

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. Standard errors clustered by state in parentheses. All regressions estimate equation (2) and are OLS. Columns 1 to 4 use 1999 and 2003 rounds of the DHS and column 5 uses data digitised from National Population Comission (NPC). Columns 1 and 2: dependent variable = 1 if child died within first year of life. Column 3: dependent variable = 1 if child died within first week of life. Column 4: dependent variable = 1 if child died within first month of life. Column 5: dependent variable is the total number of deaths per state.

D Testing for parallel trends

Regressions

	(1)	(2)	(3)	(4)	(5)
	Dependent variable = 1 if child died within first year				
Sharia × Timetrend	−0.00015		0.00015	−0.00001	
	(0.00023)		(0.00024)	(0.00026)	
Muslim × Timetrend		−0.00021			
		(0.00030)			
High Penalty × Timetrend					0.00008
					(0.00030)
Low Penalty × Timetrend					0.00031
					(0.00022)
Sample	Everyone	Sharia	Muslims	Christians	Muslims
Children	13,453	6,693	7,890	6,259	7,890

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. Standard errors clustered by state in parentheses. All regressions are OLS and are based on 1999 and 2003 rounds of DHS for children born in the pre-period, i.e. 1991 to 1998. Dependent variable = 1 if child died within first year of life, unless otherwise indicated. *Timetrend* is a linear variable for the month of birth of child running from 1991 to 1998. Samples are whole Nigeria excluding Christians in Sharia states (column 1), Sharia states only (column 2), Muslims only (columns 3 and 5) and Christians only (column 4).

Unconditional means

Notes: Figures show proportion of children dying within the first year of life for Muslims and Christians in Sharia and non-Sharia states. Data are drawn from 1999 and 2003 round of DHS.

E Effect of Sharia on infant mortality - Robustness

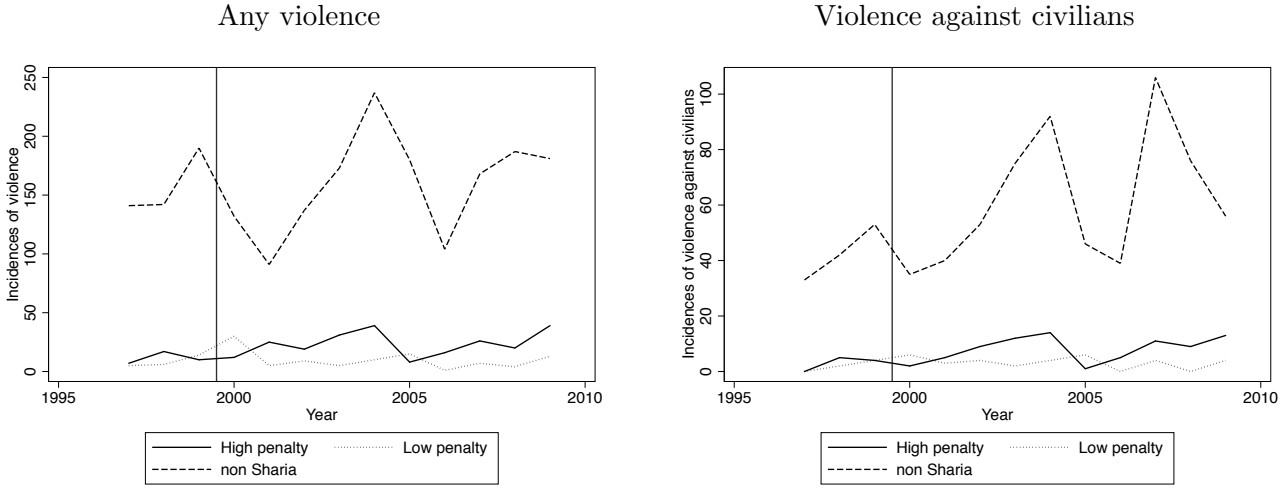
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Dependent variable = 1 if child died within first year													
Post × Sharia	−0.056 ∗ ∗	0.006	−0.059 ∗ ∗	0.002	−0.059 ∗ ∗	0.000	−0.066 ∗ ∗	0.019	−0.040 ∗ ∗	0.014	−0.058∗∗∗	0.004	−0.059 ∗ ∗	0.002
	(0.025)	(0.016)	(0.024)	(0.015)	(0.024)	(0.023)	(0.024)	(0.019)	(0.018)	(0.012)	(0.019)	(0.016)	(0.024)	(0.019)
Post × Sharia × Muslim		−0.062 ∗ ∗		−0.059 ∗ ∗		−0.057∗		−0.081∗∗∗		−0.055 ∗ ∗		−0.061 ∗ ∗		−0.061∗
		(0.028)		(0.027)		(0.032)		(0.028)		(0.022)		(0.025)		(0.031)
Sample:	Estimation sample		No Zamfara		No Shia		No Migrants		Born 1991-2003		Born 1995-2002		Born 1996-2001	
Different p-values:														
Cluster at state:	[0.030]	[0.031]												
Wild boostrap:	[0.040]	[0.042]												
Randomisation inference:	[0.002]	[0.009]												

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. Standard errors clustered by state in parentheses. All regressions are OLS based on equations 2 and 3. All regressions use 1999 and 2003 DHS, unless otherwise stated. Dependent variable = 1 if child dies within first year of life. Columns 1 and 2: compare three different p-values: state-level clustered (used in the paper), wild cluster bootstrap and randomisation inference, Columns 3 and 4: drop state of Zamfara, columns 5 and 6: drop states with a significant Shia minority (Kaduna, Kano, Katsina, Sokoto), columns 7 and 8: drop individuals who moved to their current residence after the Sharia introduction, columns 9 and 10: select children born 1991 to 2003 , and columns 11 and 12: select children born 1995 to 2002 drawn from 2003 DHS only, and columns 13 and 15: select children born 1996 to 2001 drawn from 2003 DHS only.

F Incidences of violence

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variables	Incidences of any type of violence			Incidences of violence against civilians		
Mean in pre-period	4.79		2.06	1.29		0.67
Post*Sharia	1.769		−0.846	−0.235		−1.928
	(1.355)		(4.233)	(0.433)		(2.070)
Post*High penalty		2.205			−0.110	
		(1.457)			(0.464)	
Post*Low penalty		0.952			−0.469	
		(1.296)			(0.468)	
Sample	Whole Nigeria	Border states	Whole Nigeria	Border states	Whole Nigeria	Border states

Notes: Table reports effect of Sharia on incidences of violence; *Sharia* is a dummy taking value 1 if state s introduced Sharia; parameter estimates reported are from ordinary least squares model; dependent variable in columns 1, 2 and 3 is the number of incidences of any type of violence per state per year; dependent variable in columns 4, 5 and 6 is the number of incidences of violence against civilians per state per year; years 1997 to 2004; *Post* is a dummy taking value 1 if year $\geq$ 2000; *Low penalty* is a dummy taking value 1 if state introduced Sharia laws but with low penalties for child protection laws (Jigawa, Kaduna, Kebbi and Sokoto); *High penalty* is a dummy taking value 1 if state introduced Sharia laws but with high penalties for child protection laws (remaining Sharia states); *Border states* are states that are adjacent to Sharia border; data are drawn from ACLED data base.



Notes: Figures show incidences of violence between 1997 and 2009; *Low penalty* is a dummy taking value 1 if state introduced Sharia laws but with low penalties for child protection laws (Jigawa, Kaduna, Kebbi and Sokoto); *High penalty* is a dummy taking value 1 if state introduced Sharia laws but with high penalties for child protection laws (remaining Sharia states); data are drawn from ACLED data base.

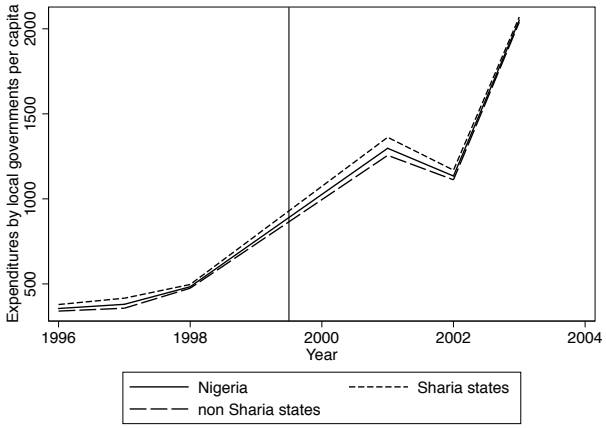
G State expenditures and migration

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Dependent variable: Indicator for migration - DHS					
Treatment group	Muslims Sharia	Muslims Sharia	Muslims Sharia	Christians Sharia	Muslims Sharia	Muslims high pen.
Control group	Everyone non-Sharia	Christians Sharia	Muslims non-Sharia	Christians non-Sharia	Everyone non-Sharia	Muslims low pen. ≤50km
Post*Sharia	−0.000		0.005	0.004		
	(0.004)		(0.006)	(0.009)		
Post*Muslim		−0.006				
		(0.009)				
Post*High penalty					0.001	0.007
					(0.005)	(0.006)
Post*Low penalty					−0.004	
					(0.005)	
Women	7,247	3,061	3601	4,011	7,247	1,759
	Panel B: Dependent variable: One household member migrated - MHS					
Mean in pre-period	0.085	0.085				
Post*Sharia	−0.007	−0.019				
	(0.012)	(0.017)				
Households	6,465	2469				

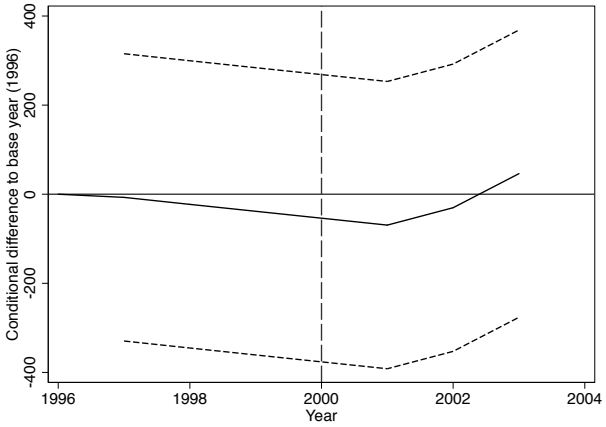
Notes: Panel A: dependent variable is indicator taking value 1 if woman i moved to current residence in year t; sample consists of women aged between 15 and 49 drawn from 2003 Nigerian DHS; each woman contributes 7 observations, one for each year between 1997 and 2003; penalty and non-Sharia states living within 50km of the border. Panel B: data used drawn from Migration and Remittances Household Surveys for Nigeria; each household contributes 3 observations, one for the years 1990-95, 1995-99 and 2000-05; dependent variable takes value 1 if household reports that one member migrated in that specific time interval within Nigeria; controls include age and gender of household head and whether household has bank account.

Expenditures of states

(a) Means

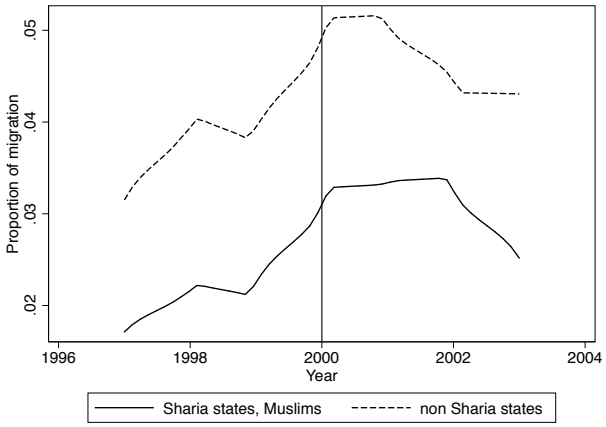


(b) Conditional differences

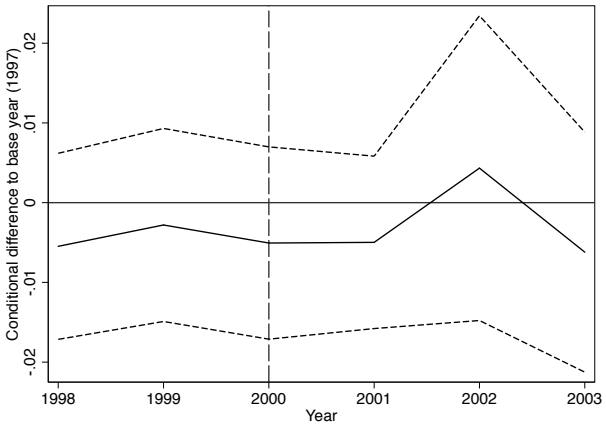


Migration

(c) Means

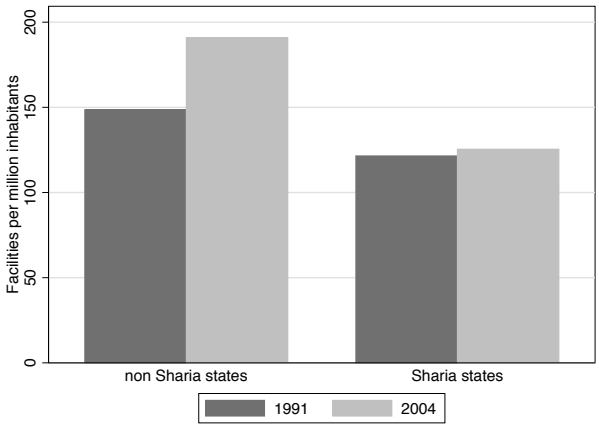


(d) Conditional differences



Notes: Panels a and b: variables reported are means of real expenditure by local governments per inhabitants for years 1996 to 2003; panel a shows means over time, panel b conditional difference (solid line) along with 95% confidence intervals; each state contributes 6 observations, one for each year between 1996 and 1998 and 2001 and 2003; information has been digitised from Annual Report of the Central Bank of Nigeria (various years) for data on state expenditures and Annual Abstract of Statistics for Nigeria (various years) for population of estimates for states; nominal expenditures have been deflated using Consumer Price Indexes from the Central Bank of Nigeria (various years); Panels c and d: Figure shows unconditional and conditional migration estimates over time for Sharia and non Sharia states; dependent variable is indicator taking value 1 if woman i moved to current residence in year t; panel c shows polynomially smoothed means of migration indicator by year, panel d conditional difference (solid line) along with 95% confidence intervals; sample consists of women aged between 15 and 49 at the time of interview drawn from 2003 Nigerian DHS; each woman contributes 7 observations, one for each year between 1997 and 2003; individuals in Sharia states are all Muslim, individuals in non Sharia states are selected irrespective of religion.

H Health facilities in Sharia and non Sharia states



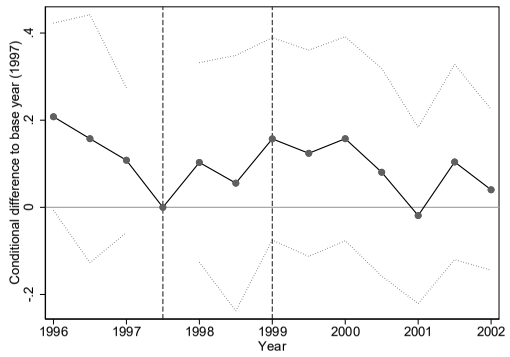
Notes: Figure reports number of health facilities per million inhabitants in Sharia and non Sharia states; figures have been digitised from National Abstract of Statistics for Nigeria Reports (various years).

I Self-reported reasons for migration

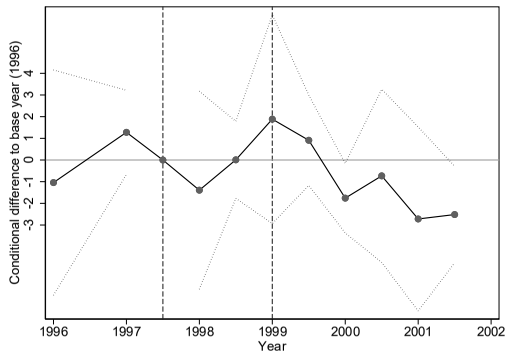
Notes: Figure shows self reported primary reason for migration for individuals migrating before and after 2000; sample consists of individuals, who migrated from their major residence; data are drawn from Migration Household Survey (2010); respondents in panel a reported education as their main reason for migration; respondents in panel b reported employment related issues as their main reason for migration; respondents in panel c reported marital issues as their main reason for migration; respondents in panel d reported family related issues as their main reason for migration; respondents in panel e reported conflict as their main reason for migration.

J Vaccinations, breastfeeding and fertility over time for Christians

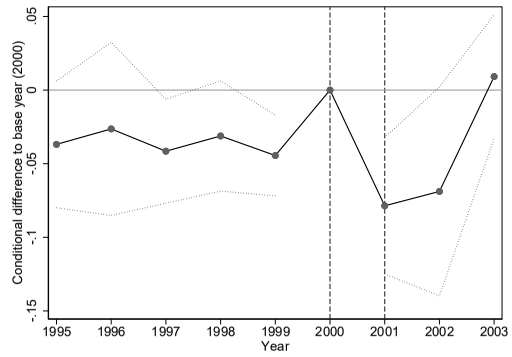
(a) Vaccinations



(b) Breastfeeding



(c) Fertility



Notes: This figure plots interaction coefficients and confidence intervals from a regression where time dummies are interacted with the Sharia dummy. Samples consists of Christians only. Dependent variable in panel a) = 1 if child was ever vaccinated. Dependent variable in panel b) is number of months child is breastfed for. Dependent variable in panel c) = 1 if woman gives birth in year t.

K Geospatial discontinuities in Islamic child protection laws

An additional identification strategy exploits the discontinuous change in exposure to Islamic child protection laws that occurs in both space and in time at the border between some Nigerian states. Individuals in *high penalty* states (dark grey in figure 1a) experience drastic changes in their exposure to child protection laws: from lay legislations before 2000 to strict Islamic criminal child protection laws. In adjacent states no such change occurs. In non-Sharia states (white in figure 1a), laws do not change. In *low penalty* states (light grey in figure 1a), Islamic laws are introduced but child protection legislation is much laxer.

In this setting, I zoom in and select children according to two criteria: i) they live geographically close to the *high penalty* border (red in figure 1b) and ii) they are born in the years just before and after the Sharia introduction. By focusing on this specific sample, I can compare—over time—children born into a similar geographical environment within a relatively short time from one another. For this, I estimate the following specification

$$y_{ist} = \gamma_b high_s \times post_t + X_{ist}\beta_{dd} + distance_i + \phi_s + \tau_t + \epsilon_{ist} \tag{4}$$

where $distance_i$ is a low-order polynomial for the distance between each individual i and the closest point to the *high penalty* border. I use linear and quadratic specifications for $distance_i$. Moreover, $high_s = 1$ if individual i resides in a state that introduced strict child protection laws (a *high penalty* state). The remaining variables are defined as in the paper. This specification is similar to *differences-in-discontinuities* estimators employed recently (Grembi et al., 2016). Appendix L re-creates the differences-in-discontinuities estimator.

When estimating equation 4, I use different cut-offs for both space and for time. First, I use the GPS coordinates of respondents to identify children living at different distances from the border. Second, I use the birthdays of children to select individuals born at different intervals around the Sharia introduction. Since *high penalty* states share boundaries with both *low penalty* and non-Sharia states (see figure 1a), I use two control groups: i) non-Sharia and *low penalty* states and ii) *low penalty* states only (see appendix B for a map of this border). As before, I focus on Muslims and use Christians as a placebo.

Focusing on children born close to each other in both space and time has a number of advantages. Individuals living in geographical proximity to one another are likely to exposed to similar social norms (Alesina et al., 2013), land rights (Fenske, 2013), diversity (Michalopoulos, 2012), disease environment (Alsan, 2015) and history (Nunn, 2008). Moreover, children born just a few years apart are likely to be exposed to similar socio-economic and political forces. By focusing on this sample, I can estimate the effect of the Sharia whilst holding many of these factors constant.

L Additional Geospatial estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Dependent variable = 1 if child died within first year of life											
High Penalty*Post	−0.049 ∗ ∗	−0.056 ∗ ∗	−0.045 ∗ ∗	−0.032 ∗ ∗	−0.030 ∗ ∗	−0.026 ∗ ∗	−0.055∗∗∗	−0.053 ∗ ∗	−0.039 ∗ ∗	−0.086∗∗∗	−0.071∗∗∗	−0.061 ∗ ∗
	(0.021)	(0.021)	(0.017)	(0.011)	(0.013)	(0.009)	(0.019)	(0.019)	(0.015)	(0.020)	(0.023)	(0.028)
Children	2,651	2,177	1,851	3,537	2,991	2,619	3,985	3,290	2,794	3,985	3,290	2,794
Specification	Children born 1995-2000			Sharia states only			$distance^2$			$distance \times post$		
Distance to border:	≤100km	≤75km	≤50km	≤100km	≤75km	≤50km	≤100km	≤75km	≤50km	≤100km	≤75km	≤50km

Notes: ***Significant at 1%, **Significant at 5%, *Significant at 10%. Standard errors clustered by state in parentheses. All regressions are OLS based on 2003 round of DHS. The sample consists of children born 1994 to 2002, unless otherwise stated. All regressions account for distance to border. Dependent variable = 1 if child dies within first year of life. Columns 1 to 3: select children born 1995 to 2000. Columns 4 to 6: select Sharia states only. Columns 7 to 9: include distance to border squared. Columns 10 to 12: interact distance to border with post dummy.