

RELIGIOSITY AND PARENTAL EDUCATIONAL ASPIRATIONS FOR CHILDREN IN KENYA

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Abstract

Poor households do not make productive investments in human capital, despite the potential benefits and gains. One way for poor parents in rural communities to alter their poverty is to invest in their children's education as such investments reflect hopes and aspirations, given that increasing aspirations is key to breaking the intergenerational poverty chain. In this study, we examine the relationship between religiosity and parental educational aspirations for their children. We study religiosity from both an extensive (membership in religious institutions) and an intensive perspective (extent of personal spiritual practice such as engaging in worship, meditating and prayer). We employ inverse probability weighting with regression adjustment and multivalued treatment effects estimators on cross-sectional data from rural households in Kenya to estimate the relationship between participation in religious institutions and religiosity on aspirations. We observe a positive association between participation in religious institutions and religiosity on parental aspirations for children. The effect was stronger for girls. Our findings are robust to the use of alternative matching and weighting estimators as well as various sensitivity tests. Overall, our findings provide empirical support that religiosity may be a pathway in the promotion of educational aspirations, especially in the light of cultural and societal norms prevalent in many rural settings.

Keywords: Religious institution; Religioisty; Educational aspirations; Kenya

JEL Classification: Z12, Z13, D83 C83

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1 Introduction

To improve development outcomes, the concept of aspirations has gained increased attention. This is because of the evidence that poor households generally have marginal involvement in human capital investments such as education, possibly due to overall low aspirations and expectations (La Ferrara, 2019). Low aspirations partly emanate from constrained economic opportunities and lack of material resources (Appadurai, 2004). Furthermore, poor households might be psychologically stressed owing to their liquidity and financial constraints, have higher information asymmetry, primarily on educational returns, and are more likely to be socially disadvantaged in terms of exposure and narrow social environments (for instance lacking role models) to build their aspirations¹ (García, Harker, & Cuartas, 2019).

A key question is then, how can aspirations be nudged to improve development outcomes? What are some of the inputs into one's psychological and physical aspirations window that can influence the formation of aspirations? This question has gained increased attention. In response, we consider the possible contribution of a rather salient though generally understudied factor, the role of religious institutions and the extent of religiosity. We use cross-sectional data from the rural Baringo County in Kenya in which we incorporate gender-separated vignette questions about parental educational aspirations for children. We measure the influence of religiosity both from an extensive (membership in a religious institution) and an intensive dimension (extent of participation in religious activities and more personal religiosity attributes). Applying inverse probability weighting with regression adjustment on both the binary and multivalued treatment effects estimator, we find that religiosity increases parental educational aspirations for children in general and girls in particular. Educational aspirations are crucial predictors of educational attainment (Basler & Kriesi, 2019), and parental aspirations are vital in predicting children's educational attainment (Serneels & Dercon, 2021). Moreover, higher parental aspirations provide a baseline to invest in children as they signal a desire to break the intergenerational cycle of poverty (Genicot & Ray, 2017, 2020).

This work links to the emerging literature on the role of religion as a psychological input in the achievement of development interventions. Several studies are related to our work and yet different. Valdes, Wydick, and Lybbert (2020) studied the effect of nudging aspirations through a positive-messaging documentary coupled with a 12-months faith-based curriculum among female borrowers of microfinance in Mexico. They found that the intervention increased individual aspirational hope and microfinance outcomes. Ross, Glewwe, Prudencio, and Wydick (2021) and Glewwe, Ross, and Wydick (2018) examined the effect of a Christian-centric child sponsorship programme on hope, self-efficacy, optimism and aspirations. They found that the program had strong positive effects on hope, educational and occupational aspirations as well

¹In aspiration terms, low aspiration usually implies low aspiration windows, that is the group of individuals around one's cognitive window that shapes his/her aspirations.

as self-esteem. [Bryan, Choi, and Karlan \(2020\)](#) studied the effect of another Christian-centric educational intervention in the Philippines on various economic outcomes and found that participants had higher consumption and perceived relative economic status.

While our work is related to these studies, there are two key distinctions that our study adds. The first is the measure of religion and religiosity. While these studies use robust experimental and quasi-experimental identification strategies that expose individuals to some measure of religious training, randomizing intrinsic values such as beliefs or religiosity is an intricate matter. We use an alternative assessment of religiosity that exploits the extent of religiosity from the current stock of religious practice. As opposed to exposing some individuals to a certain measure of religiosity and others not, we assume that all individuals have a particular stock of religious beliefs, but the intensity may vary. We, therefore, assess individuals along this intensity continuum by generating a religiosity index from several questions that measure the extent of beliefs and religious practice. This helps us evaluate the role of religion both from an extensive and an intensive dimension. Secondly, our study assesses parental aspirations using vignettes. This prevents parental favouritism and biases in parents' evaluation of their real children. This is the case since vignettes are used in eliciting complicated household dynamics such as intra-household decision making ([Bernard, Doss, Hidrobo, Hoel, & Kieran, 2020](#)). Since we ask each household their rating of educational aspirations for both boys and girls, we can observe differences across genders without conditioning households/parents to having both genders of children.

In a broader view, we contribute to research on drivers of aspirations, including those assessing the effects of conventional instruments such as cash transfers. Participation in cash transfer programs increased parental aspirations for children's education and children's educational aspirations ([Chiapa, Garrido, & Prina, 2012](#); [García et al., 2019](#); [Kosec & Mo, 2017](#); [Macours & Vakis, 2014](#); [Whetten, Fontenla, & Villa, 2019](#)), though this was not always the case as [Suarez and Cameron \(2020\)](#) found in Colombia. [Zou, Lybbert, Vosti, and Abbeddou \(2020\)](#) explored the possible pathway of nudging aspirations through an early childhood nutrition intervention and reported positive effects. Testing the hypothesis that relaxing external constraints can change internal psychological constraints, [Garcia, Lensink, and Voors \(2020\)](#) found the provision of microcredit to lessen some of the external limitations to aspire, increasing participating women's life aspirations, hopes and economic welfare.

2 Aspirations and development

The role of behavioural biases and internal constraints in explaining poverty and economic outcomes is increasingly becoming central to poverty-reduction interventions ([Besley, 2017](#)). One specific form of this behavioural bias stems from aspirations ([Appadurai, 2004](#); [Ray, 2006](#)). Aspirations are essential predictors of human capital achievement and economic outcomes through their influence on economic behaviour ([Genicot & Ray, 2020](#)). However, aspirations

vary in a population and are strongly linked to one's poverty status and material endowments (Camfield, Masae, McGregor, & Promphaking, 2013; Chivers, 2017; T. Lybbert & Wydick, 2018; Pasquier-Doumer & Brandon, 2015; Serneels & Dercon, 2021; Wuepper & Lybbert, 2017). Recent development interventions have therefore incorporated aspirational modules in their intervention continuum as a pathway to nudge aspirations building as a channel to poverty reduction (Bernard, Dercon, Orkin, & Taffesse, 2019; Bryan et al., 2020; Janzen, Magnan, Sharma, & Thompson, 2017; Mckenzie, Mohpal, & Yang, 2021; Riley, 2018).

The critical point to start in understanding aspirations is the concept of 'the capacity to aspire' (Appadurai, 2004)². Given the limitations to aspirations (such as shocks, poverty and general material endowments), the capacity to aspire is determined by an individual's capacity to fully explore the possibilities around them by repeatedly interacting with members in their social network. As such, "aspirations are never simply individual... they are always formed in interaction and the thick of social life" (Appadurai, 2004, p.68). Through observation and personal experiences, individuals broaden their aspiration windows within specific reference groups (Genicot & Ray, 2020; Ray, 2006, 2016).

Research on the determinants of aspirations can be divided into two groups. The first group considers the role of conventional development interventions such as cash transfers (Chiapa et al., 2012; García et al., 2019; Kosec & Mo, 2017; Macours & Vakis, 2014; Suarez & Cameron, 2020; Whetten et al., 2019), early childhood feeding (Zou et al., 2020) or microfinance interventions (Garcia et al., 2020). The second set of studies considers soft, psychological factors such as beliefs (Boneva & Rauh, 2018), role models (Beaman, Duflo, Pande, & Topalova, 2012; Bernard et al., 2019; Golan & You, 2020; Riley, 2018), internalised reflexive thinking in form of self-portraits (Glewwe et al., 2018) or even goal-setting (Mckenzie et al., 2021). This is in view that aspirations are driven by both physical, budget relaxing, and soft psychological interventions that nudge beliefs and values. From this second set of studies lies the more recent interest on the role of religion in aspirations and general development outcomes.

2.1 The role of religion in the development of aspirations

There has been a growth in the literature assessing the influence of religion in the context of intrinsic values that drive aspirations. The interest in religion as a driver of aspirations and overall development reconnects with Max Weber's 19th Century thesis that Protestantism's intrinsic religious values promoted a desire for aspirational capital accumulation through frugal lifestyles and higher work ethic, which became pivotal in the growth of capitalism (Weber, 2001). The evidence testing this theory suggests that, indeed, communities with a higher level of protestants had higher literacy and economic prosperity (Becker, 2008; Becker & Woessmann, 2009).

²This concept implies that the aspiration window must be opened to internalize some efforts for any welfare improvement to occur. But again, the window should not be binding or very wide so as not to induce frustration and resentment. High aspirations with limited achievement are likely to generate frustration (Mckenzie et al., 2021)

The expansion of Christian missionary work further exported these effects leading to increased urbanization (Bai & Kung, 2015), higher women's labour market participation (Meier zu Selhausen, 2014), delayed early entry into marriages (Kudo, 2017), and the associated innovations such as printing press increased literacy, trust and political participation (Cagé & Rueda, 2016).

More recently, charismatic, often Pentecostal Christianity has emerged as the new frontier for Weber's thesis in developing countries (Frahm-Arp, 2018; Freeman, 2015; Gifford & Nogueira-Godsey, 2011; Kirby, 2019). This has been followed by research assessing the effects of religion and religiosity on development outcomes. Recent studies have evaluated the impact of Christian-centric child sponsorship programmes on long term economic outcomes (Glewwe et al., 2018; Lockhart, 2003; Neubert, Bradley, Ardianti, & Simiyu, 2017; Ross et al., 2021; Wydick, Glewwe, & Rutledge, 2013, 2017) or other Christian-oriented interventions (Bryan et al., 2020; T. J. Lybbert & Wydick, 2016; Valdes et al., 2020; Wydick, Dowd, & Lybbert, 2020). The key thesis in these studies is that exposure to religious teaching unlocks individuals' internal psychological limitations and empowers them with the potential for socio-economic progress, akin to the protestant ethic thesis. Indeed, these studies report positive and significant effects of religion on most of the outcomes measured.

There are a couple of pathways through which increased exposure to religious teaching and practice can raise aspirations. First, the recent growth of Pentecostal theology of prosperity, building on Weber's thesis, enables individuals to partly challenge the adverse circumstances of their poverty (Conradie & Robeyns, 2013). Individuals of this persuasion tend to believe that they can live a "glorious life" (Fantini, 2016; Gifford & Nogueira-Godsey, 2011) (and that earthly material accumulation such as houses are an indication of such blessings (Adu-Gyamfi, 2020). Individuals receive more empowering messages that positively influence their esteem and self-efficacy (Mariz, 1992; Ross et al., 2021), thereby increasing their economic and civic participation (McClendon & Riedl, 2015). Secondly, religious practices also provide an additional capital – the faith/ spiritual capital, defined as a "fund of beliefs, examples and commitments transmitted through religious practice and which attach people to transcendental sources of happiness" (Malloch, 2014). Spiritual capital is associated with how religious practice influences economic behaviour through networks and associations (DeAngelis & Ellison, 2018; Dumangane, 2017; Holland, 2016; Strhan, 2017; Yuen & Leung, 2019).

Thirdly, through religious social networks, individuals are exposed to clerics and elders who act as role models in influencing their actions, including goal setting (Anquandah Arthur, 2021; Bhatasara, Shamuyedova, Choguya, & Chiweshe, 2017) and information sharing (Murphy, Nourani, & Lee, 2020). In these groups, members are usually exposed to reference leaders and role models, which improves their aspirations.³ Social exposure further improves information flow, allowing individuals to more fully engage in a diverse set of investment options to meet

³Social exposure triggers social interaction, which increases the navigational capacity of individuals necessary to form aspirations. Since individuals usually have bounded rationality, exposure enlarges the set of alternative options that they consider (Chiapa et al., 2012)

stated goals. Previous literature (Beaman et al., 2012; Bernard et al., 2019; Bernard & Taffesse, 2014; Golan & You, 2020; T. Lybbert & Wydick, 2018; Macours & Vakis, 2014) holds it that exposure to role models or leaders in a community can build aspiration of rural households. Of course, this is through increasing the feasible set of people (aspiration window) to whom these households can look up to. If the role models are better-off, households would look up to them and even try to mimic all they do.

3 Data and empirical strategy

3.1 Data

We use household survey data from Baringo county of Northern Kenya, conducted between July and August 2019. Multistage sampling was employed to select four wards (Marigat, Ilchamus, Mochongoi and Ewale/Chapchap) and 35 enumeration areas (villages) using the Probability Proportional to Size (PPS) framework. Complete household lists were obtained from village leaders, and 15 households were randomly selected from each village. The total sample was 530 households. Interviews were conducted with the household heads or their partners. To leverage the respondents' language abilities, interviews were conducted in the area's local languages (Ilchamus, Tugen and Pokot languages). We trained research assistants and tested the survey instrument several rounds before survey implementation.

The comprehensive survey included information on households' socio-economic and biographic profiles, wealth and asset profiles, institutional characteristics, internal behavioural characteristics like hopes, aspirations, trust, locus of control, and self-efficacy. Information on the membership of households in religious institutions was also obtained and their proximity to these institutions. Under aspirations, we captured the parental aspirations of parents towards their children using two vignettes. We distinguish our outcome variable into two: parental aspiration for girls and parental aspiration for boys. We discuss how these are measured below.

3.2 Measurement of aspirations

Educational aspirations are defined as the goals, or plans parents have for their children. They can either be realistic or idealistic (Widlund, Tuominen, Tapola, & Korhonen, 2020), depending on the perceived constraints and range of attainment. While idealistic aspirations reflect an individual's desired achievement, realistic aspirations refer to the perceived likelihood of attaining the aspired educational level considering the various constraints involved. For our analysis, we rely on the idealistic aspiration as it fits our definition of aspirations.

We use a variation of Bernard and Taffesse (2014) aspiration framework developed and tested in Ethiopia. We frame aspiration questions as vignettes that use fictional children instead of the actual children a respondent/ parent has. We formulate the vignettes as follows: "*James*

is a son in this household. He is five years old. If there were no limitations to the household's capacity to educate him, how many years of schooling would you wish James to achieve?" The enumerators were allowed to vary the name of the child to any locally recognizable name and also vary the age of the child to an age that was less or equal to 10 years. The vignette was then repeated for daughters such that for every household, two observations were recorded.

3.3 Descriptive results

Table 1 offers a descriptive summary of the outcome variables, the variable of interest, and the households' socio-economic profiles. The aspired mean years of schooling for girls was 18.12 years, slightly greater than for boys, at 18.10. Both aspiration levels are almost 2.2 times the current mean level of education of household heads, implying that parents aspire to greater education for their children. Given the educational curriculum in Kenya, which consists of 8 years of primary level education, four years of secondary education and four years of higher education, 18 years of schooling represents at least postgraduate education level. Parents thus aspire that their children reach the pinnacle of education. Irrespective of gender, parents have very high aspirations for children.

About 70% of households participate in religious institutions in the Baringo county. Though religion is widespread in Kenya, the Pokot people that inhabit a large part of Baringo county have maintained a substantial composition of traditional religious practices (Ngeiywo, 2018). Therefore, about 30% of the sample were not affiliated with any Christian or Islamic denomination. Under the Christian canopy, there is the plurality of religious institutions like the Catholic church and others that record the highest number of members. Recently, there has been an upsurge of religious entrepreneurship, which takes the form of many Pentecostal and charismatic denominations. While they are the smallest in absolute numbers, they are the fastest growing and their focus on material accumulation through the "prosperity gospel" brings them closer to the religion-aspirations spectrum. However, we do not observe religious belonging at its most minute level. We categorize all Christian denominations into one group. Christian denominations together comprise 67%.

Turning our focus to households' knowledge and attendance in RIs in our sample, we find that households know an average of 5 RIs in the various locations⁴ around their villages. Most of the RIs are located close to households, with a mean distance of 2.58km to their most preferred places of worship. It takes a median time of about 23 minutes to get to their respective RIs. As mentioned above, daily but mostly weekend attendance (Saturdays and Sundays) form a large part of household participation in RIs. Weekly average attendance was approximately one. As households participate in RIs, there is also some interaction with religious leaders. A mean interaction level of about 17% is reported.

⁴A location refers to an administrative unit in Kenya larger than a village and smaller than a ward

Table 1: Summary statistics of estimation variables

Variables	Mean	Std. Dev.	Min	Max
<i>Outcome variables</i>				
Aspirations for children	18.11	2.46	0	23
Aspirations for boys	18.10	2.45	1	23
Aspiration for girls	18.12	2.18	0	23
<i>Independent variables</i>				
Religious institution	0.70	0.45	0	1
Age (years)	45.15	15.62	18	104
Years of education	7.89	4.86	0	17
Head is male	0.74	0.43	0	1
Household size	5.93	2.82	1	15
Life satisfaction	2.36	0.67	1	4
Number of dependents	2.63	1.98	0	11
Access to electricity	0.39	0.48	0	1
Cooperative membership	0.25	0.43	0	1
Savings account	0.33	0.47	0	1
Farm size	1.29	1.79	0	20
Has a male child	0.57	0.49	0	1
Has a female child	0.53	0.49	0	1
Willingness to invest in agriculture	0.21	0.40	0	1
Livestock ownership (TLU)	3.18	5.07	0	60.7
Household income (Ksh)	10887.66	13330.23	1000	120000
Off-farm income (Ksh)	2083.11	10143.93	0	15000
Asset value (Ksh)	171532.50	1055138	5000	2030000.30
Monogamous household	0.65	0.47	0	1
Polygamous household	0.12	0.33	0	1
Distance to RI (Km)	2.58	6.46	0	60
Time to RI (minutes)	22.53	26.80	0	180
Number of RIs known	4.42	5.98	0	45
Number of weekly worships/meetings	0.89	1.38	0	5
Interacts with religious leaders	0.17	0.38	0	1
Christian	0.67	0.47	0	1
No religion	0.30	0.45	0	1

Notes: Ksh refers to Kenyan shillings, which is the local currency used in Kenya. Livestock ownership is measured in tropical livestock units (TLU) obtained using the FAO conversion scale for the different livestock. N=530 households.

Regarding other contextual and other socio-economic characteristics, household heads have an average education level of about 8years. Most households (74%) are male-headed households with a mean age of 45 years for household heads. Households have a mean size of about six members. About 65% of the households are married monogamously, while 12% are into a polygamous form of matrimony. As the study area is a pastoral community, livestock keeping is very common, with households having a mean tropical livestock unit.⁵ (TLU) of 3.18. They also report an average income of about 10887.66Ksh and an accompanying asset level of 171532.50Ksh.

3.4 Empirical specification

To examine the relationship between religious institutions and parental aspirations for children, we need a counterfactual to enable credible comparisons. However, in the absence of experimental data, counterfactuals are not possible due to the self-selection of individuals in religious institutions. Participants/ members of RIs might be systematically different from non-members. Matching on the propensity score provides a credible avenue of deriving casual associations when cross-sectional data is at hand. Matching helps us compare households that participate in RIs and those that do not but with a similar probability of participation derived from observable covariates. We apply a variation of matching – inverse probability weighting with regression adjustment (IPWRA), which is both doubly robust and imposes fewer restrictions on the functional form of the treatment reduction model. Our outcome model is thus estimated as:

$$Y_i = f(RI_i, \beta) + u_i \quad (1)$$

The treatment model is then represented as:

$$\Pr(T_i = 1, 0) = h(X_i, \alpha) + v_i \quad (2)$$

RI is the binary measure of participation in religious institutions, X is a vector of explanatory variables determining/constraining households' participation in RI. β and α are parameter estimates of the impact of RI on parental aspirations for children and the correlates of membership in RIs. Our main parameter of interest is β , where we hypothesize a positive relationship with aspirations, additionally differential impacts.

To calculate the doubly robust estimates of aspirations for household members and non-members in RIs, we estimate the following expected aspiration equations.

⁵This is the Food and Agriculture Organization scale for measuring livestock ownership based on their live weight.

For members in RIs (RI=1),

$$\frac{Y_{RI=1}}{PS} - \frac{\hat{Y}_1}{PS}(1 - PS) \quad (3)$$

For non-members in RIs (RI=0),

$$\frac{Y_{RI=0}}{1 - PS} - \frac{\hat{Y}_0}{1 - PS}(PS) \quad (4)$$

Where PS refers to the propensity score, $Y_{RI=1}$ is the observed parental aspirations for members of RIs while $Y_{RI=0}$ is the observed parental aspirations for non-members of RIs. \hat{Y}_1 and \hat{Y}_0 are the predicted parental aspirations given membership stats in RIs $E(Y | RI = 1, X)$ and $E(Y | RI = 0, X)$, respectively.

The advantages of the IPWRA doubly robust estimator lie in its ability to produce consistent estimates of the treatment parameters in cases where either the treatment or the outcome model and not necessarily both are correctly specified. Inverse probability weighting, akin to matching generates a pseudo-population where there are no confoundings, such that the weighted averages are a mirror reflection of the actual population average. By incorporating regression adjustment, IPWRA fits separate linear models for households that participate in RIs and those that do not and then predicts the covariate-specific outcomes under the different RI status. Further and even more important is the fact that IPWRA enables us to model both aspiration outcomes when the treatment is a dummy (RIs) and also when multivalued (religiosity).

To ensure validity, we examine the common support condition and find evidence of common support, as shown in Figure A1 in the supplementary material. Regarding the overlap condition for weighting regressions, we observe sufficient overlap after plotting the kernel densities of the probability of participating in a RI. We also perform different balance checks to assess pre-estimation balancing between treated and control units. As shown in Supplementary Table A1, none of the weighting variables has a standardized difference greater than 0.11, which is within the conventional thresholds (Imbens & Wooldridge, 2009) without reducing our sample size. We perform a couple of sensitivity tests, introducing non-linearity, unconfoundedness, and alternative weighting and doubly robust estimators to confirm the robustness of the treatment effects.

4 Results and discussion

4.1 Effect of religious institutions on parental educational aspirations for children

Table 2 presents the relationship between participation in religious institutions and parental educational aspirations for children. It also shows the parental aspirations for girls and boys separately. Across all the different specifications, we find a positive and statistical relationship between participation in RIs and parental aspirations for children. We see a positive and statistical relationship between participation in RIs and parental aspirations for children across all the various specifications. This finding is maintained when running separate regressions for girls and boys, though the results are not statistically significant in the case of parental aspirations for boys. Despite this non-significance, the positive coefficient of RI suggests that participation in religious institutions can potentially improve the parental educational aspirations of their young boys. Participating in RIs increased parental aspirations for children’s education by up to 0.34 years of schooling. This is equivalent to an approximate increase in years of education by 2%. Estimating the average treatment effect on the treated (ATET), we obtain higher effects as can be seen in Table A4 in the supplementary file.

Table 2: Parental aspirations for children

	All Children		Girls		Boys	
	(1)	(2)	(3)	(4)	(5)	(6)
Religious Institution	0.379** (0.166)	0.339** (0.152)	0.517** (0.248)	0.459** (0.212)	0.241 (0.279)	0.219 (0.219)
% of PO	0.021** (0.009)	0.018** (0.008)	0.028** (0.013)	0.025** (0.011)	0.013 (0.012)	0.012 (0.012)
Other controls	No	Yes	No	Yes	No	Yes
Village FE	Yes	Yes	Yes	Yes	Yes	Yes
Number of clusters	35	35	35	35	35	35
Observations	1060	1060	530	530	530	530

Robust standard errors are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively. Other controls include life satisfaction, household size, age, years of education, Head is male, access to electricity, cooperative membership, has a savings account, farm size, and ethnicity, has a male child, has a female child, number of children below 15, willingness to invest in agriculture, livestock ownership, household income, off-farm income, asset value, monogamous household, and polygamous household.

Regarding the parental aspirations for girls, we find that participating in a RI was associated with 0.46 higher parental educational aspirations than those that do not participate. This is an interesting finding and possibly indicates a ‘girl effect’ in educational aspirations (Bernard et al., 2019). Our results corroborate and are in agreement with previous studies that find higher parental aspirations for girls than boys (Whetten et al., 2019; Zou et al., 2020). However, these results portray alternate conclusions from others that have found parental bias against female

education aspirations (Bernard et al., 2019; Dercon & Singh, 2013; Favara & Sanchez, 2017). A key difference seems to be the possible proximity to potential role models in religious environments even when there is male domination (Bamberger, 2014; Bhatasara et al., 2017). Another possible dimension of our results is the social nature of religious institutions in uplifting the rights and positions of less privileged people, including women and girls. From the earlier days of Lutheran protestant expansion in medieval Europe, girls' education was highly encouraged (Becker, 2008), and this seemed to spread as Christianity extended into Africa (Kudo, 2017; Meier zu Selhausen, 2014). Our results are therefore consistent with religion's influence on girls' education and empowerment. Favara and Sanchez (2017) shows that gender bias in girls' education aspirations is associated with parental expectations in labour and marriage markets. Therefore, parents might believe that an educated daughter might have better chances in adulthood and aim to invest in both their educational attainment. There is, therefore, some suggestive evidence that participating in religious institutions might be a pathway of narrowing gender biases, especially towards better outcomes for girls.

4.2 Effect of intensive religiosity on aspirations

Beyond religious institutions, one may argue that other aspects of religiosity also matter, especially those not observed by simple membership in a RI. This also matters as they can shape values, beliefs and economic decisions more. Moreover, even individuals who do not belong to any RI might have some religious practices and beliefs, such as praying or believing in the existence of God or higher powers. We, therefore, compute a finer metric of religiosity by combining several questions into an index that captures the extent to which a respondent was religious. In this regard, we consider a set of religiosity proxies and created an index which we classify into three levels corresponding to (1) low religiosity, (2) moderate religiosity and (3) high religiosity. The variables included in this index are (i) praying times, (ii) worship times, (iii) meditation times, (iv) divine experience with a supreme being, (v) interaction with religious leaders, (vi) distance to the place of worship, and (vii) the number of places of worship in the locality. Through a multivalued treatment effects estimator (Cattaneo, 2010; Cattaneo, Drukker, & Holland, 2013), we derive two estimates that assess the differences between high religiosity and low religiosity and between moderate religiosity and low religiosity.

The results of the multivalued treatment effect model are presented in Table 3. Using the low religiosity level as the control group, moving from low religiosity to medium religiosity increases parental aspirations for children, consistent with boys and girls separately, though the results are not statistically significant. However, households in the higher religiosity group have higher education aspirations, significant at the 1% level. This confirms the hypothesis that religiosity matters for aspirations but also varies with the extent of religiosity. The magnitudes are

Table 3: Religiosity and parental aspirations

	All Children	Girls	Boys
Medium religiosity	0.249 (0.221)	0.502 (0.327)	-0.003 (0.295)
% of PO	0.013 (0.012)	0.027 (0.017)	-0.004 (0.161)
High religiosity	1.034*** (0.204)	1.036*** (0.288)	1.032*** (0.287)
% of PO	0.057*** (0.011)	0.058*** (0.016)	0.055*** (0.016)
Other controls	Yes	Yes	Yes
Number of clusters	35	35	35
Observations	1060	530	530

Low religiosity is used as the benchmark for comparison. Robust standard errors are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively. Other controls include life satisfaction, household size, age, years of education, Head is male, access to electricity, cooperative membership, has a savings account, farm size, ethnicity, has a male child, has a female child, number of children below 15, willingness to invest in agriculture, livestock ownership, household income, off-farm income, asset value, monogamous household, and polygamous household.

also similar in all the parental aspiration outcomes showing that going from low religiosity to high religiosity increases parental aspirations for children by about 6%. The average treatment effect on the treated (ATET) is presented in table A5 in the supplementary file.

4.3 Robustness checks and sensitivity analysis

4.3.1 Alternative weighting and matching estimators

To test the robustness of our results, we conduct three different checks. First, we follow [Austin and Stuart \(2017\)](#) to include non-linearity in the treatment selection model and re-estimate both the RI and religiosity models. In particular, we include square terms for age of the household head, years of schooling of the household head, TLUs, farm size and household size. Results in the supplementary material (Tables A6 and A7) confirm that our estimates are robust and insensitive to non-linearity. Secondly, we assess our basic model using an alternative doubly robust estimator, the augmented inverse probability weighting estimator. Results in the supplementary material Tables A8 and A9 show that our results are not driven by the choice of the weighting or matching estimator.

4.3.2 Sensitivity analysis

To further ensure the robustness of our estimates, we also performed some sensitivity checks to confirm the validity of the treatment effects estimated using the unconfoundedness assumption. This assumption states that after conditioning on a set of covariates, treatment outcome, in our case religiosity, is independent of potential outcomes. To render the credibility of our treatment effect estimates under this assumption, we follow [Masten, Poirier, and Zhang \(2020\)](#) to perform sensitivity inference on the treatment effect. This procedure relaxes the unconfoundedness assumption indexed by a conditional c -dependence scalar parameter $c \in [0, 1]$ using non-parametric techniques. When $c = 0$, this is equivalent to the unconfoundedness assumption, and for $c > 0$, this assumption only partially holds, making it hard to learn the value of the treatment effect. In this case, only bounds which are usually a function of c can be gotten.

To estimate these bounds for different values of c , we use the *tesensitivity* package in Stata ([Masten et al., 2020](#)). This command estimates bounds on the treatment effect for a range of c -values. It also calculates a breakdown point: the maximum value of c under which the findings are maintained. This is analogous to r bounds in propensity score matching. We observe breakdown points at 0.012 for parental aspirations for children. This further confirms that the treatment effect is non-negative, as supported by our point estimates. The results are reported graphically in the supplementary file (Figures [A3](#) and [A4](#)). Looking at the shape of the bounds, we see that our data depict substantial robustness to relaxations of the baseline assumptions. Our estimated bounds are also small, showing strong data support of the robustness of our results to relaxations of unconfoundedness.

Furthermore, we perform some leave-out analysis where we estimate the 50th, 75th and 90th percentiles. Inspecting the leave-out-variable- k propensity scores, we further observe that most variations are smaller than the treatment effect breakdown points hence confirming the robustness of our results. These results are shown in Supplementary Table [A10](#).

5 Conclusion

This paper has examined the relationship between participation in religious institutions and religiosity in general on parental educational aspirations for boys and girls in Kenya. We implement a doubly robust IPWRA estimator on both binary (RIs) and multivalued (religiosity) indicators to reduce selection bias. Overall, we find participation in religious institutions to depict a positive and statistically significant effect on parental aspirations for children. Disaggregating by gender, we observe no significant relationship with the parental aspirations of boys but find a large and statistically significant impact for girls. Suggestively, we believe that this effect might be driven by religious role models and the potential of religious institutions to look out for the least privileged. The role model postulation is in line with previous studies that report a positive effect of role models on girls' aspirations ([Beaman et al., 2012](#); [Riley, 2018](#)).

The possible girl effect is further elevated by the historical evidence of the impact of religion on female education and economic outcomes (Becker, 2008; Kudo, 2017; Meier zu Selhausen, 2014). We then consider a more subtle measurement of religious values and beliefs through a religiosity index. Comparing lower and higher religiosity households, we find that higher religiosity was associated with higher educational aspirations for all children. Our results are robust to changes in the choice of matching estimator used and introducing non-linearity in the treatment selection model. Further sensitivity tests show that our models are insensitive to confounding.

In general, we make two key contributions which are relevant for development policy. First, we add to the emerging literature on the economics of religion, especially in development outcomes. We use previously unstudied measures of religiosity to show that religion and socio-economic outcomes are strongly related. Outcomes such as aspirations can be nudged through individuals' values and practices such as religion. Secondly, we contribute to recent studies on aspirations. While other studies have established that aspirations matter in development outcomes, we partly respond to the question of what drives aspirations. By moving beyond a binary measure of religious membership, we show that more intrinsic religious values, universally held with different intensities, can predict aspirations. Therefore, interventions seeking to improve people's aspirations might strongly consider incorporating religion as a key input in individual decision-making regarding economic choices.

One limitation of our work, however, is that with cross-sectional data, we are unable to derive precise causal results due to selection biases, especially from possible unobserved differences in the distribution of religious practices. Though we employ various tests of robustness and sensitivity, we can only control for observable differences. This leaves room for future research to build on this formative evidence to test more robust causal pathways.

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Supplementary Material

Table A1: Balancing diagnostics for membership in religious institutions

Variables	Standardized differences		Variance ratio	
	Raw	Weighted	Raw	Weighted
Agea (years)	-0.198	0.034	0.778	0.956
Years of education	0.347	-0.009	0.608	1.015
Head is male (1=yes)	-0.127	0.016	1.166	0.980
Household size	0.131	-0.037	0.820	0.824
Life satisfaction	-0.433	0.019	0.757	1.023
Number of dependents	0.051	-0.100	0.864	0.835
Access to electricity (1=yes)	0.175	-0.006	1.090	0.997
Cooperative membership (1=yes)	-0.058	0.012	0.933	1.015
Savings account (1=yes)	0.400	0.005	1.469	1.003
Farm size	0.070	0.036	0.648	0.771
Has a male child	0.066	-0.037	0.978	1.012
Has a female child	0.102	-0.019	0.985	1.003
Willingness to invest in agriculture (1=yes)	-0.214	0.057	0.754	1.094
Livestock ownership (TLU)	-0.069	-0.005	0.662	1.194
Household income (Ksh)	-0.074	0.032	0.414	0.914
Off farm income (Ksh)	-0.149	-0.001	0.535	1.643
Asset value (Ksh)	-0.024	0.020	0.190	0.406
Monogamous household (1=yes)	-0.222	0.033	0.877	0.978
Polygamous household (1=yes)	-0.222	0.030	0.622	1.074

Notes: The variables represented here are those used for weighting. Standardized differences are differences means for non-members and members of RIs after the means have been scaled by the average of the group variance. The variance ratio is the ratio of the variance of the non-members of RIs over the variance of the members of RIs. Raw refers to unmatched data while weighted refers to data that has been weighted.

Table A2: Factors predicting participation in religious institutions

Variables	Coefficient
Age ^a (years)	-0.006 (0.005)
Years of education	0.498*** (0.199)
Head is male (1=yes)	-0.430** (0.187)
Household size	0.089*** (0.037)
Life satisfaction	-0.398*** (0.1)
Number of dependents	-0.058 (0.056)
Access to electricity (1=yes)	0.358*** (0.146)
Cooperative membership (1=yes)	-0.22 (0.16)
Savings account (1=yes)	0.413*** (0.15)
Farm size	0.063 (0.045)
Has a male child	-0.132 (0.155)
Has a female child	-0.035 (0.161)
Willingness to invest in agriculture (1=yes)	-0.365** (0.147)
Livestock ownership (TLU)	-0.02 (0.015)
Household income (Ksh)	-0.006 (0.004)
Off farm income (Ksh)	-0.011 (0.007)
Asset value (Ksh)	-0.006 (0.005)
Monogamous household (1=yes)	0.037 (0.207)
Polygamous household (1=yes)	-0.472* (0.254)
Constant	2.250*** (0.824)
Log likelihood	82.3
Pseudo R ²	0.127
Ethnicity dummies	Yes
Ward dummies	Yes
Village FE	Yes
Number of observations	530

Notes: Robust standard errors are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively. The margins command is used in STATA to generate the marginal effects.

Table A3: Factors predicting religiosity

Variables	Low religiosity	Medium Religiosity	High religiosity
Age ^a (years)	0.015 (0.015)	0.018* (0.01)	0.014 (0.011)
Years of education	1.388*** (0.553)	0.375 (0.426)	2.184*** (0.627)
Head is male (1=yes)	0.174** (0.32)	0.740** (0.377)	0.206 (0.427)
Household size	0.116 (0.074)	0.105 (0.082)	0.178*** (0.064)
Life satisfaction	0.037 (0.171)	0.043 (0.222)	0.353* (0.201)
Number of dependents	0.17 (0.117)	0.186 (0.135)	0.096 (0.08)
Access to electricity (1=yes)	0.201 (0.343)	0.717** (0.307)	0.733*** (0.239)
Cooperative membership (1=yes)	0.117 (0.355)	1.018*** (0.377)	0.473* (0.27)
Savings account (1=yes)	1.013*** (0.319)	0.038 (0.266)	1.049*** (0.261)
Farm size	0.083 (0.121)	0.032 (0.124)	0.118** (0.052)
Has a male child	0.213 (0.325)	0.195 (0.316)	0.043 (0.279)
Has a female child	0.124 (0.439)	0.655** (0.35)	0.357 (0.257)
Willingness to invest in agriculture (1=yes)	0.605** (0.28)	0.566 (0.439)	0.371 (0.305)
Livestock ownership (TLU)	0.009 (0.031)	0.034 (0.032)	0.043** (0.022)
Household income (Ksh)	0.001 (0.001)	0.001 (0.001)	0.01 (0.009)
Off farm income (Ksh)	0.014** (0.008)	0.002 (0.002)	0.001 (0.009)
Asset value (Ksh)	0.002 (0.001)	0.003*** (0.009)	0.002*** (0.004)
Monogamous household (1=yes)	0.404 (0.318)	0.765*** (0.438)	0.954** (0.474)
Polygamous household (1=yes)	0.239 (0.392)	0.302 (0.597)	0.983** (0.501)
Constant	13.411*** (1.799)	16.219 (1.69)	21.322*** (1.289)
Ethnicity dummies	Yes	Yes	Yes
Ward dummies	Yes	Yes	Yes
Village FE	Yes	Yes	Yes
Number of observations	177	177	176

Notes: Robust standard errors are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively. The margins command is used in STATA to generate the marginal effects.

Table A4: ATET estimates for religious institutions

	All Children		Girls		Boys	
	(1)	(2)	(3)	(4)	(5)	(6)
Religious institution	0.413** (0.166)	0.412** (0.160)	0.524** (0.249)	0.496** (0.222)	0.303 (0.221)	0.328 (0.229)
Other controls	No	Yes	No	Yes	No	Yes
Village FE	Yes	Yes	Yes	Yes	Yes	Yes
Number of clusters	35	35	35	35	35	35
Observations	1060	1060	530	530	530	530

Notes: Robust standard errors are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively. Other controls include life satisfaction, household size, age, years of education, Head is male, access to electricity, cooperative membership, has a savings account, farm size, and ethnicity, has a male child, has a female child, number of children below 15, willingness to invest in agriculture, livestock ownership, household income, off-farm income, asset value, monogamous household, and polygamous household.

Table A5: ATET estimates for religiosity

	All Children	Girls	Boys
Medium religiosity	0.127 (0.203)	0.323 (0.293)	0.067 (0.286)
High religiosity	1.274*** (0.244)	1.283*** (0.353)	1.263*** (0.341)
PO mean of low religiosity	17.647*** (0.159)	17.588*** (0.241)	17.705*** (0.217)
Village FE	Yes	Yes	Yes
Number of clusters	35	35	35
Observations	1060	530	530

Notes: Robust standard errors are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively. Other controls include life satisfaction, household size, age, years of education, Head is male, access to electricity, cooperative membership, has a savings account, farm size, ethnicity, has a male child, has a female child, number of children below 15, willingness to invest in agriculture, livestock ownership, household income, off-farm income, asset value, monogamous household, and polygamous household. Both medium and high religiosity are computed based on the potential outcome (PO) mean of low religiosity.

Table A6: Robustness-Additivity and non-linearity for religious institutions

	All Children	Girls	Boys
Religious institution	0.62*** (0.239)	0.642** (0.337)	0.603 (0.334)
Other controls	Yes	Yes	Yes
Village FE	Yes	Yes	Yes
Number of clusters	35	35	35
Observations	1060	530	530

Notes: Robust standard errors are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively. Other controls include life satisfaction, household size, age, years of education, Head is male, access to electricity, cooperative membership, has a savings account, farm size, ethnicity, has a male child, has a female child, number of children below 15, willingness to invest in agriculture, Interacts with religious leaders, livestock ownership, household income, off-farm income, asset value, monogamous household, polygamous household, and distance to RI. Some additional square terms of education, age, TLU, farmsize and household size were added.

Table A7: Robustness-Additivity and non-linearity for religiosity

	All Children	Girls	Boys
Medium religiosity	0.188 (0.222)	0.438 (0.327)	0.06 (0.299)
High religiosity	0.972*** (0.205)	0.978*** (0.289)	0.966*** (0.289)
PO mean of low religiosity	17.883*** (0.136)	17.839*** (0.199)	17.927*** (0.19)
Village FE	Yes	Yes	Yes
Number of clusters	35	35	35
Observations	1060	530	530

Notes: Robust standard errors are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively. Other controls include life satisfaction, household size, age, years of education, Head is male, access to electricity, cooperative membership, has a savings account, farm size, ethnicity, has a male child, has a female child, number of children below 15, willingness to invest in agriculture, livestock ownership, household income, off-farm income, asset value, monogamous household, and polygamous household. Some additional square terms of education, age, TLU, farmsize and household size were added.. Both medium and high religiosity are computed based on the potential outcome (PO) mean of low religiosity.

Table A8: AIPW Estimates for religious institution

	All Children		Girls		Boys	
	(1)	(2)	(3)	(4)	(5)	(6)
Religious institution	0.379** (0.166)	0.344** (0.152)	0.513** (0.248)	0.466** (0.210)	0.241 (0.223)	0.223 (0.216)
Other controls	No	Yes	No	Yes	No	Yes
Village FE	Yes	Yes	Yes	Yes	Yes	Yes
Number of clusters	35	35	35	35	35	35
Observations	1060	1060	530	530	530	530

Notes: Robust standard errors are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively. Other controls include life satisfaction, household size, age, years of education, Head is male, access to electricity, cooperative membership, has a savings account, farm size, ethnicity, has a male child, has a female child, number of children below 15, willingness to invest in agriculture, livestock ownership, household income, off-farm income, asset value, monogamous household, and polygamous household.

Table A9: AIPW estimates for religiosity

	All Children	Girls	Boys
Medium religiosity	0.259 (0.214)	0.515 (0.312)	0.003 (0.286)
High religiosity	1.021*** (0.201)	1.035*** (0.285)	1.007*** (0.283)
PO mean of low religiosity	17.819*** (0.133)	17.765*** (0.196)	17.872*** (0.217)
Village FE	Yes	Yes	Yes
Number of clusters	35	35	35
Observations	1060	530	530

Notes: Robust standard errors are reported in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% levels, respectively. Other controls include life satisfaction, household size, age, years of education, Head is male, access to electricity, cooperative membership, has a savings account, farm size, ethnicity, has a male child, has a female child, number of children below 15, willingness to invest in agriculture, livestock ownership, household income, off-farm income, asset value, monogamous household, and polygamous household. Both medium and high religiosity are computed based on the potential outcome (PO) mean of low religiosity.

Table A10: Variation in leave-out-k propensity scores

	50th	75th	90th
	percentile	percentile	percentile
Age ^a (years)	0.011	0.022	0.034
Years of education	0.020	0.049	0.083
Head is male (1=yes)	0.016	0.037	0.076
Household size	0.025	0.051	0.081
Life satisfaction	0.056	0.086	0.130
Number of dependents	0.008	0.016	0.027
Access to electricity (1=yes)	0.035	0.056	0.074
Cooperative membership (1=yes)	0.012	0.025	0.041
Savings account (1=yes)	0.036	0.057	0.084
Farm size	0.001	0.002	0.003
Has a male child	0.011	0.019	0.029
Has a female child	0.005	0.009	0.014
Willingness to invest in agriculture (1=yes)	0.028	0.046	0.095
Interacts with religious leaders (1=yes)	0.004	0.007	0.016
Livestock ownership (TLU)	0.007	0.014	0.025
Household income (Ksh)	0.008	0.016	0.028
Off farm income (Ksh)	0.007	0.014	0.022
Asset value (Ksh)	0.002	0.004	0.008
Monogamous household (1=yes)	0.001	0.002	0.004
Distance to RI (Km)	0.001	0.002	0.003

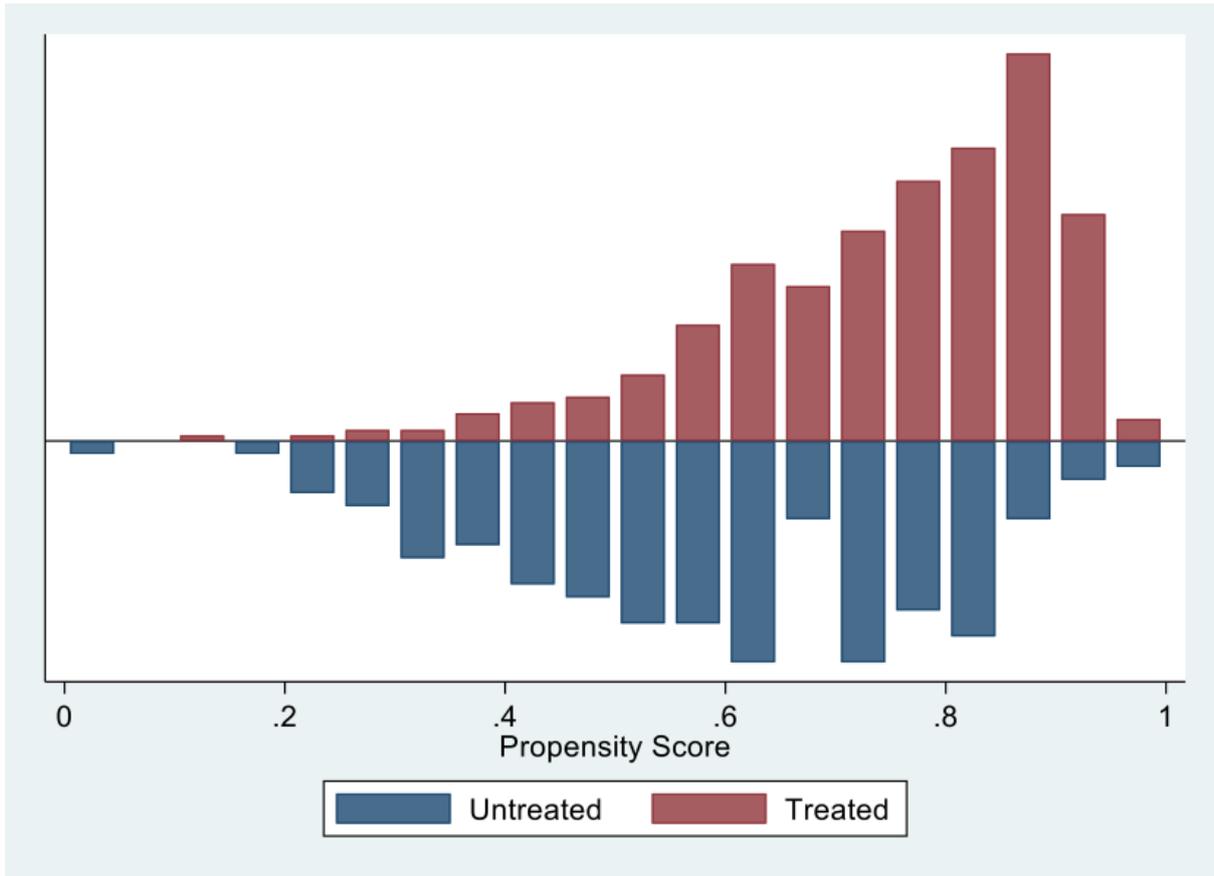


Figure A1: Distribution of propensity scores

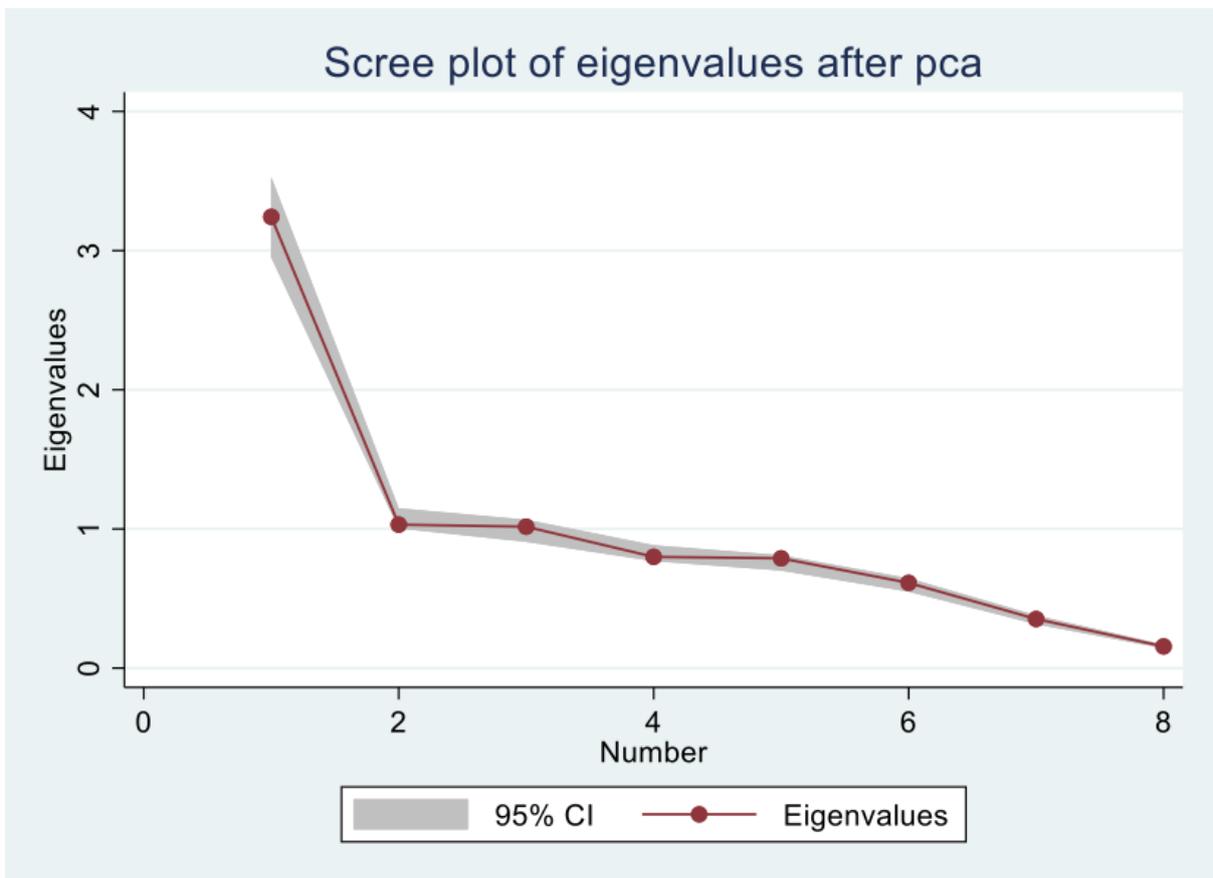


Figure A2: Scree plot of Eigen values after the PCA

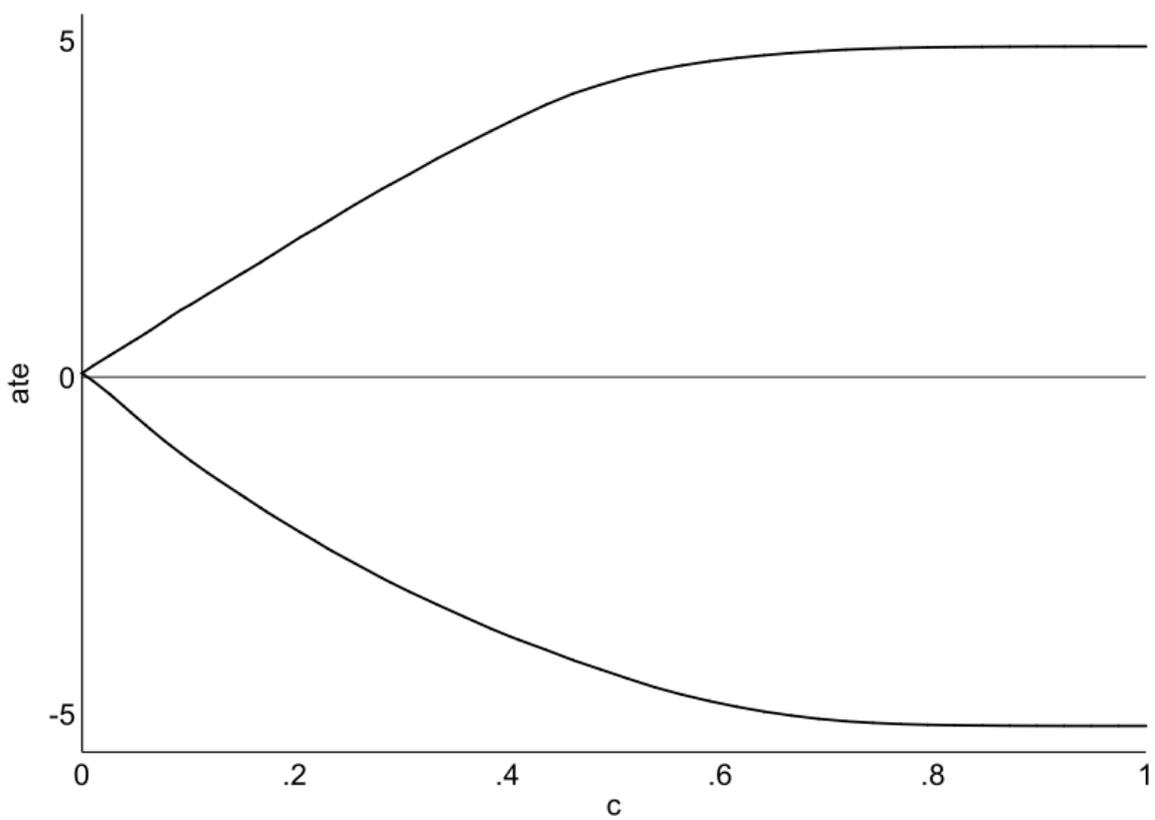


Figure A3: Bounds on treatment effects for girls

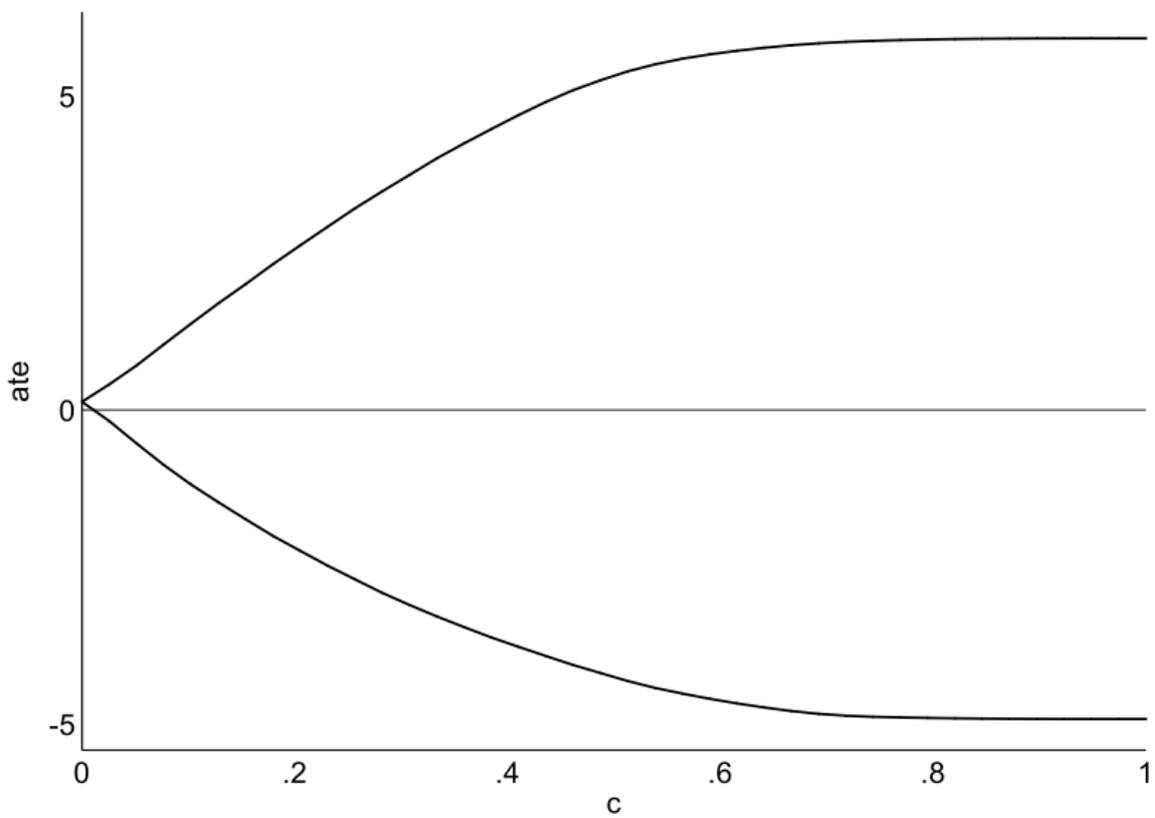


Figure A4: Bounds on treatment effects for boys