

# Developing Educational and Vocational Aspirations through International Child Sponsorship: Evidence from Kenya, Indonesia, and Mexico

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**Abstract:** The role of aspirations in facilitating movement out of poverty is a subject of increasing research in development economics. Previous work finds positive impacts from international child sponsorship on educational attainment, employment, and adult income. This paper seeks to ascertain whether the impacts of child sponsorship on educational outcomes may occur through elevated aspirations among sponsored children. Using an age-eligibility rule applied during program rollout to identify causal effects, we study whether international child sponsorship increases educational and vocational aspirations among a sample of 2,022 children in Kenya, Indonesia, and Mexico. While effects are heterogeneous, and strongest in Kenya, we find that, averaging over the three countries, sponsorship increased indices of self-esteem ( $0.25\sigma$ ), optimism ( $0.26\sigma$ ), aspirations ( $0.29\sigma$ ), and expected years of completed education (0.43 years). We find that sponsorship increases *actual* grade completion by 0.56 among children at the time of the survey, and mediation analysis suggests that the impact of sponsorship on aspirations is likely to mediate higher levels of grade completion. Our results contribute to a growing body of evidence indicating that the positive impacts of child sponsorship stem partly through elevating aspirations. More generally, our research contributes to a larger literature suggesting that the alleviation of internal constraints among the poor is a strong complement to addressing their external constraints.

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# 1. Introduction

## 1.1 Overview

Child sponsorship programs transfer resources from sponsors in wealthy countries to children in developing countries, helping to provide them access to school tuition and uniforms, nutritious meals, and healthcare. Using a program age-eligibility rule as an identifying instrument in a survey of 10,144 adults in six countries, Wydick, Glewwe, and Rutledge (2013, 2017) find large and statistically significant impacts from Compassion International’s child sponsorship program on adult life outcomes. These findings include a 12-18 percentage point increase in secondary school completion over a baseline rate of 44.5 percent, an increase in the probability of white-collar employment of 6.6 percentage points over a baseline of 18.7 percent, and an increase in monthly income of \$13-17 over a baseline of \$75.

Many of the impacts of child sponsorship compare favorably to other celebrated interventions. For example, the effect of Compassion’s program on educational completion of 1.46 years is more than double the measured impact of 0.66 years of Mexico’s *Progresa* conditional cash transfer program, at a similar cost (Wydick et al., 2013; Schultz, 2004). Why this is so constitutes an important question for both research and practice. One explanation is that the emphasis of many child sponsorship programs is not merely on the relief of *external* constraints such as better access to nutrition, enhanced healthcare, and paying for schooling expenses, but also on the relief of *internal* constraints. The internal constraints of the poor, which may be strongly manifested in children, involve feelings of hopelessness (Duflo, 2012; Glewwe, Ross, and Wydick, 2018; Lybbert and Wydick, 2018), lack of empowerment (Sen, 1999), aspirations failure (Dalton, Ghosal and Mani, 2016), a diminished sense of self-efficacy (Wuepper and Lybbert, 2017), and low self-esteem (Dercon and Krishnan, 2009). Like many international child sponsorship programs, the Compassion intervention places a heavy emphasis on the development of socio-emotional skills and on children’s educational and vocational aspirations.

Lybbert and Wydick (2018) suggest that aspirations may affect outcomes such as grade completion by creating a reference point in the utility function centered at the aspiration, where utility is convex and increasing before the aspiration and concave thereafter. For schooling completion this may be either congruent with an aspired level of education or a prerequisite for an aspired occupation. This research investigates whether the substantial impacts on adult life

outcomes from child sponsorship may be at least partially mediated by the development of aspirations and other psychological attributes during the period of sponsorship.

We investigate the impacts of the Compassion International child sponsorship program on self-esteem, optimism, educational and vocational aspirations, and an overall index of aspirations using original data collected from surveys of 2,022 *currently* sponsored children in Kenya, Indonesia and Mexico. Utilizing an identification strategy based on program eligibility rules, we find significant heterogeneity across our three countries in the program's effect on aspirations development, where effects are generally stronger in Kenya than in Indonesia and Mexico. Our aggregated results that average across the three countries find that the Compassion intervention exhibits overall positive and significant impacts on both grade level completion and psychological attributes of currently sponsored children. Specifically, in our preferred estimates, which combine instrumental variable estimation with household fixed effects across all three countries, we find that international sponsorship increases grade level completion by 0.56 among the children in our survey; the final effect could be higher, since most of these children were still enrolled in school. We also find that the program increased an index of self-esteem of these internationally sponsored children by 0.25 standard deviations (henceforth  $\sigma$ ) and an optimism index by 0.26 $\sigma$ . Sponsorship also caused educational aspirations to increase by 0.44 years. While the estimated impacts are positive on vocational aspirations, these are mostly insignificant. On the other hand, we find a statistically significant increase of 0.29 $\sigma$  on a comprehensive index of aspirations.

We carry out a mediation analysis to test whether aspirations, self-esteem, and optimism mediate the impact of sponsorship on grade completion at time of the survey. One common problem with the traditional mediation structure developed in Baron and Kenny (1986) and Preacher and Hayes (2008) is that it does not account for the possibility of endogeneity of the mediator in the regression of the final outcome on the mediating variable and the treatment. We show (in results provided in the appendix) that, given the assumption of a positive covariance between the error term and the mediator in this estimation, the statistical significance of the product of the effect of the treatment on the mediator and of the mediator on the final outcome establishes a necessary (but not sufficient) condition for mediation. Because the criteria we derive establish necessary conditions for the mediation of aspirations, we could rule out impacts of the program on child psychological traits as a causal channel for the positive impacts found on adult life outcomes if we were to find no impact on children's psychology from child sponsorship. Nevertheless, we find that the mediated

effect on grade completion outcomes from aspirations development is approximately 11% of the total effect ( $p < 0.05$ ). The mediated effect from self-esteem is about 5% of the total effect, but is significant only at 10% level, and the mediated effect for optimism, while positive, is smaller still and statistically insignificant.

In a companion paper to this one, using data from digitally-coded children's self-portraits, Glewwe, Ross and Wydick (2018) find positive impacts in Indonesia from Compassion child sponsorship on hopefulness ( $0.66\sigma$ ), self-efficacy ( $0.29\sigma$ ), and happiness ( $0.42\sigma$ ). Though methodologically quite different, we view the results of the present research as complementary to this previous work, and we also expand our analysis to multiple countries and explore the mediation of psychological variables with regards to schooling outcomes. Together with previous research on the long-term effects of child sponsorship and the larger body of work highlighting the importance of developing socio-emotional skills to improve life outcomes (e.g. Heckman et al., 2006, 2012, 2013), we view our results as contributing to the growing body of evidence which suggests that the substantial effects of child sponsorship on outcomes in adulthood are at least partially mediated by these programs' development of socio-emotional skills.

## 1.2 Psychology and Development Economics

A growing literature in behavioral economics explores the relationship between self-esteem and economic outcomes. Bénabou and Tirole (2003), for example, develop a theoretical model which demonstrates that individual encouragement from a principal to an agent (uninformed about her own type) can raise self-esteem, which may in turn raise her academic achievement. Behncke (2009) find empirical evidence for this in a university context, where she studies the impact of verbal encouragement before a diagnostic math test for an economics class. In addition, parental praise results in higher self-esteem and academic achievement in university undergraduates above what their natural ability alone would produce (Darolia and Wydick, 2011). Krishnan and Krutikova (2013) find that an intensive, multi-year after-school program in India that focused on non-cognitive skill formation increased self-esteem, which is in turn correlated with better school performance and higher earnings.

Another important strand of the literature has sought more specifically to understand the role of internal constraints among the poor (Mani et al., 2013; Haushofer and Fehr, 2014; Laajaj, 2017). Some of this work has examined the impact of differences in self-esteem, where an increase of one standard deviation in self-esteem is correlated with an increase in wages between 5.3 and

11.0 percent (Drago, 2011; Hoeschler and Backnes-Gellner 2017). Much recent theoretical work in development economics has shown how low aspirations can lead to development traps (Ray, 2006; Dalton, Ghosal, and Mani, 2016; Genicot and Ray, 2017). Ray (2006), for example, discusses how failed aspirations and poverty are reciprocally linked in a self-sustaining trap. Genicot and Ray (2017) demonstrate how aspirations failures can lead to a divergence in investment and thus growing income inequality.

Field experiments have also explored the role of psychology in economic development. Using a randomized field experiment in South Africa, Bertrand et al. (2010) test the role of psychological factors in credit and saving decisions, while Duflo, Kremer, and Robinson (2011) explore nudges and fertilizer take-up among Kenyan farmers using models of procrastination from the economics and psychology literature. Laajaj (2017) shows how pessimism about the future among the poor can cause an inauspicious focus on the present, but how a randomized match savings intervention in Mozambique resulted in an expanded planning horizon. Several empirical studies have also explored the role of aspirations in development (Bernard, Dercon, and Taffesse, 2011; Beaman et al., 2012; Chiapa, Garrido, and Prina, 2012; Dercon and Singh, 2013; Bernard et al., 2014; Macours and Vakis, 2014; Pasquier-Doumer and Brandon, 2015; Janzen et al., 2017; Kosec and Mo, 2017; Baranov, Haushofer, and Jang, 2020). This work generally finds modest but positive impacts from psychological interventions, with some exceptions, most recently and notably Baranov et al., (2020). Schilbach, Schofield, and Mullainathan (2016), Demeritt and Hoff (2018) and Kremer, Rao, and Schilbach (2019) provide outstanding overviews of this and other relevant work.

We seek to contribute to this emerging literature on the relationship between psychological phenomena and economic development, and particularly of the impact of programs that seek to elevate the educational aspirations of children. Section 2 of our paper discusses the Compassion intervention and our fieldwork and survey. Section 3 presents our empirical strategy, and Section 4 our reduced form results, mediation tests, and a series of robustness checks. Section 5 concludes with a summary of our results and an interpretation of our findings in light of other work.

## 2. Description of Survey and Fieldwork

### 2.1 Description of the Compassion Program

Compassion is a faith-based Christian organization that currently supports just over 2 million children in 25 countries, making it the third largest child sponsorship organization

worldwide. Wydick, Glewwe, and Rutledge (2013) estimate that 9.14 million children are sponsored through various sponsorship organizations worldwide, and that this represents a transfer of approximately \$3.4 billion dollars annually. These programs have been in existence for decades and typically involve a monthly sponsorship payment of around \$25-\$40. While some child sponsorship organizations use this funding for broadly based community projects, other sponsorship organizations such as Compassion direct funding specifically toward sponsored children. These funds are used for the provision of healthcare, education, clothing, food, spiritual programming and other support for the sponsored child. Sponsored children receive free school tuition, school uniforms, nutritious meals during the week, and are part of a holistically oriented tutoring and child development program that meets for four to eight hours per week for at least 48 weeks of the year. The average sponsorship duration lasts about nine years. Additionally, the program fosters a relationship between the child and the sponsor through the exchange of letters, photos, and gifts. The relationship with the sponsor is mediated and monitored by Compassion to protect both the children and sponsor. Correspondence is common, with a median exchange of two letters per year. In addition, the sponsor receives a yearly update from the local staff, along with a picture of the sponsored child. Sponsors can visit the children in their home countries, but more often sponsors never meet children in person.<sup>1</sup>

Children were eligible to begin participating in the program in the three countries included in this study provided that they were no more than 9 years of age.<sup>2</sup> Selection into the program is initially done at the household level, where local Compassion staff are instructed to identify and approach the neediest households within their community. Each country has a different rule for the number of children that can participate in the program per household; within our study the limit is one child in Kenya, two in Indonesia, and three in Mexico. If the number of age-eligible children within a household exceeds the relevant maximum, then ultimately it is up to the parents to choose which of their children participate. However, Compassion staff encourage parents to choose the

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<sup>1</sup> For a more detailed description of the Compassion program, see Wydick, Glewwe, and Rutledge (2013) as well as the Compassion program description at <https://www.compassion.com/how-we-work/benefits-of-the-program.htm>.

<sup>2</sup> This differs from the age 12 eligibility rule that was common in the Compassion program in earlier decades.

child or children that they identify as the neediest within a household, that is the child or children that would benefit the most from sponsorship.<sup>3</sup>

Compassion's sponsorship includes both pecuniary and non-pecuniary benefits, with little variation between the countries studied. In this study, we focus on the non-pecuniary aspects of the Compassion program that seek to develop children's self-esteem and aspirations. These aspects make child sponsorship programs different from those that provide only educational inputs. In each country, Compassion's child development program emphasizes the development of socio-emotional skills in their direct work with sponsored children, imparting spiritual values of love, acceptance, and forgiveness, as well as mental and emotional health through developing self-esteem, optimism, and raising self-expectations. Successful adult alumni of the program often come to visit program centers and give motivational talks, and may directly or indirectly influence currently sponsored children through their own achievements in schooling and career paths.<sup>4</sup> In this way, we conceptualize the effects of aspirations for education and vocation in light of the models of Ray (2006), in which aspects of the sponsorship program open an "aspirations window," of Dalton et al. (2016), in which effort and aspirations create a mutually reinforcing feedback loop leading to multiple equilibria and poverty traps, and of Lybbert and Wydick (2018), in which the relaxation of both internal and external constraints may be necessary for the realization of higher effort and final outcomes. However, because of the bundled nature of our intervention, it is difficult to discriminate between these models.

## 2.2 Survey

Our studies of children in Kenyan, Indonesian, and Mexican communities, which compare psychological variables such as self-esteem and life aspirations between sponsored and non-sponsored children in the same community or in neighboring communities, were designed to exploit the above-mentioned age-eligibility rule to identify causal impacts of sponsorship on the psychology of sponsored children. Thus, the sites were selected for fieldwork based on the year of program implementation in order to gain maximum advantage for our age-eligibility-rule estimation

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<sup>3</sup> Other eligibility requirements include: to live within walking distance (30 minutes) of the Compassion center, orphans and children with widowed parents are prioritized, and no sponsorship from another agency. Compassion has no religious requirement for receiving sponsorship, but the program does provide Christian religious instruction.

<sup>4</sup> Compassion program staff in Kenya relayed that an alum of the program who was a pilot with Kenya Airways visited a program center to talk about his work. Three years after his visit, our survey responses from this program center revealed a large number of children indicating that they wished to become an airline pilot.

strategy. Table 1 provides information on how the study was implemented in 15 communities across the three study countries. In each of the study sites, a survey questionnaire (see Table A1 for the one used in Mexico) was used to obtain basic information about the respondent such as age, gender, level of formal schooling, religion, sponsorship information, and family characteristics such as the occupation of each parent. In addition to this basic information, the survey questionnaire also included a series of questions designed to elicit each child's expectations for occupation and level of education, as well as a battery of questions intended to measure self-esteem (Rosenberg, 1965) and optimism. All of the questions that were asked in all three countries are included in Table A1.<sup>5</sup> The survey was administered to the children individually by enumerators who were university students or recent graduates; these enumerators were not affiliated with the Compassion program.<sup>6</sup> It was made clear to the child that the studies were confidential, independent of Compassion, and no one from Compassion or anyone else would know any of their responses. Most interviews took place in the children's schools and homes, away from any potential influences such as teachers, parents, and Compassion staff.

### *2.2.1 Kenya*

The study in Kenya was carried out in three villages from May to July of 2011. These villages were randomly sampled from a list of all villages within a three-hour journey by car from Nairobi that had a Compassion program that was first implemented between 2002 and 2004. One program started in May of 2003, and two in December of 2003. There is a limit of one sponsored child per household in Kenya.

The survey sample consisted of three groups: currently sponsored children, the next oldest non-sponsored sibling and the next youngest non-sponsored sibling. No children were surveyed from families in Kenya that did not have sponsored children. Within each of the three villages, 110 children were randomly sampled from the population of currently sponsored children between the ages of 12 and 16, for a total of 330 currently sponsored children. Of these, we successfully surveyed 326 (98.8%). Once we located the sponsored child, we then interviewed the next oldest and the next youngest siblings. There were 237 of these siblings between the ages of 10 and 18. In total, the

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<sup>5</sup> We do not have a registered pre-analysis plan for this study. However, our hands are tied rather tightly by the small number of questions we asked in our survey.

<sup>6</sup> Since Compassion's implementing church partners often had a large role in the communities of these villages, and we hired enumerators that knew the members of the village well, a couple of the hired enumerators may have had some informal volunteer role in the local church, but none had any affiliation with the Compassion program.



survey was administered to 570 children: 333 that were sponsored, 154 next older non-sponsored siblings and 83 next younger non-sponsored siblings, all with the same mother and father within a household.

### *2.2.2 Indonesia*

Researchers carried out the Indonesia fieldwork in four Compassion project sites in Jakarta from May to July of 2012. Two of these projects started in February 2003 and two in February 2007. An important difference between the Indonesia data and the Kenya data is that the non-sponsored children in the Indonesia study also include children from non-treated households who were on a Compassion sponsorship waitlist for entry into the program at the time of survey, as well as the siblings of these children. Because of Compassion's goal of serving the neediest among the poor, households on the waitlist are generally less needy than those initially selected. The age range of the children in the Indonesia sample is also wider than that of the children in the Kenya sample. There is a limit of two sponsored children per household in Indonesia.

Due to Compassion's age eligibility rule, children on the waitlist were between three and nine years old at the time of survey. Each of the sites provided a list of sponsored children and waitlisted children from which subjects were randomly chosen for the study. Each randomly chosen child from these lists was instructed to bring one sibling with him or her to the research site.<sup>7</sup> In Indonesia, which had an upper limit of two sponsored children per family, data were gathered from 288 sponsored children, 113 non-sponsored siblings of sponsored children, 79 waitlisted children, and 47 children who were siblings of waitlisted children.

### *2.2.3 Mexico*

Our final survey for this study was undertaken in Mexico. The fieldwork in Mexico was carried out in eight villages in June and July of 2017 in the Mexican states of Oaxaca and Chiapas. Four of these villages had a sponsorship program. The villages were randomly selected from a list of all rural project sites in the states of Oaxaca and Chiapas that were reachable given logistical constraints. Three of the sponsored villages were in the state of Chiapas, and one in Oaxaca. Of the four programs in these four villages, one was started in each year between the years of 2011 to 2014. For each of these four villages, a nearby community with similar characteristics but without a

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<sup>7</sup> The sibling could be either sponsored or unsponsored, but had to be within the relevant age range; 83.4% of children brought a proximate sibling in birth order. In 57.7% of cases, the sibling was either not a sponsored child (often due to eligibility restrictions) or on the waitlist.

Compassion program was chosen.<sup>8</sup> All four non-Compassion communities were outside of the catchment area for the nearby Compassion program. There is a limit of three sponsored children per household in Mexico.

An important difference between the Mexican data and the data collected in the other two countries is that in addition to surveying households with and without a sponsored child within the community that Compassion operated, children in a neighboring community without any sponsored children were also surveyed. Thus, in Mexico each village that Compassion operated had a designated “control” community with which we compare sponsored children, their siblings, and children in non-sponsored households in Compassion communities.<sup>9</sup> These “control” communities were at least 30 minutes away, often more than an hour, when traveling by car.<sup>10</sup> This ensured that children in the “control” and treatment communities did not attend the same schools, and that the children in “control” communities were unaware that the Compassion program existed.

Within the four villages with a sponsorship program we had three different groups of children: sponsored children, the next oldest and youngest non-sponsored siblings of the sponsored children, and children in the same four villages from randomly selected households without any sponsored children. As an additional control group, we surveyed a random sample of households within nearby villages without a Compassion program that had children between the ages of 10 and 18. Our sample in Mexico, where the Compassion program had an upper limit of three sponsored children per family, consists of 335 sponsored children, 148 non-sponsored siblings, 273 children from non-sponsored households in sponsorship communities, and 217 children in nearby communities without a Compassion program.

### 3. Empirical Strategy

#### 3.1 Establishing Causality

There are three possible sources of bias when comparing the outcomes of sponsored children to those of non-sponsored children. First, it is possible that program placement could be

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<sup>8</sup> The nearby sites had the same educational and health institutions, that is, each site had only one primary school, only one middle-school, only one high-school, and only one health post for basic care.

<sup>9</sup> Another difference is that the non-sponsored households were a random sample of all non-sponsored households instead of from waitlist households (which were the comparison households for Indonesia), as the waitlists in Mexico were generally very short.

<sup>10</sup> The more common modes of transportation for the income level of sponsored families were more than double this travel time.

endogenous to community characteristics, each of which may consist of different ethnic groups and/or different Christian denominations as implementing church partners. Second, Compassion states that they aim to choose the neediest households to participate in the program, implying that impacts may be underestimated if one does not account for differences between households within the targeted communities. Third, Compassion’s attempts to serve the neediest children within its targeted communities may also cause it to serve the neediest children within a given household, also potentially leading to an underestimation of impacts if estimations do not account for differences between the potential outcomes across children within a given household.

We address the first two of these potential sources of bias by using ordinary least-squares (OLS) incorporating fixed effects at the community level and then in subsequent estimations at the household level. Specifically, we estimate the following two equations:

$$y_{ijv} = \alpha_v + \gamma T_i + \boldsymbol{\beta}' \mathbf{X}_{ij} + \pi C_j + \theta S_j + e_{ijv} \quad (1)$$

$$y_{ijv} = \alpha_j + \gamma T_i + \boldsymbol{\beta}' \mathbf{X}_i + e_{ijv} \quad (1')$$

where  $y_{ijv}$  is an outcome for child  $i$  in household  $j$  living in community  $v$ ,  $T_i$  is a dummy variable for current sponsorship of child  $i$ ,<sup>11</sup>  $\alpha_v$  is a community fixed effect and  $\alpha_j$  is a household fixed effect. Although there are several sponsorship benefits, the benefit package each child receives in our sample is homogeneous, so we study the effect of the bundled treatment.  $\mathbf{X}_{ij}$  is a vector of child- and household-level control variables, including age, gender, birth order, parents’ occupation, dwelling quality, and family size, and  $\mathbf{X}_i$  is a vector of control variables that includes only those that vary among children within households (age, gender and birth order).  $C_j$  is a dummy variable indicating a household with a sponsored child (which applies only to Indonesia and Mexico, where both sponsored and non-sponsored households are surveyed), and  $S_j$  is a dummy variable indicating whether the household resides in the village with a Compassion sponsorship program (which applies only to Mexico). Within the Mexico sample, the community fixed effect  $\alpha_v$  refers to community-pair fixed effects, which allows for the  $S_j$  dummy to vary within this fixed effect.

With this specification, we account for endogenous selection of households in two ways. First, when estimating equation (1) we control for observable differences between sponsored households and the three comparison groups of non-sponsored households: (a) waitlist households

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<sup>11</sup> To avoid clutter, the  $j$  and  $v$  subscripts are not shown for  $T$ , and similar parsimony in subscripts is applied to the  $X$ ,  $C$  and  $S$  variables.

in the same community in Indonesia, (b) a random sample of non-sponsored households in the same community in Mexico and (c) a random sample of households in a neighboring community with similar characteristics but without the program in Mexico. Second, in (1') we use household fixed-effects estimates, which account for both observed and unobserved heterogeneity in household characteristics. In summary, estimates of (1) using community fixed effects control for unobserved differences between communities and observed differences between households, and estimates of (1') control for unobserved differences between both communities and households.

Yet, as noted above, there remains the third potential source of bias: endogeneity in the selection of children within a particular household. We account for the endogenous selection of children within households by using instrumental variables that predict which siblings are selected by their parents to participate in the program. More specifically, and consistent with Wydick, Glewwe, and Rutledge (2013, 2017), we find that because of Compassion's age-eligibility rule, the age of a child at the time of program roll-out is strongly correlated with sponsorship status, making it a natural instrument for sponsorship. Here our instrumental variables are a vector of dummy variables that indicate a child's age at the time the program rolled out in the child's community.

For these instrumental variable estimations, the first-stage equations are:

$$T_i = \alpha_v + \boldsymbol{\varphi}'\mathbf{X}_{ij} + \boldsymbol{\lambda}'\mathbf{Z}_i + \delta C_j + \gamma S_j + u_{ijv} \quad (2)$$

$$T_i = \alpha_j + \boldsymbol{\varphi}'\mathbf{X}_i + \boldsymbol{\lambda}'\mathbf{Z}_i + u_{ijv} \quad (2')$$

where  $\alpha_v$ ,  $\alpha_j$ ,  $T_i$ ,  $\mathbf{X}_{ij}$ ,  $\mathbf{X}_i$ ,  $C_j$ , and  $S_j$  are the same as in equations (1) and (1'), and  $\mathbf{Z}_i$  is a vector of dummy variables that indicate a child's age (in years) when the program rolled out in community  $j$ . More specifically, there are separate dummy variables for each year of age for children 9 and younger when the program rolled out, going back to -3 years (i.e., children born 3 years after the program was rolled out), and a dummy variable for children ten years and older when the program was rolled out (all of whom were ineligible for the program).<sup>12</sup>

Figure 1 shows the probability that a child in a sponsored household was sponsored as a function of his or her age at the time the program was introduced in his or her community. It is clear that children from about age 3 to age 9 when the program was introduced in the area were more likely to be sponsored than their siblings, especially those siblings who were 10 years old or

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<sup>12</sup> Due to differing age ranges of respondents at the time of the surveys, the youngest respondents in the Kenyan survey analysis were age 2 at the time of program rollout and age 3 in Mexico, while in the Indonesian analysis the youngest were 5 years from being born (-5) at time of program rollout. In the Indonesian analysis, -4 and -5 are grouped with -3 since there were very few respondents that fell into the former two categories (7 and 1, respectively).

older when the program started. Regression estimates of equations (2) and (2') yield the probability of being selected for sponsorship within each household. Table 2 presents results from this first stage estimation of (2') using this vector of dummy variables, as well as household fixed effects, age at time of survey, birth order, and gender, to predict the probability of sponsorship separately for each of our study countries in columns 1-3 and for the pooled sample in column 4. The  $F$ -statistic for our excluded instruments, the vector of age at program rollout dummy variables, ranges from 8.1 to 75.4 for each country in columns 1-3 and is 36.7 for the pooled sample in column 4.

The second-stage equations are:

$$y_{ijv} = \alpha_v + \gamma \hat{T}_i + \boldsymbol{\beta}' \mathbf{X}_{ij} + \pi C_j + \theta S_j + e_{ijv} \quad (3)$$

$$y_{ijv} = \alpha_j + \gamma \hat{T}_i + \boldsymbol{\beta}' \mathbf{X}_i + e_{ijv}, \quad (3')$$

where  $\hat{T}_i$  is the instrumented probability of being a sponsored child, and  $y_{ijv}$ ,  $\alpha_v$ ,  $\alpha_j$ ,  $\mathbf{X}_{ij}$ ,  $\mathbf{X}_i$ ,  $C_j$ , and  $S_j$  are the same as in equations (1), (1'), (2), and (2'). Assuming that age at program rollout is orthogonal to  $y_{ijv}$ , after conditioning on current age, sibling order, gender, and other characteristics, IV estimations remove bias due to intra-household selection among age-eligible children. We use standard errors clustered at the household level for all estimates. We assign equal weights to each country in our pooled estimations, and each observation within a given country is weighted equally.

### 3.2 Summary Indexes

Our survey questionnaire provides multiple measures of children's psychological well-being. One potential problem with using each of these measures in separate regressions is that, even if the impact of sponsorship on all of these outcomes of interest were equal to zero, one is still likely to find a "significant" impact by running regressions for a large number of outcome variables. We address this problem of multiple inference by utilizing the summary indices proposed by Anderson (2008). The Anderson (2008) Index is created by orienting all variables within a family of variables toward the same direction of impact, de-meaning and normalizing each of the variables in the respective family, and assigning a weight for each variable that is calculated as the sum of its row entries across the inverted variance-covariance matrix for that group. The Anderson Index for the family of variables is thus given by  $\bar{s}_i = (\mathbf{1}' \boldsymbol{\Sigma}^{-1} \mathbf{y}_i)$ , where  $\mathbf{1}$  is a  $m \times 1$  column vector of ones,  $\boldsymbol{\Sigma}^{-1}$  is the  $m \times m$  inverted covariance matrix of the  $m$  variables in the group, and  $\mathbf{y}_i$  is the  $m \times 1$  vector of the outcomes in the family for individual  $i$ . In contrast to the Kling et al. (2007) Index that

weights all variables equally, the Anderson Index gives variables that contain more unique information a higher weight in the index by weighting each variable by the sum of its corresponding row (or column) entries of the inverse covariance matrix. Summary index tests reduce the problem of over-testing and provide a concise test for whether a program has a “general effect.”

We construct three summary indices from the sampled children’s responses to psycho-social questions: self-esteem, optimism, and aspirations. The first uses the standard questions from the Rosenberg (1965) Self-Esteem scale, the second uses questions from the General Social Survey, and the aspirations index is generated based on responses to questions on hopes for adult occupation, expectations for adult occupation, and expected educational attainment.

Since we are estimating the impact on multiple summary indices, we present  $q$ -values that control for the false discovery rate (FDR). We calculate these  $q$ -values following the step-up method of Benjamini and Hochberg (1995), as outlined in Anderson (2008). These  $q$ -values are presented for the three indices for the coefficient on sponsorship to account for the fact that we test hypotheses of program impact over three different indices: self-esteem, optimism, and aspirations.

#### 4. Empirical Results

We present results separately for each of our three countries before presenting pooled specifications. Our preferred 2SLS specification, which pools all three countries, uses household fixed effects, controls for gender, age, and birth order, and instruments for sponsorship; these results show a positive causal impact of child sponsorship on self-esteem, optimism, and aspirations. We then perform a series of robustness checks that provide suggestive evidence that these results are not driven by negative spillovers onto non-sponsored siblings or onto non-sponsored children within the same community.

Table 3 presents summary statistics, separately for Kenya, Indonesia, and Mexico. Since the summary indices are demeaned and normalized within communities (or community pairs for Mexico), mean values are very close to zero. Some notable differences include the fact that respondents in the Kenya sample are much more likely to hope for and expect a white-collar job (0.900 and 0.818, respectively, vs. 0.552 and 0.557 in Indonesia and 0.677 and 0.648 in Mexico), and those in Indonesia are about 3 years younger than those in the other two countries. A further description of the variables’ distributions can be found in Table A2 in the Appendix. Some patterns stand out. When looking at the 25<sup>th</sup> percentile of our constructs, the values are similar for Indonesia and Mexico, but higher for Kenya. This pattern is also observed when looking at the dummy

variables for hope and expectation of a white-collar job. On the other hand, when looking at the indices' 75th percentile, the levels of Indonesia and Mexico are again similar and on average higher than in Kenya. In other words, we observe a higher dispersion of the data in Indonesia and Mexico, whereas children in Kenya are relatively more homogenous.

Table 4 presents simple  $t$ -tests of differences between sponsored and non-sponsored children (with robust standard errors clustered at the household level). Sponsored children are  $0.16\sigma$  higher on the optimism index, 4.2 percentage points more likely to hope for a white-collar job, expect to achieve 0.42 more years of education and are  $0.14\sigma$  higher on the aspirations index. Sponsored children are 0.9 years younger on average, have smaller families, have mothers that are less likely to work in a white-collar job, and have fathers that are more likely to work in such jobs.

#### 4.1 Kenya

Results for our preferred OLS specification, with household fixed effects and demographic controls, are presented in Panel A of Table 5. All standard errors are clustered at the household level. The results show that sponsored children in Kenya are  $0.28\sigma$  higher on the self-esteem index and are 5.8 percentage points more likely to hope for—and 7.2 percentage points more likely to expect to obtain—a white-collar job.<sup>13</sup>

To account for the endogenous selection of children into the program, we use age at program introduction as an instrument for sponsorship which, when combined with household fixed effects and individual controls, is our preferred specification. These estimates, shown in Panel A of Table 6, show that sponsorship led to an increase in the self-esteem index of  $0.34\sigma$ . The impact of sponsorship on optimism is essentially zero, which is consistent with the OLS estimates. Sponsored children are 11.4 percentage points more likely to hope for a white-collar job (column 3), and 9.1 percentage points more likely to expect a white-collar job (column 4). Sponsored children expect to achieve 0.27 additional years of education (column 5), and sponsorship increased children's aggregate educational and vocational aspirations by  $0.37\sigma$  (column 6). Notably, these magnitudes are larger than the corresponding magnitudes in the OLS specification. This is likely driven by

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<sup>13</sup> Table A4 presents more detailed estimates of equation (1) for the sample in Kenya, using four different specifications (summary statistics for Kenya are shown in Table A3). Panel A controls for community fixed effects, while Panel B adds controls for age at the time of the survey, gender, birth order, dwelling quality, and parent's occupation. Panels C and D, the latter of which is identical to Panel A of Table 5, mirror Panels A and B except that they use household fixed effects and thus the controls do not include dwelling quality and parent's occupation as those do not vary within households.

negative within-household selection into the program, as local Compassion staff in Kenya encouraged parents to choose the neediest of their eligible children for sponsorship. Overall, this provides evidence of enhanced self-esteem and aspirations of sponsored children relative to their non-sponsored siblings in Kenya.<sup>14</sup>

## 4.2 Indonesia

Our preferred OLS and 2SLS specifications for Indonesia, with household fixed effects and demographic controls, are presented in Panel B of Tables 5 and 6, respectively.<sup>15</sup> The coefficients on sponsorship, which represent the difference between sponsored children and their non-sponsored siblings, are generally small in magnitude and statistically insignificant for the OLS estimates, but consistently positive for the 2SLS. This is not surprising given Compassion’s mandate to select the neediest children; to the extent that these disadvantages are not observed in the data, it is likely that OLS estimations would be biased downward. The 2SLS estimates yield sufficient precision to identify a  $0.51\sigma$  increase in the optimism index in Panel B of Table 6.

We also present results summing the coefficients for sponsored child ( $\gamma$ ) and sponsored household ( $\pi$ ) in Panels A and B of Table A9 to facilitate comparison of sponsored children to children in waitlisted households. Here, we find that sponsored children are  $0.31\sigma$  to  $0.42\sigma$  higher on the optimism index and expect to achieve 0.55 to 0.72 years more of education than respondents in waitlisted households. The coefficients on the sponsored household, which compares non-sponsored siblings to those on the waitlist, is sometimes positive and sometimes negative for the outcomes, but only one of these (a positive impact) is statistically significant, and only at the 10 percent level. This suggests that, assuming no spillovers onto waitlisted households, there are little or no spillovers onto non-sponsored siblings within sponsored households.

## 4.3 Mexico

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<sup>14</sup> Table A5 presents all four different 2SLS specifications for Kenya including different combinations of community and household fixed effects and control variables, mirroring Table A4.

<sup>15</sup> The OLS specification with household fixed effects includes only sponsored households since sponsorship does not vary within waitlist households. Summary statistics are given in Tables A6 and A7, and additional OLS and 2SLS specifications are presented in Tables A8 and A9, respectively.



Results from our preferred OLS and 2SLS specifications, with household fixed effects and demographic controls, are presented in Panel C of Tables 5 and 6, respectively.<sup>16</sup> The OLS specifications indicate that the differences between sponsored children and their siblings are positive, except for expectation to obtain a white-collar job, but are statistically indistinguishable from zero. In the 2SLS specifications, the coefficients on sponsorship are statistically insignificant for each of the six outcomes, with three positive (expect white-collar job, years of education expected, aspirations index) and three negative (self-esteem index, optimism index, hope for white-collar job).

We present results summing the coefficients on sponsored child ( $\gamma$ ) and sponsored household ( $\pi$ ) with and without sponsored site ( $\theta$ ) in Panels A and B of Table A13 to facilitate comparison to children in non-sponsored households. For our specification with demographic controls (Panel B), we find that sponsored children, when compared with children in control villages, are  $0.25\sigma$  higher on the optimism index, but we do not find any significant differences between sponsored children and children in non-sponsored households within the same community. The coefficients on sponsored site, which compares households in Compassion villages with non-sponsored households in control villages, are positive in all specifications but never statistically different from zero.

#### 4.4 Combined Survey Results

Our main results come from the estimations which pool the data from all three countries. Although there exist some differences in the Compassion intervention at the country level, these are minor compared to the vast similarities in the standardized Compassion intervention as it is implemented worldwide. And while there are differences in eligibility rules between countries, the unbiasedness in our estimations stems from the existence of an age cutoff at program introduction, which is identical and transparent in all three countries.

OLS estimations are in Table 7, and IV estimations are in Table 8. In both tables, Panel A presents results with community-level fixed effects and no demographic controls, Panel B presents results with community-level fixed effects and demographic controls, Panel C shows results with household-level fixed effects and no demographic controls, and Panel D shows our preferred

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<sup>16</sup> The OLS specifications with household fixed effects includes only sponsored households since sponsorship does not vary within non-sponsored households. Summary statistics are given in Tables A10 and A11, and additional OLS and 2SLS specifications are presented in Tables A12 and A13.

specification, which employs both household-level fixed effects and demographic controls. We discuss these results separately for each of the dependent variables.

Our results for self-esteem (Column 1) show consistently positive point estimates across the eight panels in Tables 7 and 8. The key parameter of interest in Panels A and B is the joint effect of  $\gamma + \pi + \theta$ , which estimates the effect of sponsorship on sponsored children accounting for the fact that they belong to sponsored households and communities; it is statistically significant in two of the four estimations. These point estimates on self-esteem range from impacts of  $0.04\sigma$  to  $0.17\sigma$ . Turning to our preferred specification in Panel D (household-level fixed effects with demographic controls), the child sponsorship intervention has significant impacts on self-esteem, with an impact of  $0.11\sigma$  for OLS and  $0.26\sigma$  for IV. For a program that emphasizes the holistic nurture of children and their socio-emotional skills, this result is not surprising and clearly reflects an outcome to which substantial resources are devoted according to the descriptions and goals of the intervention in each Compassion project.

Our results show positive point estimates for impact on children's optimism (Column 2) in each of the eight panels in Tables 7 and 8, and in five of these eight panels estimates are strongly statistically significant, generally at  $p < 0.01$ . Relative to the results for self-esteem, point estimates are generally lower for optimism in our estimations using household-level fixed effects, but our preferred estimation specification in Panel D of Table 8 (IV estimations using household-level fixed effects) is significant ( $p < 0.05$ ) and shows a program impact of  $0.26\sigma$ .

Impacts on hope and expectations for a white-collar job are more modest, ranging from  $0.04\sigma$  to  $0.09\sigma$  for "hope to have a white-collar job as an adult"; although the estimates are all positive and statistically significant in five of the eight panels, the estimate for our most preferred specification in Panel D of Table 8 is not statistically significant. Point estimates for "expect to have a white-collar job as an adult" range from  $0.01\sigma$  to  $0.07\sigma$  and are significant in only two of the eight panels, and in our most preferred specification in Panel D of Table 8 it is statistically insignificant. Thus we find only very modest evidence that the Compassion program results in higher hopes and expectations among currently sponsored children of a higher-paying white-collar job as an adult, at least at the ages children were interviewed in our surveys.

Point estimates for education expectations show positive estimates in every estimation, ranging from 0.13 to 0.43 years of education. The results are significant in our most preferred specification in Panel D of Table 8, although only two results are significant out of the eight panels.

The sponsorship effect on education expectations are consistent with the sponsorship effect on actual grade completion (described below), which ranges from 0.28-0.57 years of education.

Our comprehensive aspirations index in the final column of Tables 7 and 8 shows positive point estimates in every estimation, and is statistically significant in 7 out of the 8 panels, ranging from  $0.10\sigma$  to an impact of  $0.29\sigma$  in our most preferred estimation in Panel D of Table 8. This is not surprising; even though many of our point estimates show relatively modest impacts, every point estimate for our psychological impact measures is positive in every panel of Tables 7 and 8. The combination of uniformly positive point estimates with many of our estimates achieving statistical significance suggests that the Compassion child sponsorship intervention increased psychological measures of well-being among sponsored children.

It is notable that all six of our 2SLS estimates in Panel D of Table 8 are larger in magnitude than the corresponding OLS estimates in Panel D of Table 7. This is almost certainly driven by negative selection into sponsorship, as Compassion makes an effort to help the “poorest among the poor,” and to sponsor the neediest children within these neediest households.

While results are most statistically significant for Kenya, point estimates across all of our different measures and specifications were generally positive in Indonesia and Mexico, although with lower point estimates in some cases and generally lower in statistical significance. That the results were strongest in Kenya is not surprising given that Kenya displayed some of the strongest impacts on education and other adult life outcomes among the six countries studied in Wydick, Glewwe, and Rutledge (2013, 2017). This may reflect that in countries where existing conditions are more difficult, and life outcomes are lower in education and employment, international child sponsorship tends to have larger impacts. Note also from Table 3 that years of exposure to the program was much lower in Mexico (4.0) than in Kenya (7.0) and Indonesia (7.3).

While these estimates are clearly smaller than those found by Wydick, Glewwe, and Rutledge (2013) for actual adult outcomes from the program, it is likely that even a small boost in educational aspirations for children may be valuable, in that aspirations for education tend to build on themselves. Aspirations for the highest levels of education tend to occur among those who have achieved high levels of education already. As a result, an aspiration as a child to complete an intermediate level of schooling may lead to higher aspirations to finish secondary school, and then at that point to attend a university. But these growing aspirations may be built only as sequential steps have been attained, so that the university aspiration may not manifest itself until the more modest aspiration of secondary school completion is imminent or realized.

#### 4.5 Do Psychological Variables Mediate Increases in Schooling Outcomes?

Estimations in Wydick, Glewwe, and Rutledge (2013) indicate positive impacts on completed years of schooling (for adults who were sponsored when they were children) that range from 1.03 to 1.46 years. These estimates of the final impacts on education from the intervention are more informative than those we present in this paper because most of the children in our sample are at an age where they have not completed their schooling. However, we may still observe differences in grade completion for a given younger age due to reductions in missed years of school, grade retention, and early dropout. Thus we include these early-age estimates on education to ascertain whether the psychological changes brought about by the program may mediate differences we may observe in tangible educational outcomes.

Within the sample of children in this study, we estimate the impact of the Compassion program on grade completion up to the time of the survey. Our results, found in Table 9, indicate that sponsorship results in 0.28-0.57 ( $p < 0.01$ ) additional years of grade completion. Given these increases in educational outcomes, we ask: To what extent do greater self-esteem, optimism, and aspirations mediate these observed school-age increases in grade completion?

The mediation framework established in Baron and Kenny (1986) and Preacher and Hayes (2008), contains three equations, where in our context  $M$  represents our potential mediators (self-esteem, optimism, and aspirations),  $T$  is child sponsorship treatment, and  $Y$  represents the final outcome, grade completion. (We suppress subscripts and control variables for simplicity.)

$$Y = \tau_0 + \tau T + \varepsilon_R \quad (4)$$

$$M = a_0 + aT + \varepsilon_M \quad (5)$$

$$Y = b_0 + bM + cT + \varepsilon_Y \quad (6)$$

In this general framework, the total effect of  $T$  on  $Y$  is given by the reduced-form coefficient  $\tau$ , but the indirect effect of  $T$  on  $Y$  via  $M$  is  $a \cdot b$ . Based on Baron and Kenny (1986) and Preacher and Hayes (2008), sufficient conditions accepted for mediation are traditionally the significance of  $\tau$  in the reduced-form equation (in Table 9), the significance of  $a$  in (5) (in Table 8), the significance of  $b$  in (6) after one controls for the treatment  $T$ , and the joint significance of  $a \cdot b$ . Standard errors for the mediated effect  $a \cdot b$  can be obtained via bootstrapping.

A key concern regarding the statistical identification of mediation is the potential for the endogeneity of  $M$  in (6). Although the coefficient  $c$  on  $T$  can often be identified via a randomization, or in our case through a first-stage instrumental variable estimation, it is entirely possible that  $Cov(M, \varepsilon_Y) \neq 0$ , yielding biased estimates of  $b$ . In our context, the problem might be that one of our potential mediators could be correlated with schooling outcomes through a variable that is not in our controls, such as general parental support for schooling. However, if we can assume in our context that  $Cov(M, \varepsilon_Y) > 0$ , that any spurious correlation between schooling outcomes and self-esteem, optimism, or aspirations is *positive*, as demonstrated in Appendix B, we can interpret estimates of  $b$  as an upper-bound, and thus the significance of the mediated effect  $a \cdot b$  is a necessary (but not sufficient) condition for mediation.

The results from our mediation analysis are presented in Table 10 and Figures 2a-c,<sup>17</sup> and establish the necessary conditions for the increases we see in grade completion among our population of children to be mediated at least partially through the program’s impact on psychological impacts. We show bootstrapped confidence intervals of the estimate of  $a \cdot b$  in the figures presenting these results. Of the three psychological indices, aspirations reveals the strongest potential mediation effects, where of the 0.56 years of grade completion impact from our 2SLS household fixed-effects estimate, up to 0.059 of the added grade completion ( $p < 0.05$ ) is mediated through the program’s effect on aspirations, or about 11% of the total effect. The 2SLS of the other indices are smaller, indicating that up to 0.026 ( $p < 0.10$ ) of this effect on grade completion is mediated through the program’s impact on self-esteem (about 5% of the total), and up to 0.019 through increases in optimism ( $p > 0.10$ ), or 3.4% of the total effect. However, we emphasize that these results establish only necessary conditions and upper-bounds for mediation of aspirations (and possibly self-esteem), rather than demonstrate sufficient conditions for their existence in our data (which would require separate and valid instruments for these mediators).<sup>18</sup>

#### 4.6 Robustness

We carried out three robustness checks on our estimations, which are presented in Table 11. The specification used is identical to that in Panel D of Table 8, that is, 2SLS with household fixed effects

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<sup>17</sup> The Imai et al. (2011) estimates in Table 10 are discussed below in subsection 4.6.

<sup>18</sup> Valid instruments for a mediator must be correlated with the mediator through channels other than treatment as well as satisfy the exclusion restriction. Dippel et al. (2018) show that a single variable may serve as an instrument for both treatment and a mediator if it has a direct effect on treatment and on the mediator *conditional* on treatment, a condition that is unsatisfied in the majority of contexts, including ours.

and controls for age, gender, and birth order. The first check, in Panel A, aggregates our indices using a method devised by Kling, Liebman, and Katz (2007) (similar to the Anderson indices except that they weight each characteristic in each index equally). The results are quite close to the corresponding estimates in Panel D of Table 8.<sup>19</sup>

In Panel B we check for possible endogenous selection of siblings in Indonesia by restricting the sample in Indonesia to households with only two children. The concern in Indonesia is that the children asked to select a sibling to bring to the session may not have chosen a random sibling; focusing on children with one or no siblings avoids this potential for selection bias. Point estimates are similar to our main specification for the self-esteem index, years of education expected, and the aspirations index. While our optimism index is no longer statistically significant, we now find a significantly positive impact on hope for a white-collar job of 8.5 percentage points.

In Panel C, we exclude those non-sponsored children who are older than the oldest sponsored child surveyed and those younger than the youngest sponsored child surveyed within each country. This ensures that the counterfactual non-sponsored children have the same age range as the sponsored children. The results for this subsample are broadly similar to those in our main specification, although they are more imprecisely estimated due to the reduced sample size.

It is possible that there are channels other than aspirations that lead to the success of the sponsorship program. However, we are restricted in our analysis by our original survey instrument (Table A1). Thus, we are unable to explore alternative hypotheses without further data collection. Additionally, we present FDR  $q$ -values for the three indices in our main specifications to show that our results are robust to multiple hypothesis testing.

Finally, we complement the mediation analysis by estimating a method proposed by Imai et al. (2011). Here we briefly describe their method. With a slight abuse of notation, let  $M_i(t)$  denote the potential value of a mediator for the treatment category  $t$  for individual  $i$ . Let the observed outcome be denoted by  $Y_i(T_i, M_i(T_i))$ , where  $M_i(T_i)$  represents the observed value of the mediator. The causal mediation effect, as defined by Imai et al. (2011) is  $\delta_i(t) = Y_i(t, M_i(1)) - Y_i(t, M_i(0))$ . To identify the mediation effect, they authors rely on the sequential ignorability assumption.<sup>20</sup>

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<sup>19</sup> This applies only to the three indices in columns 1, 2 and 5. The results on occupation hopes, expectations and education expectations in columns 3-5 remain unchanged since those variables are not indices.

<sup>20</sup> Sequential ignorability incorporates the following assumptions: (1) Conditional on the observed pretreatment covariates, treatment is independent of all potential values of the outcome and mediating variables; and (2) the mediator is independent of all potential outcomes given the observed treatment and pretreatment covariates.

We estimate average mediation effects using linear models for both the mediators and outcome equations. Notice though that we still have the problem of endogeneity of the mediator. Within this framework, as in Dippel et al. (2018), a valid instrument should be correlated with the mediator through channels other than treatment, a condition that is hard to satisfy and that we do not meet. Furthermore, within this setting, we do not instrument for treatment. Hence, these results are most informative when compared to our mediation estimates using OLS. The estimates of  $\hat{\delta}_i(1)$  are presented in Table 10. The estimates using the method of Imai et al. (2011) are similar to our OLS results for aspirations and self-esteem, but larger for optimism; all are significant at the 5% level.

#### 4.7 Spillovers

The results above suggest that child sponsorship increased aspirations, optimism, and self-esteem of program participants, relative to their unsponsored siblings and other children in their community. However, we must verify that these positive psychological impacts are not driven by negative psychological impacts on their siblings in addition to, or instead of, positive impacts on the sponsored children themselves. While Wydick, Glewwe, and Rutledge (2013) found evidence of *positive* spillovers in terms of secondary school completion for younger siblings, the direction of any psychological spillovers is less clear. The possibility of negative spillovers is a valid concern, for example, as Baird, de Hoop, and Özler (2013) show that a cash transfer program increased psychological distress among untreated adolescents in treatment areas.

We are unable to test directly for spillovers onto nonparticipants. However, we can provide suggestive evidence by comparing differences between our three groups of nonparticipants: non-sponsored siblings in Compassion households, children in the same community as a Compassion program but not in a household with a sponsored child, and (for Mexico only) children in a neighboring village without a Compassion program. If there are negative spillovers onto siblings, we would expect to find that they score lower on our measures of self-esteem, optimism, and aspirations relative to children in comparable unsponsored households within the same community and children in neighboring communities without the program. If there are negative spillovers onto unsponsored children in the same community in households without sponsored children, we would expect them to score lower on the three indices relative to children in a neighboring community where no such program exists.

The primary concern is the possibility of negative spillovers onto unsponsored siblings. In order to address this, we run a placebo regression comparing unsponsored siblings of sponsored children to children in households without a sponsored child. We estimate a version of equation (1), with community fixed effects and the full set of controls. Instead of an indicator for sponsorship, we include an indicator for unsponsored sibling of sponsored child, and drop all sponsored individuals from the sample. Thus, the coefficient on unsponsored sibling represents the difference compared to children in unsponsored households.

Table A14 presents results from this exercise in Panels A and B. Panel A includes both Indonesia and Mexico and includes only individuals from the same community. There are no significant differences between unsponsored siblings and children in the same village without a sponsored sibling. Additionally, for 5 of the 6 outcomes the point estimate is positive, and the one negative estimate is very small ( $-0.001\sigma$  on hope for a white-collar job). Panel B estimates this equation but excludes individuals in untreated households in the same community while adding children in neighboring villages (Mexico only) without a Compassion program. Again, for 5 of the 6 outcomes, the point estimate is positive, and is statistically significant for occupation aspirations and the aspirations index. The one negative outcome, optimism, is much smaller ( $-0.024\sigma$ ) than the positive effect for sponsorship in the same specification in Panel B of Table 7 ( $0.159\sigma$ ).

An additional concern is spillovers onto children in the same community as a Compassion program. These children lack the resources of sponsored children, possibly creating negative psychological impacts. To test for this, in Mexico we run a similar specification but now we compare those in untreated households in Compassion villages with children in a neighboring village without Compassion. These results are presented in Panel C. For all 6 of the outcomes the point estimate is positive, although never statistically significant.

Finally, there are good reasons to believe that spillovers from child sponsorship, if they exist, would be much larger onto younger siblings of sponsored children than onto older siblings, a phenomenon long recognized in the family psychology literature (e.g. Widmer, 1997, Brook, 1990). To take advantage of this, we follow the approach taken in Wydick et al. (2013) and use older siblings, who are less likely to be affected by sponsorship of a younger sibling, as a benchmark and test for relative spillovers onto younger siblings of sponsored children. Table A15 presents results mirroring those of Table 7, but with an additional indicator for being the younger sibling of a sponsored child, where the excluded group is now the older siblings of sponsored children. The



coefficient on younger sibling is negative and significant for self-esteem and optimism in Panels A and C, but once age, gender, and birth order are taken into account in Panels B and D, there is no evidence of negative spillovers onto younger siblings. Table A16 repeats this for Table 8, and uses our vector of age at program introduction indicators as an instrument for both sponsorship and being the younger sibling of a sponsored child. The results are similar.

Overall, these results are consistent with a lack of negative psychological spillovers onto unsponsored siblings of sponsored children (in Mexico and Indonesia), as well as onto children within the same community without a sponsored child in the household (in Mexico). Our preferred estimates use a household fixed effect, and the lack of evidence for spillovers provides added confidence to estimates from Kenya, where all data are from households that contain a sponsored child. The implication is that even if additional data were to exist in Kenya from households without sponsored children, it would exhibit very little change on our estimates. Indeed, the overall results suggest that if any spillovers exist, they are small and positive.

This is consistent with the findings for long-term impacts in Wydick, Glewwe and Rutledge (2013, 2017) that resources provided by the program in some cases likely provided additional resources for non-sponsored children, and that sponsored children achieving higher levels of education created a desire by parents to facilitate similarly higher levels of education among younger unsponsored siblings. Moreover, the (weakly) positive spillovers onto siblings, particularly for younger siblings, is consistent with anecdotal evidence in the field that the success of their older siblings served as an inspiration for those within the household.

## 5. Conclusion

This paper seeks to explain whether elevated levels of aspirations may account for the large and significant impacts on life outcomes found in studies of international child sponsorship (Wydick, Glewwe, and Rutledge, 2013 and 2017). While the program we study, Compassion International, provides many of the traditional interventions to promote child health and education, a strong focus of Compassion's program is on building the self-esteem, optimism, and aspirations of sponsored children regarding educational and vocational outcomes.

Our instrumental variable estimates indicate that Compassion's child sponsorship program has large and statistically significant causal effects on self-esteem, optimism, overall aspirations, and higher self-expectations for education, along with weaker but still generally positive effects on expectations for employment. We also find that the program increased grade completion levels by

0.56 years in our sample and that the program's effect on elevating aspirations for education and future employment among children mediate as much as 11% of this increase in added grade completion. Point estimates indicate that self-esteem mediates as much as 5% of the effect on education, and optimism as much as 3.4% of that effect, but the former is significant only at the 10% level and the latter is not statistically significant. Much of the remainder of the impact of the program may occur through the practical inputs provided by the program, such as paying for school fees and school uniforms. We find effects to be generally positive in all countries, but stronger and generally more statistically significant in Kenya. This is likely to reflect a phenomenon similar to that observed in Wydick et al. (2013, 2017), where the largest impacts of the intervention on adult life outcomes were in the two sub-Saharan African countries in the study (Uganda and Kenya), where counterfactual outcomes to the Compassion intervention were lower than in Asian and Latin American countries. We find no evidence for positive or negative spillovers onto non-sponsored siblings or onto children in non-sponsored households within the same community. It is particularly encouraging that we find no evidence that the psycho-social benefits received by sponsored children come at the expense of negative psycho-social impacts on non-sponsored children (e.g. because they feel left out of the program).

Given that aspirations mediate a substantial fraction of the differences we find in education, what aspects of child sponsorship might serve as channels for heightened aspirations? Because we analyze a bundled intervention, our data do not allow us to test the differential effects of the separate components of the Compassion program. There are a number of candidates for these possible channels, including the effects of relaxed household resource constraints, sponsor/child communication, and programmatic elements. We would tend to rule out the first of these since it is likely that household resources freed through sponsorship of a child would likely be spread relatively uniformly over all children, which seems incompatible with our findings using on household-level fixed effects. While it is possible that communication from sponsors could account for some of the heightened aspirations, the few hours a year (on average) children spend in communication with sponsors is very small relative to the time children spend in Compassion's programmed activities, in which they spend several hundred hours per year. Consequently, we believe that it is likely to be the programmatic elements of the intervention related to holistic child development that elevate aspirations. Even so, future research could productively focus on which elements play key roles.

Our research seeks to contribute to a larger literature exploring a causal link between aspirations and key development outcomes, such as education, employment, and income. If such a link can be established, it would have significant implications for the way in which both researchers and practitioners think about how virtuous cycles of economic development occur among the poor in developing countries. Development economics has long concerned itself with the relief of *external* constraints. Seen from the broader perspective of behavioral development economics, our study suggests that when evaluating the impacts of programs, it is also important to consider how interventions alleviate *internal* constraints, the psychological factors that can lead to persistent poverty through low self-esteem, low aspirations, and feelings of hopelessness. An understanding of how interventions to reduce poverty not only exhibit direct effects on key development outcomes, but how they affect psychological mediators that also affect these outcomes, has substantial implications for the design of poverty reduction programs. Greater understanding of the relationships between outcomes, external constraints, and internal constraints will lead to more effective poverty reducing interventions and a clearer understanding of why some programs are able to exhibit more transformative impacts than others.

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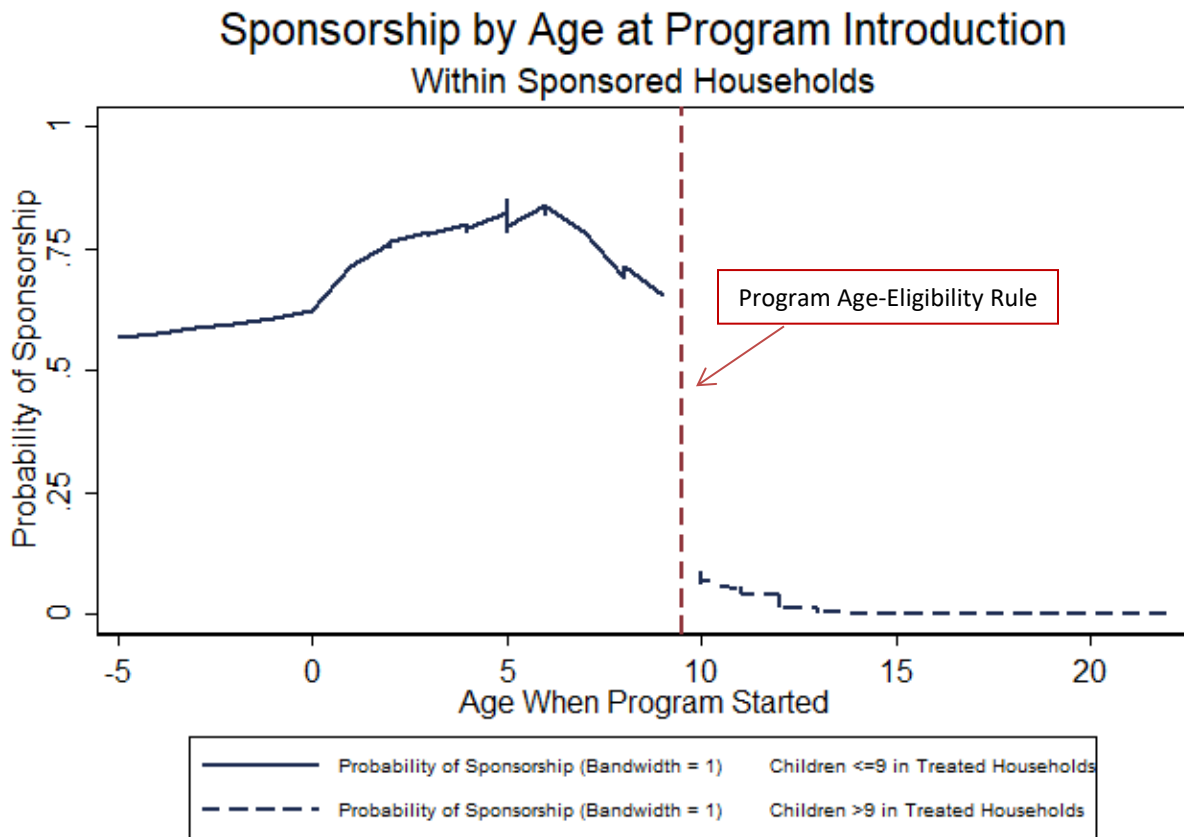
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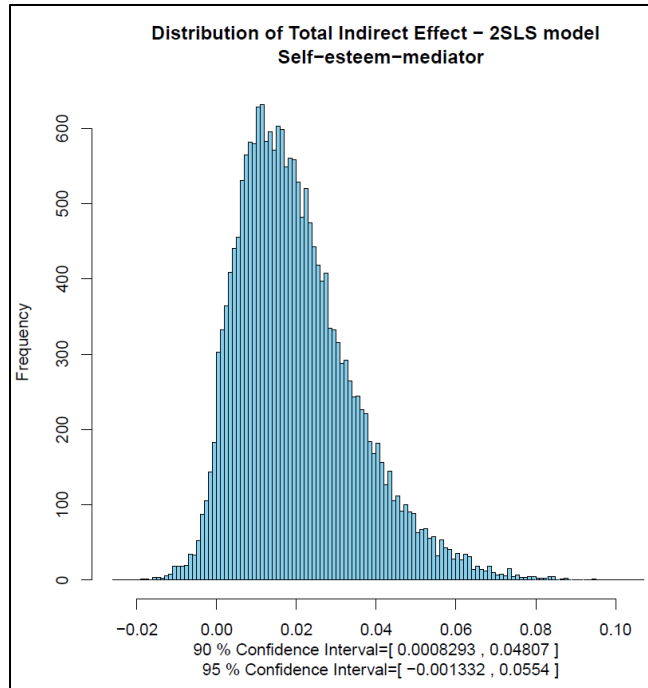
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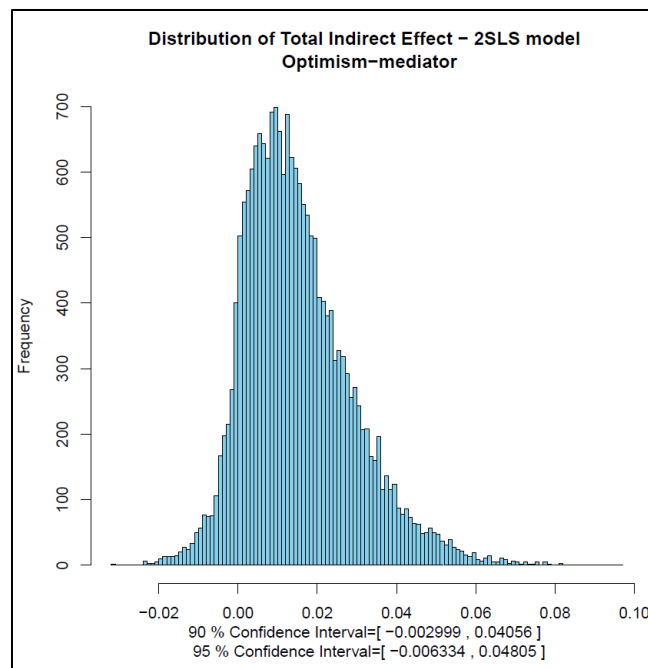
**Figure 1. Discontinuity in sponsorship by age at time of program introduction**

*Note:* Presents results from a locally weighted regression of age at program introduction on sponsorship across all three countries for those in treated households separately above and below the age-eligibility cutoff. Children had to be 9 years of age or younger at time of program introduction to be eligible for sponsorship. Sample size is 1,408.

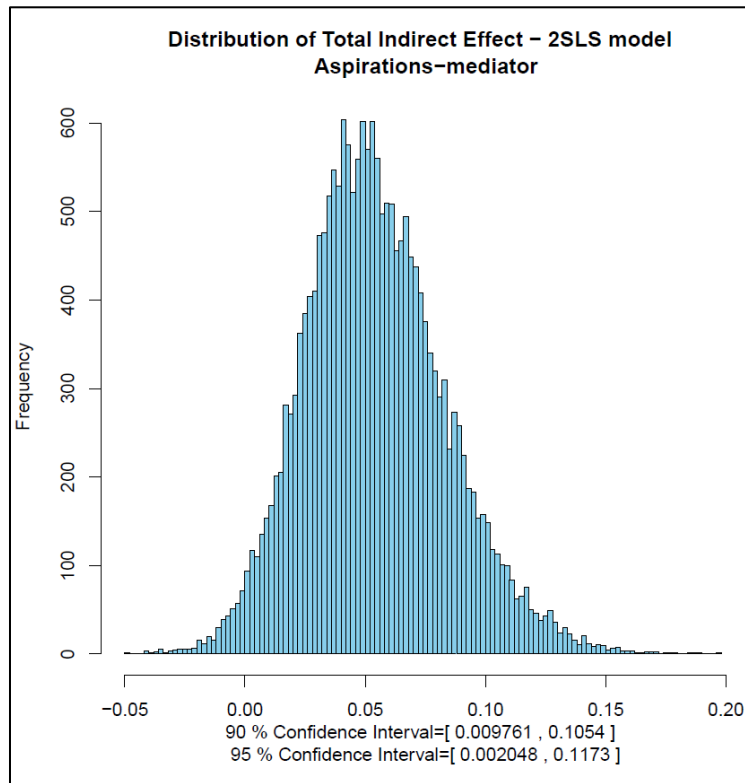




**Figure 2A: Mediation of Program Impact of Self-Esteem on Schooling**  
*Note:* The graph shows the distribution of the mediation estimate of self-esteem on schooling. The distribution is built by bootstrap. Data quartiles are used to build confidence intervals at the 90% and 95% level.



**Figure 2B: Mediation of Program Impact of Optimism on Schooling**  
*Note:* The graph shows the distribution of the mediation estimate of optimism on schooling. The distribution is built by bootstrap. Data quartiles are used to build confidence intervals at the 90% and 95% level.



**Figure 2C: Mediation of Program Impact of Aspirations on Schooling**  
*Note:* The graph shows the distribution of the mediation estimate of aspirations on schooling. The distribution is built by bootstrap. Data quartiles are used to build confidence intervals at the 90% and 95% level

**Table 1. Characteristics of Study Communities**

County	Treatment Communities (year of program rollout)	Control Communities	Sample Size	Time of Fieldwork
Kenya	Rironi (2003), Isinya (2003), Njoro (2003)	None	570	May-July 2011
Indonesia	Jakarta (two communities in 2003 and two in 2007)	None	526	May-July 2012
Mexico	San Sebastián (2012), Cintalapa (2011), Nuevo San Juan Chamula (2014), Maravilla Tenejapan (2013)	San Mateo Río Hondo, Villamorelos, Nuevo Huixtán, Francisco Madero	926	June-July 2017

**Table 2. First Stage Regressions (Dependent Variable = Sponsored Child)**

Age at Prog. Intro.	(1) Kenya	(2) Indonesia	(3) Mexico	(4) Pooled
-3		0.159 (0.288)		-0.340* (0.202)
-2		0.436 (0.269)		-0.021 (0.184)
-1		0.194 (0.284)		-0.255 (0.209)
0		0.660*** (0.226)		0.252 (0.154)
1		0.610*** (0.221)		0.193 (0.156)
2	-0.271 (0.243)	0.729*** (0.200)		0.198 (0.127)
3	0.012 (0.256)	0.818*** (0.173)	0.671* (0.344)	0.389*** (0.120)
4	0.652*** (0.194)	0.930*** (0.153)	0.381** (0.186)	0.718*** (0.105)
5	0.807*** (0.144)	0.893*** (0.151)	0.385** (0.151)	0.786*** (0.090)
6	0.859*** (0.129)	0.922*** (0.157)	0.412*** (0.123)	0.828*** (0.082)
7	0.360*** (0.114)	0.985*** (0.130)	0.385*** (0.103)	0.514*** (0.073)
8	0.185* (0.097)	0.840*** (0.122)	0.503*** (0.087)	0.449*** (0.061)
9	-0.048 (0.104)	0.387** (0.164)	0.313*** (0.078)	0.217*** (0.058)
Households	207	260	236	703
Observations	455	520	531	1506
F-Statistic	75.38	28.43	8.07	36.73

Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ , Robust standard errors clustered at the household level in parentheses. This is a linear probability model, with additional controls for household fixed effects, gender, age, and birth order. The excluded group is all children ten years or older at the time of program introduction in community.

**Table 3. Summary Statistics by Country**

Country	Kenya	Indonesia	Mexico	Pooled
Self Esteem Index	-0.003 (0.874)	-0.001 (1.088)	-0.003 (0.995)	-0.002 (0.989)
Optimism Index	0.000 (0.952)	0.000 (1.026)	-0.002 (0.962)	-0.000 (0.980)
Hope for White-collar Job	0.900 (0.300)	0.552 (0.498)	0.677 (0.468)	0.715 (0.451)
Expect White-collar Job	0.818 (0.387)	0.557 (0.497)	0.648 (0.478)	0.675 (0.468)
Years of Education Expected	15.449 (1.320)	14.992 (2.200)	14.306 (2.455)	14.920 (2.099)
Aspirations Index	0.000 (0.977)	0.009 (0.992)	-0.010 (0.983)	-0.001 (0.983)
Age	13.721 (1.976)	10.798 (3.428)	13.343 (2.414)	12.620 (2.973)
Male	0.544 (0.499)	0.466 (0.499)	0.470 (0.499)	0.493 (0.500)
Birth Order	3.249 (2.129)	2.225 (1.251)	2.519 (1.801)	2.665 (1.816)
Children in Household	4.788 (2.221)	3.528 (1.326)	3.894 (2.024)	4.071 (1.968)
Father has White-collar Job	0.237 (0.426)	0.264 (0.441)	0.103 (0.304)	0.201 (0.401)
Dwelling Index	0.000 (0.999)	0.000 (0.983)	-0.000 (1.000)	-0.000 (0.994)
Years of Sponsorship <sup>1</sup>	7.026 (1.813)	7.252 (4.633)	3.984 (1.885)	6.303 (3.659)
Observations	570	526	926	2022

*Note:* Means per country with standard deviations in parentheses.

<sup>1</sup> If sponsored, it measures the average years of sponsorship.

**Table 4. Differences between Sponsored and Non-Sponsored Across All Countries**

	Mean, All (std. dev.)	Mean, Sponsored (std. dev.)	Mean, Non-Sponsored (std. dev.)	Difference, <i>t</i> -test (std. error)
Self Esteem Index	-0.002 (0.989)	0.032 (0.965)	-0.036 (1.011)	0.068 (0.043)
Optimism Index	-0.000 (0.980)	0.080 (0.947)	-0.080 (1.006)	0.160*** (0.043)
Hope for White-collar Job (%)	0.715 (0.451)	0.736 (0.441)	0.694 (0.461)	0.042** (0.021)
Expect White-collar Job (%)	0.675 (0.468)	0.690 (0.463)	0.661 (0.474)	0.029 (0.022)
Years of Education Expected	14.920 (2.099)	15.130 (1.892)	14.711 (2.268)	0.419*** (0.089)
Aspirations Index	-0.001 (0.983)	0.068 (0.933)	-0.069 (1.027)	0.136*** (0.046)
Age	12.620 (2.973)	12.168 (2.126)	13.070 (3.568)	-0.902*** (0.143)
Male	0.493 (0.500)	0.494 (0.500)	0.492 (0.500)	0.002 (0.023)
Birth Order	2.665 (1.816)	2.640 (1.835)	2.691 (1.797)	-0.052 (0.069)
Family Size	4.071 (1.968)	3.950 (1.947)	4.192 (1.982)	-0.241*** (0.072)
Father has White-collar Job	0.189 (0.392)	0.208 (0.406)	0.171 (0.376)	0.037** (0.018)
Dwelling Index	-0.000 (0.994)	-0.024 (1.013)	0.023 (0.974)	-0.047 (0.041)

*Note:* Full sample = 2,022: 956 sponsored children, 1,066 non-sponsored children. All *t*-tests include robust standard errors clustered at household level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Table 5. OLS Estimations by Country**

	(1)	(2)	(3)	(4)	(5)	(6)
	Self Esteem Index	Optimism Index	Hope for White- collar Job	Expect White- collar Job	Years of Education Expected	Aspirations Index
<i>Panel A: Kenya</i>						
Sponsored	0.279*** (0.077)	0.035 (0.092)	0.058** (0.029)	0.072* (0.037)	0.112 (0.110)	0.148 (0.090)
FDR $q$ -value	[0.001]	[0.706]				[0.152]
Households	207	207	207	207	207	207
Observations	455	455	455	455	455	455
<i>Panel B: Indonesia</i>						
Sponsored	-0.086 (0.129)	0.055 (0.126)	0.033 (0.049)	-0.057 (0.058)	0.232 (0.281)	0.066 (0.123)
FDR $q$ -value	[0.663]	[0.663]				[0.663]
Households	198	198	198	197	198	196
Observations	395	395	361	386	394	354
<i>Panel C: Mexico</i>						
Sponsored	0.003 (0.182)	0.171 (0.173)	0.045 (0.083)	-0.015 (0.086)	0.136 (0.499)	0.076 (0.179)
FDR $q$ -value	[0.987]	[0.978]				[0.987]
Household	128	128	128	128	128	128
Observations	290	290	288	289	289	290
<i>Note:</i> *** $p < 0.01$ , ** $p < 0.05$ , * $p < 0.1$ , Robust standard errors clustered at the household level in parentheses. Controls for household fixed effects and age, gender, and birth order. Summary indices in columns 1, 2, and 6 are measured in standard deviations. Columns 3 and 4 are measured in percentage points, and column 5 is in years of education. Sample includes only sponsored households.						

**Table 6. 2SLS Estimations by Country**

	(1)	(2)	(3)	(4)	(5)	(6)
	Self Esteem Index	Optimism Index	Hope for White- collar Job	Expect White- collar Job	Years of Education Expected	Aspirations Index
<i>Panel A: Kenya</i>						
Sponsored	0.336*** (0.105)	-0.001 (0.120)	0.114*** (0.038)	0.091* (0.053)	0.267* (0.149)	0.368*** (0.122)
FDR $q$ -value	[0.003]	[0.995]				[0.003]
Households	207	207	207	207	207	207
Observations	455	455	455	455	455	455
<i>Panel B: Indonesia</i>						
Sponsored	0.138 (0.205)	0.512*** (0.196)	0.057 (0.083)	0.005 (0.087)	0.529 (0.414)	0.225 (0.214)
FDR $q$ -value	[0.501]	[0.027]				[0.440]
Households	259	259	212	250	258	206
Observations	518	518	424	500	516	412
<i>Panel C: Mexico</i>						
Sponsored	-0.004 (0.381)	-0.280 (0.387)	-0.102 (0.199)	0.052 (0.192)	1.539 (1.035)	0.402 (0.413)
FDR $q$ -value	[0.991]	[0.705]				[0.705]
Households	231	231	229	228	230	231
Observations	519	519	514	513	516	519
<i>Note: *** <math>p &lt; 0.01</math>, ** <math>p &lt; 0.05</math>, * <math>p &lt; 0.1</math>, Robust standard errors clustered at the household level in parentheses. Controls included for household fixed effects and age, gender, and birth order. Summary indices in columns 1, 2, and 6 are measured in standard deviations. Columns 3 and 4 are measured in percentage points, and column 5 is in years of education. <math>F</math> statistics of the excluded instruments are 80.1 in Panel A, 17.5 to 28.5 in Panel B and 8.1 to 9.0 in Panel C.</i>						

**Table 7. Pooled OLS Estimations for All Countries (Kenya, Indonesia, and Mexico)**

	(1)	(2)	(3)	(4)	(5)	(6)
	Self Esteem Index	Optimism Index	Hope White- collar Job	Expect White- collar Job	Education Expected	Aspirations Index
<i>Panel A: Community Fixed Effects, No Demographic Controls</i>						
Sponsored ( $\gamma$ )	0.043 (0.055)	0.087 (0.056)	0.028 (0.024)	0.018 (0.027)	0.224** (0.102)	0.139** (0.058)
FDR $q$ -value	[0.430]	[0.183]				[0.054]
Sponsored Household ( $\pi$ )	0.062 (0.081)	0.168** (0.078)	-0.011 (0.038)	-0.002 (0.037)	0.059 (0.183)	-0.003 (0.085)
Sponsored Site ( $\theta$ )	0.007 (0.088)	0.049 (0.085)	0.060 (0.042)	0.048 (0.044)	-0.114 (0.212)	0.016 (0.091)
$\gamma + \pi$	0.105 (0.067)	0.255*** (0.066)	0.017 (0.034)	0.017 (0.033)	0.283* (0.162)	0.135* (0.073)
$\gamma + \pi + \theta$	0.112 (0.083)	0.304*** (0.081)	0.077* (0.039)	0.064 (0.040)	0.169 (0.190)	0.152* (0.081)
FDR $q$ -value	[0.179]	[0.001]				[0.092]
Households	1215	1215	1208	1211	1208	1210
Observations	2010	2010	1953	1994	2000	1952
<i>Panel B: Community Fixed Effects with Demographic Controls</i>						
Sponsored ( $\gamma$ )	0.112** (0.055)	0.159*** (0.058)	0.020 (0.023)	0.009 (0.026)	0.206* (0.108)	0.107* (0.058)
FDR $q$ -value	[0.065]	[0.018]				[0.065]
Sponsored Household ( $\pi$ )	-0.010 (0.079)	0.082 (0.076)	-0.011 (0.035)	0.002 (0.036)	0.098 (0.181)	0.027 (0.080)
Sponsored Site ( $\theta$ )	0.072 (0.086)	0.104 (0.083)	0.062 (0.041)	0.047 (0.042)	-0.017 (0.212)	0.034 (0.089)
$\gamma + \pi$	0.102 (0.065)	0.241*** (0.064)	0.009 (0.031)	0.011 (0.031)	0.304* (0.159)	0.133* (0.068)
$\gamma + \pi + \theta$	0.174** (0.082)	0.346*** (0.081)	0.071* (0.038)	0.058 (0.039)	0.287 (0.190)	0.167** (0.079)
FDR $q$ -value	[0.034]	[0.001]				[0.034]
Households	1054	1054	1049	1051	1049	1049
Observations	1793	1793	1738	1778	1786	1735
<i>Panel C: Household Fixed Effects, No Demographic Controls</i>						
Sponsored	0.068 (0.058)	0.008 (0.063)	0.040 (0.026)	0.023 (0.030)	0.134 (0.112)	0.125* (0.066)
FDR $q$ -value	[0.359]	[0.895]				[0.174]
Households	533	533	533	532	533	531
Observations	1140	1140	1104	1130	1138	1099
<i>Panel D: Household Fixed Effects with Demographic Controls</i>						
Sponsored	0.108* (0.061)	0.053 (0.066)	0.036 (0.025)	0.014 (0.029)	0.147 (0.123)	0.102 (0.068)
FDR $q$ -value	[0.201]	[0.429]				[0.201]
Households	533	533	533	532	533	531
Observations	1140	1140	1104	1130	1138	1099

Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ , Robust standard errors clustered at the household level in parentheses. Demographic controls include age, gender, and birth order in panels B and D. Panel B additionally controls for family size, dwelling quality, and parent occupation. Summary indices in columns 1, 2, and 6 are measured in standard deviations. Columns 3 and 4 are measured in percentage points, and column 5 is in years of education. Sponsored household is for Indonesia and Mexico. Sponsored site is only for Mexico.



**Table 8. Pooled 2SLS Estimations for All Countries (Kenya, Indonesia, and Mexico)**

	(1)	(2)	(3)	(4)	(5)	(6)
	Self Esteem Index	Optimism Index	Hope White- collar Job	Expect White-collar Job	Education Expected	Aspirations Index
<i>Panel A: Community Fixed Effects, No Demographic Controls</i>						
Sponsored ( $\gamma$ )	-0.235** (0.116)	0.018 (0.112)	0.092* (0.052)	0.058 (0.053)	0.325 (0.222)	0.387*** (0.121)
FDR $q$ -value	[0.063]	[0.874]				[0.003]
Sponsored Household ( $\pi$ )	0.268** (0.112)	0.219** (0.107)	-0.059 (0.052)	-0.031 (0.052)	-0.016 (0.238)	-0.189 (0.120)
Sponsored site ( $\theta$ )	0.011 (0.087)	0.050 (0.085)	0.059 (0.042)	0.047 (0.044)	-0.115 (0.211)	0.013 (0.091)
$\gamma + \pi$	0.034 (0.071)	0.237*** (0.070)	0.033 (0.036)	0.027 (0.034)	0.309 (0.167)	0.198*** (0.076)
$\gamma + \pi + \theta$	0.044 (0.085)	0.287*** (0.084)	0.092** (0.041)	0.074* (0.042)	0.194 (0.196)	0.211** (0.084)
FDR $q$ -value	[0.599]	[0.003]				[0.018]
Households	1215	1215	1208	1211	1208	1210
Observations	2010	2010	1953	1994	2000	1952
<i>Panel B: Community Fixed Effects with Demographic Controls</i>						
Sponsored ( $\gamma$ )	0.041 (0.124)	0.348*** (0.122)	0.105* (0.056)	0.068 (0.058)	0.703*** (0.259)	0.466*** (0.130)
FDR $q$ -value	[0.741]	[0.006]				[0.001]
Sponsored Household ( $\pi$ )	0.045 (0.116)	-0.063 (0.113)	-0.076 (0.052)	-0.043 (0.054)	-0.286 (0.256)	-0.249** (0.123)
Sponsored site ( $\theta$ )	0.071 (0.085)	0.106 (0.083)	0.063 (0.041)	0.047 (0.042)	-0.012 (0.211)	0.035 (0.089)
$\gamma + \pi$	0.086 (0.070)	0.285*** (0.068)	0.029 (0.034)	0.025 (0.033)	0.418** (0.167)	0.217*** (0.072)
$\gamma + \pi + \theta$	0.157* (0.085)	0.391*** (0.084)	0.092** (0.041)	0.072* (0.041)	0.406** (0.198)	0.253*** (0.084)
FDR $q$ -value	[0.063]	[0.001]				[0.005]
Households	1215	1215	1208	1211	1208	1210
Observations	2010	2010	1953	1994	2000	1952
<i>Panel C: Household Fixed Effects, No Demographic Controls</i>						
Sponsored	0.084 (0.100)	0.051 (0.099)	0.078* (0.045)	0.053 (0.050)	0.281 (0.201)	0.279** (0.111)
FDR $q$ -value	[0.602]	[0.605]				[0.036]
Households	697	697	648	685	695	644
Observations	1492	1492	1393	1468	1487	1386
<i>Panel D: Household Fixed Effects with Demographic Controls</i>						
Sponsored	0.255** (0.110)	0.259** (0.109)	0.077 (0.048)	0.046 (0.052)	0.437* (0.236)	0.292** (0.119)
FDR $q$ -value	[0.021]	[0.021]				[0.021]
Households	697	697	648	685	695	644
Observations	1492	1492	1393	1468	1487	1386

Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ , Robust standard errors clustered at the household level in parentheses. Demographic controls include age, gender, and birth order in panels B and D. Panel B additionally controls for family size. Summary indices in columns 1, 2, and 6 are measured in standard deviations. Columns 3 and 4 are measured in percentage points, and column 5 is in years of education. Excluded instruments for sponsorship in first stage of two stage least squares estimations are dummy variables for age at sponsorship program introduction. F-statistic of the excluded instruments range from the following: panel A: 52.6 to 57.9, panel B: 33.1 to 36.0, panel C: 49.2 to 55.0, panel D: 30.4 to 36.5. Sponsored household is only for Indonesia and Mexico. Sponsored site is only for Mexico.

**Table 9. Years of Education**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<u>Ordinary Least Squares</u>				<u>Two Stage Least Squares</u>			
Additional Controls?	<u>Community Fixed Effects</u>		<u>Household Fixed Effects</u>		<u>Community Fixed Effects</u>		<u>Household Fixed Effects</u>	
	N	Y	N	Y	N	Y	N	Y
Sponsored ( $\gamma$ )	0.332*** (0.062)	0.286*** (0.062)	0.282*** (0.063)	0.300*** (0.062)	0.526*** (0.136)	0.555*** (0.135)	0.564*** (0.131)	0.567*** (0.131)
Sponsored Household ( $\pi$ )	0.104 (0.103)	0.161 (0.104)			-0.043 (0.127)	-0.046 (0.128)		
Sponsored Site ( $\theta$ )	-0.260 (0.167)	-0.212 (0.167)			-0.256 (0.167)	-0.209 (0.167)		
$\gamma + \pi$	0.436*** (0.085)	0.447*** (0.085)			0.489*** (0.094)	0.509*** (0.094)		
$\gamma + \pi + \theta$	0.177 (0.146)	0.235 (0.148)			0.227 (0.152)	0.300* (0.153)		
Households	1206	1206	534	534	1206	1206	698	698
Observations	2003	2003	1143	1143	2003	2003	1495	1495

*Note:* \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Robust standard errors clustered at the household level in parentheses. All columns control for age. Additional controls include gender and birth order. Community fixed effects estimations also include family size and parent's occupation as additional controls. Dependent variable in each panel is years of education. Excluded instruments for sponsorship in first stage of two stage least squares estimations are dummy variables for age at sponsorship program introduction. F-statistic from first stage estimation for column 5 is 35.3, column 6: 35.6, column 7: 36.8, and column 8: 35.8.

**Table 10: Mediation Effects of Aspirations, Self-Esteem, and Optimism**

	Point Estimate $a \times b$	CI 90%	CI 95%
<b>Aspirations</b>			
OLS	0.0273	[-0.0002,0.0544]	[-0.0046,0.0608]
2SLS	0.0590	[-0.0102,0.1077]	[-0.0023,0.1194]
Imai et al. (2011)	0.0397	[-0.0157,0.0700]	[-0.011,0.0700]
<b>Self-esteem</b>			
OLS	0.0137	[-0.0003,0.0270]	[-0.0009,0.0311]
2SLS	0.0261	[-0.0017,0.0505]	[-0.0004,0.0580]
Imai et al. (2011)	0.0106	[-0.002,0.0200]	[-0.0008,0.0200]
<b>Optimism</b>			
OLS	0.0085	[-0.0014,0.0184]	[-0.0029,0.0219]
2SLS	0.0193	[-0.0022,0.0408]	[-0.0055,0.0482]
Imai et al. (2011)	0.0237	[-0.0102,0.0400]	[-0.0083,0.0400]

*Note:* The confidence intervals were created using bootstrapped standard errors. The estimates from Imai et al. (2011) use linear models for the mediation and outcome equations. Hence, as a robustness analysis, these estimates are more informative when compared with our OLS estimates.

**Table 11. Robustness Checks (pooled results)**

	(1)	(2)	(3)	(4)	(5)	(6)
	Self Esteem Index	Optimism Index	Hope for White- collar job	Expect White- collar job	Years of Education Expected	Aspirations Index
<i>Panel A: Kling, Liebman, and Katz (2007) indices</i>						
Sponsored	0.243** (0.107)	0.283*** (0.109)	0.077 (0.048)	0.046 (0.052)	0.437* (0.236)	0.256** (0.116)
Households	697	697	648	685	695	696
Observations	1492	1492	1393	1468	1487	1490
<i>Panel B: Restrict Indonesia sample to families with only 1 or 2 children</i>						
Sponsored	0.286*** (0.109)	0.017 (0.124)	0.085** (0.042)	0.075 (0.054)	0.395* (0.239)	0.299** (0.120)
Households	488	488	480	484	487	482
Observations	1074	1074	1057	1066	1071	1062
<i>Panel C: Drop non-sponsored children without sponsored child age support</i>						
Sponsored	0.181 (0.118)	0.202* (0.118)	0.060 (0.050)	0.043 (0.055)	0.348 (0.255)	0.237* (0.124)
Households	648	648	603	637	647	599
Observations	1381	1381	1290	1359	1378	1283
<i>Note: *** <math>p &lt; 0.01</math>, ** <math>p &lt; 0.05</math>, * <math>p &lt; 0.1</math>, Robust standard errors clustered at the household level in parentheses. Controls for household fixed effects and age, gender, and birth order. Summary indices in columns 1, 2, and 6 are measured in standard deviations. Columns 3 and 4 are measured in percentage points, and column 5 is in years of education. <math>F</math> statistics for the excluded instrument are 30.4 to 36.5 in Panel A, 32.0 to 32.6 in Panel B and 24.8 to 29.1 in Panel C. Panel C drops non-sponsored observations outside of the age range of sponsored children within each country.</i>						

# APPENDIX A

**Table A1: Survey Instrument**

<b>Household ID:</b>	<b>Village:</b>	<b>Enumerator:</b>		
<b>Name:</b>		<b>Compassion Number:</b>		
<b>Gender:</b>	M	F		
<b>Age:</b>				
<b>Year in School or highest class level achieved:</b>				
<b>Is the child attending boarding school?</b>	Yes	No		
<b>Sponsored?</b>	Yes	No		
<b>Does this child have a Sibling that is Sponsored?</b>	No	Yes, and this child is older than sponsored sibling	Yes, and this child is younger than sponsored sibling	
<b>Birth Order:</b> (1 is oldest)		<b>Total Number of Children in Family:</b>		
<b>Religion:</b>	Evangelical/ Protestant	Catholic	Other	None
<p>BELOW IS A LIST OF STATEMENTS DEALING WITH YOUR GENERAL FEELINGS ABOUT YOURSELF. IF YOU <b>STRONGLY AGREE</b>, CIRCLE <b>SA</b>. IF YOU <b>AGREE</b> WITH THE STATEMENT, CIRCLE <b>A</b>. IF YOU <b>DISAGREE</b>, CIRCLE <b>D</b>. IF YOU <b>STRONGLY DISAGREE</b>, CIRCLE <b>SD</b>.</p>				
<b>Self-Esteem:</b>	<b>Strongly Agree</b>	<b>Agree</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
I feel that I'm a person of worth, on an equal plane with others.	SA	A	D	SD
I am able to do things as well as most other people.	SA	A	D	SD
I feel I do not have much to be proud of.	SA	A	D	SD
On the whole, I am satisfied with myself.	SA	A	D	SD
At times I think I am no good at all.	SA	A	D	SD
<b>Hopefulness about future:</b>				
I feel like the future holds good things for me.	SA	A	D	SD
I feel that when I am older I will have a good job with a good income.	SA	A	D	SD
I feel that my life as an adult will be better for me than it was for my parents.	SA	A	D	SD
What kind of job do you <b>hope</b> that you can have in the future?				

<b>Reference Points: (skip 22&amp;23 if not sponsored)</b>						
What level of education does your mother expect you to achieve?	Primary School (Primaria)	Secondary School (Secundaria)	Technical Studies	High School (Preparatoria)	University (Universidad)	
What level of education does your father expect you to achieve?	Primary School (Primaria)	Secondary School (Secundaria)	Technical Studies	High School (Preparatoria)	University (Universidad)	
What level of education do your siblings expect you to achieve?	Primary School (Primaria)	Secondary School (Secundaria)	Technical Studies	High School (Preparatoria)	University (Universidad)	
What level of education do your peers expect you to achieve?	Primary School (Primaria)	Secondary School (Secundaria)	Technical Studies	High School (Preparatoria)	University (Universidad)	
What level of education does the staff at Compassion expect you to achieve?	Primary School (Primaria)	Secondary School (Secundaria)	Technical Studies	High School (Preparatoria)	University (Universidad)	
What level of education does your foreign sponsor expect you to achieve?	Primary School (Primaria)	Secondary School (Secundaria)	Technical Studies	High School (Preparatoria)	University (Universidad)	
What level of education do you expect that your peers will achieve?	Primary School (Primaria)	Secondary School (Secundaria)	Technical Studies	High School (Preparatoria)	University (Universidad)	
What level of education would you say is sufficient in order for one to be successful today?	Primary School (Primaria)	Secondary School (Secundaria)	Technical Studies	High School (Preparatoria)	University (Universidad)	
What level of education do you realistically expect that you will achieve?	Primary School (Primaria)	Secondary School (Secundaria)	Technical Studies	High School (Preparatoria)	University (Universidad)	
Would you be satisfied with the same occupation as your father or mother?	Yes	No				
What kind of job do you <b>realistically expect</b> to have in the future?						
If you run into challenges or bad luck pursuing your first choice occupation, what other occupations would you consider?						
What age is a good age to get married?						
How many children is a good number of children to have?						

<b>The questions below are only if the child is currently sponsored through Compassion</b>				
How old were you when you first became sponsored?				
What grade in school were you when you first became sponsored?				
In what country does your sponsor live?				
What occupation does your sponsor have?				
How many times a year do you receive letters or gifts from your sponsor?				
<b>Household Characteristics: Answer once per household</b>				
Father's highest education level completed				
Mother's highest education level completed				
Father's Occupation				
Mother's Occupation				
Dwelling Roof Material	Plastic, Cardboard or Asbesto	Wood	Iron Sheet	
	Cement	Brick		
Dwelling Floor Material	Dirt	Wood	Cement	Tile
Dwelling Wall Material	Thatched	Mud blocks	Plastering	
	Concrete	Wood	Iron Sheet	
	Part Wood, Part Iron Sheet	Part Stone, Part Wood	Part Stone, Part Iron Sheet	Stone
Electricity in dwelling?	Yes	No		
Toilet in dwelling?	Yes	No		
Sewage in dwelling?	Yes	No		
Car in dwelling ?	Yes	No		
Motrocycle in dwelling?	Yes	No		
Television in dwelling?	Yes	No		
Computer in dwelling?	Yes	No		
Internet in dwelling?	Yes	No		
Fridge in dwelling?	Yes	No		

**Table A2: Summary Statistics by Country (25th, 50th and 75th percentile)**

	Kenya			Indonesia			Mexico		
	25th percentile	Median	75th percentile	25th percentile	Median	75th percentile	25th percentile	Median	75th percentile
Self Esteem Index	-0.55	-0.06	0.55	-0.76	-0.02	0.65	-0.62	-0.05	0.52
Optimism Index	-0.29	0.37	0.54	-0.79	-0.04	0.81	-0.60	-0.26	0.82
Hope for White-collar job	1	1	1	0	1	1	0	1	1

Expect White-collar job	1	1	1	0	1	1	0	1	1
Years of Education Expected	16	16	16	16	16	16	12	16	16
Aspirations Index	-0.34	0.26	0.80	-0.58	-0.05	0.93	-0.52	0.35	0.70
Age	12	14	15	8	11	13	11	13	15
Birth Order	2	3	5	1	2	3	1	2	3
Children in household	3	5	6	3	3	4	3	3	5
Dwelling Index	-1.13	-0.06	1.01	-0.36	0.23	0.81	-0.80	0.07	0.93



**Table A3. Summary Statistics for Kenya**

	Mean, All (std. dev.)	Mean, Sponsored (std. dev.)	Mean, Non-Sponsored (std. dev.)	Difference, <i>t</i> -test (std. error)
Self Esteem Index	-0.003 (0.874)	0.093 (0.833)	-0.137 (0.913)	0.230*** (0.068)
Optimism index	0.000 (0.952)	0.054 (0.895)	-0.076 (1.025)	0.129* (0.076)
Hope for White-collar job (%)	0.900 (0.300)	0.919 (0.273)	0.873 (0.333)	0.046* (0.027)
Expect White-collar job (%)	0.818 (0.387)	0.850 (0.358)	0.772 (0.420)	0.078*** (0.035)
Years of Education Expected	15.449 (1.320)	15.574 (0.956)	15.274 (1.691)	0.299*** (0.111)
Aspirations Index	0.000 (0.977)	0.103 (0.897)	-0.145 (1.064)	0.248*** (0.086)
Age	13.721 (1.976)	13.366 (1.204)	14.219 (2.635)	-0.853*** (0.161)
Male	0.544 (0.499)	0.547 (0.499)	0.540 (0.499)	0.006 (0.042)
Birth Order	3.249 (2.129)	3.150 (2.180)	3.388 (2.051)	-0.238** (0.105)
Children in household	4.788 (2.221)	4.471 (2.247)	5.232 (2.110)	-0.761*** (0.103)
Father has white-collar job	0.211 (0.408)	0.216 (0.412)	0.203 (0.403)	0.014 (0.021)
Dwelling Index	0.000 (0.999)	0.035 (1.035)	-0.049 (0.948)	0.084* (0.050)

*Note:* Full sample = 570: 333 sponsored children, 237 non-sponsored siblings of sponsored children. All *t*-tests include robust standard errors clustered at household level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Table A4. OLS Estimations for Kenya**

	(1)	(2)	(3)	(4)	(5)	(6)
	Self Esteem Index	Optimism Index	Hope for White- collar job	Expect White- collar job	Years of Education Expected	Aspirations Index
<i>Panel A: Community Fixed Effects, No Demographic Controls</i>						
Sponsored	0.230*** (0.068)	0.130* (0.077)	0.048* (0.027)	0.080** (0.035)	0.322*** (0.109)	0.248*** (0.087)
Households	322	322	322	322	322	322
Observations	570	570	570	570	570	570
<i>Panel B: Community Fixed Effects with Demographic Controls</i>						
Sponsored	0.272*** (0.073)	0.117 (0.081)	0.044 (0.027)	0.076** (0.034)	0.191* (0.098)	0.186** (0.083)
Households	322	322	322	322	322	322
Observations	570	570	570	570	570	570
<i>Panel C: Household Fixed Effects, No Demographic Controls</i>						
Sponsored	0.239*** (0.069)	0.004 (0.087)	0.066** (0.028)	0.082** (0.037)	0.203* (0.108)	0.209** (0.090)
Households	207	207	207	207	207	207
Observations	455	455	455	455	455	455
<i>Panel D: Household Fixed Effects with Demographic Controls</i>						
Sponsored	0.279*** (0.077)	0.035 (0.092)	0.058** (0.029)	0.072* (0.037)	0.112 (0.110)	0.148 (0.090)
Households	207	207	207	207	207	207
Observations	455	455	455	455	455	455

*Note:* \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ , Robust standard errors clustered at the household level in parentheses. Demographic controls include age, gender, and birth order in panels B and D. Panel B additionally controls for family size and parent's education. Summary indices in columns 1, 2, and 6 are measured in standard deviations. Columns 3 and 4 are measured in percentage points, and column 5 is in years of education.

**Table A5. 2SLS Estimations for Kenya**

	(1)	(2)	(3)	(4)	(5)	(6)
	Self Esteem Index	Optimism Index	Hope for White- collar job	Expect White- collar job	Years of Education Expected	Aspirations Index
<i>Panel A: Community Fixed Effects, No Demographic Controls</i>						
Sponsored	0.166 (0.109)	-0.001 (0.111)	0.120*** (0.045)	0.129** (0.054)	0.377** (0.173)	0.539*** (0.140)
Households	322	322	322	322	322	322
Observations	570	570	570	570	570	570
<i>Panel B: Community Fixed Effects with Demographic Controls</i>						
Sponsored	0.295*** (0.109)	0.016 (0.116)	0.105** (0.043)	0.097* (0.053)	0.313** (0.156)	0.455*** (0.131)
Households	322	322	322	322	322	322
Observations	570	570	570	570	570	570
<i>Panel C: Household Fixed Effects, No Demographic Controls</i>						
Sponsored	0.254*** (0.091)	-0.055 (0.106)	0.123*** (0.040)	0.109** (0.052)	0.405*** (0.155)	0.443*** (0.127)
Households	207	207	207	207	207	207
Observations	455	455	455	455	455	455
<i>Panel D: Household Fixed Effects with Demographic Controls</i>						
Sponsored	0.336*** (0.105)	-0.001 (0.120)	0.114*** (0.038)	0.091* (0.053)	0.267* (0.149)	0.368*** (0.122)
Households	207	207	207	207	207	207
Observations	455	455	455	455	455	455

*Note:* \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ , Robust standard errors clustered at the household level in parentheses. Demographic controls include age, gender, and birth order in panels B and D. Panel B additionally controls for family size and parent's education. Summary indices in columns 1, 2, and 6 are measured in standard deviations. Columns 3 and 4 are measured in percentage points, and column 5 is in years of education. Excluded instruments for sponsorship in first stage of two stage least squares estimations are dummy variables for age at sponsorship program introduction.  $F$ -statistic for the excluded instruments are the following: panel A: 315.6, panel B: 118.7, panel C: 110.0, panel D: 80.1.

**Table A6. Summary Statistics for Indonesia**

	Mean, All (std. dev.)	Mean, Sponsored (std. dev.)	Mean, Non- Sponsored (std. dev.)	Difference <i>t</i> -test (std. error)
Self Esteem Index	-0.001 (1.088)	0.016 (1.078)	-0.022 (1.101)	0.038 (0.090)
Optimism index	0.000 (1.026)	0.095 (0.992)	-0.114 (1.056)	0.210** (0.089)
Hope for White-collar job (%)	0.552 (0.498)	0.544 (0.499)	0.561 (0.497)	-0.018 (0.046)
Expect White-collar job (%)	0.557 (0.497)	0.521 (0.500)	0.601 (0.491)	-0.080* (0.043)
Years of Education Expected	14.992 (2.200)	15.275 (1.923)	14.650 (2.456)	0.625*** (0.183)
Aspirations Index	0.009 (0.992)	0.055 (0.990)	-0.049 (0.993)	0.105 (0.090)
Age	10.798 (3.428)	11.045 (2.547)	10.500 (4.244)	0.545* (0.303)
Male	0.466 (0.499)	0.458 (0.499)	0.475 (0.500)	-0.016 (0.043)
Birth Order	2.225 (1.251)	2.184 (1.290)	2.274 (1.202)	-0.090 (0.113)
Children in Household	3.528 (1.326)	3.490 (1.349)	3.574 (1.299)	-0.084 (0.116)
Father has white-collar job	0.264 (0.441)	0.267 (0.443)	0.261 (0.440)	0.007 (0.044)
Dwelling Index	0.000 (0.983)	-0.042 (0.989)	0.051 (0.974)	-0.093 (0.089)

*Note:* Full sample = 526: 288 sponsored, 79 waitlist, 113 sibling of sponsored, 47 sibling of waitlist. All *t*-tests include robust standard errors clustered at household level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Table A7. Summary Statistics by Groups in Indonesia**

	Sponsored	Non-sponsored, siblings of sponsored kid	Non-sponsored in waitlist household	Total
Self Esteem Index	0.016 (1.078)	0.112 (1.164)	-0.143 (1.031)	-0.001 (1.088)
Optimism index	0.095 (0.992)	0.076 (1.086)	-0.287 (1.001)	0.000 (1.026)
Hope for White-collar job (%)	0.544 (0.499)	0.539 (0.501)	0.582 (0.496)	0.552 (0.498)
Expect White-collar job (%)	0.521 (0.500)	0.624 (0.487)	0.581 (0.495)	0.557 (0.497)
Years of Education Expected	15.275 (1.923)	14.857 (2.258)	14.464 (2.617)	14.992 (2.200)
Aspirations Index	0.055 (0.990)	0.006 (0.863)	-0.100 (1.099)	0.009 (0.992)
Age	11.045 (2.547)	11.973 (4.925)	9.168 (2.959)	10.798 (3.428)
Male	0.458 (0.499)	0.460 (0.501)	0.488 (0.502)	0.466 (0.499)
Birth Order	2.184 (1.290)	2.283 (1.271)	2.266 (1.141)	2.225 (1.251)
Children in household	3.490 (1.349)	3.655 (1.406)	3.500 (1.193)	3.528 (1.326)
Father has white-collar job	0.267 (0.443)	0.195 (0.398)	0.320 (0.468)	0.264 (0.441)
Dwelling Index	-0.042 (0.989)	-0.001 (1.009)	0.099 (0.942)	0.000 (0.983)
Observations	288	113	125	526

*Note:* Means with standard deviations in parentheses.

**Table A8. OLS Estimations for Indonesia Survey**

	(1)	(2)	(3)	(4)	(5)	(6)
	Self Esteem Index	Optimism Index	Hope for White- collar job	Expect White- collar job	Years of Education Expected	Aspirations Index
<i>Panel A: Community Fixed Effects, No Demographic Controls</i>						
Sponsored ( $\gamma$ )	-0.098 (0.119)	0.020 (0.115)	0.014 (0.056)	-0.079 (0.056)	0.326 (0.229)	0.048 (0.105)
Sponsored Household ( $\pi$ )	0.257* (0.141)	0.364*** (0.134)	-0.038 (0.071)	0.032 (0.064)	0.430 (0.303)	0.106 (0.138)
$\gamma + \pi$	0.159 (0.108)	0.385*** (0.105)	-0.024 (0.060)	-0.047 (0.053)	0.756*** (0.239)	0.154 (0.122)
Households	266	266	263	265	266	261
Observations	525	525	475	515	524	467
<i>Panel B: Community Fixed Effects with Demographic Controls</i>						
Sponsored ( $\gamma$ )	-0.053 (0.116)	0.109 (0.114)	-0.001 (0.043)	-0.084* (0.051)	0.389 (0.241)	0.038 (0.097)
Sponsored Household ( $\pi$ )	0.129 (0.133)	0.143 (0.132)	-0.055 (0.056)	0.001 (0.060)	0.151 (0.317)	0.011 (0.123)
$\gamma + \pi$	0.076 (0.106)	0.252** (0.104)	-0.056 (0.049)	-0.083* (0.047)	0.540** (0.236)	0.050 (0.104)
Households	266	266	263	265	266	261
Observations	525	525	475	515	524	467
<i>Panel C: Household Fixed Effects, No Demographic Controls</i>						
Sponsored	-0.107 (0.131)	0.037 (0.126)	0.065 (0.066)	-0.047 (0.066)	0.250 (0.272)	0.142 (0.136)
Households	198	198	198	197	198	196
Observations	395	395	361	386	394	354
<i>Panel D: Household Fixed Effects with Demographic Controls</i>						
Sponsored	-0.086 (0.129)	0.055 (0.126)	0.033 (0.049)	-0.057 (0.058)	0.232 (0.281)	0.066 (0.123)
Households	198	198	198	197	198	196
Observations	395	395	361	386	394	354

Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ , Robust standard errors clustered at the household level in parentheses. Demographic controls include age, gender, and birth order in panels B and D. Panel B additionally controls for family size. Summary indices in columns 1, 2, and 6 are measured in standard deviations. Columns 3 and 4 are measured in percentage points, and column 5 is in years of education.

**Table A9. 2SLS Estimations for Indonesia Survey**

	(1)	(2)	(3)	(4)	(5)	(6)
	Self Esteem Index	Optimism Index	Hope for White- collar job	Expect White- collar job	Years of Education Expected	Aspirations Index
<i>Panel A: Community Fixed Effects, No Demographic Controls</i>						
Sponsored ( $\gamma$ )	-0.266 (0.223)	0.127 (0.211)	0.050 (0.104)	-0.082 (0.098)	0.211 (0.367)	0.180 (0.211)
Sponsored Household ( $\pi$ )	0.378* (0.203)	0.288 (0.183)	-0.064 (0.095)	0.034 (0.087)	0.513 (0.364)	0.011 (0.198)
$\gamma + \pi$	0.111 (0.115)	0.415*** (0.117)	-0.014 (0.065)	-0.048 (0.056)	0.724*** (0.251)	0.191 (0.127)
Households	266	266	263	265	266	261
Observations	525	525	475	515	524	467
<i>Panel B: Community Fixed Effects with Demographic Controls</i>						
Sponsored ( $\gamma$ )	-0.122 (0.217)	0.360* (0.205)	0.043 (0.090)	-0.078 (0.092)	0.446 (0.380)	0.206 (0.193)
Sponsored Household ( $\pi$ )	0.180 (0.199)	-0.046 (0.181)	-0.088 (0.081)	-0.004 (0.083)	0.108 (0.381)	-0.113 (0.183)
$\gamma + \pi$	0.058 (0.109)	0.314*** (0.112)	-0.044 (0.052)	-0.082 (0.050)	0.554** (0.246)	0.093 (0.106)
Households	266	266	263	265	266	261
Observations	525	525	475	515	524	467
<i>Panel C: Household Fixed Effects, No Demographic Controls</i>						
Sponsored	0.043 (0.212)	0.407** (0.201)	0.144 (0.104)	0.033 (0.097)	0.498 (0.396)	0.363 (0.233)
Households	259	259	212	250	258	206
Observations	518	518	424	500	516	412
<i>Panel D: Household Fixed Effects with Demographic Controls</i>						
Sponsored	0.138 (0.205)	0.512*** (0.196)	0.057 (0.083)	0.005 (0.087)	0.529 (0.414)	0.225 (0.214)
Households	259	259	212	250	258	206
Observations	518	518	424	500	516	412

Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ , Robust standard errors clustered at the household level in parentheses. Demographic controls include age, gender, and birth order in panels B and D. Panel B additionally controls for family size. Summary indices in columns 1, 2, and 6 are measured in standard deviations. Columns 3 and 4 are measured in percentage points, and column 5 is in years of education. Excluded instruments for sponsorship in first stage of two stage least squares estimations are dummy variables for age at sponsorship program introduction.  $F$ -statistic for the excluded instruments range from the following: panel A: 19.2 to 25.4, panel B: 16.7 to 20.7, panel C: 26.5 to 44.9, panel D: 17.5 to 28.5.

**Table A10. Summary Statistics for Mexico**

	Mean, All (std. dev.)	Mean, Sponsored (std. dev.)	Mean, Non-Sponsored (std. dev.)	Difference, <i>t</i> -test (std. error)
Self Esteem Index	-0.003 (0.995)	-0.042 (0.982)	0.020 (1.003)	-0.062 (0.065)
Optimism index	-0.002 (0.962)	0.100 (0.965)	-0.059 (0.957)	0.159** (0.066)
Hope for White-collar job (%)	0.677 (0.468)	0.707 (0.456)	0.660 (0.474)	0.047 (0.032)
Expect White-collar job (%)	0.648 (0.478)	0.681 (0.467)	0.629 (0.483)	0.052 (0.034)
Years of Education Expected	14.306 (2.455)	14.179 (2.558)	14.378 (2.393)	-0.200 (0.173)
Aspirations Index	-0.010 (0.983)	0.027 (0.909)	-0.030 (1.023)	0.057 (0.065)
Age	13.343 (2.414)	11.931 (1.500)	14.146 (2.467)	-2.215*** (0.122)
Male	0.470 (0.499)	0.463 (0.499)	0.474 (0.500)	-0.011 (0.034)
Birth Order	2.519 (1.801)	2.503 (1.723)	2.528 (1.845)	-0.025 (0.137)
Children in Household	3.894 (2.024)	3.805 (1.999)	3.945 (2.039)	-0.139 (0.150)
Father has white-collar job	0.093 (0.290)	0.104 (0.306)	0.086 (0.281)	0.018 (0.023)
Dwelling Index	-0.000 (1.000)	-0.098 (0.973)	0.055 (1.011)	-0.153** (0.073)
Participate in Prospera Prog.	0.859 (0.348)	0.867 (0.339)	0.854 (0.353)	0.013 (0.026)

*Note:* Full sample = 926: 334 sponsored children, 102 non-sponsored siblings of sponsored children, 490 non-sponsored children in non-sponsored households. All *t*-tests include robust standard errors clustered at household level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$



**Table A11. Summary Statistics by Groups for Mexico**

	Site with sponsorship			Site without sponsorship	Total
	Sponsored	Non-sponsored, siblings of sponsored kid	Non-sponsored in non-sponsored HH	Non-sponsored in non-sponsored HH	
Self Esteem Index	-0.041 (0.983)	0.196 (1.001)	0.011 (1.028)	-0.053 (0.966)	-0.003 (0.995)
Optimism index	0.103 (0.964)	-0.002 (0.893)	-0.012 (0.975)	-0.148 (0.961)	-0.002 (0.962)
Hope for White-collar job (%)	0.709 (0.455)	0.714 (0.454)	0.664 (0.473)	0.628 (0.484)	0.677 (0.468)
Expect White-collar job (%)	0.683 (0.466)	0.673 (0.471)	0.629 (0.484)	0.606 (0.490)	0.648 (0.478)
Years of Education Expected	14.185 (2.559)	14.354 (2.451)	14.458 (2.418)	14.280 (2.343)	14.306 (2.455)
Aspirations Index	0.031 (0.907)	0.059 (1.006)	-0.035 (1.060)	-0.071 (0.987)	-0.010 (0.983)
Age	11.928 (1.501)	15.333 (1.916)	13.941 (2.489)	13.839 (2.510)	13.343 (2.414)
Male	0.464 (0.499)	0.500 (0.502)	0.473 (0.500)	0.461 (0.500)	0.470 (0.499)
Birth Order	2.502 (1.726)	2.141 (1.485)	2.663 (1.931)	2.540 (1.864)	2.519 (1.801)
Children in Household	3.796 (1.994)	4.525 (2.096)	3.880 (2.083)	3.764 (1.918)	3.894 (2.024)
Father has White-collar job	0.105 (0.307)	0.059 (0.236)	0.103 (0.304)	0.078 (0.269)	0.093 (0.290)
Dwelling Index	-0.096 (0.974)	-0.339 (1.097)	0.064 (0.957)	0.226 (0.990)	-0.000 (1.000)
Participate in Prospera Prog.	0.867 (0.340)	0.915 (0.279)	0.841 (0.366)	0.842 (0.364)	0.859 (0.348)
Observations	334	102	273	217	926

*Note:* Means with standard deviations in parentheses

**Table A12. OLS Estimations for Mexico Survey**

	(1)	(2)	(3)	(4)	(5)	(6)
	Self Esteem Index	Optimism Index	Hope White- collar job	Expect White-collar job	Education Expected	Aspirations Index
<i>Panel A: Community Pair Fixed Effects, No Demographic Controls</i>						
Sponsored ( $\gamma$ )	-0.238** (0.102)	0.102 (0.104)	-0.012 (0.048)	0.004 (0.053)	-0.197 (0.264)	-0.032 (0.106)
Sponsored Household ( $\pi$ )	0.184 (0.118)	0.005 (0.112)	0.053 (0.054)	0.046 (0.056)	-0.069 (0.299)	0.090 (0.125)
Sponsored Site ( $\theta$ )	0.065 (0.092)	0.142 (0.088)	0.039 (0.044)	0.025 (0.046)	0.165 (0.233)	0.040 (0.099)
$\gamma + \pi$	-0.054 (0.083)	0.108 (0.081)	0.041 (0.038)	0.050 (0.041)	-0.267 (0.223)	0.057 (0.089)
$\gamma + \pi + \theta$	0.010 (0.086)	0.249*** (0.085)	0.080** (0.040)	0.075* (0.042)	-0.102 (0.202)	0.097 (0.082)
Households	627	627	623	624	620	627
Observations	915	915	908	909	906	915
<i>Panel B: Community Pair Fixed Effects with Demographic Controls</i>						
Sponsored ( $\gamma$ )	0.014 (0.118)	0.279*** (0.113)	-0.042 (0.055)	-0.054 (0.059)	-0.461 (0.290)	-0.189 (0.117)
Sponsored Household ( $\pi$ )	0.074 (0.124)	-0.081 (0.112)	0.071 (0.057)	0.091 (0.059)	0.272 (0.303)	0.232* (0.130)
Sponsored Site ( $\theta$ )	0.071 (0.088)	0.139 (0.087)	0.047 (0.042)	0.028 (0.045)	0.188 (0.235)	0.056 (0.097)
$\gamma + \pi$	0.089 (0.087)	0.197*** (0.085)	0.028 (0.040)	0.038 (0.042)	-0.188 (0.228)	0.043 (0.091)
$\gamma + \pi + \theta$	0.160 (0.091)	0.337*** (0.090)	0.075* (0.041)	0.066 (0.043)	-0.001 (0.210)	0.099 (0.083)
Households	627	627	623	624	620	627
Observations	915	915	908	909	906	915
<i>Panel C: Household Fixed Effects, No Demographic Controls</i>						
Sponsored	-0.184 (0.113)	-0.032 (0.117)	-0.095 (0.059)	-0.052 (0.069)	-0.349 (0.315)	-0.175 (0.117)
Households	128	128	128	128	128	128
Observations	290	290	288	289	289	290
<i>Panel D: Household Fixed Effects with Demographic Controls</i>						
Sponsored	0.003 (0.182)	0.171 (0.173)	0.045 (0.083)	-0.015 (0.086)	0.136 (0.499)	0.076 (0.179)
Households	128	128	128	128	128	128
Observations	288	288	286	287	287	288

*Note:* \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ , Robust standard errors clustered at the household level in parentheses. Demographic controls include age, gender, and birth order in panels B and D. Panel B additionally controls for family size and parent's education. Summary indices in columns 1, 2, and 6 are measured in standard deviations. Columns 3 and 4 are measured in percentage points, and column 5 is in years of education.

**Table A13. 2SLS Estimations for Mexico Survey**

	(1)	(2)	(3)	(4)	(5)	(6)
	Self Esteem Index	Optimism Index	Hope White- collar job	Expect White-collar job	Education Expected	Aspirations Index
<i>Panel A: Community Pair Fixed Effects, No Demographic Controls</i>						
Sponsored ( $\gamma$ )	-1.090*** (0.245)	-0.459** (0.223)	0.035 (0.104)	0.077 (0.107)	-0.565 (0.536)	0.049 (0.232)
Sponsored Household ( $\pi$ )	0.842*** (0.207)	0.439** (0.191)	0.017 (0.089)	-0.011 (0.091)	0.215 (0.460)	0.026 (0.200)
Sponsored Site ( $\theta$ )	0.061 (0.091)	0.139 (0.088)	0.039 (0.043)	0.025 (0.046)	0.163 (0.232)	0.040 (0.098)
$\gamma + \pi$	-0.248** (0.099)	-0.020 (0.092)	0.052 (0.043)	0.066 (0.046)	-0.350 (0.251)	0.076 (0.102)
$\gamma + \pi + \theta$	-0.187* (0.098)	0.120 (0.096)	0.091** (0.046)	0.092* (0.047)	-0.187 (0.228)	0.116 (0.095)
Households	627	627	623	624	620	627
Observations	915	915	908	909	906	915
<i>Panel B: Community Pair Fixed Effects with Demographic Controls</i>						
Sponsored ( $\gamma$ )	-0.608 (0.374)	-0.032 (0.368)	-0.061 (0.182)	-0.042 (0.183)	-1.597* (0.937)	-0.462 (0.376)
Sponsored Household ( $\pi$ )	0.530* (0.281)	0.146 (0.283)	0.084 (0.139)	0.082 (0.139)	1.107 (0.710)	0.432 (0.291)
Sponsored Site ( $\theta$ )	0.071 (0.089)	0.139 (0.086)	0.047 (0.042)	0.028 (0.045)	0.186 (0.232)	0.056 (0.096)
$\gamma + \pi$	-0.078 (0.134)	0.115 (0.124)	0.023 (0.061)	0.041 (0.063)	-0.490 (0.336)	-0.030 (0.132)
$\gamma + \pi + \theta$	-0.007 (0.131)	0.254** (0.126)	0.070 (0.060)	0.069 (0.060)	-0.304 (0.297)	0.026 (0.121)
Households	627	627	623	624	620	627
Observations	915	915	908	909	906	915
<i>Panel C: Household Fixed Effects, No Demographic Controls</i>						
Sponsored	-0.349* (0.208)	-0.389* (0.203)	-0.150 (0.099)	-0.016 (0.105)	-0.223 (0.480)	-0.135 (0.197)
Households	231	231	229	228	230	231
Observations	519	519	514	513	516	519
<i>Panel D: Household Fixed Effects with Demographic Controls</i>						
Sponsored	-0.004 (0.381)	-0.280 (0.387)	-0.102 (0.199)	0.052 (0.192)	1.539 (1.035)	0.402 (0.413)
Households	231	231	229	228	230	231
Observations	519	519	514	513	516	519

Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ , Robust standard errors clustered at the household level in parentheses. Demographic controls include age, gender, and birth order in panels B and D. Panel B additionally controls for family size and parent's education. Summary indices in columns 1, 2, and 6 are measured in standard deviations. Columns 3 and 4 are measured in percentage points, and column 5 is in years of education. Excluded instruments for sponsorship in first stage of two stage least squares estimations are dummy variables for age at sponsorship program introduction.  $F$ -statistic for the excluded instruments range from the following: panel A: 25.0 to 25.5, panel B: 13.5 to 13.8, panel C: 20.4 to 21.1, panel D: 8.1 to 9.0.

**Table A14. Possibility of Spillovers**

	(1)	(2)	(3)	(4)	(5)	(6)
	Self Esteem Index	Optimism Index	Hope for White- collar job	Expect White- collar job	Years of Education Expected	Aspirations Index
<i>Panel A: Test for spillovers to non-sponsored siblings – same community (Indonesia and Mexico)</i>						
Sibling of Sponsored	0.053 (0.095)	0.056 (0.096)	-0.001 (0.042)	0.035 (0.044)	0.085 (0.238)	0.090 (0.094)
Households	464	464	448	457	459	448
Observations	605	605	575	595	600	575
<i>Panel B: Test for spillovers to non-sponsored siblings – neighboring community (Mexico)</i>						
Sibling of Sponsored	0.107 (0.136)	-0.024 (0.131)	0.134** (0.063)	0.118* (0.064)	0.314 (0.323)	0.268* (0.138)
Households	250	250	247	248	248	250
Observations	315	315	312	313	312	315
<i>Panel C: Test for spillovers to non-sponsored households (Mexico)</i>						
Sponsorship Community	0.078 (0.089)	0.141 (0.088)	0.033 (0.042)	0.012 (0.044)	0.133 (0.237)	0.024 (0.097)
Households	358	358	354	355	352	358
Observations	484	484	479	479	477	484

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ , Robust standard errors clustered at the household level in parentheses. Controls for community fixed effects and age, gender and birth order, dwelling quality, and parental occupation. All specifications exclude sponsored children. Panel A includes only non-sponsored siblings and those in non-sponsored households in the same community. Panel B compares non-sponsored siblings in sponsored households to children in control villages. Panel C compares those in non-sponsored households in Compassion villages to those in control villages.

**Table A15. OLS Estimations with Younger Sibling Indicator**

	(1)	(2)	(3)	(4)	(5)	(6)
	Self Esteem Index	Optimism Index	Hope for White- collar job	Expect White- collar job	Years of Education Expected	Aspirations Index
<i>Panel A: Household Fixed Effects, No Demographic Controls</i>						
Sponsored	-0.075 (0.064)	0.003 (0.066)	0.039 (0.027)	0.043 (0.031)	0.189 (0.118)	0.180** (0.071)
Younger Sibling	-0.336*** (0.100)	-0.239** (0.104)	0.031 (0.041)	0.069 (0.044)	-0.100 (0.193)	0.114 (0.097)
Households	2010	2010	1953	1994	2000	1952
Observations	1215	1215	1208	1211	1208	1210
<i>Panel B: Household Fixed Effects with Demographic Controls</i>						
Sponsored	0.099 (0.075)	0.202*** (0.077)	0.031 (0.030)	0.039 (0.035)	0.265* (0.140)	0.162** (0.079)
Younger Sibling	-0.030 (0.125)	0.101 (0.127)	0.026 (0.044)	0.072 (0.050)	0.141 (0.229)	0.128 (0.112)
Households	1215	1215	1208	1211	1208	1210
Observations	2010	2010	1953	1994	2000	1952
<i>Panel C: Household Fixed Effects, No Demographic Controls</i>						
Sponsored	-0.018 (0.069)	-0.048 (0.073)	0.045 (0.030)	0.041 (0.036)	0.215* (0.130)	0.185** (0.080)
Younger Sibling	-0.254** (0.117)	-0.166 (0.123)	0.016 (0.049)	0.051 (0.054)	0.240 (0.247)	0.177 (0.134)
Households	533	533	533	532	533	531
Observations	1140	1140	1104	1130	1138	1099
<i>Panel D: Household Fixed Effects with Demographic Controls</i>						
Sponsored	0.029 (0.121)	0.147 (0.108)	0.068 (0.048)	0.023 (0.054)	0.556*** (0.212)	0.275** (0.119)
Younger Sibling	-0.166 (0.221)	0.201 (0.199)	0.069 (0.083)	0.019 (0.092)	0.867** (0.396)	0.367* (0.203)
Households	533	533	533	532	533	531
Observations	1140	1140	1104	1130	1138	1099

*Note:* \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ , Robust standard errors clustered at the household level in parentheses. Sample restricted to households with a sponsored child, an unsponsored younger sibling, and an unsponsored older sibling. Demographic controls include age, gender, and birth order. Summary indices in columns 1, 2, and 6 are measured in standard deviations. Columns 3 and 4 are measured in percentage points, and column 5 is in years of education.

**Table A16. 2sLS Estimations with Younger Sibling Indicator**

	(1)	(2)	(3)	(4)	(5)	(6)
	Self Esteem Index	Optimism Index	Hope for White- collar job	Expect White- collar job	Years of Education Expected	Aspirations Index
<i>Panel A: Household Fixed Effects, No Demographic Controls</i>						
Sponsored	-0.408*** (0.124)	-0.193* (0.117)	0.089* (0.054)	0.056 (0.055)	0.091 (0.230)	0.338*** (0.128)
Younger Sibling	-0.878*** (0.200)	-1.069*** (0.205)	-0.015 (0.084)	-0.009 (0.093)	-1.216*** (0.391)	-0.221 (0.192)
Households	1215	1215	1208	1211	1208	1210
Observations	2010	2010	1953	1994	2000	1952
<i>Panel B: Household Fixed Effects with Demographic Controls</i>						
Sponsored	0.088 (0.234)	0.400 (0.252)	0.125 (0.109)	0.090 (0.110)	0.458 (0.535)	0.462* (0.248)
Younger Sibling	0.105 (0.438)	0.117 (0.482)	0.041 (0.181)	0.049 (0.197)	-0.547 (1.016)	-0.009 (0.416)
Households	1215	1215	1208	1211	1208	1210
Observations	2010	2010	1953	1994	2000	1952
<i>Panel C: Household Fixed Effects, No Demographic Controls</i>						
Sponsored	-0.039 (0.104)	-0.119 (0.106)	0.072 (0.047)	0.050 (0.053)	0.218 (0.212)	0.266** (0.120)
Younger Sibling	-0.605*** (0.196)	-0.834*** (0.209)	-0.029 (0.079)	-0.013 (0.089)	-0.318 (0.370)	-0.061 (0.193)
Households	697	697	648	685	695	644
Observations	1492	1492	1393	1468	1487	1386
<i>Panel D: Household Fixed Effects with Demographic Controls</i>						
Sponsored	0.402 (0.257)	0.147 (0.247)	0.171 (0.108)	0.001 (0.121)	1.057* (0.621)	0.486* (0.268)
Younger Sibling	0.339 (0.549)	-0.261 (0.534)	0.209 (0.203)	-0.103 (0.242)	1.440 (1.221)	0.430 (0.488)
Households	697	697	648	685	695	644
Observations	1492	1492	1393	1468	1487	1386

*Note:* \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ , Robust standard errors clustered at the household level in parentheses. Sample restricted to households with a sponsored child, an unsponsored younger sibling, and an unsponsored older sibling. Demographic controls include age, gender, and birth order. Summary indices in columns 1, 2, and 6 are measured in standard deviations. Columns 3 and 4 are measured in percentage points, and column 5 is in years of education.  $F$ -statistic for the excluded instruments for sponsorship range from the following: panel A: 58.9 to 64.8, panel B: 14.2 to 16.3, panel C: 59.6 to 66.2, panel D: 11.5 to 11.8.  $F$ -statistic for the excluded instruments for younger sibling of sponsored child range from the following: panel A: 25.8 to 28.0, panel B: 9.9 to 10.8, panel C: 25.8 to 27.7, panel D: 8.0 to 8.4.

## APPENDIX B

### Identification of Endogenous Mediators under Exogenous Treatment

To estimate effects of an exogenous treatment, we typically estimate (ignoring controls) the reduced-form equation  $Y = \alpha + \tau X + \varepsilon$ , where  $X$  is an exogenous treatment (which we refer to as  $T$  in the main paper) and  $Y$  is a final outcome of interest. However, in many cases we would like to test for the existence of a possible channel or “mediator”  $M$  for this effect of  $X$  on  $Y$ . There are countless examples where we might be interested in mediation. For example, if  $X$  is the (randomized) provision of water filters and  $Y$  is infant mortality,  $M$  might represent a type of potentially fatal infant illness. If  $X$  is local temperature and  $Y$  is a measure of violence,  $M$  might represent measured psychological phenomena or variation in outdoor activity which could mediate the effect of temperature on violence. In our present research example,  $X$  represents a child sponsorship intervention,  $Y$  a schooling outcome, and we want to test the effect of aspirations, self-esteem and optimism as mediators from the sponsorship intervention to schooling. Using the basic framework established in Baron and Kenny (1986) and Preacher and Hayes (2008), along with the reduced form equation, we have

$$M = a_0 + aX + \varepsilon_M \quad (1)$$

$$Y = b_0 + bM + cX + \varepsilon_Y \quad (2)$$

In this general framework the total effect of  $X$  on  $Y$  is given by the reduced-form coefficient  $\tau$ , but the indirect effect of  $X$  on  $Y$  via  $M$  is  $ab$ . Sufficient conditions for mediation are traditionally: 1. The significance of  $\tau$  in the reduced-form equation; 2. The significance of  $a$  in (1); and 3. The significance of  $b$  in (2) after one controls for the treatment  $X$ . A test of *full* mediation is the added statistical *insignificance* of  $c$  in (2), where the effect of the treatment goes to zero when the mediator is included in accounting for variation in the final outcome.

However, a common issue of concern is the endogeneity of the mediator, very specifically the correlation of  $M$  with  $\varepsilon_Y$  in (2). There are many cases where we would expect  $Cov(M, \varepsilon_Y) > 0$ . For example, when considering aspirations as a mediator in the relationship between child sponsorship and improved schooling outcomes, we might expect some unobserved factor that improves a child’s aspirations to also have a positive effect on  $Y$ . (But cases in which the opposite holds,  $Cov(M, \varepsilon_Y) < 0$ , do not change the results of the method we propose.)

Because  $X$  is exogenous, the coefficient  $a$  in (1) is well-identified. The challenge comes in identifying  $b$  and  $c$  in the presence of endogeneity of  $M$ . As a first step, consider the OLS estimates of  $b$  and  $c$ . Mechanically, OLS with two dependent variables works as follows. This does not imply that the OLS estimates are consistent; it simply shows mechanically how they are produced. Under the (possibly false) assumption where  $Cov(M, \varepsilon_Y) = 0$ , the following two equations hold:

$$Cov(M, Y) = Cov(M, b_0 + bM + cX + \varepsilon_Y) = bVar(M) + cCov(M, X) \quad (4)$$

$$Cov(X, Y) = Cov(X, b_0 + bM + cX + \varepsilon_Y) = bCov(M, X) + cVar(X) \quad (5)$$

Equations (4) and (5) are two linear equations with two unknowns,  $b$  and  $c$ , where solving these gives the OLS estimates for  $b$  and  $c$ :

$$b_{OLS} = \frac{Cov(M, Y)Var(X) - Cov(X, Y)Cov(M, X)}{Var(X)Var(M) - Cov(M, X)^2}$$

$$c_{OLS} = \frac{Cov(X, Y)Var(M) - Cov(M, Y)Cov(M, X)}{Var(X)Var(M) - Cov(M, X)^2}$$

In this case  $b$  and  $c$  can be identified. Consider next how the presence of an endogenous mediator affects OLS estimation of  $b$  and  $c$ . Suppose that  $Cov(M, \varepsilon_Y) > 0$ . This correlation does not affect  $Var(X)$ ,  $Var(M)$ ,  $Cov(M, X)$  or  $Cov(X, Y)$ . However, it does effect  $Cov(M, Y)$ , which now equals  $bVar(M) + cCov(M, X) + Cov(M, \varepsilon_Y)$ . A positive (negative) correlation between  $M$  and  $\varepsilon_Y$  causes an upward (downward) bias in  $b_{OLS}$  (because  $Cov(M, Y)$  is a positive argument in its numerator) and causes a downward (upward) bias in  $c_{OLS}$  (because  $Cov(M, Y)$  is a negative argument in its own numerator). Accounting for this bias from  $Cov(M, \varepsilon_Y)$  gives us the following expressions for  $b_{OLS}$  and  $c_{OLS}$ :

$$b_{OLS} = b + \frac{Cov(M, \varepsilon_Y) \times Var(X)}{Var(X)Var(M) - Cov(M, X)^2} \quad (8)$$

$$c_{OLS} = c - \frac{Cov(M, \varepsilon_Y) \times Cov(M, X)}{Var(X)Var(M) - Cov(M, X)^2} \quad (9)$$

Thus given  $Cov(M, \varepsilon_Y) > 0$ , the OLS estimate  $b_{OLS}$  establishes an upper bound for  $b$ , and the OLS estimate  $c_{OLS}$  establishes a lower bound for  $c$ .