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ABSTRACT

Aspirations, Poverty and Education: Evidence from India[1]

This paper investigates whether aspirations matter for education, which offers a common route out of poverty. We find that mother aspirations are strongly related to the child's grade achieved at age 18. The relation is nonlinear, suggesting there is a threshold, and depends on caste, household income and the village setting. The coefficients remain large and significant when applying control function estimation, using first born son as instrument. A similar strong relation is observed with learning outcomes, including local language, English and maths test results, and with attending school, but not with attending private education. These results are confirmed for outcomes at age 15. The findings provide direct evidence on the contribution of mother aspirations to children's education outcomes and point to aspirations as a channel of intergenerational mobility. They suggest that education outcomes can be improved more rapidly by taking aspirations into account when targeting education programmes, and through interventions that shape aspirations.

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1. Poverty and aspirations

Aspirations are receiving increased attention in the study of poverty.[2] Economic analysis traditionally focuses on constraints that are external to the individual.[3] Recent work in behavioural economics shifts emphasis to internal constraints, arguing that poverty *causes* ineffective decision-making, as scarcity taxes individual cognitive resources (Mullainathan and Shafir (2013), Mani et al. (2013)).[4] The implied policies focus on releasing external constraints, which, in turn, remove internal constraints.

This paper follows a complementary approach. Insights from psychology and behavioural economics suggest that agents decide based on comparison with a reference point (Kahneman and Tversky 2000). Poor decision-making, in this context, is a consequence of poor reference points, caused by limited exposure or selective beliefs. Decisions about investment in the future are of particular interest, and are based on aspirations, which are reference points for future outcomes. This approach calls for policies that directly release internal constraints.

Early work in economics emphasises the role of income aspirations for economic growth (Schloss 1975).[5] In social psychology Bandura (1991, 1997) accentuates how the belief in one's own potential influences choices among the poor. Taking an anthropological perspective, Appadurai (2004) argues that the poor lack aspirational resources to overcome the conditions of their own poverty: they lack the 'capacity to aspire'. In development economics, Banerjee and Duflo (2011) and Duflo (2012) see low aspirations as a fundamental driver of low investment in the future. Amartya Sen (1992) earlier viewed aspirations as part of people's capabilities, which bring about individuals' freedoms.

The role of aspirations for poverty is also the subject of recent theoretical work in economics. Ray (2006), in a short but influential book chapter, argues that the poor may suffer from 'aspirations failure', with poverty and a failure of aspirations reciprocally linked in a self-sustaining trap. Mookherjee, Napel and Ray (2010) consider parental decision-making in an overlapping-generations model, and Genicot and Ray (2017) analyse the role of aspirations for income distribution and growth. Dalton, Ghosal and Mani (2016) detail how poverty constraints the reference set - people whose outcomes serve as a benchmark. Combined with greater downside risk and pessimism among the poor about the likelihood of achieving success, this creates a poverty trap. Using further insights from psychology, Lybbert and

Wydick (2018) view aspirations, together with individual agency and pathways followed, as key determinants of hope, which itself affects outcomes.

Different viewpoints exist on the kind of aspirations failures that arise. First, a more is better' perspective advocates a positive monotonic relationship between aspirations and outcomes (see Dalton, Ghosal and Mani (2011) for instance). Here, the precise shape of the curve is of primary interest, in particular, whether it follows a concave, linear, or convex trajectory, or shows lumpiness following a step function. A convex or step function trajectory is consistent with a poverty trap, as aspirations need to raise above a threshold level before they have a substantial effect. Variation in the gradient is also informative. A steeper slope among children in households with characteristics traditionally associated with poverty provides supportive evidence that aspirations matter for escaping poverty. A second, alternative, view sees 'more' not necessarily as 'better', and focuses on the gap between aspirations and outcomes. The poor may have aspirations that are either too close to *or* too far from what can be achieved, implying that there is an optimal level beyond which aspirations have a negative effect on outcomes (see Ray (2006) and Genicot and Ray (2017) for instance). This would suggest an inverse U-shaped relationship between aspirations and outcomes.[6]Quantitative empirical evidence on the role of aspirations for economic outcomes remains scarce.[7] One likely reason is the challenge to measuring aspirations, especially when considered across different domains (see Bernard, Dercon and Taffesse, 2011). Another reason is the potential endogeneity of aspirations, which complicates empirical analysis. Endogeneity may stem from different sources. Aspirations themselves may be directly affected by income.[8] Reference point and economic situation may also be co-determined, as people observe from their economic environment what is possible, and set their aspirations accordingly. The literature on neighbourhood effects makes a similar point (Durlauf 2003).[9] Agents may also learn and revise aspirations as a consequence of experiences or observations that either reinforce or deter, referred to as reinforcement learning. In summary, these economic, sociological and psychological factors imply potential reverse causality and simultaneity in the relationship between aspirations and economic outcomes. We aim to address several of these challenges.

This paper investigates whether mothers' aspirations for their children at age 12 matter for the children's education outcomes at age 18, using data on a cohort of children in Andhra Pradesh, India. We find a strong non-linear relationship, with low aspirations having a weak,

and medium to high aspirations having a strong contribution, consistent with a low aspirations trap. These results remain significant when controlling for a wide range of child, parent, household and village characteristics, including the child's cognitive skills, mother expectations about her child school outcomes, and neighbourhood effects. The relationship remains large and significant when using control-function estimation.   Heterogeneity analysis further indicates that aspirations contribute more for children belonging to backward caste and from poorer backgrounds, while village characteristics also matter.

Looking at learning outcomes, which may be more salient still than grade achieved, we find that mother's aspirations also matter for language and maths test results at age 18. Aspirations also affect the probability of attending school (versus working or neither), but do not explain attending private education.   A robustness analysis considering outcomes three years earlier, at age 15, shows similar strong relationships, confirming the consistency and robustness of the results.

While the survey nature of the data makes it less equipped to explain where the variation in aspirations comes from, some insights can be gained. Investigating the covariates of maternal aspirations confirms that household wealth and mother education matter, while village characteristics also play a role.

Taken together, these results confirm a solid relationship between aspirations and outcomes. A number of concerns characteristic to empirical analysis of aspirations are overcome. By focusing on the narrow relationship between education aspirations and education outcomes we circumvent challenges related to analysis across different domains. To account for several possible sources of endogeneity, we use a lagged right hand side variable and include a rich set of control variables. A formal test indicates limited concern for endogeneity. To further assess robustness, we carry out control function estimation, using first born son as an instrument, which confirms a strong positive relationship – although we cannot rule out that the analysis suffers from a weak instrument. Despite the richness of data, making neat causal claims remains a challenge using survey data. The results suggest nevertheless that education interventions can be more effective when taking aspirations into account. The findings also furnish new insights regarding intergenerational mobility, suggesting that parent aspirations are a key channel through which parent education operates.

The remainder of the paper is structured as follows. In the next section we discuss the relevant literature. Section 3 discusses the framework for analysis and empirical strategy, while Section 4 considers the context and data. Section 5 discusses the results, and Section 6 concludes and highlights lessons for policy making.

2. Education outcomes and aspirations

Formal education yields many benefits, both for the concerned individual and for society at large.[10] This is especially relevant for the poor in low-income countries, for whom schooling provides a promising way out of poverty. Recent studies suggest that while divergences in schooling and learning outcomes start at an early age, sustained investment is key to make sure the benefits of earlier efforts are not undone. To reach desirable outcomes (jobs, income), investment in human capital has to occur at critical and sensitive periods (Heckman 2007). There is, however, limited understanding of the types of investment needed at different stages. With much of the ongoing work focusing on early childhood development, investment during teenage years remains poorly understood. Yet, school drop-out remains an important issue in many of the poorest countries, with the transition from primary to secondary school in particular being problematic (see World Bank 2007), and graduation to tertiary education little understood. This requires a better comprehension of the driving forces of demand for secondary and tertiary education in these contexts.

Three studies highlight the potential importance of aspirations during teenage years. Beaman et al. (2012) show that adolescent girls' educational attainment and career aspirations in West Bengal, India, can be altered directly through exposure to female leadership. Riley (2018) demonstrates how displaying a role model movie increases secondary school exam scores performance in Uganda, especially among girls and lower ability students. Bandiera et al. (2017) evidence how a programme to empower adolescent girls had significant impacts on their knowledge, risky behaviours and likelihood of engaging in income-generating activities.

Aspirations differ from expectations[11], which are central in recent work on information constraints. Jensen (2010) studies perceived returns to education among students in Grade 8 in the Dominican Republic, where measured returns are substantial, and finds that

information constraints matter for expectations and investment. Attanasio and Kaufman (2014), focusing on high school graduates in Mexico, confirm that both parents' and young people's expectations help explain high school attendance. Specifically, aspirations are preferences about future outcomes that convey a goal or target, and a desire to achieve that goal, implying that some kind of effort will be exerted to reach that target.[12] Aspirations may or may not reflect the feasibility of the goal; they demonstrate a person's willingness to invest. Expectations, in contrast, refer to beliefs about the realization of future outcomes, taking into account binding constraints, and may affect aspirations.[13] The interest of this paper lies with the preference and investment dimension of aspirations, and how this affects outcomes, net of expectations. Our analysis therefore includes a control for mother's expectations about her child's education outcomes throughout.[14]

Direct quantitative evidence on the role of aspirations for education outcomes remains scarce. Furstenberg and Neumark (2005), focusing on a high income context, find that programmes encouraging post-secondary enrolment implemented in Philadelphia high schools had a positive effect both on aspirations for higher education and on college attendance, especially among at-risk youngsters. For low income countries , Bernard et al. (2014), , find that exposing poor people in Ethiopia to life stories of similar persons who improved their own situation, affect both aspirations and outcomes six months later, including investment in schooling.

Studies focusing on *explaining* aspirations underline the bi-directional nature of the relationship, observing a strong positive relation with increased exposure to human capital. Progressa parent participants who are more exposed to highly educated professionals are found to have higher aspirations for their daughters (Chiapa, Garrido and Prina, 2010). In a similar vein, households' attitudes towards the future in Nicaragua are affected positively by social interactions with successful leaders, and amplify impact of a conditional cash transfer programme on investments in human capital (Macours and Vakis, 2014). Female leadership has a positive effect on adolescent girls' career aspirations and education outcomes (Beaman et al., 2012). International child sponsorship For low levels of aspirations,impacts educational achievements, employment and adult income, as well as overall (but not vocational) aspirations in Kenya, Indonesia and Mexico (Ross et al. 2018).

The literature studying the effects of parent on child education provides indicative *indirect quantitative evidence* that aspirations matter for education outcomes. Across countries, a strong relationship is observed between parent and child education (Narayan and Van der Weide, 2019, Black and Devereux 2011; Hertz et al (2007) Solon 1999; Behrman 1997). Individual studies attempting to identify causality tend to find confirmation for a causal effect of parent on child education, but not always.[15] When investigating the different impacts of paternal and maternal education, a wide variation in the respective estimates is observed: while maternal education has a stronger effect in the USA (see Black, Devereux and Salvanes 2005), this result does not hold for all of India (Behrman 1997).[16] Despite the rich insights from this literature, the channel through which intergenerational transmission takes place is not well understood, as parent education may be a proxy for many factors. Studies of intergenerational mobility frequently underline how tastes and attitudes are passed on from parents to children. While early empirical evidence remained inconclusive – see for instance studies for the USA investigating the transmission of work attitudes (Corcoran 1995), more recent work provides support for the transmission of attitudes. Dohmen et al. (2012), for instance, finds that levels of trust and willingness to take risks are correlated across generations in Germany. Almond, Edlund and Milligan (2009), observe persistence in a wide range of gender-related attitudes across generations among Asian immigrants in Canada. Black and Devereux (2011), in their literature review on intergenerational mobility, appealed for more research in this area. More recent empirical work also underlines the central role of locality (neighbourhoods, villages, regions) for educational mobility (see for instance Alesina et al. 2019; Bell et al. 2019; Chetty and Hendren 2018; Chetty et al 2014), which others suggest is strongly related to aspirations (see Appadurai 2004, Manski 1993). This paper provides a direct test whether aspirations might be the often-assumed channel through which intergenerational transmission takes place. We find that maternal aspirations have a stronger relationship with education outcomes than either maternal or paternal education.

3. Econometric strategy

Consider households deriving happiness, or utility, from reaching targets that correspond to aspirations. More formally, they maximise $U_{it} = u(y_{it}, a_{i(t-1)})$, where y stands for income and a for aspirations.[17] Since income depends on education, $y_t = f(e_t, \theta)$, and investment

occurs in accordance with aspirations, education can be written as a function of aspirations, the cost of education, and income generated in the previous period: $e_{it} = g(a_{i(t-1)}, c, y_{i(t-1)}, \varepsilon_i)$.

To test whether aspirations have a positive relationship with investment in education, we estimate the following equation:

$$E_{it}^c = \beta_0 + \beta_1 A_{i(t-1)}^m + \beta_2 X_{i(t-1)}^p + \beta_3 X_{i(t-1)}^c + \beta_4 X_{i(t-1)}^{hh} + \beta_5 V_i + \varepsilon_i \qquad (1)$$

where E_{it}^c refers to education of child i at time t; our main analysis considers outcomes at age 18, including grade achieved, local language, English and Maths test scores, attending a private school, and attending school or working, versus staying at home.

$A_{i(t-1)}^m$ stands for maternal aspirations for child i at time t-1, $X_{i(t-1)}^p$ represents parent characteristics, including parental education and expectations about the child's educational attainment, $X_{i(t-1)}^c$ reflects child characteristics at t-1, including age, gender, caste, and religion, but also cognitive ability, as well as physical and mental health; $X_{i(t-1)}^{hh}$ reflect other household characteristics, while V_i are village dummies, and ε_i other unobserved factors. All right-hand side variables are measured at age 12, implying a six year lag when considering outcomes at age 18.[18]

As alluded to in the introduction, two key issues that present themselves in estimating Equation 1 are potential non-linearity and endogeneity. The concern with non-linearity arises from competing views set out earlier. A 'more is better' view advocates a positive monotonic relation between aspirations and outcomes. This relation may be concave, linear, or convex, or follow a step function, indicating that aspirations need to be above a threshold before they have impact. The 'more is not necessarily better' view focuses on the gap between aspirations and outcomes and argues that the poor may have aspirations that are either too close to *or* too far from what can be expected to be achieved, which would suggest an inverse U-shaped relationship between aspirations and outcomes. Which of these views holds is, ultimately, an empirical question. We test this by allowing for non-linearity of the relationship between aspirations and education outcomes. If 'more is better' dominates, aspirations should have a monotonically increasing effect; if the alternative perspective rules, the effects would be negative - or if final outcomes at adulthood are not yet observed, decreasing - for high levels of aspirations. Distinguishing between low, middle and high

levels of aspirations we also look at possible threshold effects. To allow for nonlinearity, we use a spline function permitting the coefficient to vary across levels of aspirations; we estimate:

$$E_{it}^c = \beta_0' + g\left(A_{i(t-1)}^m\right) + \beta_2' X_{i(t-1)}^p + \beta_3' X_{i(t-1)}^c + \beta_4' X_{i(t-1)}^{hh} + \beta_5' V_i + \varepsilon_i' \tag{2}$$

with $g\left(A_{i(t-1)}^m\right) = \sum_{n=1}^N \beta_n A_{i(t-1)} I_{in}$ and $I_{in} = 1\left[\eta_{n-1} \leq A_{i(t-1)} < \eta_n\right]$, with η_n the place of the n-th node for $n=1,2,...,N$. We consider two nodes, which we fix at 10 and 13 years of education respectively to reflect the structure of education in India, where junior secondary school lasts nine years and senior secondary lasts another three years, after which students can move to higher education.[19] β_n then reflects the returns to aspirations for the n-th interval in terms of educational achievement. Returns are linear if $\beta_1 = \beta_2 =, ..., = \beta_n$.

A second issue of concern is that aspirations may be endogenous. To help address reverse causality, aspirations – and all right hand side variables - are lagged in time, so we can exclude that the estimated effects reflect parents adapting their aspirations when they observe their child's performance. Simultaneity, where education outcomes and mother's aspirations are co-determined by an unobserved third variable, are addressed in part, by controlling for a wide range of variables, including the child's cognitive achievement, physical and mental health, as well as mother's education, mother's expectations about educational attainment of the child, demographic and household characteristics, and village fixed effects. A formal test confirms limited endogeneity concerns when these variables are included, as exogeneity cannot be rejected at conventional levels (p=0.29) using a Wooldridge (1995) variation of the Wu-Hausman test. As a further robustness check we apply control-function estimation, an appropriate equivalent to instrumental-variable estimation in the case of non-linearity[20]:

$$E_{it}^c = \beta_0'' + g'\left(A_{i(t-1)}^m\right) + \beta_2'' X_{i(t-1)}^p + \beta_3'' X_{i(t-1)}^c + \beta_4'' X_{i(t-1)}^{hh} + \beta_5'' V_i + \delta_6 \hat{c}_i + \varepsilon_i'' \tag{3}$$

and test whether the coefficients of aspirations are significant. The control-function term $\hat{c}_i$ is obtained from the first stage estimation, which also sheds light on the correlates of maternal aspirations:

$$A_{i(t-1)}^m = \pi_0 + \pi_1 Z_i + \pi_2 X_{2i} + \pi_3 V_i + c_i \tag{4}$$

using first born son as identifying instrument, Z_i. As in many cultures, parents tend to have higher aspirations for their eldest son. The special status of first-born sons is particularly strong in India, often resulting in sex-selective abortion, and stems from ancient inheritance customs, where the eldest son becomes head of household when the father deceases.[21] Our data confirm that aspirations are higher for first-born sons. It seems reasonable to assume that the effect of being first-born son on education outcomes runs through aspirations, which makes it attractive as an instrument. Importantly, the instrumental variable is included in the first stage together with, so its effect is conditional on, a rich set of control variables including: expectations, the number of other siblings in the household, as well as the child's cognitive ability (which are also included in the second stage regression).[22] A placebo test where the instrument is added to the OLS regression confirms the absence of a direct relationship between the instrument and education outcomes. Further tests suggest plausible exogeneity, although we cannot exclude that it is a relatively weak instrument, as discussed in section 5. Ultimately, proving causality using survey data remains a challenge, and our focus lies on the OLS results, while the CFE results demonstrate general robustness. As a further robustness test we investigate the relationship with the same outcomes at age.[15]

4. Context and data

India harbours the largest number of poor people as a country. Nationwide an estimated 30 per cent of the population lives in poverty.[23] Andhra Pradesh, one of the five most populous states, representing just below 10 per cent of India's population, performs slightly better than average, with 21 per cent of its people living in poverty. More than 80 per cent of the labour force works in agriculture.

Education outcomes in India have improved substantially over the past decades, with even in rural areas an estimated 96 per cent of 6–14 year olds in school in 2012 (Pratham 2012). Enrolment drops with age and the national average Gross Enrolment Rate was 58 per cent for secondary and 33 per cent for higher secondary in 2012 (MHRD 2012). Nevertheless, the proportion attending higher-education at age 18 is high compared to other countries.[24] These figures vary somewhat by state, with Andhra Pradesh scoring better on enrolment among girls and enrolment in general, and having a smaller proportion of over-aged enrolled (See Table A.1 in extra Appendix). Schedule Caste and Scheduled Tribe enrolment are

around the national average. More students are in private schools comparing to the national average, although this needs to be interpreted with caution as official figures tend to underrepresent small private schools, which are non-negligible in number. Returns to secondary education have been high, estimated to be 15 per cent for men and 32 per cent for women, as have been the returns to higher education (15 per cent, 18 per cent respectively) and tertiary education (21 per cent and 17 per cent respectively) (World Bank 2009). This poses the question why secondary and post-secondary school participation are not higher still. Constraints in the supply of schooling are often put forward as a major cause (see, for instance, Kingdon 2007), and the government launched a centrally sponsored scheme, committing to additional investment in secondary education.[25] Here we focus on the demand side, investigating whether one specific demand factor, namely maternal aspirations, plays a role in influencing school achievements of teenage children.

Grade achieved is at best an imperfect measure of human capital accumulated through schooling. Variation in school and teacher quality makes that students who achieved a similar grade can differ substantially in the skills they accumulated during their time at school. In rural India, more than half of all children in fifth grade were at least three grade levels behind where they should be in terms of learning (Pratham 2012). Early learning affects later learning and school outcomes, in Andhra Pradesh and in other settings (Singh 2019; Das, Singh and Chang 2019). Differences in learning may also help explain the increased attendance of private schools, which typically deliver better learning and have risen from enrolling 19% in 2006 to 28% of children 6-14 child in 2012 nationwide.

We use the oldest cohort of the Young Lives data from Andhra Pradesh, which sampled 1,008 children born between January 1994 and June 1995, surveyed at age 5, and revisited in 2006–7, in 2009 and in 2012.[26] Attrition rates are very low, resulting in data for 994 adolescents in 2009 and 934 in 2012. We focus on outcomes at age 18, obtained from the 2012 round, and child, parent and household characteristics at age 12 and age 8, obtained from the previous rounds. To check robustness and further enrich our understanding we replicate the analysis for outcomes at age 15, using the 2009 round of data.

The figures in Table 1 illustrate the substantial variation in grade achieved at age 18. While students who are still in school at this age are expected to be in Grade 12 or in tertiary education, depending on their month of birth[27], 40 per cent have completed less than Grade 12, and this is higher for girls than for boys (46 versus 33 per cent). Ten per cent is attending

post-secondary technical or vocational education, and one third is attending university. Learning outcomes include local and English language and maths test results are measured by language and maths tests designed for the local setting and are standardised (results not reported). Just under two third (64%) of those in education at age 18 attend a private institution. About half (49 per cent) of all 18 year old are in education and not working, under a quarter (22%) is engaged in work and not in school, and over a quarter (29%) neither in school nor working.

Mothers' aspirations for their children at age 12 also show considerable variation: while more than half (54 per cent) want their child to complete university education, another 7 per cent aspire to post-secondary non-university education, and 8 per cent aspire to completion of secondary school.[28] Twenty-five per cent aspire to Grade 10 as the highest level of education, and 5 per cent to less than Grade 10. Maternal aspirations are higher for boys than for girls: while 65 per cent of mothers aspire to university for their sons, the corresponding figure for girls is 43 per cent, and while 4 per cent of mothers aspire to a grade below Grade 10 for boys, 8 per cent do so for girls.

Table 1 also reports the descriptive statistics for the wide range of household, parent and child characteristics controlled for.[29] Caste and religion proxy potential differences in norms and access to schooling. We include age when starting school as a control variable, as we are mostly interested in the effect of aspirations on student progression after enrolment, although the results remain the same if this variable is dropped from the analysis.

The identifying instrument, namely whether the child is a first-born son, is captured by a dummy variable. Fifty-nine per cent of sampled children are first-born sons, the others being either first-born daughter or a younger child in the household. The analysis controls for the number of siblings.

Table 1 also reports the outcomes at age 15. Grade achieved at age 15 demonstrate similarly large variation, with over 40 per cent of pupils below the expected Grade 9 at that age, and no substantial differences between boys and girls at this age. Verbal ability at this age is measured by a Peabody Picture Vocabulary Test (PPVT). Because the tests are taken in English, we also control for the individual's score on a Cloze test measuring knowledge of English as a second language.[30] Roughly one-third of adolescents in school (36 per cent) at the age of 15 attend a private school. While the majority of adolescents attend school at age

15, a substantial minority, 25 per cent, do not. Of those not attending school, over half (56 per cent) are engaged in work, while the remainder are neither at school nor in work.

5. Results

5.1. Grade achieved at age 18

To provide a first idea about the relationship between maternal aspirations and grade achieved at age 18, without imposing much restriction, Figure 1 plots the results from a (non-parametric) kernel regression and suggests a strong positive relationship.[31]

We next carry out parametric analysis. Table 2 reports the results from estimating Equation 1, with grade achieved at age 18 as left hand side variable. In a first step (Column 1) we only include mother's aspirations for her child at age 12, using OLS, and observe a strong and significant relationship: aspiring to an additional year of schooling is associated with a 60 per cent increase in grade achieved at age 18. The coefficient remains large and significant when including the full set of control variables (Column 2).

It is of interest to compare the coefficient of aspirations this straight away with the role of maternal education – the key variable of interest in the literature on intergenerational mobility – by running a similar simple regression as in Column 1, but with maternal education as only right-hand side variable. This yields a coefficient that is significant and less than half the size of the coefficient of aspirations, with one additional year of maternal education leading to an increase of 28.9 per cent in grade achieved at age 18 (see Column 2 of Table A.2 in extra Appendix). The importance of aspirations is further underlined when considering the two together (see Column 3 of Table A.2 in extra Appendix): the coefficient of aspirations remains large, while the coefficient of maternal education is further attenuated to almost half of its original size.[32] This suggests that some of the effect of maternal education takes place through mother aspirations, as also maintained by recent work on intergenerational mobility of education (Narayan and Van der Weide (2018), Black and Devereux (2011)). These results remain the same when also controlling for mother expectations about her child's education (see Column 4 of Table A.2.). When further control variables are included, the effect of maternal education remains significant and drops further to 0.096, as reported in Column 2 of Table 2. The effect of aspirations, on the other hand, remains large and significant when including the rich set of control variables and

village fixed effects, which are jointly significant (see Column 2 of Table 2).[33] When applying control function estimation, the coefficient of aspirations remains highly significant (see Column 3 of Table 2). It is larger, suggesting that the OLS estimate is downwards biased. While counter-intuitive at first sight, this result is common in the study of outcomes and social networks, and suggests the presence of exclusion bias in OLS[34], although we cannot exclude that the results stem from weak instruments, as discussed in more detail below. A formal test rejects that the coefficient of aspirations equals unity for the OLS (p=0.00), but not for control function estimates because of its large standard errors (p=0.75).

Turning to the first-stage results in Column 4 of Table 2, we find the coefficient on the instrument to be relatively large, with the expected sign, and highly significant. Aspirations for eldest sons are considerably higher than for other children, and this result is significant at the 1 per cent level. The validity of the instrument relies on the notion that the effect of being first-born son on education outcomes, runs through aspirations (after conditioning on expectations, the number of other siblings in the household, the child's cognitive ability, etc.). A placebo test that includes first born son in the OLS regression confirms the absence of a direct relationship between this variable and education outcomes (p=0.29). An F-test yields a p-value of 0.005 and F-statistic of 7.8, indicating that we cannot exclude that this is a relatively weak instrument for the models with grade achieved as left hand side variable.[35] Focusing on plausible rather than perfect exogeneity of the instrument – following contemporary thinking in this area - we carry out an additional estimation that allows for more relaxed assumptions (Nevo and Rosen 2012). This yields a point estimate of 0.44, with upper bound 0.56, providing further support for a positive relationship between aspirations and grade achieved, and also suggesting a downward bias in OLS. Nevertheless, we cannot fully exclude that the results arise from weak instrumentation.

The first stage results in Column 4 of Table 2 also shed light on other correlates of maternal aspirations. Expectations about the child's educational outcomes have a strong and significant relationship. Aspirations are also higher for more-educated mothers, providing further support for the assertion that aspirations are a channel through which educational outcomes are transmitted across generations. Mothers with one additional year of education aspire to 1.6 years per cent higher education for their child (12.5 per cent evaluated at the mean). Mothers coming from better-off households also have significantly higher aspirations, underlining the link between aspirations and poverty. Aspirations are not

higher for those who score better in Raven's matrix test. The number of siblings, accumulated health, and mental health also have no significant relationship with aspirations. Aspirations are consistently and substantially lower for girls than for boys. Turning to social caste and religion, which are both highly correlated within households, we find no significant relationship with aspirations. Village effects are important (jointly significant at p=0.00), indicating that neighbourhood characteristics matter.[36]

5.2. Non-linear estimation

A possible shortcoming of the above estimations is that it imposes linearity on the relationship of interest, which contrasts with the non-linearity suggested by the non-parametric kernel regression plotted in Figure 1. We proceed with estimating Equation 2, followed by Equation 3.

The OLS results, presented in Column 1 of Table 3, indicate potential nonlinearities in the relationship. Low levels of aspirations, aspiring up to junior secondary school, have a weaker association with grade achieved, both in terms of the size and significance of the coefficient, while aspiring to completing senior secondary school has a large and significant coefficient, as does aspiring to tertiary education . The difference between the last two is negligible. These raw estimates suggest an S-shaped relation, with a potential low-aspiration trap. Importantly, the coefficient of aspirations for the highest levels of aspirations remains large and positive, suggesting that a more-is-better model fits best.[37]

To further assess heterogeneity in the relationship of interest, we interact high aspirations with key variables of interest. The results, reported in Columns 2-4 of Table 3indicate that caste, and especially income, matter.   Aspiring to secondary or tertiary education significantly increases the grade achieved for children from Backward caste (Column 2), and mothers in poorer households (Column 4), and these interaction terms remain significant when included jointly. [38] When also including interaction effects with village dummies (Column 6) these coeficients become insignificant indicating that they are driven by differences across villages. A possible explanation is that aspirations are benchmarked locally, in comparison with what happens in the neighbourhood, as described by Appadurai (2004).[39] Alternative explanations are that other constraints, for instance supply factors

including distance to school and credit constraints, hold back the aspiration effects in some neighbourhoods more than in others.

5.3. Learning outcomes at age 18

Table 4 presents the results for child's learning as right hand side variable. OLS estimation indicates a strong relationship of maternal aspirations with both language and maths test results. In the regressions explaining Telugu and English language test results, the coefficients of the lowest level of aspirations are small and insignificant, while those at medium and high levels are larger and significant. For maths, even low level aspirations make a difference. Control function estimation confirms a strong and significant relationship, and suggests downward-biased OLS estimates, like before.

5.4. Other school- and work outcomes at age 18

Using a linear probability model to assess the relationship of aspirations with enrolment at a private versus a state school, the results indicate a weak relationship in OLS, as reported in the first two columns of Table 5, and this remains of low significance when using control function estimation. [40]

Using a multinomial logit to investigate the relationship with school and work outcomes, we estimate the equivalent of Equations 2 and 3, where the latter includes a control function term following Petrin and Train (2009). The results indicate that aspirations are associated with lower probabilities of working and higher probabilities of attending school (with those neither at school nor in work as base category), as shown in Columns 3-4 of Table 5, and the latter remains significant when using control function estimation, as shown in Columns 5-6.

5.5. Outcomes at age 15, and across teenage years

Redoing the analysis with outcomes at age 15 as left hand side variable allows us both to assess robustness of the above results, and to consider the dynamics of the role of aspirations during teenage years. Three quarters of adolescents remains in education at age 15, while fourteen percent is engaged in work - it is legal to enter (certain types of) work

from age 14 onwards; 11% is neither in school nor working. OLS estimation results are overall consistent with those for outcomes at age 18, as summarised in Table A.3 in the extra appendix. Small differences occur in the CFE results, which are significant for attending private school but not for working (results available upon request). Results on the role of mother education versus mother aspirations, and on non-linearity and heterogeneity of the relationship are also similar. Table A.4-A.6 show the detailed estimates. One notable difference in the relative size of the coefficients occurs when estimating the relationship with learning outcomes. Aspiring to one additional year of schooling has larger effects on maths learning at low levels of aspirations compared to medium aspiration at age 15, but this is not the case at age 18. Using the panel nature of the data allows us to zoom in. We observe that mother aspirations at age 12 are a good predictor of English language skills at age 15 and age 18 (as reflected by the horizontal lines in Figure A.2.), consistent with a low aspirations trap. [41] For maths, this also holds for high levels of aspirations, while for low aspirations they predicts learning at age 18. At age 15, those with lower levels of aspirations still score as good as those with medium aspirations. Future work may want to study the dynamic role of aspirations during teenage years in more detail.

6. Conclusion

Existing work on the role of aspirations for poverty is primarily theoretical, and there is limited direct quantitative evidence on aspirations related to education in particular. This paper observes substantial variation in mothers' educational aspirations for their children and finds that they are strongly related to the grade achieved at age 18, focusing on Andhra Pradesh, India. The relationship follows an S-shaped curve, which is consistent with a low-aspiration trap. Heterogeneity in the gradient indicates that aspirations are especially important for children from backward caste and those in households with lower wealth, while village effects also matter.

One might argue that what really matters is how aspirations relate to learning outcomes, rather than grade achieved. We find a strong relation with test scores for Telugu and English language, as well as maths, at age 18. Results are largely consistent when considering learning outcomes at age 15. Aspirations at age 12 predict test results at age 15 and age 18

well, underlining the importance of aspirations, and largely consistent with a low aspirations trap,

In contrast to common perception, we find no relationship with private school enrolment during teenage years. Aspirations are, however, positively related to attending school and negatively related to working (relative to neither working nor in school).

The observed relationships remain strong when accounting for several endogeneity concerns, by lagging the right hand side variable, controlling for a wide range of child, parent and household characteristics, and carrying out control function estimation, with being first-born son as identifying instrument. Establishing strict causality remains, however, a challenge with survey data, and this study is no exception. The large and significant estimates do, however, survive several robustness checks; they are also confirmed when considering outcomes at age 15 as a left hand side variable.

While the data is less well equipped to explain variation in aspirations, the results confirm that maternal aspirations are higher for better-educated mothers, those with higher expectations for their children's education, and those from wealthier households, while location also plays a role.

The results also shed new light on intergenerational mobility. They provide scarce direct evidence that parents' aspirations matter more than parents' education for children's school outcomes. The increased importance of aspirations for backward caste children also fits with the higher mobility among these castes observed in recent work on India.[42]

Our findings highlight potentially large benefits from taking aspirations into account in policy making. Interventions that release internal constraints provide promising ways forward, by themselves or in combination with those releasing external constraints. On their own, directly changing aspirations – for instance through increased exposure to role models, psychological interventions that change self-image, or legal change, can alter outcomes, as shown by emerging evidence.[43] In combination with other interventions, aspirations can be used more actively when targeting interventions. .[44] Changing aspirations offers a promising avenue to accelerating improvements in education outcomes of the next generation.

Taken together, the findings confirm that aspirations can play an important role for educational investment, and by extension for poverty reduction. Future research may want to further assess the precise shape of the relationship, the causal impact , and whether these findings transport to other contexts.

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**Figure 1: Kernel regression of grade achieved at age 18 (y-axis), on maternal aspirations at age 12 (x-axis)**

Kernel regression, bw = 4, k = 2
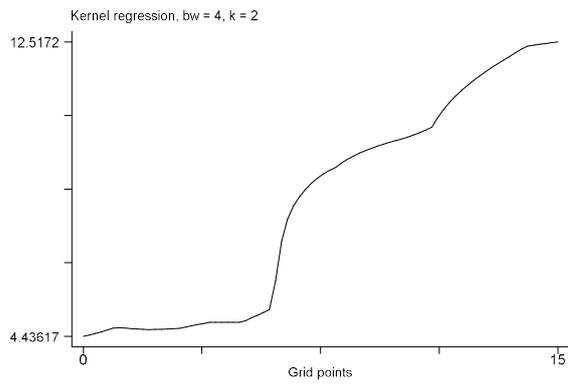
Table 1: Descriptive statistics

School (and work) outcomes

	Grade achieved at age 18		Grade achieved at age 15	
	Mean	S.d.	Mean	S.d.
Overall mean	11.46	3.51	8.20	0.06
0	0		0.001	
1–6	0.12		0.13	
7	0.04		0.11	
8	0.03		0.20	
9	0.08		0.39	
10	0.09		0.16	
11	0.05		0.01	
12	0.16			
In post-secondary technical	0.02			
In post-secondary vocational	0.08			
In post-secondary university	0.33			
Attending private school (for profit or not for profit)^	0.61	0.49	0.36	0.48
Attending school and not working	0.49	0.50	0.75	0.43
Engaged in work and not in school	0.22	0.41	0.14	0.35
Neither in school nor working	0.29	0.46	0.11	0.32

Maternal aspiration (aspired grade) when child was 12

	Mean	S.d.		
Overall mean	12.70	3.07		
0	0.02			
1–9	0.03			
10–12	0.33			
13–15	0.62			

Household characteristics

	Mean	S.d.		
Maternal education	2.70	4.01		
Maternal expectation: expected age leaving school	13.71	8.87		
Household consumption (in Rupee)	0.91	0.73		
Number of siblings	1.82	1.06		

Child characteristics when child was 12

	Mean	S.d.		
Raven's matrix score (in %)	0.64	0.15		
Height-for-age z score	-1.52	1.05		
Total Difficulty score	0.38	0.49		
Female	0.51	0.50		
Age at which started school	5.01	0.70		
Scheduled caste	0.20	0.40		
Scheduled tribe	0.10	0.30		
Backward caste	0.49	0.50		
Other caste	0.21	0.41		
Hindu	0.93	0.26		
Muslim	0.06	0.24		
Christian	0.01	0.12		

Instrumental variable

	Mean	S.d.		
Eldest son	0.59	0.02		

^ Attending private school is expressed as per centage of those attending school

Table 2: Grade achieved at age 18 and maternal aspirations at age 12

	At age 18			
	(1) Grade achieved at age 18 OLS	(2) Grade achieved at age 18 OLS	(3) Grade achieved at age 18 CFE	(4) Maternal aspiration at age 12 1st stage
Maternal aspiration	0.599***	0.483***	0.883*-	
	(0.034)	(0.037)	(0.376)	
Maternal expectation		0.041***	-0.002	0.107***
		(0.015)	(0.043)	(0.014)
Maternal education		0.096***	0.043	0.125***
		(0.028)	(0.056)	(0.030)
Eldest son				0.550***
				(0.196)
Control function term			-0.404	
			(0.379)	
L(hh con pc)		0.074	-0.320	1.017***
		(0.195)	(0.423)	(0.191)
N siblings		-0.188**	-0.222**	0.160
		(0.095)	(0.099)	(0.098)
Raven's test result		3.413***	3.181***	0.545
		(0.720)	(0.767)	(0.708)
Height-for-age z		-0.068	-0.044	-0.049
		(0.093)	(0.097)	(0.091)
Total Difficulty score		-0.014	0.098	-0.288
		(0.205)	(0.231)	(0.200)
Female		-0.260	0.153	-1.048***
		(0.186)	(0.435)	(0.183)
Age		-0.021	0.131	-0.341
		(0.291)	(0.322)	(0.290)
Scheduled caste		-0.619*	-0.650**	0.046
		(0.323)	(0.322)	(0.336)
Scheduled tribe		-0.172	-0.062	-0.304
		(0.420)	(0.428)	(0.464)
Backward caste		-0.524**	-0.432*	-0.239
		(0.239)	(0.261)	(0.272)
Christian		-0.070	-0.462	0.937
		(0.866)	(0.957)	(0.780)
Muslim		-1.044**	-0.736	-0.719
		(0.463)	(0.533)	(0.449)
Age started school		-0.098	-0.113	0.028
		(0.149)	(0.149)	(0.144)
Other control vars		yes	yes	yes
Village dummies		yes	yes	yes
Constant	3.884***	4.324	-1.731	14.347***
	(0.462)	(3.412)	(6.526)	(3.356)
Observations	934	914	914	914
R-squared	0.286	0.395	0.396	0.253

Notes: The estimations use non-clustered standard errors, since we have a small number of groups relative to the number of observations per group (Moulton, 1990). Results remain the same when using clustered standard errors.

Table 3.: Maternal aspirations at age 12 and grade achieved at age 18, allowing for non-linearity and heterogeneity

	(1) Grade achieved at age 18 OLS	(2) Grade achieved at age 18 OLS	(3) Grade achieved at age 18 OLS	(4) Grade achieved at age 18 OLS	(5) Grade achieved at age 18 OLS	(6) Grade achieved at age 18 OLS	(7) Grade achieved at age 18 CFE
Maternal aspirations 1-9 years schooling	0.218*	0.388***	0.249*	0.176	0.338**	0.522***	0.870**
	(0.126)	(0.137)	(0.128)	(0.127)	(0.138)	(0.169)	(0.397)
Maternal aspirations 10-12 years schooling	0.458***	0.295**	0.484***	0.333***	0.171	0.205	0.561
	(0.058)	(0.118)	(0.062)	(0.074)	(0.179)	(0.271)	(0.457)
Maternal aspirations 13-15 years schooling	0.455***	0.341***	0.478***	0.390***	0.277**	0.261	0.613
	(0.042)	(0.084)	(0.045)	(0.052)	(0.130)	(0.180)	(0.407)
Maternal aspirations 10-12 years schooling X Scheduled caste		0.037			0.021	0.003	0.007
		(0.145)			(0.182)	(0.215)	(0.215)
Maternal aspirations 10-12 years schooling X Scheduled tribe		0.150			0.093	0.244	0.247
		(0.172)			(0.206)	(0.252)	(0.252)
Maternal aspirations 10-12 years schooling X Backward caste		0.337**			0.320*	0.257	0.253
		(0.131)			(0.176)	(0.198)	(0.198)
Maternal aspirations 13-15 years schooling X Scheduled caste		0.080			0.092	0.099	0.103
		(0.102)			(0.130)	(0.154)	(0.154)
Maternal aspirations 13-15 years schooling X Scheduled tribe		0.008			-0.002	0.140	0.146
		(0.123)			(0.150)	(0.182)	(0.182)
Maternal aspirations 13-15 years schooling X Backward caste		0.231**			0.228*	0.189	0.187
		(0.092)			(0.126)	(0.142)	(0.142)
Maternal aspirations 10-12 X Maternal education			-0.028		0.008	0.016	0.015
			(0.020)		(0.027)	(0.031)	(0.031)
Maternal aspirations 13-15 X Maternal education			-0.023		0.001	0.003	0.002
			(0.014)		(0.020)	(0.023)	(0.023)
Maternal aspirations 10-12 X l(hhcons pc)				-0.256***	-0.265***	-0.240*	-0.238*
				(0.092)	(0.095)	(0.126)	(0.126)
Maternal aspirations 13-15 X l(hhcons pc)				-0.119*	-0.114*	-0.074	-0.073
				(0.064)	(0.065)	(0.086)	(0.086)
Maternal aspirations X village dummies	No	No	No	No	No	Yes**	Yes**
Observations	914	914	914	914	914	914	914
R-squared	0.400	0.413	0.402	0.407	0.421	0.458	0.458

Notes: The models include the same variables as in Table 2; estimations use non-clustered standard errors as before.

Table 4: Learning outcomes at age 18 and maternal aspirations at age 12

	Telugu z-score		English z-score		Maths z-score	
	OLS	CFE	OLS	CFE	OLS	CFE
	(1)	(2)	(3)	(4)	(5)	(6)
Maternal aspirations 1-9 years of schooling	0.019	0.153	-0.013	0.110	0.079*	0.292**
	(0.046)	(0.121)	(0.046)	(0.116)	(0.047)	(0.118)
Maternal aspirations 10-12 years of schooling	0.071***	0.206*	0.089***	0.212*	0.080***	0.293***
	(0.021)	(0.114)	(0.021)	(0.109)	(0.021)	(0.111)
Maternal aspirations 13-15 years of schooling	0.073***	0.208*	0.083***	0.206*	0.082***	0.295***
	(0.015)	(0.113)	(0.015)	(0.108)	(0.015)	(0.110)
Observations	840	840	829	829	829	829
R-squared	0.277	0.279	0.368	0.369	0.361	0.364

Notes: Control variables are the same as in Table 2; estimations use non-clustered standard errors as before.

Table 5: Other school and work outcomes at age 18 and maternal aspirations at age 12

	Attending private tertiary education or not		Working, attending school or neither			
	OLS	CFE	mlogit		CFE	
			Working	Attending school	Working	Attending school
	(1)	(2)	(3)	(4)	(5)	(6)
Maternal aspirations 1-9 years of schooling	-0.065	-0.207*	-0.017	0.054	0.040	0.115**
	(0.071)	(0.123)	(0.020)	(0.034)	(0.047)	(0.057)
Maternal aspirations 10-12 years of schooling	-0.013	-0.161	-0.019**	0.049***	0.037	0.109**
	(0.025)	(0.108)	(0.010)	(0.017)	(0.044)	(0.049)
Maternal aspirations 13-15 years of schooling	-0.006	-0.154	-0.023***	0.051***	0.033	0.112**
	(0.018)	(0.107)	(0.007)	(0.012)	(0.043)	(0.048)
Observations	447	447	756	756	756	756
R-squared	0.247	0.251				

Notes: Figures reflect marginal effects. The first two columns use linear probability models; Probit models yield the same results. The multinomial logit models in Columns 3-6 has those neither at school nor working as the base category. Control variables included are the same as before, and estimations use non-clustered standard errors like before. We categorised the small number of people who are in school and also working (4% of those in school) as working; results are similar when they are categorised as in school

APPENDIX WITH SUPPLEMENTARY MATERIALS

Figure A.1: Kernel regression of grade achieved at age 15 (y-axis) on maternal aspirations at age 12 (x-axis)
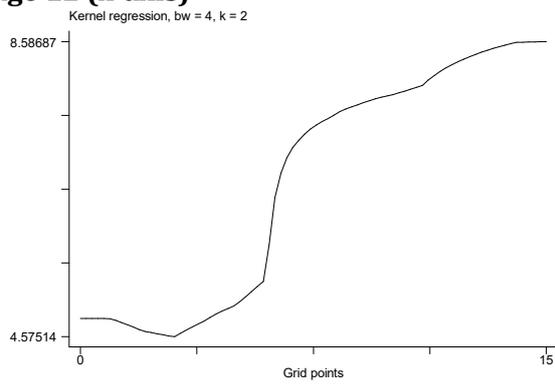

Figure A.2: Test results for language and maths at age 15 and 18, by level of aspirations
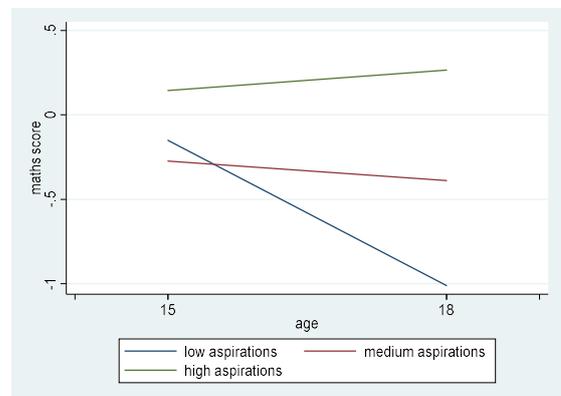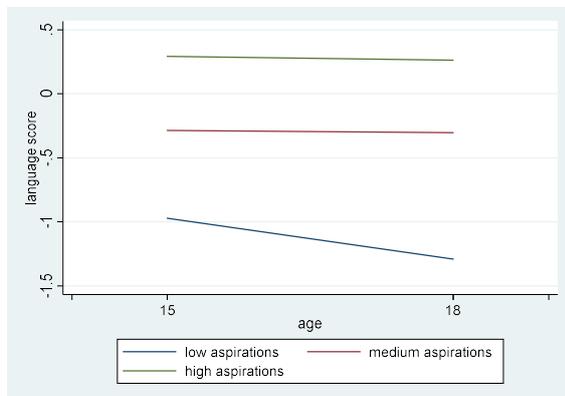
Table A.1: Education outcomes in Andhra Pradesh versus Indian national average

	Andhra Pradesh	India Nationally
Primary enrolment	0.96	0.94
Boys as per centage of enrolment	47.67	49.83
Girls as per centage of enrolment	52.33	50.17
SC as per centage of total enrolment	18.60	19.34
ST as per centage of total enrolment	10.89	11.26
Per centage over age	3.03	8.79
Enrolment in Government schools as per centage of total enrolment	75.98	85.23

Notes: Figures are from Pratham (2012)

Table A.2. Grade achieved at age 18 and mother education versus mother aspirations

	Grade achieved at age 18 OLS (1)	Grade achieved at age 18 OLS (2)	Grade achieved at age 18 OLS (3)	Grade achieved at age 18 (4)
Maternal aspiration	0.599***		0.540***	0.517***
	(0.034)		(0.035)	(0.036)
Maternal expectation				0.039***
				(0.015)
Maternal education		0.289***	0.160***	0.155***
		(0.022)	(0.021)	(0.021)
Constant	3.884***	10.703***	4.216***	3.933***
	(0.462)	(0.139)	(0.456)	(0.453)
Observations	934	962	929	929
R-squared	0.286	0.106	0.317	0.323

Notes: The above models do not contain the usual control variables , nore village dummies, that are included in the models in Table 2. Estimations use non-clustered standard errors. Results remain the same when using clustered standard errors.

Table A.3. Comparing aspirations coefficient and outcomes at age 18 versus age 15

	Grade achieved	Learning		Private school	School or work	
		English	Maths		Attending school	Working
Age 18						
Maternal aspirations 1-9 years of schooling	0.218*	-0.013	0.079*	-0.065	-0.017	0.054
	(0.126)	(0.046)	(0.047)	(0.071)	(0.020)	(0.034)
Maternal aspirations 10-12 years of schooling	0.458***	0.089***	0.080***	-0.013	-0.019**	0.049***
	(0.058)	(0.021)	(0.021)	(0.025)	(0.010)	(0.017)
Maternal aspirations 13-15 years of schooling	0.455***	0.083***	0.082***	-0.006	-0.023***	0.051***
	(0.042)	(0.015)	(0.015)	(0.018)	(0.007)	(0.012)
Age 15						
Maternal aspirations 1-9 years of schooling	0.065	0.060*	0.107***	0.008	-0.005	-0.013
	(0.065)	(0.036)	(0.035)	(0.044)	(0.010)	(0.017)
Maternal aspirations 10-12 years of schooling	0.252***	0.084***	0.034**	-0.004	-0.018***	0.025***
	(0.030)	(0.017)	(0.016)	(0.015)	(0.004)	(0.007)
Maternal aspirations 13-15 years of schooling	0.216***	0.071***	0.026**	0.002	-0.020***	0.027***
	(0.022)	(0.012)	(0.012)	(0.011)	(0.003)	(0.005)

Notes: The above reports the OLS coefficients from models that contain the usual control variables, as in Table 2. Estimations use non-clustered standard errors. Results remain the same when using clustered standard errors. CFE results available upon request.

Detailed results for age 15

Tables These results are overall consistent with those for age 18 and are detailed below in Tables A.4-A.6.

Like before, when included on its own and using OLS, mother's aspirations for her child at age 12 have a strong and significant relationship with grade achieved: aspiring to one additional year of schooling is associated with a 24.4 per cent increase in grade achieved at age 15. This relationship remains significant when including the rich set of control variables, but becomes insignificant in this case when using control function estimation, due to its large standard error.

The non-linear estimates show similar patterns to those obtained with grade achieved at age 18. Like before, the coefficients suggest that a 'more is better' model fits the data best (See columns 1 of Table A.5). Including interaction terms confirms that caste and household income matter, while mother education also plays a role here, in contrast to at age 18; village effects also matter (results not reported, available upon request).

The estimations for learning outcomes at age 15 as left hand side variable confirm a large role for aspirations, even at low levels. OLS estimation indicates a strong relationship of maternal aspirations with both PPVT and maths test results at all levels of aspirations (see Columns 3-6 of Table A.5, respectively). While the coefficients in the PPVT regressions are of similar magnitude across the different levels of aspirations, they are largest at low levels of aspirations in the maths regressions. Control function estimates confirm the results.

The relationship between aspirations and attending a private school is overall weak, also at age 15 (see Table A.6), although the control function estimates suggest significance. Aspirations have a significant negative relationship with working and positive relationship with attending school (versus neither) in the ordinary multinomial logit (Columns 3-4), although these estimates become insignificant in control function estimation (Column 5-6).

Table A.4. Grade achieved at <u>age 15</u> and <u>maternal aspirations at age 12 and</u>

	(1) Grade achieved at age 15 OLS	(2) Grade achieved at age 15 OLS	(3) Grade achieved at age 15 CFE	(4) Maternal aspirations at age 12 1st stage
Maternal aspiration	0.244***	0.210***	0.193	
	(0.020)	(0.020)	(0.204)	
Maternal expectation		0.025***	0.027	0.107***
		(0.008)	(0.024)	(0.014)
Maternal education		-0.017	-0.014	0.125***
		(0.014)	(0.032)	(0.030)
Eldest son				0.542***
				(0.197)
Control function term			0.017	
			(0.203)	
Constant	5.076***	-1.012	-0.760	14.593***
	(0.270)	(1.785)	(3.289)	(3.372)
Observations	930	910	910	910
R-squared	0.195	0.323	0.323	0.253

Notes: The models include the same variables as in Table 2. Estimations use non-clustered standard errors, since we have a small number of groups relative to the number of observations per group (Moulton, 1990). Results remain the same when using clustered standard errors.

Table A.5.: Learning outcomes at <u>age 15</u> and maternal aspirations at age 12

	Grade achieved at age 15		Learning outcomes at age 15			
			PPVT z-score		Maths z-score	
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	CFE	OLS	CFE	OLS	CFE
Maternal aspirations 1-9	0.065	0.050	0.060*	0.229**	0.107***	0.334***
	(0.065)	(0.198)	(0.036)	(0.103)	(0.035)	(0.101)
Maternal aspirations 10-12	0.252***	0.237	0.084***	0.252**	0.034**	0.261***
	(0.030)	(0.189)	(0.017)	(0.098)	(0.016)	(0.096)
Maternal aspirations 13-15	0.216***	0.200	0.071***	0.239**	0.026**	0.253***
	(0.022)	(0.188)	(0.012)	(0.097)	(0.012)	(0.095)
Observations	910	910	813	813	813	813
R-squared	0.345	0.345	0.438	0.440	0.478	0.482

Notes: Control variables included in the regression are the same as before, as well as a variable
for test results on a test for English as a second language; Estimations use non-clustered
standard errors as before.

Table A.6: Other school and work outcomes <u>at age 15</u> and maternal aspirations at age 12

	Attending private tertiary education or not		Working, attending school or neither			
	OLS	CFE	mlogit		CFE	
			Working	Attending school	Working	Attending school
	(1)	(2)	(3)	(4)	(5)	(6)
Maternal aspirations 1-9 years of schooling	0.008	0.126*	-0.005	-0.013	-0.002	-0.055
	(0.044)	(0.072)	(0.010)	(0.017)	(0.037)	(0.045)
Maternal aspirations 10-12 years of schooling	-0.004	0.116*	-0.018***	0.025***	-0.015	-0.017
	(0.015)	(0.061)	(0.004)	(0.007)	(0.036)	(0.043)
Maternal aspirations 13-15 years of schooling	0.002	0.122**	-0.020***	0.027***	-0.017	-0.015
	(0.011)	(0.060)	(0.003)	(0.005)	(0.036)	(0.043)
Observations	729	729	938	938	938	938
R-squared	0.395	0.398				

Notes: Figures reflect marginal effects. The first two columns use linear probability models; Probit models yield the same
results. The multinomial logit models in Columns 3-6 has those neither at school nor working as the base category. Control
variables included are the same as before, and estimations use non-clustered standard errors like before. We categorised the
small number of people who are in school and also working (4% of those in school) as working; results are similar when they
are categorised as in school

[2] Bloem 2016 illustrates that the number of economics papers mentioning the word 'aspirations' grew sixfold between 2000 and 2016 (see https://jeffbloem.wordpress.com/2019/04/16/aspirations-and-real-estate-investment-in-rural-myanmar-new-working-paper/)

[3] Different phases can be distinguished in the thinking of poverty. Early economic analysis assumed that the poor, like the rest of us, are rational decision-makers (see for instance Duflo 2006). Behavioural economics argues that human decision-making fails many of the rationality assumptions (see, for instance, Henrich et al. 2001). A subsequent view saw the poor, like the rest of us, as ineffective decision-makers, but paying a higher price for otherwise similar errors of judgement (Bertrand, Mullainathan and Shafir 2004).

[4] Earlier work by Baumeister et al. (1998) focuses on will power and ego depletion, and sees resisting temptation or inhibiting behaviour as consuming volition, which is limited.

[5] Growth is then explained either in terms of aspirations or in terms of the gap between outcomes and aspirations. This is applied across different subfields. See Dixon (2000) and Oechssler (2001) Fafchamps and Quin (2015) for aspirations explaining decision-making of firms and entrepreneurs; Furstenberg and Neumark (2005), Danzinger and Eden (2006), (1990) for career decisions ; De la Croix (1996) on how the inheritance of aspirations may create a poverty trap for the economy as a whole.

[6] Here, when aspirations are close to current outcomes, the aspirations gap is small and willingness to invest is low, since agents are already close to their aspiration, and the reward of additional investment is too small. When aspirations are far removed from what is possible to achieve, this implies a large aspirations gap, leading to reluctance to invest because the cost is high relative to uncertain future benefits.

[7] Lybbert and Wydick (2018) provide an initial overview of recent work, which we discuss and complement in section 2.

[8] The early economic literature contained two opposing views, one considering aspirations as exogenous and arguing that aspirations remain relatively constant and growth can be explained by the gap between aspirations and outcomes (see, among others, Fuchs and Landsberg 1973; Schloss 1975); another that aspirations change as income increases, stimulating a perpetual growth process. The current consensus view is that we cannot exclude endogeneity and aspirations may change over time.

[9] Even if there is no consensus about what neighbourhood effects reflect precisely and how we should model them, there is clear evidence on their importance (see Durlauf, 2003). One interpretation is that they determine much of the information people are exposed to.

[10] Better-educated individuals tend to have higher labour-market participation and higher earnings. Higher education is also associated with better health, longer lifespan and increased freedom. Higher-educated societies tend to do better and have higher growth (Barro 1991; Krueger and Lindahl 2000; Hanushek and Woessmann, 2012) – although not universally so (Pritchett 1999), they tend to have lower poverty (WDR 2000), better health outcomes (Glewwe 1999b; Levine 2004) and more favourable demographic trends (Birdsall 1988; Glewwe 1999a), although the effect of education on inequality and political participation remains ambiguous (Hannum and Buchmann 2004). Analysis for India confirms the role of education for growth (see for instance Self and Gabrowski 2004)

[11] Manski's (2004) underlines the importance of focusing on expectations rather than observed choices.

[12] See for instance Bernard and Taffesse (2014).

[13] They reflect subjective probabilities of realizations of distinct future states of the world. In contrast to aspirations, expectations do not have a preference dimension about these future states of the world, or an implied exertion of effort.

[14] More explicitly, including expectations as right hand side variable, we control for beliefs and acknowledged constraints about the probability of future states of the world; This helps reduce reverse causality concerns. Note that when we drop expectations as right hand side variable, observed patterns are very similar, while the coefficient of aspirations is slightly larger.

[15] While Carneiro, Meghir and Parry (2013) find substantial causal effects of maternal education on children's learning and behavioural outcomes for the USA, Chevalier (2004) observes substantial effects of parents' education on the probability that a child stays in school in the UK. Black, Devereux and Salvanes

(2005), focusing on Norway, find no evidence for a relationship between child and parent education in general, although they do observe a relationship between mother and son education, and Farre, Klein and Vella (2009) conclude that the observed intergenerational educational correlation reflects both a causal parental educational effect and a transfer of unobserved ability.

[16] Using twins data, Behrman and Rosenzweig (2002) also question the results for the USA, but later work argues that one needs to distinguish between MZ and DZ (dizygotic, fraternal) twins, and find opposite results for Sweden when following this approach (Amin, Lundborg and Rooth 2011). More recent evidence using census data for Nepal finds distinct marginal effects of female and male education on various household welfare indicators (Fafchamps and Shilpi 2014).

[17] We abstract from the precise functional form this function of outcomes (income) and goals (aspirations) takes.

[18] The included variables are selected for their conceptual relevance and reliable measurement. Information from earlier rounds of the data was not used as the quality of the data was less than satisfactory. Other information, like village characteristics, network data, shocks experienced, etc. are not included as they are self-reported, subjective, and may therefore be biased or suffer from selective reporting or selective access to information, complicating interpretation.

[19] Using different nodes leads to similar results.

[20] Control function estimation has two main attractions over instrumental variable estimation, which also explains its increasing popularity (see for instance Blundell, Daerden, and Sianesi 2005): It allows for more transparent modelling of non-linearity, and more straightforward and transparent modelling of interaction effects.

[21] See Prabhat Ja et al. (2011) for evidence on sex-selective abortion.

[22] In scarce cases where birth order seem to help explain education outcomes – a result on which there seems no full agreement regarding its robustness – this effect is attributed to higher cognitive ability, which we include as a control variable. See Black, Devereux and Salvanes (2006) for discussion.

[23] These are figures for 2004–5, and reflect re-evaluated earlier estimates, carried out by a specially appointed expert group (see Government of India Planning Commission, 2009).

[24] See for instance Sánchez and Singh 2016 for a comparison across India, Peru and Vietnam.

[25] Rashtriya Madyamik Shiksha Abhiyan (RMSA) was launched in March 2009 with the objective to provide universal access to secondary-level education by 2017 and to achieve universal retention by 2020. RMSA also aims at improving quality of education in secondary schools through investment in additional appointments, training and new technology (MHRD 2012). Around the time of the survey The World Bank approved a US$500 million credit to the Government of India to finance its efforts to improve secondary education (*India Today*, 23 March 2012).

[26] See www.younglives.org.uk. Young Lives is a multi-year study on childhood poverty in Ethiopia, India, Peru and Vietnam, funded by the Department for International Development (DFID). The views expressed here are those of the authors.

[27] Children normally start in Grade 1 in September of the year when they turn 6.

[28] Mother aspirations was measured by the question 'Ideally, what level of formal education would you like the child to complete?'.

[29] Mother's expectations are measured by the question *'At what age do you expect the child to leave education?'*. The expectations question was included in a separate part of the questionnaire (and after fine tuning during pilot). For mothers answering 'no expectations' the variable gets a value zero; in line with common practice, we add a dummy variable indicating no or missing expectations. The results remain similar when dropping these missing observations. The child's cognitive ability is measured by Raven's matrix test, their health stock is measured by height-for-age z score, their mental health is measured by the Total Difficulty Score, a validated psychiatric behavioural screening test to identify borderline cases in mental health (it is the sum of answers to 20 questions related to emotional symptoms, conduct problems, hyperactivity, and peer problems). We use a dummy variable, indicating that a case is borderline or abnormal.

[30] In PPVT the child is presented with a series of pictures. The examiner then states a word, and the child has to point to the picture that the word describes (see Dunn and Dunn 2007). The Cloze test presents a text with some words removed, where the subject is asked to fill in the missing words. This requires understanding of both vocabulary and context.

[31] Figure A.1 in extra Appendix plots the relationship with outcomes at age 15, and shows a very similar course.

[32] Note that the two variables are only modestly correlated with a Pearson coefficient of correlation of 0.28. The absence of a collinearity problem is confirmed when assessing the variance inflation factor, (1.09), which is far below the threshold commonly considered signalling collinearity (Chatterjee and Hadi (2012)

propose 10 as a threshold). The regression of maternal aspirations (lhs) on maternal education (rhs) further indicate that a coefficient of 1 can be confidently rejected at high levels of significance (p=0.00).

[33] A stepwise analysis looking at the effect of mother's and father's education (either and both) shows similar results (results not reported).

[34] More precisely, it suggests that exclusion bias is larger than the reflection bias. Exclusion bias refers to the notion that there is a negative relationship between one's own outcomes and peer outcomes by construction. For instance: all those with higher (lower) than average outcomes than their peers will have a negative (positive) relationship with the average outcome of all other peers (see Caeyers and Fachamps 2020). Reflection bias refers to Manski's reflection problem where a peer's outcomes affect my outcomes positively, which in turn raise my peer's outcomes, and so on. A common approach to address reflection bias is to instrument, as 2SLS estimates of peer effects do not suffer from exclusion bias (Caeyers and Fafchamps 2020). If aspirations are strongly determined by peers (of children and /or parents), these insights may transport to the context of aspirations.

[35] Stock and Yogo (2005) suggest an F statistic of above 10 to reject that the instrument is weak, as a rule of thumb. The F-statistic is closer to or larger than 10 for the models with other left hand side variables.

[36] The data allow us to explore whether maternal aspirations are related to different types of self-reported exposure. Maternal aspirations are significantly and substantially higher when parents are member of more organisations, but it is unclear what these self-reported variables measure exactly, as the relationship may be driven by unobserved third variables such as parental (including paternal) ambition, social status, or political power, and suffer from the reflection problem (Manski 1993). We find no evidence that aspirations are related to other types of self-reported exposure, including time living in the village or shocks experienced. We also explored the role of community characteristics and found that the highest grade of anyone else in the village is strongly related with aspirations (in terms of the size and significance of its coefficient), indicating that people with high aspirations live in neighbourhoods with more highly educated people, and living in these neighbourhoods may also increase aspirations.

[37] For other outcomes (see next sections) as well the coefficient of the highest level of aspirations is typically larger, although in some instances it is smaller than the coefficient of medium level of aspirations. They are however consistently close and statistically indistinguishable. Our outcome data is also censored from above, as the sampled individuals have not yet completed their education. We therefore restrain from strong interpretation about high aspirations and a possible high aspirations trap.

[38] Note that we do not find evidence for heterogeneity along cognitive ability, belonging to a dominant caste (Srinivas 1959) or belonging to a dominant land-owning caste within a village (Anderson 2011; Iversen et al. 2010). The analysis for outcomes at age 15 also find heterogeneity for mother education, but this is not significant at age 18.

[39] Appadurai argues that aspirations are socially embedded as they are the product of what people see around them, and this explains the common element in poor people's self-perceptions and view of the world frequently described in qualitative studies (see, for instance, Narajan 2006).

[40] The results are similar when using a probit model or when considering private for profit against others.

[41] Note the similarity to analysis of the role of early child hood for learning later learning (Heckman 2006). Little is known about the dynamic processes during teenage years, which is much less understood.

[42] See for instance Asher et al. (2019).

[43] See Bernard et al 2014; Riley 2018; for interventions that increase exposure to role models; see Ghosal et al. (2019) on how psychological interventions among sex workers in Kolkata changes self-image; Bagde shows how affirmative action, which increases role model exposure, is found to have had strong positive effects on enrolment outcomes of targeted lower caste (Bagde, 2016), although others warn for possible undesirable consequences for nontargeted , in their case female, groups (Bertrand et al 2009). Beaman et al (2012) demonstrate how legal reservation of leadership positions for women led to higher aspirations and educational attainments among girls.

[44] This is similar to improvements in micro finance performance where increased aspirational hope specifically among micro finance clients increased their employment, sales, profits, plans for growth, and micro finance performance, as well as aspirational hope itself (Rojas Valdes et al 2019).