Does Poverty Stifle Dreams?
Parental Aspirations for Children's Education

by

Tri Hoang

An honors thesis submitted in partial fulfillment

of the requirements for the degree of

Bachelor of Arts

Economics Honors Program

NYU Shanghai

May 2019

Professor Marti G. Subrahmanyam Professor Pei Gao
Professor Yiqing Lu
Professor Shuang Zhang

Faculty Advisors Thesis Advisor

Contents

Abstract

In this paper, we empirically study the effects of constrained resources on the formulation and adaptation of educational aspirations of parents for their children. Using panel data from the Young Lives survey in Vietnam, we identify exogenous shocks that have a direct impact on household's wealth and observe how post-shock aspirations respond to these changes in household's wealth level. We find that aspirations of economically vulnerable parents tend to be very sensitive to an external negative shock in wealth, even when the shock is rather moderate or mild in nature. Furthermore, we find that parental aspirations respond strongly to an individual household-level negative wealth shock, but such response is not as strong when the shock is at community level. Our findings together suggest that (1) poverty is a cause, and not a consequence, of low level of aspirations, and that (2) aspirations are more socially determined.

Keywords: aspirations, poverty, education, inequality, Vietnam.

Acknowledgement

I first would like to express my gratitude towards my thesis advisor, Professor Pei Gao. Without her support and guidance throughout the year, this thesis would have not been possible. All errors found in the paper are mine.

In addition, I would like to thank Professors Marti G. Subrahmanyam, Yiqing Lu, and Shuang Zhang for organizing the first joint Business & Economics honors program at NYU Shanghai. Thank you, Xinyi Yang, for your wonderful logistical coordination throughout the year.

Lastly, thank you, ông bà, ba mẹ, and em gái Hạnh, for the faith, hope and aspirations you all have in me throughout the years!

1 Introduction

Chronic poverty, or the persistence of low welfare equilibrium over a long period of time, is an extreme condition that affects up to 500 million people (Chronic Poverty Report 2014) and tends to persist inter-generationally (Vakis, Rigolini, & Lucchetti, 2016). Extensive literature on chronic poverty has led to the study of poverty traps, which focuses on the question of how poverty recreates itself. An influential viewpoint among this literature proposes that such perpetuation of poverty is due to constraints external to the individuals. Various theoretical and empirical studies have identified these external constraints in access to saving and credit services (Barry & Robison, 2001), healthcare and education (Peters et al., 2008; Dasgupta & Debraj, 1986), networks and information (Chantarat & Barrett, 2012), as well as constraints in cultural norms (Qian, 2008) and institutional structures (Acemoglu, Johnson, & Robinson, 2005).

Another viewpoint that is increasingly gaining attention regards the causes of chronic poverty beyond external constraints: it seeks to understand the internal process of an individual in locking himself or herself in poverty. Among these includes the "capacity to aspire," a concept initially proposed by anthropologist Appadurai (2004) and later formulated in economics by Ray (2006), Dalton et al. (2015), and Genicot and Ray (2017). While there is still the question whether low level of aspirations, i.e. the lacking "presence of forward-looking goals and a willingness to attain them" is a consequence or cause of poverty (Locke & Latham, 2002), Sen notes that a weak "capacity to aspire" can induce a weakened motivation to work to-

wards desired goals. Having low aspirations may also affect one's perceived returns and temporal horizon, thus negatively impacting the person's decision whether or not to take on an opportunity, such as savings and investment. Furthermore, people with low aspirations are more prone to activities that are unproductive, unhealthy, and adverse to their social mobility and that of their children, such as substance abuse and unprotected sex (Shepherd et al., 2014).

An important element in the study of aspirations is understanding how aspirations are formed. Though not discussing its philosophical ground, Genicot and Ray (2017) proposes a tractable model of "socially determined aspirations," i.e. the idea that a person's aspirations are shaped by not only her[1] own characteristics but those of her reference group as well. The question of whom a reference group, which Ray refers to as an "aspiration window," may comprise is rather an empirical one, and is usually reasonably interpreted in a geographical sense, such as people living the same neighborhood, village or region. In this setting, a person's aspirations are described by a function of the distance between her characteristics and that of her reference group, or what Ray describes as "aspiration gap." Such a function must be non-convex in the sense that the gap is neither too small to induce sufficient investment and effort, nor too large that it would "frustrate" high aspirations. Specifically, if the aspiration gap is too small, then the discounted future satisfaction might be not worth current investment and effort. If the aspiration gap is too large, then cost of current investment and effort may be too high, thus a person might adapt her aspirations downward to a more attainable range. Therefore, a negative shock in wealth

[1] In cases of pronoun ambiguity, I use "she," "her," and "herself" exclusively.

to an individual may prompt a decrease in aspirations if the resulting aspiration gap is so large that it would make current investment and effort very costly to afford.

In this paper, we empirically study the effects of constrained resources on the formulation and adaptation of parental aspirations for their children's education. Specifically, we use a five-round survey panel data from Vietnam to investigate how the aspiration to complete university or college of low-income parents for their children might respond and adapt to a negative shock in wealth. We use data on death, illness, and job loss of household members as proxies as for household-level wealth shocks, and exploit environmental shocks as an indirect measure for wealth shocks at community level. We identify what kind of shocks would have adverse effects on aspirations, and look at how parents may respond differently to a negative shock at household and community levels; the latter of which might provide implications as to how one's aspirations are formed. Through the study, we seek to accumulate evidence to address a broader and, perhaps deeper, question: is it that poor people stay poor because of their internal constraints, i.e. low aspirations, or is it true that "the poor may exhibit the same basic weaknesses and biases as do people from other walks of life, except that in poverty, the same behaviors may lead to worse outcomes?" (Bertrand, Mullainathan, & Shafir, 2004).

Our main results show that while poor people in Vietnam may set their aspirations high, such aspirations are sensitive to their external constraints. Aspirations of the more economically vulnerable people tend to more be sensitive and thus respond more strongly to a negative shock in wealth, even when the shock is rather mild or moderate in nature. Furthermore, we find that while parental aspirations respond

strongly to an individual household-level negative wealth shock, such response is not as strong when the shock is at community level, suggesting the possibility that one's aspirations are determined by the *relative* social distance between herself and her reference group.

The rest of the paper is organized as follows: Section 2 discusses recent literature on the topic. Section 3 presents a theoretical framework on aspiration failure. Section 4 describes the data and descriptive statistics. Sections 5 and 6 presents the empirical specifications and results. Section 7 presents robustness checks, and Section 8 concludes.

2 Literature review

Dalton et al. (2015) proposes an alternative framework to Genicot and Ray (2017) which describes aspiration adaptation as an internal process. The model posits that aspirations initially do not differ significantly among the rich and the poor. However, at a given level of aspirations, the poor would choose to exert much less effort and investment than the rich because their lower wealth level curtails their marginal benefit of effort, i.e. the poor have to spend much greater effort in order to achieve the same outcome as the rich. As aspirations and effort are interdependent, the former determines the latter, which in turn determines the former via realized outcome. Therefore, poor people who fail to commit to making sufficient effort toward their goals would have to adapt to a much lower aspiration level relative to their rich counterparts. The spiral continues depending on the level of initial wealth of the

individual. In the event of a negative shock in wealth, while Genicot and Ray would predict a decrease in one's aspirations as a result of "frustration" due to the increased and sufficiently large aspiration gap between the person and her reference group, Dalton et al. attribute this decrease to the curtailed incentive for putting in effort toward the desired outcome, an effect that pushes aspirations of the poor to an even lower level due to their extreme conditions.

Empirical literature on aspirations remain limited in quantity, partly due to difficulties in "measuring" aspirations. Several recent papers find consistent results with Ray's hypothesis of socially dependent aspirations. For instance, Bernard et al. (2014) find that aspirations of the participants in their experiment in Ethiopia increased after watching short documentaries about successful stories of people from similar backgrounds, and in some instances, the increased aspirations manifest into in higher investment. Using survey data from Nepal, Janzen et al. (2017) find that people's aspirations are correlated with achievements of those in her network of higher, and not lower, status. Galiani et al. (2018) exploit the randomized experiment in Latin America that provides housing for poor households and find that aspirations of the non-treated group increased significantly after observing housing upgrade of their treatment counterparts. However, no results are found regarding housing investments and the increased effect on aspirations phased out in eight months following the experiment. Despite adopting different measurements of aspirations and having non-concurring results regarding the effects of aspirations on future behaviors, empirical studies have consistently suggested that aspirations tend

to be socially determined and that lower aspirations are associated with lower investment and less future-oriented behaviors.

To the best of our knowledge, there is a very limited number of literature that directly studies the effect of a wealth shock, especially a negative one, on aspirations. Analyzing this shock-induced aspirational effect can provide important insights in understanding the "endogenous" nature between poverty and low level of aspirations: our results present evidence for that poverty causes low aspirations. While we do not directly test Genicot and Ray's hypothesis of "socially determined" aspirations, our estimates of aspirational effects of shocks at different scales, i.e. household and community level, provide evidence that supports this theoretical concept.

3 Theoretical framework

In what follows, we briefly introduce the theoretical framework on aspirations failure by Genicot and Ray (2017) with minor adaptations made by Janzen et al. (2017). We make additional minor changes in the payoff quantity and simplify a few modeling details in order to make the model relevant to our study context and mathematically simple.

We assume an inter-temporal utility maximization problem of a parent over two periods $t = 0, 1$. The parent receives income $y_0 \geq 0$ at $t = 0$, and no additional income at $t = 1$. At $t = 0$, the parent decides to invest an amount of $0 \leq k \leq y_0$ on her child's education, and consumes the remaining amount $c \equiv y_0 - k$. An investment of amount of k at $t = 0$ yields total income of ρk at $t = 1$, where ρ is the return rate

of education. We assume the parent derives a benefit amount of ρqk at $t = 1$ from her child's future educational return, where q is a constant and $0 \leq q \leq 1$.

Assume the parent has aspiration $a \equiv \Phi(y_0, \mathbf{F})$ for her child, where $\mathbf{F}$ denotes the overall distribution of characteristics in the parent's "aspiration window." However, for simplicity, we assume a to be exogenous. At $t = 0$, the parent has utility $u_0(c)$ derived solely from consumption. At $t = 1$, the parent has utility $u_1(\rho qk) + b \cdot \mathbb{1}_{\{\rho k \geq a\}}$, where, in addition to the utility derived from her share in the child's educational return, the parent yields an additional bonus b if her aspiration a is satisfied and 0 bonus otherwise.[2] The parent incurs cost $\mathbf{C}(k) \equiv u_0(y_0) - u_0(c) = u_0(y_0) - u_0(y_0 - k)$ when investing in her child's education. We assume u_t to be a continuous, strictly increasing ($u_t^{'}(\cdot) > 0$) and strictly concave function ($u_t^{''}(\cdot) < 0$). Taking derivatives with respect to k of $\mathbf{C}(k)$, we see that $\mathbf{C}(k)$ is an increasing ($C^{'}(k) > 0$), and strictly convex ($\mathbf{C}^{''}(k) > 0$). In short, we have the following set-up of the problem:

$$\mathbf{U}(k) = u_0(y_0 - k) + \beta \left[u_1(\rho qk) + b \cdot \mathbb{1}_{\{\rho k \geq a\}} \right] \tag{1}$$

$$\mathbf{C}(k) = u_0(y_0) - u_0(y_0 - k) \tag{2}$$

where β is the discount factor. Subtracting (2) from (1), we obtain the benefit function:

$$\mathbf{B}(k) = \mathbf{U}(k) - \mathbf{C}(k) = \beta \left[u_1(\rho qk) + b \cdot \mathbb{1}_{\{\rho k \geq a\}} \right] - u_0(y_0) + 2u_0(y_0 - k) \tag{3}$$

In the scenario when the parent's aspiration is satisfied, i.e. $\rho k \geq a$, we have:

$$\mathbf{B}(k) = \mathbf{U}(k) - \mathbf{C}(k) = \beta \left[u_1(\rho qk) + b \right] - u_0(y_0) + 2u_0(y_0 - k) \tag{4}$$

[2]Genicot and Ray model b as a function of realized outcome ρk, we treat b as a constant.

Similarly, when aspiration is not satisfied, i.e. $\rho k < a$, we have:

$$\mathbf{B}(k) = \mathbf{U}(k) - \mathbf{C}(k) = \beta\left[u_1(\rho q k)\right] - u_0(y_0) + 2u_0(y_0 - k) \tag{5}$$

Maximizing $\mathbf{B}(k)$ over k in equations (4) and (5) yields two investment equilibiria k_{low} and k_{high}, corresponding to two aspiration levels a_{low} and a_{high}. Theoretical results from Genicot and Ray (2017) suggest that there is a unique threshold a^* (which coressponds to a unique threshold of current investment $k*$) such that if the parent's aspiration a exceeds a^* ($a > a^*$), then k_{low} is optimally chosen in frustration, and if the parent's aspiration a is below a^*, k_{high} is optimally chosen. At a^*, the parent is thus indifferent between choosing k_{low} and k_{high}, or:

$$\mathbf{B}(k_{low}) = \mathbf{B}\left(\frac{a^*}{\rho}\right)$$

$$\beta u_1(\rho q k_{low}) + 2u_0(y_0 - k_{low}) = \beta\left[u_1(qa^*) + b\right] + 2u_0\left(y_0 - \frac{a^*}{\rho}\right) \tag{6}$$

Using implicit differentiation in expression (6) obtain an expression for $\frac{da^*}{dy_0}$, we have $\frac{da^*}{dy_0} > 0$.[3] This result implies that the aspiration threshold $a*$ is higher for wealthier parents. Given a is predetermined, higher $a*$ would increases the chance that the parent's aspiration a lies below the threshold $a*$. Therefore, in the light of Genicot and Ray's theory, there is a higher chance that the higher aspiration equilibrium k_{high} is chosen. In the event of a negative shock in wealth, which results in a lower y_0, there is a higher probability that the parent will choose k_{low} as the optimal level of aspiration.

[3] See Appendix C for formal derivation

4 Data and the sample

4.1 The Young Lives survey

We obtained the data from Young Lives, an international longitudinal survey project conducted by the Department of International Development at the University of Oxford. The project tracked 12,000 children in Ethiopia, India (Andhra Pradesh), Peru, and Vietnam over a 15-year period to investigate the causes and consequences of childhood poverty. In each country, the survey was conducted among two children cohorts: "younger" (born between 2001 and 2002; 2,000 children) and "older" (born between 1994 and 1995; 1,000 children). Each survey has three components: *a community questionnaire* (answered by a local representative of the community where the child lived), *a household questionnaire* (answered by the primary caregiver of the child, usually the mother), and *a child questionnaire* (answered by the child him/herself if at or above 8 years old). The data is available in 5 rounds with each round conducted in 2002, 2006, 2010, 2013, and 2016, respectively. We only use data from Vietnam in this paper.

The survey data is not nationally representative because it was intentionally sampled to over-represent the poor population. In Vietnam, 5 provinces (Lao Cai, Ben Tre, Da Nang, Hung Yen, Phu Yen) were chosen to represent different regions of the country. All administrative communes in each province were then classified based on their poverty ranking: poor, average, better-off, and rich. Three criteria were used to determine such a poverty ranking: level of infrastructure, proportion of households recognized as "poor," and child malnutrition condition. Within each

province, 4 *sentinels* were chosen from all administrative communes with a pro-poor bias ratio: 2 *poor* : 1 *average* : 1 *better-off or rich*. Within each sentinel, a group of approximately 50 children was selected using simple random sampling. To protect identity of the children, sentinel names were replaced by pseudonyms. However, a brief description on main geographic, demographic, and economic features for each sentinel is available. Attrition rates over the 15 years are low at 2.5% for the younger cohort and 8.6% for the older cohort.

4.2 Measuring educational aspirations

Data on parental aspirations on children's education are available from round 2 to round 5 for the younger cohort and from round 2 to 4 for the older cohort, when the child aged around 6 (only for younger cohort), 10, 13-14 (only partially available for older cohort), and 15-16 years. Educational aspirations of parents are extracted from the *household questionnaire* in which the primary caregiver (usually a biological parent) was asked "What level of formal educational would you like your child to complete?" To respond to the question, the primary caregiver indicated her choice among a list of options, ranging from "None," "Adult literacy," "Grade 1-12," "Post-secondary vocational school," "University or College," to "Postgraduate study." As the aspiration data of parents is more complete for the younger cohort, we will focus our analysis for parental aspirations on this particular group.

Since the aspiration variable is of ordinal nature and a significant proportion of parents aspires their children to complete university or college (76.7 percentage points in round 2, and 58.9 percentage points in round 5), we create a dummy

variable to indicate whether a parent has high aspirations as the dependent variable. Specifically, the dummy variable receives value 1 the parent aspires to *at least* a bachelor's degree, i.e. answered either "University or College" or "Postgraduate study" to the survey question, and value 0 otherwise.

4.3 Shock data

Within the *household questionnaire*, the parents were asked to provide information on recent changes in economic and life situation of the households since the most recent round of the survey. Information on the three shock categories, which are family shocks, environment shocks, economic shocks, are the most complete (available for at least 3 rounds) and recorded as dummy variables. The family shock category includes information on whether there was a recent death or illness of father, mother, and other household members, birth of a new household member, and divorce or separation of parents. The environment shock data records whether the household experienced any extreme weather conditions, such as drought, flooding, and frost. For economic shocks, information is available for whether the household experienced any loss of major source of income or job, increase in food price, and death of livestock.

In this paper, we use family shocks, or death and illness of household members in particular, and economic shocks, specifically loss of major income or job, to investigate the empirical question of interest. We use these shocks because they tend to have quite direct impact on household's wealth compared to others. We also use environmental shocks, namely drought and flooding, to study the aspirational effects

of a wealth shock at a community level. We do not use frost as a proxy measurement since this weather condition is very rare a tropical country like Vietnam, as reflected in that a very small portion of households in the data experienced a frost. To be conservative, we only count a death as "unexpected" if deceased household member was not reported sick in previous period. This is motivated by the possibility that being able to anticipate death of a family member may bias the estimate upward for household may be able to mobilize financial or wealth resources to afford the shock.

4.4 Descriptive statistics

Table 0 in Appendix A presents descriptive statistics of our sample. Panel A shows statistics of demographic features of data. The average age of the children at Round 2, when the parents were first asked about aspirations in the survey, is 5.2 years, whereas 6 is the usual starting age for school in Vietnam. At Round 2, both parents on average are in their early 30s with a standard deviation of 6. There is also a balanced proportion between boys and girls. Data from ethnic minorities are collected at a representative ratio. The calculated proportion of households living under the national poverty rate in Round 2 is 18.3% whereas the national poverty rate in the same period is 7.0% (IMF, 2006), indicating the pro-poor nature of the sample. Children in the sample also have good access to education at both primary and secondary level, with the closest school on average being located within a 12- (Round 2) to 17-minute (Round 5) walking distance from home.

Panel B presents statistics of on parental aspirations for children's education. In Round 2, 76% of parents aspire for their children to complete *at least* a bache-

lor's degree; and this number, despite declining over time, still stays high at 62% in Round 5. These figures are impressively high, especially for a pro-poor sample, perhaps partly due to the high values that the Vietnamese culture places on education.

Panel C describes shock variables aggregated over all household members in the data. Health shock is most common among the households, with almost 1 out of 4 households experienced an illness shock of at least one family member in Round 2. This ratio reduces to 1 out of 8 in Round 5, suggesting improved health condition over the years. Almost 4.5 % of households experienced death shock of a household member in Round 2, and 2.3% in Round 5; whereas job loss rate remains between 2 to 3% between Round 2 and Round 5.

5 Empirical strategy

Since an individual's aspirations can be determined by both internal characteristics and external factors, we assume a linear regression model with a fixed effect at household level and simultaneously control for time-varying community[4] characteristics. We seek to estimate the following equation:

$$paspirations_{itc} = \alpha + \beta_1 shock_{it} + \gamma \mathbf{R}_t + \eta \mathbf{R}_t^{'} \times \mathbf{S}_{itc} + household_i + u_{ict}$$

where $paspirations_{ict}$ is a dummy variable for whether the parent aspires highly for future education of child i in community c at time t. Variable $shock_{it}$ is a dummy variable indicating whether the household experienced any shock since period $t-1$.

[4]Referred to as "sentinel" in the data. We will use these two words interchangeably in this paper.

$\mathbf{R}_t$ is a time trend vector, and $\mathbf{S}_{ict}$ is the vector of sentinel dummies. The interaction $\mathbf{R}_t \times \mathbf{S}_{itc}$ is the control for sentinel time-varying characteristics. The term $household_i$ is the fixed effect, and u_{ict} is the error term. The coefficient of interest is thus β_1.

Additionally, we relax our specification from household to community fixed effects, and control important household and child characteristics. This is motivated by two reasons, firstly to cross check if results from both fixed effect models are consistent. Secondly, we want to observe the relationships of time-insensitive household and child characteristics on parental aspirations. We estimate the following equation:

$$paspirations_{itc} = \phi + \beta_2 shock_{it} + \mu \mathbf{X}_i + \zeta \mathbf{R}_{it} + \eta \mathbf{P}_i + sentinel_c + e_{ict}$$

where $paspirations_{ict}$ and $shock_{it}$ are defined the same as above. $\mathbf{X}_i$ is the vector of time-invariant characteristics of child i, such as sex, and whether the child belongs to an ethnic minority. $\mathbf{R}_{it}$ is vector of child i's time-varying characteristics, such as health condition, whether the child is currently in school, wealth percentile of the child's household, as well as the standardized performance in the math and reading tests. $\mathbf{P}_i$ is a vector of dummies indicating the level of education obtained by parents, with "no education" being the reference group for *low* (adult literacy, elementary education), *medium* (middle school), *high* (high school and/or some post-secondary), and *very high* (university and/or postgraduate). The term $sentinel_c$ is the community fixed effect, and e_{ict} is the error term. The coefficients of interests are thus β_2.

6 Empirical results

6.1 Aspirational effects of a death shock

Table 1 presents the baseline results of a death shock of a household member on parental aspirations. Both household and community fixed effect models give similar estimates. Specifically, a father's death shock would decrease the likelihood of high aspirations by 15 percentage points. We find no statistically significant aspirational effects of a death shock of mother or another household member. This result suggests that a negative wealth shock that is large in magnitude, such as death of the father, who tends to be the major contributor of the household's income, will result in lower level of aspirations. On the other hand, a wealth shock that is moderate or small in magnitude, like death of the mother or of another dependent household member, would unlikely have a negative effect on aspirations.

Aspirational effects across age groups and genders: We extend our baseline results by interacting the parental death shock variable with the child's age and gender, respectively. Column (1) in Table 2 shows the estimates of the how aspirational effect of a father's death changes according to the child's age. Both specifications give similar results: (1) that a father's death would only start to have a negative effect on aspirations when the child is at least 8 years old, and (2) that the magnitude of this negative effect is larger if the child is older at the time of the shock. For instance, the likelihood of a parent aspiring highly for their child's education decreases by 25 percentage points if the death shock occurs when the child is at age 15. In Vietnam, 15 is the minimum legal working age. The result suggests that, in the event of a

father's death, the closer the child's age is to the minimum legal working age, the more discouragement towards aspiring highly for the child to attend university in the future due to the *current* option to leave school and take on jobs outside. Consistent with our previous baseline findings, we find no statistically significant patterns in the aspirational effects on a mother's death across age groups of the child.

Columns (2) and (3) in Table 2 and Table 3 show the short-term and long-term aspirational effects of a parental death shock across the child's gender groups. Specifically, a father's death shock would decrease the likelihood of high aspirations for boys by 33 percentage points. Interestingly, the shock mildly increases such likelihood for girls by approximately 3 to 5 percentage points. This positive aspirational effect for girls, however, diminishes over time and becomes small in magnitude, a statistically significant increase of 1 to 2 percentage points, in the next period. In contrast, the negative aspirational effect for boys is persistent through the subsequent period. The lagged estimate predicts a 26-percentage point decrease the likelihood of high aspirations for boys after 6 to 7 years following the father's death. This interesting heterogeneous effect on aspirations between boys and girls could be due to the increased bargaining power of the mother and thus of female members in the household for the mother likely assumes responsibilities of a household head. Such increased bargaining power of the mother is likely associated with an increase in her educational aspirations for her daughter. On the other hand, boys might be expected to enter the labor force earlier, instead of spending more time at school in the future, in order to help the family and replace the father's financial role in the household.

We find no aspirational effects following a mother's death for both boys and girls in the short run. Our household-level fixed-effect estimates, however, suggest a decrease in aspirations for girls and not for boys in the long run following a mother's death. There are several channels that may explain such a negative aspirational effect on girls in the long run. For instance, girls might be expected to study less and assume the housework responsibilities of her deceased mother. Furthermore, decreased bargaining power of female members in the household may also lead to lower level of educational aspirations for daughters. We doubt that this downward adaptation in aspirations for girls is due to the lagged effect of wealth reduction because we do not observe a similar lagged effect for boys, who are more likely to bring in income for the households by taking outside jobs in the event of an economic hardship.

Aspirational effects across wealth groups: To motivate our understanding as to how a negative shock in wealth may affect aspirations of parents across wealth groups, we divide our sample into two sub-samples of poor and non-poor neighborhoods using the provided descriptions of the sentinels and compute the estimates of the coefficients of interest using the same regression specifications. Table 2A and Table 3A present the corresponding results in the event of a father's death and a mother's death, respectively. The poor sub-sample contains households located in sentinels described as "poor" or "very poor," and we do not include include households in sentinels described as "used to be poor but not so poor now" in this subsample. The non-poor pool contains the rest of the households. If the theoretical prediction from Ray and Genicot (2017) and Dalton et al. (2015) holds true, we ex-

pect to observe parental aspirations in the poor neighborhoods to respond strongly and in a negative direction following a death shock, whereas the negative aspirational effects might be smaller in magnitude or less statistically significant in richer areas.

In the event of father's death, aspirations for boys in both sub-samples decrease in the short run, but this short-run negative aspirational effect is more significant, in both economic and statistical sense, in the poor neighborhoods. The likelihood of a parent aspiring highly for boys decreases by 28 percentage points in the non-poor neighborhoods, but by 47 percentage points in the poor sub-sample. This negative aspirational effect on boys persists through the next period, with a decrease of 26 percentage points in the likelihood in both sub-samples, suggesting that aspirations for boys do not recover in the long run following a father's death shock. As to girls, we find a strong short-run "bargaining" effect on aspirations across all wealth groups following a father's death, as reflected in the increase in the post-shock aspirations. However, such a "bargaining effect" actually phases out in the long-run for girls in the poor neighborhoods. In fact, long-run aspirations for girls in the poor neighborhoods actually decreases by 26 percentage points following a father's death. On the other hand, the "bargaining" effect, though becomes smaller in magnitude, stays statistically significant and does not phase out in the long run for households in wealthier neighborhoods.

In the event of a mother's death, we find a statistically significant negative effect on aspirations in poor, but not in non-poor neighborhoods. Specifically, a mother's death would result in a 24.4 percentage points decrease in the likelihood of high

aspirations for both genders in the short run, and a 34 percentage points decrease in the long run, in the poor neighborhoods. Since a mother's death would likely result in some moderate level of wealth reduction in the household,[5] this result carries an important implication: aspirations of economically vulnerable parents are more sensitive to their external constraints and thus suffer more in the event of an external shock in wealth, even when the shock is *moderate* in nature, as evidenced in the larger estimates (in absolute values) for the households located in poor neighborhoods compared to their counterparts in the wealthier areas.

6.2 Aspirational effects of an illness shock

Although we do not have data on whether a health shock would lead to a short- or long-term impact in household's wealth, an illness would likely reduce a parent's productivity and even her ability to work at least in the short run. We are interested in estimating the impact of a health shock on parental aspirations in the period immediate to the household's exposure to the shock. Although we do not find statistically significant estimates in the baseline results, which are presented in Table 4, our extended results indicate two main findings: (1) that *only* a father's illness shock would result in a lower aspiration level for the child, and (2) that such negative impact is found *only* among the older children in the poor neighborhoods. The remaining of this subsection discusses the empirical results in more details.

Table 4A presents the regression results of a father's illness shock across age and gender groups. At the event of a father's illness, we observe a decrease in aspirations

[5]The mother tends to be the non-primary income source of the household.

for older children. At age 15, the negative aspirational effect is more severe for boys than for girls, with the likelihood of high aspirations declining by 22 percentage points for boys compared 11 percentage points for girls. Here we observe that the aspirational effect for girls is actually negative, rather than mildly positive as in case of a father's death. Such negative impact on aspiration persists for boys, but not for girls in the long run. In fact, parental aspirations for girls increases in the long run following a father's illness.

Estimates across poor and non-poor sub-samples suggest that the aforementioned pattern in aspirational effects following a father's illness is stronger in poor neighborhoods, while no statistically significant estimates are found on the non-poor sub-sample. Table 4B and Table 4C report the corresponding results for the poor and non-poor sub-samples, respectively. A father's illness shock when the child is at age 15 would lead to a strong decrease of 42 percentage points in the likelihood of high aspirations for boys, and 30 percentage points decrease for girls. In the long run, the aspirational effect for boys is persistent and negative, whereas parental aspirations for girls increase.

While we may attribute the long-term positive increase in parental aspirations for girls to the long-run increased bargaining power of the mother in the household, it is not quite clear why the aspirational effect is negative, instead of positive as in the father's death case, in the short run. Such a negative effect on aspirations for girls could be because households may experience an even more severe wealth shock in the period immediate to the health shock due to the costs of medical treatments in addition to loss or reduction in income as a result of the father's illness. Financial

burden of medical treatment costs or psychological effects due to father's illness could potentially be factors that might impact short-term response of parental aspirations. As disentangling the mechanisms behind the heterogeneity in aspirational effects across genders requires further empirical specification and could well be the scope of another study, we shall leave the gender story for a possible future research direction.

6.3 Aspirational effects of an economic shock

A loss of job can have a direct impact on household wealth and income, which may have implications on aspirations. Although the baseline results, presented in Table 6's columns (1) and (2), suggest no statistically significant aspirational effects of job loss, we should interpret this result with caution. One determinant of the duration and magnitude of a wealth shock caused by a job loss is how quickly a parent is able find a replacement job. While we do not have this information directly, we use parents' level of education as a proxy measure for the wealth shock's magnitude. The underlying motivation for such a proxy is that parents with high education level is more likely to be able to find employment faster than parents with little or no education. Therefore, the aspirational effect of a job loss tends to be more severe for the latter group of parents. Column (5) in Table 6 reports the household-level fix-effect estimates of the aspirational effects of a job loss across parental levels of education. The results suggest that likelihood of a parent with *no* education aspiring highly for their children decreases by 21 percentage points, however the corresponding likelihood of parents with *at least* some education, whether low, medium or high, is not

affected by the shock. Interestingly, we find no statistically significant aspirational effects across child's age groups and genders.

We continue our analysis by investigating the aspirational effect of a job loss *across wealth groups*. Columns (8) to (12) in Table 6A report the estimates of aspirational effects of a job loss using sub-samples of poor and non-poor neighborhoods. We find no effects of job loss on aspirations of parents across all levels of education in the poor sub-sample, but a statistically significant difference in the aspirational effect of the job loss between parents with *no* education and parents of other levels of education in the non-poor neighborhoods. Specifically, the likelihood of high aspirations decreases by 57 percentage points for the group of parents with *no* education, whereas aspirations of parents with other educational backgrounds remain relatively the same. This result initially appears to be counter-intuitive for we usually expect aspirations of parents in the poor neighborhoods, especially parents with no education, to be "hit" harder by the shock. However, one possible channel for explanation is that it may be relatively easier for a low-educated parent to find a replacement job in a poor than a rich neighborhood since finding a job in a rich neighborhood may require certain skill levels or connections that those with little to no education may well lack. This result thus carries an important implication: in the event of an external shock, not only are aspirations of the economically vulnerable are affected, but they also tend to suffer more in a society where there is a higher degree of inequality. As reflected in our analysis, aspirations are severely impacted by a job shock, which is rather temporary in nature, only for parents with *no* education in the richer neighborhoods, where there is likely a higher degree of inequality, but

not for the same group of parents in the poorer area, where exists relatively more equal wealth distribution.

6.4 Aspirational effects of an environmental shock

In many ways, poor people are vulnerable to extreme weather conditions. As poor households are more dependent on agricultural activities, their income and livelihoods tend to be more heavily impacted by an environmental shock. As previously mentioned, we use data on droughts and floods to study the aspirational effect of an environmental shock. Furthermore, because environmental shocks occur on a community level, we can observe how aspirations may respond to such a shock as compared to shock to an individual household. Table 7 and Table 8 present the empirical results for this subsection.

While we do not observe any aspirational effect of a flood, we observe that a drought would lead to a 90% statistically significant negative effect on parental aspirations for older children (aged around 15), but not for children of other age groups. We also find that the drought shock would only affect aspirations of parents in the poor neighborhoods. No aspirational effects across genders are found. In the long run, no effects of the drought are found on parental aspirations.

There are several important comments to be made regarding the findings of this subsection. *Firstly*, the fact that the drought does not result in heterogeneous aspirational effect across genders is, in some extent, consistent with our hypothesis regarding the "bargaining power" effect in our previous analysis for parental death since an environmental shock would unlikely prompt a shift in the bargaining balance

within the household. *Secondly*, results on the aspirational effect of a drought suggest that parents may respond less strongly to negative shock at community level. Genicot and Ray (2017)'s theoretical results provide an insight in understanding this behavior in the sense that a person's aspirations are dependent on the *relative* social distance, or "aspiration gap," between her characteristics and that of her reference group. While a community-level shock reduces a household's wealth level, the fact that it would inflict on other households in the community as well implies the *relative* aspiration gap may remain unchanged or change very little. As a result, we might not observe a strong response of aspirations to a community level shock as to an individual household level shock.

Our findings in this subsection have thus been consistent with previous results that aspirations of poor people tend to be more sensitive to external constraints and thus respond more strongly in an event of wealth shocks. Furthermore, the discussed implications from this subsection suggest that aspirations are socially determined, although further evidence and investigation are required.

7 Robustness checks

7.1 Comments on results from the two fixed-effect models

We note that estimates from both household-level and community-level fixed-effect specifications are quite consistent with each other in both magnitude and statistical significance. Such a "coincidence" implies that our shock variables as proxy variables to measure negative shock in wealth are not highly correlated with individual

household and child's characteristics. This evidence confirms the validity of our results in the sense that proxy variables are reasonably exogenous to the households.

7.2 Shocks to non-parent household members

As a placebo test, we obtain the estimates for the aspirational effects of a death shock of a non-parent household member across age and gender groups of the child, as well as across wealth groups using the two sub-samples. Because non-parent household members are usually dependent members of the family, such as grandparents or siblings, their decease will unlikely result in a negative wealth shock for the family. In some instances, death of a *dependent* household member can even "relax" spending constraints of the household, which may result in "extra wealth" for additional current expenditure or future investment. Such an effect may have implications on the aspirational effects for the child's education. As can be seen the results presented in Appendix B, we, however, observe no statistically significant effects of the shock on educational aspirations. This result hence strengthens our findings in the sense that the explanatory mechanism behind identified negative aspirational effects are indeed through the household's wealth channel.

7.3 Other robust results

One concern with our analysis is that the parent, or more precisely referred to as "primary caregiver," responding to the survey might be not be the same person throughout the five rounds because different caregivers may share different perspectives on the child's future education. In our sample, 96% of respondents are

reported "biological parent" to child, and 95% of the time when a biological parent responds to the survey the respondent is the mother. Therefore, the mother is survey respondent most of the time (92%). To test the hypothesis whether there is a statistically significant difference between father and mother's responses to the aspiration question, we regress the high aspiration dummy variable on parental sex using both household-level and community-level fixed effect specifications. We find no statistically significant estimate for the difference of interest, suggesting that aspirations for father and mother for their child are similar.

To be conservative, we further drop observations in which the survey respondent prior to the death shock was the deceased parent. For instance, if a father responded to survey in Round 2 and subsequently deceased in the period between Round 2 and Round 3, we would drop this observation from the sample. We then obtain the new estimates of interest using the same specifications. Our results show that aspirational effects following to a father's death remains robust and similar to our previous results.

8 Conclusion

In this paper, we investigate the impact of various wealth shocks on the educational aspirations of parents for their children. Our main results show that aspirations economically vulnerable parents tend to be very sensitive to their external constraints and thus suffer more if there happens a negative wealth shock. Specifically, while aspirations of non-poor parents only decrease in the in event of a severe wealth

shock, such as death of father, aspirations of poor parents tend to respond strongly to not only a severe, but also moderate or temporary, shock in wealth, such as father's illness or job loss. Our findings show that poverty *does* "stifle" dreams in the sense that although the poor may aspire highly, they are unable to keep up with their goals due to their highly unstable income and wealth endowment.

Understanding the relationship between poverty and aspirations is central to effective policy-making in poverty alleviation. This paper suggests that policies targeting to improve aspirations and future behaviors of the poor should also take into account the question of sustaining the aspirations over time by tailoring social protection programs for the poor. As to our results regarding socially determined aspirations, it is suggested that policy agenda for improving aspirations must also address social inequality and immobility, which is key to creating aspirational "upward mobility" in society.

References

Acemoglu, D., Johnson, S., & Robinson, J. A. (2005). Institutions as a fundamental cause of long-run growth. *Handbook of Economic growth*, *1*, 385–472.

Barry, P. J., & Robison, L. J. (2001). Agricultural finance: Credit, credit constraints, and consequences. *Handbook of Agricultural Economics*, *1*, 513–571.

Bernard, T., Dercon, S., Orkin, K., Taffesse, A., et al. (2014). *The future in mind: Aspirations and forward-looking behaviour in rural ethiopia*. Centre for Economic Policy Research London.

Bertrand, M., Mullainathan, S., & Shafir, E. (2004). A behavioral-economics view of poverty. *American Economic Review*, *94*(2), 419–423.

Chantarat, S., & Barrett, C. B. (2012). Social network capital, economic mobility and poverty traps. *The Journal of Economic Inequality*, *10*(3), 299–342.

Dalton, P. S., Ghosal, S., & Mani, A. (2015). Poverty and aspirations failure. *The Economic Journal*, *126*(590), 165–188.

Dasgupta, P., & Debraj, R. (1986). Inequality as determinant of malnutrition and unemployment: theory.

Galiani, S., Gertler, P. J., & Undurraga, R. (2018). *Aspiration adaptation in resource-constrained environments* (Tech. Rep.). National Bureau of Economic Research.

Genicot, G., & Ray, D. (2017). Aspirations and inequality. *Econometrica*, *85*(2), 489–519.

IMF. (2006). 'Vietnam: Poverty Reduction Strategy Paper–Annual Progress Report', IMF Country Report No. 06/340.

Janzen, S. A., Magnan, N., Sharma, S., & Thompson, W. M. (2017). Aspirations failure and formation in rural nepal. *Journal of Economic Behavior & Organization*, *139*, 1–25.

Locke, E. A., & Latham, G. P. (2002). Building a practically useful theory of goal setting and task motivation: A 35-year odyssey. *American psychologist*, *57*(9), 705.

Peters, D. H., Garg, A., Bloom, G., Walker, D. G., Brieger, W. R., & Hafizur Rahman, M. (2008). Poverty and access to health care in developing countries. *Annals of the New York Academy of Sciences*, *1136*(1), 161–171.

Qian, N. (2008). Missing women and the price of tea in China: The effect of sex-specific earnings on sex imbalance. *The Quarterly Journal of Economics*, *123*(3), 1251–1285.

Ray, D. (2003, 01). Aspirations, poverty and economic change. *Understanding poverty*. doi: 10.1093/0195305191.003.0028

Ray, D. (2016). Aspirations and the development treadmill. *Journal of Human Development and Capabilities*, *17*(3), 309–323.

Shepherd, A., Scott, L., Mariotti, C., Kessy, F., Gaiha, R., da Corta, L., ... others (2014). The chronic poverty report 2014-2015: The road to zero extreme poverty. *London: Overseas Development Institute, www. odi. org. uk/sites/odi. org. uk/files/odiassets/publications-opinion-files/8834. pdf*.

Vakis, R., Rigolini, J., & Lucchetti, L. (2016). *Left behind: Chronic Poverty in Latin America and the Caribbean*. The World Bank.

Young Lives Survey Design and Sampling in Vietnam. (2014). Oxford University, Department of International Development: Young Lives Project.

Appendix A: Main results

Table 0: Descriptive statistics

Panel A: Basic characteristics					
Variable	**Obs**	**Mean**	**Std.**	**Min**	**Max**
Child's age, R2	1970	5.26	0.46	4	7
Male	2000	0.513	0.5	0	1
Ethnic minority	2000	0.144	0.351	0	1
Dad's age, R2	1908	34.06	5.989	19	59
Mom's age, R2	1956	31.185	5.769	19	54
Household size, R2	1970	4.666	1.514	2	15
Mins to school, R2	1963	12.688	8.861	1	120
Mins to school , R5	1549	17.987	14.164	0	180

Panel B: Parental aspirations				
	Frequency		Percentage	
	R2	R5	R2	R5
Below Grade 12	122	115	6.29	6.02
Grade 12	244	535	12.6	28.04
Vocational school	85	65	4.39	3.41
University, or above	1486	1193	76.72	62.53

Panel C: Shock data					
Variable	**Obs**	**Mean**	**Std**	**Min**	**Max**
Death shock, R2	1970	0.044	0.206	0	1
Death shock, R5	1940	0.023	0.151	0	1
Health shock, R2	1970	0.239	0.426	0	1
Health shock, R5	1940	0.129	0.335	0	1
Economic shock, R2	1970	0.028	0.166	0	1
Economic shock, R5	1940	0.02	0.139	0	1

Table 1: Baseline results of death shock of household members

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent variable is parental aspirations					
Dad died	-0.148**	-0.146**				
	(0.06)	(0.05)				
Mom died			-0.220	0.200		
			(0.15)	(0.11)		
Non-parent died					-0.033	0.000
					(0.04)	(0.03)
Observations	7,034	6,673	7,612	6,673	7,035	6,673
R-squared	0.076	0.11	0.075	0.109	0.075	0.109
Number of households or sentinels	1,907	20	1,981	20	1,907	20
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	No	Yes	No	Yes	No
Community FE	No	Yes	No	Yes	No	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2: Aspirational effects of father's death across age groups and genders

	(1)		(2)		(3)	
VARIABLES	Dependent variable is parental aspirations					
Dad died	0.250	0.240**	-0.336***	-0.331***		
	(0.15)	(0.10)	(0.08)	(0.0794)		
Dad died * Child's age	-0.031**	-0.036***				
	(0.01)	(0.01)				
Dad died $\times Female$			0.405***	0.353***		
			(0.10)	(0.110)		
Dad died$_{t-1}$					-0.377***	-0.267***
					(0.09)	(0.0959)
Dad died$_{t-1} \times Female$					0.396***	0.289**
					(0.14)	(0.134)
Observations	7,010	6,652	7,034	6,673	5,177	5,033
R-squared	0.076	0.110	0.077	0.117	0.088	0.132
Number of households	1,905		1,907		1,878	
Number of sentinels		20		20		20
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	No	Yes	No	Yes	No
Community FE	No	Yes	No	Yes	No	Yes

Robust standard errors in parentheses,
** p<0.01, ** p<0.05, * p<0.1

Table 3: Aspirational effects of mother's death

	(1)		(2)		(3)	
VARIABLES	Dependent variable is parental aspirations					
Mom died	0.216	0.233	-0.381*	0.220*		
	(0.193)	(0.202)	(0.210)	(0.125)		
Mom died * Child's age	-0.003	-0.00435				
	(0.019)	(0.0225)				
Mom died * Female			0.321	-0.0441		
			(0.247)	(0.162)		
Mom diedt-1					0.408	0.0289
					(0.373)	(0.127)
Mom diedt-1* Female					-0.754**	0.0103
					(0.381)	(0.170)
Observations	7,011	6,652	7,612	6,673	5,033	5,618
R-squared	0.075	0.110	0.075	0.115	0.127	0.086
Number of households	1,905		1,981		1,963	
Number of sentinels		20		20		20
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	No	Yes	No	Yes	No
Community FE	No	Yes	No	Yes	No	Yes

Robust standard errors in parentheses,
** p<0.01, ** p<0.05, * p<0.1

Table 2A: Aspirational effects of father's death in poor and non-poor subsamples

	Dependent variable is parental aspirations								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	All	Poor	Non-poor	All	Poor	Non-poor	All	Poor	Non-poor
Dad died	-0.145**	-0.119	-0.163**	-0.336***	-0.472***	-0.277***			
	(0.0604)	(0.0962)	(0.0769)	(0.0791)	(0.0959)	(0.102)			
Dad died * Female				0.403***	0.563***	0.313**			
				(0.102)	(0.134)	(0.132)			
Dad died t-1 * Female							-0.268***	-0.255**	-0.257***
							(0.0714)	(0.129)	(0.0897)
Dad died t-1 * Female							0.274**	0.233	0.292***
							(0.132)	(0.247)	(0.101)
Observations	7,035	2,833	4,202	7,035	2,833	4,202	5,177	2,072	3,085
R-squared	0.076	0.094	0.058	0.077	0.097	0.059	0.084	0.094	0.073
Number of households	1,907	766	1,148	1,907	766	1,148	1,878	746	1,125
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3A: Aspirational effects of mother's death in poor and non-poor samples

	Dependent variable is parental aspirations								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	All	Poor	Non-poor	All	Poor	Non-poor	All	Poor	Non-poor
Mom died	-0.220	-0.244***	-0.213	-0.381*	-0.244***	-0.375*			
	(0.150)	(0.0450)	(0.193)	(0.210)	(0.0450)	(0.214)			
Mom died * Female				0.321	0.039	0.467**			
				(0.247)	(0.15)	(0.219)			
Mom died t-1							0.499	-0.339***	0.509
							(0.375)	(0.0755)	(0.367)
Mom died t-1 * Female							-0.846**		
							(0.383)		
Observations	7,612	2,822	4,790	7,612	2,822	4,790	5,618	2,057	3,492
R-squared	0.075	0.092	0.058	0.075	0.092	0.058	0.086	0.095	0.072
Number of households	1,981	766	1,283	1,981	766	1,283	1,963	745	1,241
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4: Baseline results of illness shock

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent variable is parental aspirations					
Father is sick	-0.00179	-0.0200				
	(0.0211)	(0.0169)				
Mother is sick			0.0123	0.0158		
			(0.0196)	(0.0159)		
Non-parent is sick					-0.00185	-0.00962
					(0.0196)	(0.0191)
R-squared	0.075	0.142	0.075	0.142	0.075	0.142
Number of households	1,907		1,907		1,907	
Number of sentinels		20		20		20
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	No	Yes	No	Yes	No
Community FE	No	Yes	No	Yes	No	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4A: Extended results of father illness shock

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent variable is parental aspirations					
Father is sick	0.0278	0.0259	0.0355	0.0195		
	(0.0364)	(0.0393)	(0.0306)	(0.0374)		
Father is sick * Age 8	0.00331	-0.0281				
	(0.0489)	(0.0506)				
Father is sick * Age 12	-0.0206	-0.0420				
	(0.0488)	(0.0540)				
Father is sick * Age 15	-0.131**	-0.129*	-0.218***	-0.215**		
	(0.0582)	(0.0679)	(0.0681)	(0.0799)		
Father is sick * Female			-0.0366	-0.0419		
			(0.0438)	(0.0524)		
Father is sick * Age 15 * Female			0.207**	0.231***		
			(0.0980)	(0.0802)		
Father is sick, t-1					0.0563	0.00522
					(0.0442)	(0.0403)
Father is sick, t-1 * Age 15					-0.176***	-0.137**
					(0.0659)	(0.0480)
Father is sick, t-1 * Female					-0.0503	-0.0205
					(0.0623)	(0.0506)
Father is sick, t-1 * Age 15 * Female					0.279***	0.197**
					(0.0986)	(0.0692)
Observations	7,035	6,673	7,035	6,673	5,177	5,033
R-squared	0.076	0.142	0.082	0.145	0.092	0.149
Number of households	1,907		1,907		1,878	
Number of sentinels		20		20		20
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	No	Yes	No	Yes	No
Community FE	No	Yes	No	Yes	No	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4B: Effects of illness shock of father in poor neighborhoods

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Dependent variable is parental aspirations					
Father is sick	0.0314	0.0583	0.0575	0.0887*		
	(0.0690)	(0.0607)	(0.0576)	(0.0391)		
Father is sick * Age 8	0.0293	0.000103				
	(0.0872)	(0.0730)				
Father is sick * Age 12	-0.0292	-0.0871				
	(0.0885)	(0.0850)				
Father is sick * Age 15	-0.287***	-0.242**	-0.415***	-0.340**		
	(0.102)	(0.0940)	(0.109)	(0.116)		
Father is sick * Female			-0.0629	-0.132**		
			(0.0814)	(0.0427)		
Father is sick * Age 15 * Female			0.114***	0.0807	0.0727*	0.0536
			(0.0377)	(0.0457)	(0.0411)	(0.0447)
Father is sick, t-1			0.270*	0.262	0.0730	0.0633
			(0.162)	(0.177)	(0.0626)	(0.0458)
Father is sick, t-1 * Age 15					-0.278**	-0.275***
					(0.112)	(0.0612)
Father is sick, t-1 * Female					-0.168*	-0.112
					(0.102)	(0.0705)
Father is sick, t-1 * Age 15 * Female					0.489***	0.395**
					(0.168)	(0.122)
Observations	2,833	2,656	2,833	2,656	2,072	1,982
R-squared	0.099	0.167	0.106	0.170	0.105	0.170
Number of households	766		766		746	
Number of sentinels		8		8		8
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	No	Yes	No	Yes	No
Community FE	No	Yes	No	Yes	No	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4C: Effects of illness shock of father in rich neighborhoods

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Dependent variable is parental aspirations					
Father is sick	0.0271	0.00286	0.0236	-0.0181		
	(0.0393)	(0.0479)	(0.0346)	(0.0487)		
Father is sick * Age 8	-0.0102	-0.0362				
	(0.0570)	(0.0659)				
Father is sick * Age 12	-0.0178	-0.00983				
	(0.0563)	(0.0708)				
Father is sick * Age 15	-0.0579	-0.0695	-0.129	-0.152		
	(0.0678)	(0.0865)	(0.0808)	(0.101)		
Father is sick * Female			-0.0227	0.00575		
			(0.0502)	(0.0730)		
Father is sick * Age 15 * Female			0.186	0.215**		
			(0.117)	(0.0858)		
Father is sick, t-1					0.0517	-0.0308
					(0.0599)	(0.0536)
Father is sick, t-1 * Age 15					-0.118	-0.0559
					(0.0805)	(0.0519)
Father is sick, t-1 * Female					0.00466	0.0294
					(0.0786)	(0.0605)
Father is sick, t-1 * Age 15 * Female					0.163	0.0791
					(0.121)	(0.0544)
Observations	4,202	4,017	4,202	4,017	3,085	3,051
R-squared	0.057	0.124	0.063	0.126	0.079	0.135
Number of households	1,148		1,148		1,125	
Number of sentinels		12		12		12
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	No	Yes	No	Yes	No
Community FE	No	Yes	No	Yes	No	Yes

Robust standard errors in parentheses,
** p<0.01, ** p<0.05, * p<0.1

Table 5: Extended results of mother illness shock

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Dependent variable is parental aspirations					
Mother is sick	-0.0133	-0.0185	0.0475	0.0408		
	(0.0340)	(0.0392)	(0.0290)	(0.0312)		
Mother is sick * Age 8	0.0503	0.0645				
	(0.0423)	(0.0490)				
Mother is sick * Age 12	0.0892*	0.0862				
	(0.0520)	(0.0585)				
Mother is sick * Age 15	-0.0701	-0.0403	-0.175**	-0.138		
	(0.0645)	(0.0938)	(0.0806)	(0.0878)		
Mother is sick * Female			-0.0361	-0.0216		
			(0.0405)	(0.0443)		
Mother is sick * Age 15 * Female			0.159	0.124*		
			(0.113)	(0.0671)		
Mother is sick, t-1					-0.0178	0.00474
					(0.0346)	(0.0375)
Mother is sick, t-1 * Age 15					-0.0544	-0.0974
					(0.0758)	(0.0645)
Mother is sick, t-1 * Female					-0.00306	-0.0111
					(0.0484)	(0.0554)
Mother is sick, t-1 * Age 15 * Female					0.0322	0.0964
					(0.104)	(0.106)
Observations	7,035	6,673	7,035	6,673	5,177	5,033
R-squared	0.076	0.142	0.081	0.144	0.089	0.148
Number of households	1,907		1,907		1,878	
Number of sentinels		20		20		20
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	No	Yes	No	Yes	No
Community FE	No	Yes	No	Yes	No	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5A: Extended results of mother illness shock in poor neighborhoods

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Dependent variable is parental aspirations					
Mother is sick	0.0357	0.0259	0.0431	0.0428		
	(0.0768)	(0.0676)	(0.0508)	(0.0477)		
Mother is sick * Age 8	-0.00431	0.0419				
	(0.0876)	(0.0900)				
Mother is sick * Age 12	-0.0431	0.0295				
	(0.0986)	(0.114)				
Mother is sick * Age 15	-0.172	-0.0763	-0.254	-0.141		
	(0.129)	(0.150)	(0.158)	(0.0849)		
Mother is sick * Female			-0.0411	0.0180		
			(0.0701)	(0.0613)		
Mother is sick * Age 15 * Female			0.199	0.0905		
			(0.208)	(0.162)		
Mother is sick, t-1					0.0155	0.0404
					(0.0592)	(0.0536)
Mother is sick, t-1 * Age 15					0.0899	-0.103
					(0.148)	(0.121)
Mother is sick, t-1 * Female					-0.0222	0.00353
					(0.0811)	(0.0699)
Mother is sick, t-1 * Age 15 * Female					-0.184	0.0421
					(0.179)	(0.130)
Observations	2,833	2,656	2,833	2,656	2,072	1,982
R-squared	0.095	0.165	0.101	0.168	0.101	0.166
Number of households	766		766		746	
Number of sentinels		8		8		8
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	No	Yes	No	Yes	No
Community FE	No	Yes	No	Yes	No	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5B: Extended results of mother illness shock in poor neighborhoods

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Dependent variable is parental aspirations					
Mother is sick	-0.0358	-0.0370	0.0516	0.0427		
	(0.0348)	(0.0484)	(0.0352)	(0.0423)		
Mother is sick * Age 8	0.0752	0.0698				
	(0.0474)	(0.0586)				
Mother is sick * Age 12	0.171***	0.119*				
	(0.0606)	(0.0653)				
Mother is sick * Age 15	-0.0248	-0.0251	-0.148	-0.142		
	(0.0728)	(0.122)	(0.0932)	(0.119)		
Mother is sick * Female			-0.0343	-0.0481		
			(0.0495)	(0.0616)		
Mother is sick * Age 15 * Female			0.149	0.152**		
			(0.135)	(0.0625)		
Mother is sick, t-1					-0.0359	-0.0146
					(0.0427)	(0.0499)
Mother is sick, t-1 * Age 15					-0.134*	-0.0888
					(0.0809)	(0.0794)
Mother is sick, t-1 * Female					0.00620	-0.0164
					(0.0607)	(0.0776)
Mother is sick, t-1 * Age 15 * Female					0.175	0.123
					(0.129)	(0.152)
Observations	4,202	4,017	4,202	4,017	3,085	3,051
R-squared	0.060	0.125	0.063	0.125	0.079	0.135
Number of households	1,148			12		12
Number of sentinels		12		12		12
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	No	Yes	No	Yes	No
Community FE	No	Yes	No	Yes	No	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6: Baseline results of a job loss shock

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Dependent variable is parental aspirations					
Job loss	-0.00825	-0.0485	-0.0482	-0.0821*	-0.216***	-0.196
	(0.0281)	(0.0303)	(0.0375)	(0.0394)	(0.0828)	(0.148)
Job loss * Female			0.0859	0.0752		
			(0.0549)	(0.0556)		
Job loss * Parent low edu					0.231**	0.113
					(0.109)	(0.203)
Job loss * Parent medium edu					0.202**	0.165
					(0.0899)	(0.142)
Job loss * Parent high edu					0.223**	0.157
					(0.0918)	(0.154)
Observations	7,035	6,673	7,035	6,673	7,035	6,673
R-squared	0.075	0.142	0.075	0.142	0.077	0.142
Number of households	1,907		1,907		1,907	
Number of sentinels		20		20		20
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	No	Yes	No	Yes	No
Community FE	No	Yes	No	Yes	No	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6A: Effects of job loss shock in poor and rich neighborhoods

VARIABLES	Dependent variable is parental aspirations											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Poor	Poor	Rich	Rich	Poor	Poor	Rich	Rich	Poor	Poor	Rich	Rich
Job loss	-0.0195	0.00112	-0.00612	-0.0563	-0.0597	-0.0493	-0.0453	-0.0862*	-0.151	0.00951	-0.323***	-0.573***
	(0.0706)	(0.0558)	(0.0306)	(0.0346)	(0.0885)	(0.0747)	(0.0414)	(0.0452)	(0.125)	(0.163)	(0.0647)	(0.0796)
Job loss * Female					0.116	0.147	0.0811	0.0645				
					(0.137)	(0.127)	(0.0598)	(0.0624)				
Job loss * Parent low edu									0.0373	-0.257	0.366***	0.534***
									(0.203)	(0.317)	(0.101)	(0.147)
Job loss * Parent medium edu									0.215	0.147	0.295***	0.506***
									(0.144)	(0.182)	(0.0755)	(0.100)
Job loss * Parent high edu									-0.0297	-0.331*	0.339***	0.545***
									(0.487)	(0.150)	(0.0749)	(0.0898)
Observations	2,833	2,656	4,202	4,017	2,833	2,656	4,202	4,017	2,833	2,656	4,202	4,017
R-squared	0.093	0.165	0.057	0.125	0.094	0.165	0.058	0.125	0.098	0.167	0.060	0.125
Number of households	766		1,148		766		1,148		766		1,148	
Number of sentinels		8		12		8		12		8		12
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Community FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 7: Aspirational effects of an environmental shock (drought)

	Dependent variable is parental aspirations					
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	All	All	Poor	Poor	Non-poor	Non-poor
Drought shock	0.00873		0.0239		-0.0337	
	(0.0329)		(0.0380)		(0.0652)	
Drought shock * Age 15	-0.151*		-0.171*		-0.101	
	(0.0822)		(0.0990)		(0.148)	
Drought shock t-1		-0.00462		-0.0173		0.0377
		(0.0392)		(0.0430)		(0.0946)
Drought shock t-1 * Age 15		-0.0588		0.0629		-0.152
		(0.0958)		(0.166)		(0.138)
Observations	7,035	5,162	2,833	2,072	4,202	3,085
R-squared	0.075	0.081	0.095	0.093	0.057	0.071
Number of households	1,907	1,876	766	746	1,148	1,125
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 8: Aspirational effects of an environmental shock (flood)

	Dependent variable is parental aspirations					
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	All	All	Poor	Poor	Non-poor	Non-poor
Flood shock	0.00291		-0.00538		0.00858	
	(0.0252)		(0.0391)		(0.0327)	
Flood shock * Age 15	0.0606		-0.0913		0.0971	
	(0.0649)		(0.151)		(0.0714)	
Flood shock t-1		-0.0516		-0.0762		-0.0292
		-0.0379		-0.0601		(0.0385)
Flood shock t-1 * Age 15		0.173*		-0.00594		0.227**
		(0.101)		(0.201)		(0.112)
Observations	7,035	5,177	2,833	2,072	4,202	3,085
R-squared	0.075	0.084	0.094	0.095	0.058	0.073
Number of households	1,907	1,878	766	746	1,148	1,125
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix B: Robust results

Table 1: Aspirational effects of death of a non-parent household member

	(1)		(2)		(3)	
VARIABLES	Dependent variable is parental aspirations					
Non-parent died	0.0366	0.0513	-0.0418	-0.0131	0.00226	0.0141
	(0.09)	(0.0899)	(0.05)	(0.0473)	(0.08)	(0.0613)
Non-parent died * Child's age	-0.008	-0.00611				
	(0.01)	(0.00957)				
Non-parent died * Female			0.018	0.0241	-0.0684	-0.0526
			(0.07)	(0.0667)	(0.11)	(0.0852)
Non-parent diedt-1					0.0818	0.0553
					(0.07)	(0.0495)
Non-parent diedt-1* Female					-0.0148	0.0170
					(0.10)	(0.0705)
Observations	7,011	6,652	7,035	6,673	5,177	5,033
R-squared	0.075	0.109	0.075	0.114	0.084	0.128
Number of households	1,905		1,907		1,878	
Number of sentinels		20		20		20
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	No	Yes	Yes	No	Yes
Community FE	No	Yes	No	Yes	No	Yes

Robust standard errors in parentheses,
** p<0.01, ** p<0.05, * p<0.1

Table 2: Baseline results of illness shock of a non-parent household member

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Dependent variable is parental aspirations					
Non-parent is sick	-0.0134	-0.0184	0.000232	0.00381		
	(0.0291)	(0.0267)	(0.0274)	(0.0313)		
Non-parent is sick * Age 8	0.0396	0.0327				
	(0.0428)	(0.0489)				
Non-parent is sick * Age 12	0.0286	-0.0164				
	(0.0516)	(0.0546)				
Non-parent is sick * Age 15	-0.0580	0.0120	-0.0441	0.00580		
	(0.0586)	(0.0537)	(0.0654)	(0.0599)		
Non-parent is sick * Female			0.0152	-0.0282		
			(0.0385)	(0.0352)		
Non-parent is sick * Age 15 * Female			-0.0401	0.00988		
			(0.121)	(0.128)		
Non-parent is sick, t-1					0.0301	0.0552*
					(0.0328)	(0.0296)
Non-parent is sick, t-1 * Age 15					-0.0653	-0.158***
					(0.0707)	(0.0524)
Non-parent is sick, t-1 * Female					-0.0744*	-0.105**
					(0.0452)	(0.0371)
Non-parent is sick, t-1 * Age 15 * Female					0.0455	0.138
					(0.0970)	(0.0851)
Observations	7,035	6,673	7,035	6,673	5,177	5,033
R-squared	0.075	0.142	0.080	0.143	0.090	0.150
Number of households or sentinels	1,907		1,907		1,878	
Number of households or sentinels		20		20		20
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	No	Yes	No	Yes	No
Community FE	No	Yes	No	Yes	No	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2A: Effects of illness shock of mother in poor neighborhoods

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Dependent variable is parental aspirations					
Non-parent is sick	-0.0780*	-0.0603	-0.00288	0.0212		
	(0.0473)	(0.0418)	(0.0469)	(0.0495)		
Non-parent is sick * Age 8	0.184**	0.161				
	(0.0727)	(0.0899)				
Non-parent is sick * Age 12	0.117	0.0492				
	(0.0960)	(0.0709)				
Non-parent is sick * Age 15	-0.0556	0.0546	-0.0517	0.0623		
	(0.107)	(0.0794)	(0.135)	(0.141)		
Non-parent is sick * Female			0.0117	-0.0475		
			(0.0630)	(0.0656)		
Non-parent is sick * Age 15 * Female			-0.176	-0.145		
			(0.201)	(0.260)		
Non-parent is sick, t-1					-0.00115	0.0674
					(0.0612)	(0.0541)
Non-parent is sick, t-1 * Age 15					-0.207	-0.262***
					(0.130)	(0.0359)
Non-parent is sick, t-1 * Female					-0.121	-0.117
					(0.0796)	(0.0870)
Non-parent is sick, t-1 * Age 15 * Female					0.0691	0.0134
					(0.168)	(0.101)
Observations	2,833	2,656	2,833	2,656	2,072	1,982
R-squared	0.097	0.166	0.101	0.167	0.108	0.172
Number of households	766		766		746	
Number of sentinels		8		8		8
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	No	Yes	No	Yes	No
Community FE	No	Yes	No	Yes	No	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2B: Effects of illness shock of mother in rich neighborhoods

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Dependent variable is parental aspirations					
Non-parent is sick	0.0460	0.0197	0.000220	-0.00731		
	(0.0347)	(0.0321)	(0.0335)	(0.0418)		
Non-parent is sick * Age 8	-0.0637	-0.0455				
	(0.0505)	(0.0415)				
Non-parent is sick * Age 12	-0.0445	-0.0649				
	(0.0579)	(0.0711)				
Non-parent is sick * Age 15	-0.0939	-0.0274	-0.0445	-0.00803		
	(0.0691)	(0.0651)	(0.0748)	(0.0698)		
Non-parent is sick * Female			0.0236	-0.0151		
			(0.0482)	(0.0429)		
Non-parent is sick * Age 15 * Female			0.0775	0.0864		
			(0.151)	(0.161)		
Non-parent is sick, t-1					0.0467	0.0474
					(0.0372)	(0.0347)
Non-parent is sick, t-1 * Age 15					0.0158	-0.101
					(0.0779)	(0.0797)
Non-parent is sick, t-1 * Female					-0.0212	-0.102***
					(0.0519)	(0.0286)
Non-parent is sick, t-1 * Age 15 * Female					0.0210	0.204
					(0.111)	(0.119)
Observations	4,202	4,017	4,202	4,017	3,085	3,051
R-squared	0.058	0.124	0.062	0.125	0.078	0.136
Number of households	1,148		1,148		1,125	
Number of sentinels		12		12		12
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	No	Yes	No	Yes	No
Community FE	No	Yes	No	Yes	No	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix C: Deriving $\frac{da^*}{dy_0} > 0$

Recall we have the following condition at $a*$:

$$\mathbf{B}(k_{low}) = \mathbf{B}\left(\frac{a^*}{\rho}\right)$$

$$\beta u_1(\rho q k_{low}) + 2u_0(y_0 - k_{low}) = \beta\left[u_1(qa^*) + b\right] + 2u_0\left(y_0 - \frac{a^*}{\rho}\right) \tag{1}$$

We can write (1) as the following equation:

$$H \equiv \beta u_1(\rho q k_{low}) + 2u_0(y_0 - k_{low}) - \beta\left[u_1(qa^*) + b\right] - 2u_0\left(y_0 - \frac{a^*}{\rho}\right)$$

We have:

$$\frac{da^*}{dy_0} = \frac{\partial a*}{\partial H} \times \frac{\partial H}{\partial y_0} = \frac{\frac{\partial H}{\partial y_0}}{\frac{\partial H}{\partial a*}}$$

To show $\frac{da^*}{dy_0} > 0$, we shall show that $\frac{\partial H}{\partial y_0} > 0$ and $\frac{\partial H}{\partial a*} > 0$ *OR* $\frac{\partial H}{\partial y_0} < 0$ and $\frac{\partial H}{\partial a*} < 0$.
We have:

$$\frac{\partial H}{\partial y_0} = 2u_0^{'}(y_0 - k_{low}) - 2u_0^{'}\left(y_0 - \frac{a^*}{\rho}\right)$$

For $a* > a_{low}$, we have $\frac{a^*}{\rho} > k_{low} = \frac{1}{\rho}a_{low}$, therefore $y_0 - \frac{a^*}{\rho} < y_0 - k_{low}$.
Because u_t is a strictly concave function, we have $u_0^{'}(y_0 - k_{low}) - u_0^{'}\left(y_0 - \frac{a^*}{\rho}\right) > 0$.
We have shown that $\frac{\partial H}{\partial y_0} > 0$. It's left to show $\frac{\partial H}{\partial a*} > 0$.
We have:

$$\frac{\partial H}{\partial a*} = -q\beta u_1^{'}(qa*) + \frac{2}{\rho}u_0^{'}\left(y_0 - \frac{a^*}{\rho}\right)$$

Recall at at k_{low}, marginal benefit of investment equals marginal cost of investment:

$$\frac{\partial U}{\partial k}\Big|_{k_{low}} = \frac{\partial C}{\partial k}\Big|_{k_{low}} \Leftrightarrow \frac{\partial U}{\partial k} - \frac{\partial C}{\partial k}\Big|_{k_{low}} = 0$$

$$q\rho\beta u_1^{'}(\rho q k_{low}) - 2u_0^{'}(y_0 - k_{low}) = 0$$

$$q\beta u_1^{'}(\rho q k_{low}) - \frac{2}{\rho}u_0^{'}(y_0 - k_{low}) = 0$$

Since $\frac{a^*}{\rho} > k_{low}$, we have the marginal cost must therefore exceeds the marginal benefit at $a*$. In other words, we have:

$$q\beta u_1^{'}\left(qa^*\right) - \frac{2}{\rho}u_0^{'}\left(y_0 - \frac{a^*}{\rho}\right) < 0$$

$$-q\beta u_1^{'}\left(qa^*\right) + \frac{2}{\rho}u_0^{'}\left(y_0 - \frac{a^*}{\rho}\right) > 0$$

We have shown $\frac{\partial H}{\partial a*} > 0$, whence $\frac{da^*}{dy_0} > 0$ as desired.