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Who wears the trousers in the family?

Intra-household resource control, subjective expectations and human capital investment

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Who wears the trousers in the family? Intra-household resource control, subjective expectations and human capital investment

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Abstract

This paper studies how the interaction between intra-household allocation of resources and parental beliefs about the returns to education influences human capital investment among poor households. For this purpose, I study a conditional cash transfer program in the Republic of Macedonia, aiming at improving secondary school enrollment among children in poor households. For identification I exploit the random allocation of payments either to mothers or household heads, together with a unique information on parental subjective expectations of returns to schooling. I show that targeting mothers leads to an increase in secondary school enrollment only for children whose parental returns are sufficiently high at the beginning of the program. This effect is associated with an increase in individual expenditure shares on education for this group. I find no differential impact for other inputs, such as monitoring of school attendance and time use. Overall, I show that the effect of channeling resources to mothers is strictly related to heterogeneity in parental perceived returns to schooling.

JEL Codes: D13, J12, J16**,** D8, I2, J16, O15

Keywords: intra-household; conditional cash transfers; expectations; returns to schooling; gender; cognitive biases.

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1 Introduction

A large body of research shows that Conditional Cash Transfer (CCT) programs in the developing world have been beneficial for human capital investments in children among poor households[1]. However, the vast majority of these programs transfer money to women in the household, keeping uncertainty on whether the delivered effect is due to an increase of resources or to a behavioral change related to their use. The understanding of these mechanisms is particularly important in countries where the empowerment of women may have important indirect implications on children's human capital investment, especially through behavioral changes within households.

At the same time, decisions to invest in human capital are likely to depend on expected costs and benefits of schooling. It is therefore reasonable to believe that the effect of CCT programs transferring money to women rather than men should vary with parental expected returns to schooling[2]. This is particularly important in environments where limited or imperfect information about future income possibilities are a deeper issue. Still, it is unclear how the link between the identity of the recipient receiving a cash transfer and the perceived returns to schooling in the family might influence human capital investments in their children.

This paper studies the effect on children's human capital investment of channelling cash transfers to women versus household heads when parental[3] perceived returns to schooling are heterogeneous across households. I study this effect in the context of the CCT for Secondary School education in the Republic of Macedonia, the first CCT program to be implemented in the Balkan region. This is a national program providing cash transfers to poor households conditional on secondary school attendance of their children. What makes this program unique is that this is the first nationally implemented study to randomize cash transfers to the household head versus the mother of the child. The CCT provides an exogenous variation in the share of resources controlled by mothers which can be studied to determine whether channelling resources to women has an impact on children's human capital investment. To understand whether this effect is varying depending on perceived returns to schooling, I collected a unique dataset on parental expectations of children's future income possibilities and

[1] Fiszbein and Schady (2009) provide a comprehensive review of the literature on the effects of Conditional Cash Transfers.

[2] I focus only on benefits, since the role of costs should be symmetric.

[3] Throughout the paper I will consider parental expectations as the shared expectations of both parents.

employment probability under different educational achievements[4]. This allowed uncovering the large heterogeneity characterizing parental perceived returns to schooling.

I find that targeting CCT payments to mothers had a small and not statistically significant effect on child enrollment in secondary school. However, when ex-ante parental perceived returns to schooling are sufficiently large, channelling resources to women led to an increase in enrollment and achievement rates. This effect is associated with an increase in individual expenditure shares on education for the children in this group. For children in the higher tercile of the parental perceived returns, individual expenditure shares increased by roughly 4 percent. These findings support the idea that households tend to invest more in children when the payment is transferred to mothers, but only when the perceived returns to schooling are large enough to justify the investment. In order to understand the joint effect of channelling transfers to mothers and high parental perceived returns to schooling on human capital investment, we need to disentangle the relationship between each of the two components with the decision to invest in children.

The majority of educational and health-related social programs have targeted women in the past using the justification that mothers have stronger preferences for child education and health, but evidence about this mechanism is still lacking[5]. Policy interventions shifting the relative income of women versus men within households have proven to have an effect on different family decisions (Lundberg et al. (1997) and Ward-Batts (2008) use the 1979 UK Reform of Child benefits, Attanasio and Lechene (2002) and Bobonis (2009) use Mexican Progresa). However, there is little experimental evidence on the differential effect of targeting a payment to mothers or fathers when the objective is to subsidize education. Recently Benhassine et al. (2013) studied an unconditional (labeled) cash transfer for primary school attendance in Morocco using an experimental design. They compare payments made to fathers versus a more standard modality of payments made to mothers and they find very little effect of targeting fathers versus mothers. However, the program object of the study is based in Morocco, where the vast majority of the population is muslim. Similarly, Akresh et al. (2012) studied the effect of different CCT modalities on preventative health visits in rural Burkina Faso and they find no effect of targeting payments to women. It is reasonable to believe that targeting women might

[4]Since the aim of the Macedonian CCT program is to increase the low secondary school enrollment of children in poor households, in the paper I focus on the return of completing secondary school versus completing only primary school.

[5]The other reason is that women have a lower participation in the labour market and therefore have more available time to collect the payment and fulfill administrative procedures.

generate different outcomes depending on the social norms that characterize the household, which are strong determinants of the relative power distribution across household members. In Macedonia, this is particularly important since the heterogeneity in our sample, in terms of religions and ethnicities[6], allows studying the effect of targeting payment to mothers in a very diverse environments.

Results suggest that one possible channel through which targeting payments to mothers affect human capital investment is through a differential allocation of resources within the household. This is supported by the literature, which provides evidence that targeting payments to mothers could lead to a distinct impact through a shift in relative decision power within the household, resulting in a differential allocation of expenditures. A large body of research reports evidence that the amount of resources that each household member contributes to the family affects its allocation of expenditures (for a literature review, see Duflo, 2005). However, there is no clear consensus on the precise mechanism through which households take decisions and allocate consumption when receiving a cash transfer. Evidence on collective models suggests that targeting payments to a precise household member might result in different outcomes[7] if individuals have different preferences and the targeted payment affects the relative decision power within the household. At the same time, evidence suggests that women have different preferences over consumption than men, favoring public goods rather than private goods (Thomas, 1990; Hoddinott and Haddad, 1995; Lundberg et al., 1997; Doss, 2006; Ward-Batts, 2008). This paper contributes to this branch of literature by providing evidence that channelling resources to women might indeed change the allocation of expenditures.

In CCTs the presence of a conditionality gives parents incentives, such as monitoring of school attendance, that might have additional indirect effect on education and that might depend on who is entitled to receive the cash transfer. Different studies provide evidence that conditionality is beneficial, since it might generate the incentive to improve performance in order to achieve the conditionality (De Brauw and Hoddinott, 2011; Barrera-Osorio et al., 2011;

[6]The sample includes households from Macedonian, Albanian, Turkish and Roma ethnicities. At the same time across ethnicities, I observe variation in religion (christian orthodox and muslim).

[7]I will discuss in the paper the alternative of targeting different adults in the household. However, an alternative strategy would be to target directly children, especially beyond a certain age, but there is little or no evidence on the effect of such targeting in developing countries. Ashworth et al. (2002) studied the effect of targeting children for the Education Maintenance Allowance (EMA) in the United Kingdom, which provides a cash subsidy to young people aged 16–19 from poor households to avoid drop-outs before the end of compulsory education. At the piloting stage of the program, different variants of the program were tested and among other one was comparing the targeting of parents versus the targeting of children. The authors find that the effect on participation was twice as large when the subsidy was paid to young individuals.

Baird et al., 2012; Akresh et al., 2012). This might translate in a differential incentive on monitoring of child enrollment and attendance and on a differential incentive to invest more time (or less) with the child. However, this paper provides evidence against differential effects related to the conditionality of targeting mothers. I find no impact on the frequency in which parents monitor their children and on the amount of time they spend with them. One possible reason is that for children of secondary school age, this mechanism might not be relevant since parents have smaller control or influence over them.

Human capital investments in children are likely to be influenced not only by whether who control resources in the household is more prone to invest on it, but also by how parents value its costs and benefits. It is realistic to believe that parents make schooling decisions for their children based on subjective expectations rather than actual schooling returns (Manski, 2004), which have been extensively used and estimated in literature mainly using earning data. In absence of data on expectations, non-verifiable assumptions on expectations are needed, while there is little reason to believe that individuals with similar information form their expectations in the same way. Instead, the availability of subjective expectations allows eliciting ex-ante beliefs given information that parents have at the time of decision making, allows controlling for the heterogeneity in people's expectations and on ex-ante perceptions of employment risk. This paper allows testing for effect heterogeneity of targeting payments to women by directly eliciting subjective returns to schooling at the beginning of the program.

Most of the early papers linking perceived returns to schooling to educational choices focused on developed countries, while only recently the attention turned to developing countries. This is particularly important since, among poor households, the decision of investing in human capital might be strictly related to expectations, due to the fact that budget constraints might be more binding. Evidence shows that in developed countries individuals have fairly correct expectations of returns to schooling[8], while there is still little evidence on how returns to schooling are perceived in developing countries. In such environment, it is reasonable to believe that students and parents are not well-informed about future returns to schooling. This might be related to a scarce availability of information about earnings, especially when

[8] Freeman (1971) and Betts (1996) were among the first to collect individual information among college undergraduates about earnings for different categories of jobs. Smith and Powell (1990) collected college seniors' income expectations for the first year of their job and after 10 years. Similarly, Blau (1990) collected college seniors' information about initial, after 10 years and after 20 years if they were to stay in the same occupation after leaving school. Dominitz and Manski (1996) provided the first computer-assisted interview to collect information among high school and college students.

informal labour markets are large.

Perceived returns are particularly important for developing countries since measured returns are high, but schooling tend to remain low. As noted by Jensen (2010), in the Dominican Republic around 80-90% of youths complete primary school, but only 25% to 30% complete secondary school, compared to a secondary school return of over 40%. In his study, he finds that 8th grade pupils underestimate the returns to schooling, while informing a random set of children about the average returns to schooling significantly increase their perceived returns and the attained years of schooling. Similarly, Nguyen (2008) finds that informing a random subset of children in Madagascar about their returns to schooling increased attendance and test scores. Attanasio and Kaufmann (2009) for Mexico finds that higher expected returns are related to higher college attendance. These studies provide evidence that perceived expected returns are heterogenous even across comparably similar groups. If learning about future income is happening locally by observing neighbors or friends, there is a larger chance of segregation in expectations; for instance, in rural areas, individuals might learn only about returns in agricultural-specific activities, rather than learning about returns in urban areas, where jobs related to higher levels of schooling are most probably be found. Consistently with this literature, I show that parental perceived returns are particularly important determinants of secondary schooling decisions in Macedonia.

Whether information matters for educational choices might depend as well on whose information we are considering. This paper focuses on parental expectations without distinguishing between mother and father since information is collected when both parents are present. There is no evidence in literature that justify differences in perceived returns to schooling across partners and I believe it is reasonable to assume partners are sharing the same information set. In contrast, it would not be reasonable to assume that parents have the same expectations of their children. Attanasio and Kaufmann (2009) provide evidence for college enrollment in Mexico by using responses about schooling returns from mothers and from children and find that there are significant differences between male and female children. Mother's expectations are important for female enrollment into college, while they don't matter for male children. Giustinelli (2011) provides evidence instead on whether major choice for high school students depends on parental versus child expectations.

While literature provides evidence on heterogeneity of expected returns to schooling, the use of subjective expectations in choice models has been limited in literature since data of this type has become only recently and because there is widespread belief that subjective data are flawed by cognitive biases. One type of such bias attributed to subjective expectation data is the cognitive dissonance, i.e. the tendency of respondent to report expectations that conform to their decisions rather than the real expectation (Festinger, 1962). Evidence on this type of cognitive bias is still scarce in economics literature. Mullainathan and Washington (2009) find evidence of cognitive dissonance in political support of candidates by comparing opinions on voting-age eligibles versus non-eligible after the presidential elections and providing evidence that eligibles tend to have higher polarization than non-eligibles. In relation to subjective expectations related to schooling, Zafar (2011) provides instead evidence against cognitive biases in expectation reporting by comparing expectations on a different set of outcomes related to undergraduate major choice before and after the decision is taken. This paper contributes to this branch of literature by providing evidence against cognitive dissonance by making use of the longitudinal dimension of the dataset and by analyzing the updating process of expectations. In this paper, cognitive dissonance would affect the updating of expectations such that expectations linked to choices made during the two data collection point would be systematically revised upward and the expectations for the educational option not taken would be systematically revised down. I provide evidence that respondents do not revise their expectations in such a way, but that the updating of expectations follow a similar pattern across individuals with different educational choices. This makes the results of the paper robust to cognitive biases.

The paper is organized as follow. In Section 2, I present the theoretical framework. In Section 3, I present the Macedonian CCT for Secondary School Education and the research design. In Section 4, I present the data used in the paper and the way different measures are constructed. In Section 5 I present the empirical strategy and the results of the paper, while in Section 6 I present the robustness checks.

2 Theoretical framework

Targeting payments to different household members has indirect implications for the welfare analysis of human capital investment on children. This section illustrates how the effect of channelling resources to women within a household can be studied in a collective household

framework[9]. I consider a static version of a collective model for the decision to either consume or invest in child education for a household composed by two decision-makers (mother and father, indicated by the subscript m and f) and their child. The household decides how to allocate income (y) between consumption (c), which includes private and public consumption, and human capital investment for their child (h). Individual d preferences are represented by a twice continuously differentiable utility function $U_d(c, h)$, which I assume is separable in consumption and human capital investment. I assume therefore that the utility function for each decision maker is defined by

$$U_d(c, h) = u(c) + v_d(r \cdot h) \tag{1}$$

where r is the return (in terms of utility) of the human capital investment. I am therefore assuming that both parents have the same preferences for consumption, while they have different tastes for human capital investment. In addition, I assume the household faces uncertainty on the return to human capital investment and, for simplicity, I assume that the rate of return can be either low or high, $r = (r_L, r_H)$. The probability assigned to the higher return is π_H, while the probability assigned to the lower return is $\pi_L = 1 - \pi_H$. Information is shared among parents, so that mother and father in the household share the same expectation for the rate of return to human capital investment. We can therefore define the expected utility derived by each parent from consumption and human capital investment by

$$EU_j(c, h) = u(c) + \pi_L \cdot v_j(r_L \cdot h) + \pi_H \cdot v_j(r_H \cdot h) \tag{2}$$

Following the literature on collective households, I assume that the decisions made by the household are Pareto-efficient (Chiappori, 1992). The household decision to allocate income to either consumption or human capital investment is therefore defined by the following maximization problem:

$$\begin{aligned} \max_{c,h} \quad & (1-\lambda)\left[u(c) + E\left[v_f(r \cdot h)\right]\right] + \lambda\left[u(c) + E\left[v_m(r \cdot h)\right]\right] \\ \text{subject to} \quad & y \geq c + p \cdot h \\ & c \geq \bar{c} \end{aligned} \tag{3}$$

[9]The main reference is Blundell et al. (2005), who extend a general collective model with labour supply to allow for the presence of public goods expenditures.

where the Pareto weight $\lambda \in [0,1]$ reflects the weight of the mother in the household, p is the (relative) price for human capital investment and $\bar{c}$ is a minimum consumption which is necessary for the household before investing in human capital. With an interior solution, the problem lead to the following first order condition:

$$\begin{aligned}(1-\lambda)\left[\pi_L \cdot r_L \cdot v_f'(r_L \cdot h) + \pi_H \cdot r_H \cdot v_f'(r_H \cdot h)\right] + \\ \lambda\left[\pi_L \cdot r_L \cdot v_m'(r_L \cdot h) + \pi_H \cdot r_H \cdot v_m'(r_H \cdot h)\right] &= p \cdot u'\left(y - p \cdot h\right)\end{aligned} \tag{4}$$

If we define $\Phi_d = \left(\pi_L r_L \cdot v_d'(r_L \cdot h) + \pi_H r_H \cdot v_d'(r_H \cdot h)\right)/u'(c)$ as the marginal willingness to pay for the human capital investment for each parent, we can rewrite the optimality condition (4) as:

$$(1-\lambda) \cdot \Phi^f + \lambda \cdot \Phi^m = p \tag{5}$$

The efficiency condition for human capital investment takes the standard Bowen-Lindahl-Samuelson form for public good expenditures. Parents will invest in human capital up to the point in which the weighted sum of the (expected) marginal willingness to pay for human capital investment of father and mother is equal to the price of education.

How does the Macedonian CCT program relate to this setting? Firstly, the introduction of a subsidy for all households lowers the price of education, p. Secondly, and more importantly for this study, the targeting of mothers versus household heads changes parental relative income and therefore provides an exogenous change in the Pareto weight λ. If we indicate w_f and w_m as the contribution to household income attributed to the mother and the father in the family, the CCT program generates an exogenous change in the relative income in the household, w_f/w_m. We are implicitly assuming that the direction of the derivative is positive in municipalities where the payments are made to mothers (since λ indicates the weight associated to mother's utility function) and negative in municipalities where the payments are made to household heads. We are therefore assuming that

$$\frac{\partial \lambda}{\partial\left(\frac{w_f}{w_m}\right)} > 0 \tag{6}$$

in the municipalities where the payments is targeted to mothers.

Since the CCT program provides an exogenous shift in the Pareto weight, we are therefore interested in understanding how such a change towards one household member or the other

would affect the decision to invest on the child. Using Implicit Function theorem, we can derive the change in h induced by a change in λ[10]:

$$\frac{\partial h}{\partial \lambda} = \frac{\pi_L \cdot r_L \cdot \left(v'_m(r_L \cdot h) - v'_f(r_L \cdot h)\right) + \pi_H \cdot r_H \cdot \left(v'_m(r_H \cdot h) - v'_f(r_H \cdot h)\right)}{D} \tag{7}$$

where $D > 0$. Targeting women is beneficial for human capital investment if they have stronger preferences for child education, e.g. $\frac{\partial h}{\partial \lambda} > 0$ if $v'_f(h) < v'_m(h)$ for any h. If we observe a positive increase in investment in human capital in municipalities where the payments are made to women, we would expect that this is driven by a change in the Pareto weight induced by the program. Additionally, the model indicates that this would attributable to a different sensitivity of the marginal propensity to pay for child education compare with respect to consumption among decision makers. The size of the effect depends on preference differences among parents and on the cost/benefit of human capital investment (the relative price for education and the expected returns). The intuition behind this result is that when expected returns are small both parents have small incentives to invest. Once the returns becomes larger the incentives to invest on education become stronger for the parent who has stronger preferences for human capital investment. When expected returns are sufficiently large both parents have strong incentives to invest in human capital. We would therefore expect to observe a differential effect on human capital investment only when subjective expectations are sufficiently large to compensate for reductions in consumption.

3 The Macedonian CCT for Secondary School Education

3.1 Background

The Republic of Macedonia is a country of roughly 2 million inhabitants at the center of the Balkan region, in South-Eastern Europe. It is classified as an upper middle income country, registering in 2012 a GDP per capita of 4,568$ in current USD and 11,700$ in PPP[11]. From the education perspective, overall, the country is achieving good levels of primary school completion, with a gross (adjusted) enrollment rate in primary school equal to 98 percent in 2010[12]. At the same time, it is slightly under-performing on secondary school completion rates in comparison to the average among developing countries in the Europe and Central

[10] A detailed derivation is provided in the Appendix A..

[11] Based on The World Bank classification and databank.

[12] Source: United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics.

Asia (ECA) region. In 2010, Macedonia registered a gross secondary school enrollment of 90 percent and a net rate of 84 percent (compared to 92 and 85 percent in the ECA region). However, if we focus on the poorest share of the population, secondary school achievement is significantly lower, putting at risk the skill formation of the children with higher probabilities to face the consequences of child poverty in their lives. Net enrollment rates in secondary school age among Social Financial Assistance (SFA) recipients were 67% for girls and 65% for boys at the beginning of the school year 2009/2010, roughly 20 percentage points smaller than the country average.Figure 2 shows the share of children in SFA households who are either enrolled or have completed any secondary school program (two, three or four-year) by age of the child. This shows that among poor households, children tend to enter secondary school later (the curve has a positive slope from 15 to 16 years old) and the achievement rate for higher ages is considerably smaller, providing evidence of a high rate of drop-outs.

Before introducing the program, it is important to summarize the Macedonian education system (see Figure 3 for a graphical summary). Students access secondary school after the completion of primary education, which is offered from 6 to 15 years old on a three three-year cycles with classroom teaching in grades 1-5 and subject teaching in grades 6-9. Secondary education, which is compulsory and free of charge in public schools, is divided into specialized (languages and science-mathematics) preparatory schools offering four-year programs, general education and art secondary school offering three or four-year programs, and vocational education schools offer two-, three-, or four-year programs. At the end of preparatory schools and general secondary education, students sit the matura exam, but there are also final exams at the end of three- and four-year vocational education programs.

3.2 The program

The Macedonian "Conditional Cash Transfer (CCT) for Secondary School Education" is a social protection program aiming at increasing secondary school enrollment and completion rate among children in the poorest households of the population. It was first implemented by the Macedonian Ministry of Labour and Social Policy in Fall 2010 and provided cash transfers to poor households conditional on having children in school-age attending secondary school at least 85% of the time. In order to target poor households, the Ministry of Labour and Social Policy decided to offer the program to the beneficiaries of the Social Financial Assistance (SFA) benefit, which is the most significant income support program, accounting for around 0.5 percent of GDP and 50 percent of total spending on social assistance (Verme, 2008). SFA

is a mean-tested monetary transfer granted to people who are fit for work, are socially not provided for and cannot support themselves. The amount paid for SFA is equivalent to the difference between household income and the social assistance amount determined for the household, depending on household size and time spent in SFA, varying from 1 825 MKD (around 40 USD) for one-member household to 4 500 MKD (around 98 USD) for households with 5 or more members. It is considered as the benefit of last resort, meaning it is provided after other benefits if the household income is still below a certain living standards threshold. It is mainly collected by households in the poorest tail of the income distribution; in 2009, the World Bank[13] reports that total SFA benefits are collected for 55 percent by the poorest quintile, 22 percent by the second poorest quintile and 11 percent to the middle quintile.

The total annual amount of the subsidy provided by the CCT if all conditions are met is 12 000 MKD (roughly 240 USD) to be paid in quarterly installments. Cash transfers refer to the school quarters that constitute a school year, which follows the following division in quarters: from September to October, from November to December, from mid-January to March and from April to mid-June. CCT payments are made immediately after the school quarter is completed and data about attendance is checked. Therefore, the payments are scheduled at the following times: December, February, May and July.

The management of the CCT program was integrated within the social protection system and conditionality is controlled using a national software. Secondary schools enters attendance data at the end of each period and Social Welfare Centers (SWC), which are the administrative bodies managing payments for all benefits of financial assistance, issue the payment if the conditionality is met. Compliance with local guidelines governing the gender of the recipient is therefore easy to ensure, given that the full CCT management is computerized and the payments are processed depending on the family composition originally entered in the social protection system. The payment is processed via nominal cheques, which can be cashed in at banks or post offices[14].

[13] I make reference to the "Project Appraisal Document - Report No: 47195-MK" between the Former Yugoslav Republic of Macedonia and the World Bank.

[14] Starting from the third year of the CCT, which is not considered in this paper, payments have been processed using transactional accounts only, which allow a stronger enforcement of the payment modality.

3.3 Research design

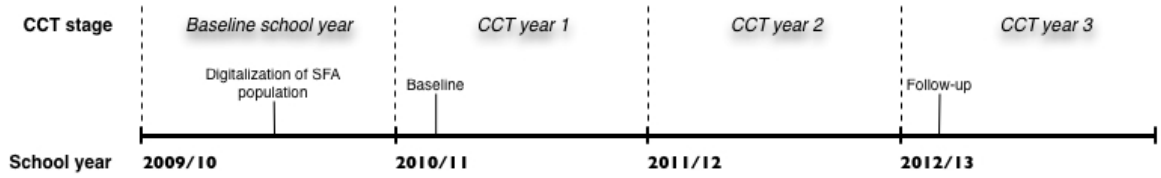
The objective of the program was to increase the enrollment and attendance of children in secondary school age among poor households. In a first impact evaluation of the program, Armand and Carneiro (2013) compared the evolution in outcomes of SFA recipients from the pre-CCT to the post-CCT period to the evolution of outcomes for recipients of a similar type of Social Assistance and ineligible for CCT during the same period and found that after two years of its implementation the CCT had led to an increase in secondary school attendance among 15-19 years old children by roughly 6.5 percentage points. This is a substantial impact, given that average enrollment is close to 65% for this group. At the same time, they find that the effect of the program is driven only by enrollment, while the program had no effect on attendance. Was such an increase in enrollment equal among payment modalities or was there a beneficial effect of targeting mothers versus household head? Even if on average the program had no impact on attendance, would targeting mothers increase the outcome in that dimension too?

When first considering the implementation of a program to fight the low Macedonian enrollment rates among poor households, the government of Macedonia faced very specific design challenges and considered that gender-targeted transfers could have played a central role in educational choices since women empowerment is an important issue in the country. In 2011, the World Bank reported that the ratio of female-to-male labour force participation was 62 percent, smaller than the average of developing countries in the ECA region (68 percent). The ratio is presumably much more significant when considering the poorest share of the Macedonian population. For this reason, changing the identity of who controls the resources within the household was thought as having potentially dramatic consequences for household decision-making.

An experiment was then designed to test whether gender-targeted transfers could generate differential results. For this purpose, recipients of the cash transfer were randomized allowing payments to be received by either the the mother of the child or the household head, who is generally male[15]. The CCT program defines "Household Head" the person in the household that is registered at the Social Welfare Centre (SWC) for Social Financial Assistance. Ac-

[15]Looking at the Baseline data, among Social Financial Assistance recipients, in non-single parent households, in 90% of households the household head is the male partner (and father of children eligible for the CCT). In single parent households, the household head is the male partner only in 32% of households. Non-single parent households represent 88% of Social Financial Assistance households.

Figure 1: Program timescale and data collection



cording to the rulebook for acquiring the right to Financial Assistance, the Household Head is determined by the following ordered rules: if there is an employed person in the household, the household head would be the employed person; if there is a pensioner, the household head would be the pensioner; if no employed person or pensioner exist in the household, the household head is the unemployed person representing the household; for all other households, the SWC selects the Household Head as the person representing the household.

Randomization of the payment modality was done at municipality level using stratification by population size. The Republic of Macedonia is divided into 84 municipalities, which were first divided into 7 groups depending on population size and then randomized into two groups, one of which has 42 municipalities and where the payment of the transfer is done to the mother of the child, and the other which also has 42 municipalities and where the payment is transferred to the household head, regardless of gender. Panel A of Figure 4 presents the randomization of treatment modalities across Macedonian municipalities.

4 Data

The data used in the paper comes from a different number of sources. The main datasets are the Macedonian Household Surveys collected by the Ministry of Labour and Social Protection (MLSP), which contains detailed information on a variety of household information (demographics, expenditures, durable goods, housing characteristics) and individual level information on household members (education, health, labour supply). For children enrolled in secondary school, the Household Survey is supplemented with administrative data about attendance and performance at school. Additionally, I make use of different aggregated data at municipality level, supplied by Macedonian State Statistical Office, to construct measures of sex ratios, local labour market characteristics and other marriage market indicators.

For the scope of CCT program evaluation, two household surveys were collected during the Winter 2010, at the beginning of the program, and in Fall 2012, after two years of implementation. The baseline survey was conducted between November and December 2010, coinciding with the beginning of the first school year in which CCT program became available. At baseline, households were interviewed during the first two months of the program, rather than before the start of the intervention. However, it is reasonable to believe that this timeline had no effect on baseline results, since the program implementation was very slow at the beginning and the first payments were processed only in March-April 2010. In contrast, the survey was quick and the last interviews were carried out by the end of December. In parallel with the household survey, administrative data on student attendance and performance were collected by visiting secondary schools and collecting school records. This allowed double-checking the validity of self-reported information on school enrollment. Figure 1 shows the timescale of the program implementation and of the data collections.

At baseline, a sample of eligible households was produced using the Ministry of Labour and Social Policy's electronic database of the recipients of all types of financial assistance, which has been assembled during Summer 2010 along with the implementation of the program. The population frame has been produced using the hardcopy archives at Social Welfare Centers (SWCs), which are the main territorial units for social welfare provision. There are 27 inter-municipal SWCs and they function as the key public providers of professional services in social work. The use of the electronic database for sampling allowed identifying 12481 SFA households with at least one child of secondary school age, from which we drew a random sample[16].

The follow-up survey was collected during the Fall of 2012. In order to minimize attrition, we made use of the detailed tracking information collected at baseline[17]. This methodology proved to have worked acceptably well during the follow-up data collection. In terms of SFA

[16] We aimed for a sample size of 17 households eligible for the CCT (recipients of social and financial assistance with children of secondary school age) per municipality, although in practice there was some variation in this number due to the fact that in some municipalities the eligible population was smaller then 17. For power calculations, we considered a power of 0.8 and a significance level of 0.05. With 42 clusters per arm and an inter-cluster correlation of 0.25, using 17 households per municipality it would be possible to detect a difference in expenditures in children's education (or in any other item) of 0.33 of a standard deviation and an increase in the proportion of students attending 85% or more of the classes of roughly 10% points.

[17] We collected and updated contact information of at least two relatives or neighbors of the surveyed households, including addresses and telephone numbers. This allowed us minimizing the risk of not finding the household in case they moved to another address or are not present at home during the attempt to interview them and to limit attrition to non-response due to refusal.

recipients, 1205 households were interviewed at baseline and, among those, 126 households were not found or refused to answer at follow-up, resulting in an attrition rate of 11.7%. Appendix B. presents some robustness checks related to attrition and provides evidence that attrition at follow-up didn't changed significantly the composition of the sample for each treatment modality.

Table 2 presents the main characteristics at baseline of the household and the children in the sample, comparing the two different treatment groups. Households are composed by 4.7 members and have on average 0.7 boys and 0.78 girls in the age category 13-18 years old. Household heads are male in 90 percent of households and have a low level of education with half having completed upper primary only and 20 percent having completed lower primary or not having a degree. Almost half of the sample lives in rural municipalities, while 14 percent of sampled households lives in the main urban area[18], which is the capital city of Skopje. If we look at living conditions, we can note that almost all households have access to a private toilet, but for only 45 percent the toilet is connected to a sewerage and in only 76 percent of cases households have access to a connection to public water. If we turn our attentions at the structure of consumption, we can notice that households consume roughly 12 percent in education, compared to a 60 percent share in food. As an indicator of the disadvantaged situation of these households, we can underline that the consumption share for tobacco and alcohol is roughly 6 percent. In a comparison of the mothers and fathers, we can note that mothers are on average 42 years old and relatively younger than fathers, which are on average 45 years old. In addition, mothers are relatively less educated than fathers, with roughly 30 percent having achieved only lower primary or less, compared to a 20 percent for fathers. If we look instead at children, we can note that average age at baseline was 15.30 years old and among sampled children 57.4 percent was enrolled in secondary school and 34.1 percent was already enrolled in secondary school.

On most dimensions, the samples in municipalities where the payments are made to mothers and where the payments are made to household heads are balanced at baseline. While we

[18]I use the Macedonian administrative definition of rural area as defined by the Law on Territorial Organization of the Local Self-Government (OG 55/2004, 12/2005). According to the Law, municipalities are defined as "rural" if they have a seat in a village and "urban" if they have a seat in town. Towns are defined as "compactly built up residential areas with a population exceeding 3000, has a developed structure of various economic activities, above 51% of the employees are working in the secondary and tertiary sector, has an urban physiognomy of zones for residence, recreation and green area (parks), town square, street infrastructure, communal services and acts as a functional centre for the surrounding populated places". Villages are defined as "mono-functional populated areas, in which one business activity is prevalent and whereas the area has agricultural physiognomy and function".

find some unbalanced variables, normalized differences never exceeds 0.25, which is the limit suggested by Imbens and Wooldridge (2009) beyond which a linear specification is not appropriate. In order to control for such imbalances, in addition to individual and municipality controls, I include in any specification the baseline value of the dependent variable and the mean dependent variable at baseline for the correspondent age group.

4.1 Subjective expectations of schooling returns

To the purpose of collecting information on the heterogeneity in subjective expectations, during both baseline and follow-up data collection, a specific section was filled for each male and female youngest adolescent (aged 10 up to 17) in the household. This resulted in a total of 1455 children (750 boys and 705 girls) selected to answer the section, of which 136 didn't complete the section (characterizing non-response rate of 9.35 percent), 111 where attrited at follow-up[19] and 120 were too young to be enrolled in secondary school at follow-up. Among those, for the purpose of the study, I select the children that are in secondary school age at the time of the follow-up (14-19 years old, including age 14 and 19 to allow for children to enter secondary school earlier or stay longer due to not passing a grade) and I restrict the sample to only households where both parents are present. This results in 920 children that will be object of the study.

Considering the low level of schooling among most of the respondents, it was fundamental to select a methodology that allowed eliciting a credible measure of subjective expectations without mentioning directly the term "probability" (Attanasio et al., 2005; Attanasio and Kaufmann, 2009). The questionnaire asked parents information over the expected income conditional on completion of primary or secondary school (and conditional on being employed at age 25) for at least one adolescent child in the household (in the case that two adolescents of different gender are present the information was collected for both). In order to collect information on subjective expectations, the interviewer picked the youngest male and female adolescent in the age range 10-17 years old (at baseline) and refer to them in each question. The specific set of questions asked are the following:

1. Now imagine that your child completed only primary (secondary) school and he/she finds a job. Try to imagine which possible job could he/she be employed in and imagine which could be the maximum and the minimum that he/she could earn, given

[19] Attrition didn't generate significant differences driven by the treatment modality. Appendix B. discusses the checks related to attrition bias in detail.

(a) In the worst of the cases, how much do you think he/she could earn per month?

(b) In the best of the cases, how much do you think he/she could earn per month?

2. Now using the ruler, could you indicate how likely it is that:

(a) he/she is going to earn less than $[(2a) + (2b)]/2$ Denars?

(b) he/she is going to earn more than $[(2a) + (2b)]/2$ Denars?

In order to elicit subjective probabilities, a 0-100 ruler was used as visual aid and was initially presented using an example linking the chances of rain with the chosen scale[20].

In order to reconstruct the probability density function, it is necessary to consider distributions that can be identified using available information: the lower (y^L) and the upper (y^U) bounds of the distribution and the reported mass probability between y^L and the midpoint $(y^L + y^U)/2$. Given the structure of the collected information and assuming a specific class of distribution functions[21], we can construct the distribution of the expected income and calculate its first moments[22] (Guiso et al., 2002). Specifically, assuming that y^L and y^U are the reported income in the worst and the best scenario and $f_{Y|E}(y|E_i)$ is the assumed continuous density function of the expected income conditional on being employed, we can compute the expected value and the variance for the future income:

$$E[Y|E_i = 1] = \int_{y^L}^{y^U} y\, f_{Y|E}(y|E_i = 1)\, \mathrm{d}y \equiv \bar{y}_E \tag{8}$$

$$Var[Y|E_i = 1] = \int_{y^L}^{y^U} (y - \bar{y}_E)^2\, f_{Y|E}(y|E_i = 1)\, \mathrm{d}y \tag{9}$$

In the paper, in order to build expected income and variance, I assume a triangular distribution and I make use of only the first probability reported by the respondent. The online appendix

[20] The precise text read by the interviewer is the following: We are now going to deal with events in the future that may happen or not. We have a RULER with a scale from 0 to 10 which we will use to indicate how likely do you think one event might happen. For example: If I ask you "How likely is it that tomorrow will rain?" and you are fully sure that it will rain, then you'll indicate 10. If, on the contrary, you think that it is not going to rain, you will indicate 0. In case you're not sure whether it is going to rain or not, you will give me a low value in the scale if you think that the event is not very likely, or a high value if you think it is very likely. Let's try now. "How likely is it that tomorrow will rain?"

[21] Among the distribution functions that are consistent with this setting are the step-wise uniform distribution, the triangular distribution and the bi-triangular distribution. All the data related to expectations reported in the paper are generated assuming a triangular distribution, since we allow for the extremes to have lower density.

[22] For simplicity, in the following analysis we won't condition for education level. However, all expectations and variances are conditional on completion of either primary or secondary school.

analyzes the differences between distributional assumptions and the choice of using different reported probabilities. All the results are robust to these assumptions.

The sample provides evidence that expected income and returns are greatly heterogenous across individuals. Figure 5 reports the sample distribution of expected income for different levels of completed education, divided by gender. As we can notice both expected income after primary and secondary school are similar for boys and girls, but the main characteristics is that in the sample households have largely heterogenous expectations. Table 3 presents the descriptive statistics for subjective expectations and a comparison among different treatment groups. I cannot identify any significant difference across groups, providing evidence that at baseline, expectations were balanced among different treatment modalities. Additionally, in relation to the complexity of this section of the questionnaire, a possible issue is the presence of missing values. Panel B of Table B1 reports the estimated difference in the probability of having a missing value for expectations at baseline. For each child in the household that was selected in order to collect subjective expectations, the dependent variable is a dummy variable equal to one if data is missing due to incomplete reporting or to refusal and is equal to zero if the data is complete. Columns 1-2 and 4-5 are estimated using OLS, while Column 3 and 6 are estimated using a Probit model. The coefficient is very close to zero, stable across specifications and never significant. The treatment doesn't seem to influence the chance of having a missing data in the expectation section, even when considering a extended (14-19 years old) versus a reduced sample (15-18 years old).

5 Empirical strategy

The evaluation design for the comparison of alternative CCT modalities allows examining differences in outcomes by comparing households living in municipalities with different payment modalities. Since the municipalities were allocated at random to different payment modalities, they should be identical (on average) on all their other characteristics, observed or unobserved. Therefore, a simple comparison across municipalities will give us the impact on enrollment δ_{im} of implementing one versus another payment modality. Let M_{im} be an indicator that takes value 1 if household i lives in municipality m where payments are done to the mother of the child and equal to 0 if payments are instead done to the head of household. In order to estimate

the effect of different modalities on the enrollment I estimate the following Probit model:

$$\begin{aligned}\delta_{im,2012} &= \alpha + \sigma_M M_{im} + \beta_0 \cdot ExpRet_{im,2010} + \beta_2 \cdot ExpIncPrim_{im,2010} \\ &+ \sum_{j=1}^{2} \tau_j \cdot VarInc_{ijm,2010} + \qquad (10) \\ &+ \sum_{j=1}^{2} \gamma_j \cdot PrWork_{ijm,2010} + X'_{im}\gamma + \delta_{im,2010} + \epsilon_{im} \qquad (11)\end{aligned}$$

where $ExpRet_{im,2010}$ is the expected return to secondary school, $ExpIncPrim_{im,2010}$ is the expected income when completing only primary school, $VarInc_{ijm,2010}$ are the variances of income when completing educational level j, $PrWork_{ijm,2010}$ are the probabilities to be employed at age 25 when completing educational level j, X_{im} is a vector of individual, household and municipality characteristics and ε_{im} is a residual. Educational levels considered are $j = 1$ if the only primary school is completed and $j = 2$ if secondary school is completed. The impact on enrollment of paying the mother of the child as opposed to paying the head of household is given by σ_M. In order to control for potential imbalances in the outcomes of interest at baseline, I estimate Equation 11 by including the observed value of the dependent variable at baseline, $\delta^*_{im,2010}$ in the model.

In order to check for heterogeneity in the impact of the payment modality in the subjective returns to schooling, I compute indicator variables identifying the quantile of the sample distribution to which the individual return belong to and I estimate the following model by interacting the indicator variable with the payment modality indicator:

$$\begin{aligned}\delta_{im,2012} &= \alpha + \sigma_{M,L} M_{im} \cdot D^L_{im,2010} + \sigma_{M,M} M_{im} \cdot D^M_{im,2010} + \sigma_{M,H} M_{im} \cdot D^H_{im,2010} + \\ &\eta_L \cdot D^L_{im,2010} + \eta_H \cdot D^H_{im,2010} + \beta_2 \cdot ExpInc_{ij,2010} + \sum_{j=1}^{2} \tau_j \cdot VarInc_{ijm,2010} + \\ &+ \sum_{j=1}^{2} \gamma_j \cdot PrWork_{ijm,2010} + X'_{im}\gamma + \delta_{im,2010} + \epsilon_{im} \qquad (12)\end{aligned}$$

where $D^L_{im,2010}$, $D^M_{im,2010}$ and $D^H_{im,2010}$ are indicator variables for the return being in the lowest, middle and higher tercile.

A similar specification is used to analyze the effect heterogeneity in the subjective expectations of returns to schooling in terms of employment. In this case, I look at the interaction between the treatment indicator variable and the subjective gain in the probability of being employed

after completing secondary school. This is defined as the difference between the subjective probability of being employed at age 25 after having completed secondary school and the subjective probability of being employed at age 25 after having completed primary school only, e.g. $PrWork_{i2m,2010} - PrWork_{i1m,2010}$.

6 Results

This section presents the results of the paper. In all specifications I include controls for gender, age and education of mothers and fathers, ethnicity and religion of the household, household size, number of female and male children in age 14-19 (extended secondary school age) and age 6-13 (primary school age) and municipality controls (rural and capital city dummies). Year and semester of birth dummies and Regional dummies are included in all specifications. For clarity, all tables related to the effect of paying mothers versus household heads omit all estimated coefficients for controls different than subjective expectations.

The large set of outcomes studied in the paper raises concerns about multiple inference, i.e. the probability of erroneously rejecting at least one null hypothesis of no impact naturally increases with the number of outcomes considered. To deal with multiple inference, all significance levels are adjusted following Romano and Wolf (2005).

6.1 Resource ownership and schooling outcomes

In order to understand how targeting (conditional) cash transfers to mothers versus household heads lead to differential outcomes, Table 4 shows the estimates of the enrollment regressions specified by Equations 11 and 12. The dependent variable is equal to one if the child is either enrolled or has completed any secondary school. The model is estimated using a linear index Probit model and allows controlling for baseline average of the dependent variable.

We can note that in municipalities where payments were targeted to women, at the beginning of the school year 2012/2013 there is no significant difference in term of enrollment/achievement in secondary school when considering the sample as a whole. Since we are interested in analyzing the heterogeneity in the effect on ex-ante expectations, Panel B presents the results for the interactions with the subjective returns to schooling, while Panel C presents the interaction with the return in the probability of being employed. If we look at the effect for children with different expected returns, we can note that targeting mothers provides a significant positive

effect for the highest tercile of the distribution of returns to schooling, where the probability of being enrolled or having completed secondary school is 9.8 percent higher . If we look instead at the heterogeneity in the return in terms of employment, we find a significant positive effect for children in the middle tercile of the return distribution. For this children, targeting payments to mothers leads to an increase in the probability to enroll in secondary school of 10.5 percentage points. It is important to note that, when controlling for heterogeneity in ex-ante expectations, the coefficient in the lowest tercile is close to zero and not significant. This provides evidence that targeting mothers is beneficial, but only if parental perceived returns are sufficiently large. I don't find any significant difference of targeting mothers versus household head for children whose pre-program expectations were low.

What mechanism is driving an increase in the probability to be enrolled in school when targeting women in households with high expected returns? In the next sub-sections, I will compare possible mechanisms through which targeting women can be beneficial for school achievement.

6.1.1 Expenditure shares

In order to understand the mechanism driving a larger school achievement in municipalities where the payments are made to women, I estimate the effect of the payment modality on individual expenditure shares[23]. Individual expenditure shares on education are defined as the ratio between monetary expenditure on education for the child and total household expenditure. Expenditures on education includes school fees, uniforms, school supplies, textbooks, additional courses and other expenses, transportation and meals at school. While up to secondary school, public education is free, cost such as transportation and living costs are still important to determine whether children go to school or drop-out.

Table 5 presents the estimates of a linear regression of individual shares on the payment modality indicator and its interactions with ex-ante returns to schooling and ex-ante returns in terms of employment. Results show that while we cannot identify a significant effect for the whole sample, in municipalities were payments are made to mothers, a significant difference in individual shares is found, but only for children whose ex-ante expectations presented larger returns to schooling, both in monetary and employment terms. For children in the highest tercile of the distribution of expected returns, targeting mothers increase individual shares by 3.8 percent compared to targeting household heads. Similarly, an increase of 3.9 percent in

[23] **??** describes how expenditure data have been collected and how it is structured.

found for children in the highest tercile of the distribution of returns to schooling in terms of employment. This is consistent with the idea that targeting women would improve educational achievement by switching expenditures towards public goods, such as education, if women have stronger preferences for this good compared to men. This results are consistent with estimation using correction for attrition (see Appendix B. for a discussion about attrition).

If we look at boys and girls differently, we can observe that this effect is mainly driven by higher monetary returns to schooling for girls and higher returns in terms of employment for boys. Table 6 provides estimates of the effect on individual expenditure shares by estimating the model separately for boys and girls. The results are consistent with the idea that boys and girls have different issues related to schooling and the entrance in the labour market. Results might be explained by the fact that girls tend to go to school more often if their parents perceive they can obtain a higher monetary return, while for boys targeting of resources is mainly driven by gains in the probability of being employed at age 25.

6.1.2 Monitoring and time use

The conditionality introduced by the CCT might interact with parental incentives related to child attendance. Parental behavior might change in response to whom is receiving the CCT transfer if parents increase their monitoring of schooling activities in a different way. In other words, are payment delivered to mothers providing better outcome in terms of secondary school achievement because mothers tend to monitor better their children and control whether they are attending to school[24]?

To this purpose, we collected at baseline and at follow-up information on the frequency in which parents talk to children about school. We collected this information for the youngest adolescent enrolled in primary school and for the youngest adolescent enrolled in secondary school during the year previous to the interview (the two years for the follow-up). Table 7 presents the estimates of the effect of payment modalities on the probability for the parents to

[24] Additionally, I find no difference among treatment modalities related to whether parents are more informed or have a better knowledge of the program where payments are made to the mother versus the household head. I don't test this hypothesis jointly with the others. In order to answer this question, we asked the respondent to answer some specific questions about the program characteristics, and specifically whether they heard about the program name, whether they know the conditionality, whether they are aware of the total amount of the CCT transfer, whether the know which groups are eligible, which school level is targeted and whether they know how many installments are paid. I cannot identify a precise pattern of difference across the two groups, providing evidence that the program modality didn't generate substantial differences in the way people understand and know about the program.

talk to children about school on a daily basis[25]. Results show no effect on parental monitoring. This is consistent with the findings on the overall impact of the CCT on attendance, showing a zero impact and providing evidence that monitoring of school attendance might not be central for the Macedonian case (Armand and Carneiro, 2013). In fact, at baseline only 8 percent of children attending school was attending less than 85 percent of classes and 60 percent was attending 95 percent or more classes.

Another mechanism through which parents might invest differentially on children is through time spent with children. To this purpose, we collected information on the amount of time spent by both parents the day before the interview on different activities. Table 8 presents the results for the total time (expressed as share of the day) spent by both mothers and fathers with their children[26]. Results show very little effect on the way parents allocate their time in municipalities with different payment modalities. This provides additional evidence that targeting mothers do not change significantly the way parents monitor the schooling or the way parents spend time with their children. This might due to the fact that the program is targeting children older than 15 years old, an age category in which human capital investment through time spent with them might not be relevant.

7 Robustness checks

7.1 Expectations and enrollment in Secondary School

The first question we need to answer in this section is whether subjective expectations do correlate with schooling outcomes or in other words we need to control whether subjective returns to schooling matter in explaining education demand. Table 9 presents the coefficients on subjective expectations for the model (11). The dependent variable is an indicator variable that is equal to 1 if the child is enrolled or has completed any secondary school at the beginning of the school year 2012/2013 and is equal to 0 otherwise. If we look at how ex-ante expectations matter for enrollment, returns to secondary school are significantly positive only for the component of expected income after completion of secondary school. When we control for measures associated to the variance of expected income, we don't find any significant effect, while the coefficients associated with expected income are robust. Additionally, controlling for the probability of being employed at the age of 25 after completing primary and

[25] Similar results are obtained if we control for the probability to talk to children monthly, yearly or never.

[26] Similar results are found if we analyze the share of the day spent helping children studying or on leisure activities with children.

secondary school, shows that both variables explain secondary school enrollment. If parents expected a high probability of employment after primary school, the probability of having completed or being enrolled in secondary school two years after is lower, while the opposite is true for expectations of employment after secondary school. This result is consistent with the recent literature (Jensen, 2010; Attanasio and Kaufmann, 2009) which provides evidence that perceived returns are important to explain how individuals take educational choices.

7.2 Endogeneity of reported expectations

While we showed that subjective expectations are important for explaining education demand and heterogenous program effects, we need to control whether we are measuring subjective returns associated to schooling or whether reported expectations are capturing other variables and incentives. This sub-section aims at showing that subjective expectations play an important role in explaining secondary school enrollment even after controlling for several indicators that could have generated omitted variable bias.

Firstly, parental expectations might directly reflect the chances to go to secondary school, so that wealthier households would report higher returns to compensate for the fact that they can afford sending their children to school. Since most household adult members are unemployed, we cannot rely on income since at the moment of the interview the respondent's only official source of income is the social assistance benefit. In this case, it is very difficult to observe household's long run economic status, that is the main determinant of important choices like human capital investment. One possible solution proposed by Filmer and Pritchett (2001) is to use principal-component approach and information collected on assets owned by the household to compute an asset index proxying wealth[27]. I make use of the rich information about household asset ownership collected at baseline to build a pre-program wealth index and divide households into three groups depending on the percentile position in distribution of the index.

While Column (1) in Table 10 present estimates of the subjective expectations coefficients in model 11 controlling only for individual and municipality characteristics, Column (2) reports the same estimates by controlling for household pre-program wealth. Results suggest that controlling for household wealth doesn't affect significantly the coefficients on expectations. This is supported by the fact that expected returns are equally distributed across wealth

[27] See Appendix C. for details on how the index was built and for robustness checks.

groups (see Figure 9). In other words, children in households with low wealth tend not to enroll in secondary school, but among those the ones associated with higher returns have higher probability to go to school. This result is consistent with using expenditure data to rank households, rather than asset information.

Secondly, subjective returns could be affected by direct costs associated with distance to school and with availability of better schools. This is particularly important since direct costs of attending school are often associated with the enrollment decision, especially when considering poor households. In Macedonia, as previously explained, up to secondary school, public education is free, therefore issues related to tuition and enrollment costs are not a concern in this study. In addition, recipients of Social Financial Assistance are entitled to free books. However, we need to consider transportation and living costs related to attending school, which rely directly on the accessibility of the school from the location where the household live. Secondary schools are built in main towns and cities in the largest municipalities, therefore for children living in smaller villages, the accessibility to a secondary school might be the main reason for early drop-outs and, perhaps, for low expected returns.

For this reason, I compute distance from secondary school as a proxy to capture costs associated with transportation and living costs. Figure 4 presents the geographical distribution of secondary schools (distinguishing among schools offering only courses in Macedonian language and school offering course in Albanian and Turkish) and of sampled households, along with the road network. In order to construct a measure of distance from the household dwelling to the secondary school, I make use of geographic coordinates collected for each household and for each secondary school in the country. I compute road distance and time required to reach the school by car for each school in the country, in order to identify the closest secondary school. In addition, in order to check for the robustness of the measure, I perform the same method using the closest school providing a program taught in the same ethnic language of the household and by the type of the program offered[28]. Results are summarized in Table 1.

In order to check for school quality, information on the main characteristics of the schools were collected. In particular, information was collected about the number of students, the number of classes, the number of teachers and a series of supply-side indicators related to the school building (for example, the number of toilets available or whether the school has a

[28] I differentiate schools offering preparatory high school programs versus any other programs.

Table 1: Distance from secondary school

Distance from	**Mean**	**Standard deviation**
...closest school	9.610	(9.615)
...closest school of same ethnicity	13.277	(16.179)
...closest preparatory high school	10.260	(9.657)

Note. Distances are reported in kilometers. Closest distance is computed as the minimum distance from the dwelling of the household to the closest available school using the available road network.

gym) and to the learning offer (for example, the number of computers available or whether the school provides classes in a science lab). To control for local school quality, I construct the teacher-to-student ratio and the suspension rate for violent behavior in the closest school to the household. Column (3) in Table 10 present estimates of the subjective expectations coefficients in model 11 adding controls for distance to the closest school and for the teacher-to-student ratio in the closest school. The coefficients are robust even after controlling for these measures, providing evidence that measures related to direct costs associated to schooling and to school quality do not affect reported expectations.

Another concern related to using subjective expectations in schooling models is that reported returns might be correlated with unobserved taste heterogeneity. In this case, in order to test for the robustness of the estimates, I check whether subjective expectations encompass monetary returns related to completion of primary or secondary school that are not directly related to the increase in productivity associated to schooling. For instance, reported returns to secondary school might include higher returns in the marriage market (Attanasio and Kaufmann, 2009) or might be correlated with returns in the crime market. Both are outside options that could have important consequences on schooling decisions and, in both cases, reported expectations might be different from the monetary returns linked to an increase in human capital. For this purpose, I construct measures of the marriage market and the crime market to control for this relationship. In Column (4) of Table 10 a Probit model for the enrollment decision is estimated by controlling for a marriage market indicator. I use male and female population at municipality level to build sex ratios in the age group 10-24 years old. In Column (5) I additionally control for the local characteristics of the juvenile crime market. I control for the local variation in the number of convictions and reported crimes for juvenile perpetrators (younger than 18 years old) in the period before the data collection (2007-2010)[29] and by normalizing

[29]I use the Macedonian State Statistical Office definitions for adult and juvenile perpetrator of a crime. Adult perpetrator of crime is a person who has committed crime and who at the time of committing the crime had reached 18 years of age, and has committed the crime as: executor, accomplice, initiator or assistant. Convicted

it by the municipality population. In both cases, we can observe that controlling for measures related to the marriage and the crime market, do no affect the estimates significantly.

7.3 Cognitive bias

One of the main reasons why subjective expectations have not been used in choice models is that they might suffer from cognitive dissonance, i.e. respondents reports expectations that are consistent with their decisions. If the collected data suffer from cognitive dissonance we would therefore face the following situation. Imagine that $E^*[Y|E_i = 1, J]$ is the real expected income conditional on being employed after having achieved education level j, while $E[Y|E_i = 1, J]$ is the reported expectation. Data would suffer from cognitive bias if an individual who opted to enroll in education $J = j$ (in our case, secondary school) would report expectations such that the expected income consistent with the decision is higher than the real expectations. We would therefore have the following case:

$$E[Y|E_i = 1, J = j] > E^*[Y|E_i = 1, J = j] \tag{13}$$

Using subjective expectations affected by cognitive dissonance in choice models would therefore upward bias our estimates. In order to test for cognitive dissonance, I make use of the panel dimension of the dataset and I compare the expectations reported at 2010 and the expectations for the same child reported at 2012, after a decision is taken. Zafar (2011) provides a similar evidence against cognitive dissonance in his study on major choice and subjective expectations by comparing expectations before and after the decision in taken. I compare the expectations associated to children whose highest educational level achieved at 2010 is primary school (independently from the grade they have achieved) and it is unchanged at 2012, with children whose highest educational level achieved at 2010 is primary school and whose highest educational level achieved at 2012 is secondary school (independently from the grade they have achieved). In presence of cognitive dissonance we would expect expectations for children who transitioned from primary to secondary school to have a positive difference compared to the children who didn't transition from primary to secondary. Figure 6 presents

person is an adult person recognized as responsible, against whom penal measures have been imposed. Juvenile perpetrator of crime is a perpetrator of crime who at the time of the execution of the crime had reached the age of 14, but not yet the age of 18 and has preformed the crime as: executor, accomplice, initiator or assistant. Reported juvenile is a juvenile against whom the legal procedure after the filed charges was not raised (the charge was rejected), against whom the proceeding has been stopped or a proposal has been applied for announcing a penalty or educational measure. Convicted person is a juvenile perpetrator of crime against whom with a Court decision a legal sanction has been pronounced-juvenile imprisonment or educational measures.

the distribution of the change in expected return from secondary school education (defined as the difference between the expected return at 2012 and the expected return at 2010), while Figure 7 shows the change in probabilities to be employed after primary and secondary school. In both cases, I cannot reject the Kolmogorov-Smirnov test for equality of distributions (see Table 11). This test would be invalid in the case in which parental expectations reported at baseline are already consistent with the enrollment decision of their children. This might be related to the fact that some students are already enrolled in secondary school at the time in which we collect subjective expectation. However, the decision to enroll at baseline is not permanent, since the cases of drop outs are high and the cost to enroll is relatively low (see Section 7.2).

To complement this test, I compare the reported expected return for children in primary school age and for children in secondary school age (older than 15) by looking at differences across age. Panel A of Figure 8 shows estimates of two local polynomial regressions of the return to secondary schooling for the children in primary school age (younger than 15) and for the children in secondary school age (older than 15). By comparing means at the cutoff point of 15 years old, we can observe that there is no significant difference across the two groups. Similarly, Panel B presents a local polynomial smooth for the returns to schooling in terms of employment. Both figures provides evidence that parents with children in primary school age at baseline had similar expectations compared with children in secondary school age, even when comparing children at the margin.

8 Conclusion

The understanding of the "black box" called household is central in any policy initiative since it is fundamental to understand how individuals behave while being part of a group. To do so it is important to study how intra-household resource control and subjective expectations for the returns to schooling interact to determine human capital investment decisions. In this paper, in order to identify the causal effect of a change in intra-household resource ownership on household decisions, I made use of a randomized experiment linked to a secondary school conditional cash transfer in the Republic of Macedonia and of information on subjective returns to schooling. The conditional cash transfer provides an exogenous shock to intra-household resource ownership by targeting payments to mothers versus household heads. The paper provides evidence that targeting cash transfers to mothers has a beneficial effect, but only for

households were ex-ante expectations presented higher returns to schooling, both in monetary and employment terms. I provide evidence that for these children, individual expenditure shares for education are higher where payments are targeted to mothers.

These findings suggest that in order to understand the role of each member in familial interactions is key to clarify how these relates to subjective expectations. This is particularly important in developing countries since perceived returns to education are often are below the market returns. Additionally, as I showed in the paper, individuals have largely heterogeneous expectations related to education and the perceived returns do correlate with future choices and outcomes. If shifts in parental expectations have indirect impacts on the decision to invest on human capital, then much work need to be done in order to understand how subjective expectations form, how they evolve over time and how they interact with individual and collective choices.

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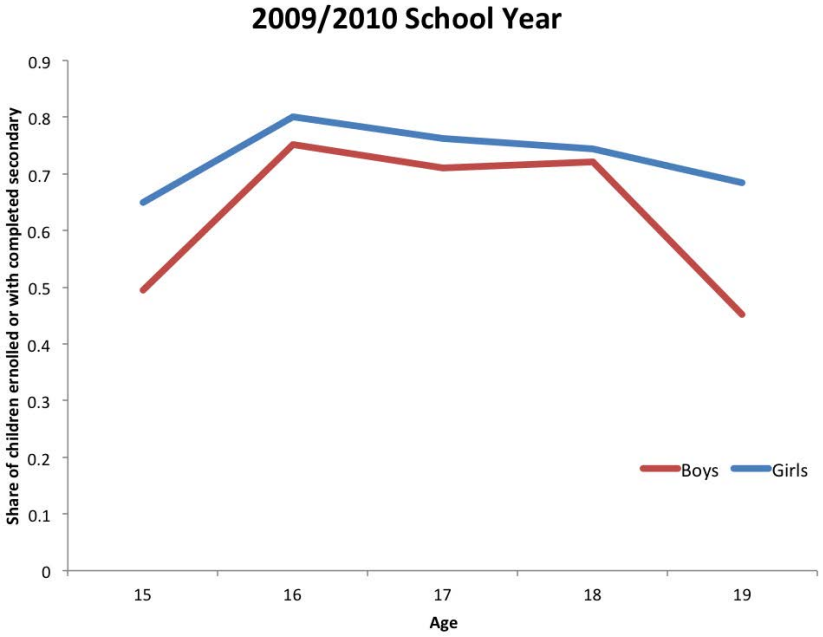
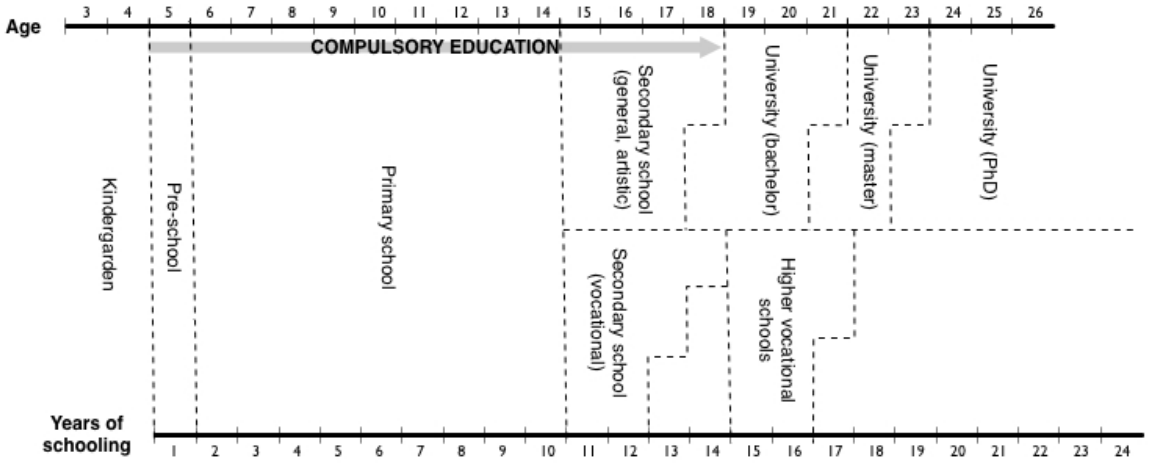
Figure 2: Enrollment curve among Social Financial Assistance recipients (15-19 years old)



Note: The graph represents the share of children which are enrolled in either 2, 3 or 4-year secondary school programs among Social Financial Assistance households. This is based on author's calculation using the baseline household survey and using sampling weights based on Social Financial Assistance population updated at summer 2010.

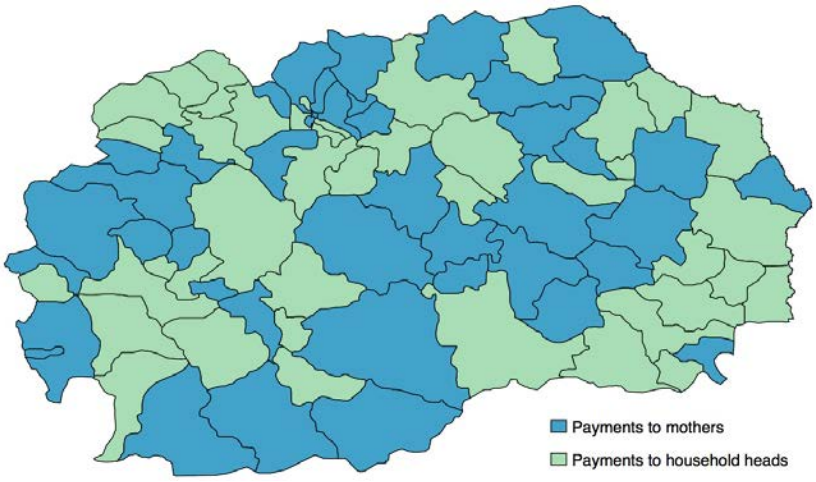
Figure 3: Educational system in Macedonia



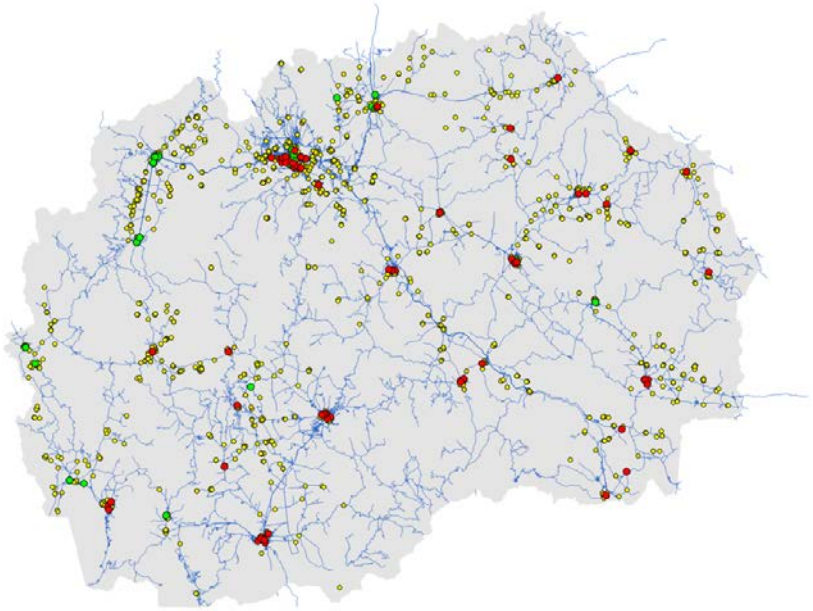
Note: Conditional Cash Transfer is targeting children who are in Social Financial Assistance families and who haven't completed secondary school up to age 23. Access to secondary school is provided upon completion of primary school. Access to university is possible only after completion of general and artistic secondary school. We don't consider here religious education.

Figure 4: Randomization of treatment across municipalities and distribution of secondary schools and sampled households

Panel A. Randomization of treatment across municipalities

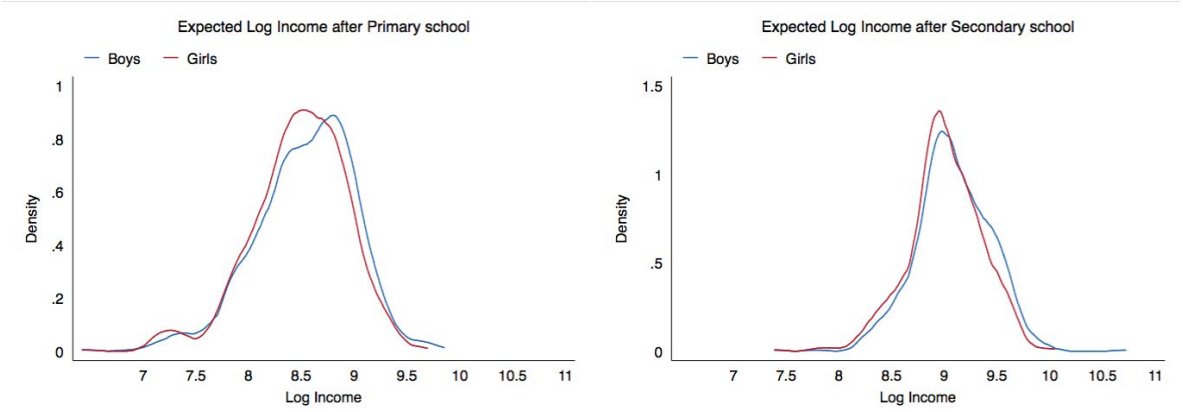


Panel B. Secondary schools and sampled households



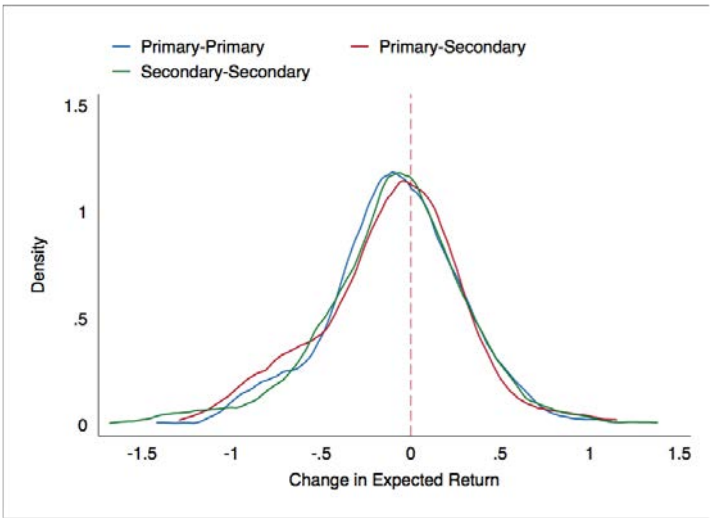
Note. The Macedonian administrative division includes 8 regions and 84 municipalities. Randomization of the payment modality was done at municipality level and using stratification by population size, dividing municipalities into 7 groups. Households and secondary schools presented in the map are computed using geo-coding data collected at follow-up. Red dots represent secondary schools providing educational programs only in Macedonian language, while green dots show secondary schools providing programs in Albanian or Turkish (in addition to Macedonian). In blue, the main and secondary road network.

Figure 5: Sample distribution of expected income after primary and secondary school by gender



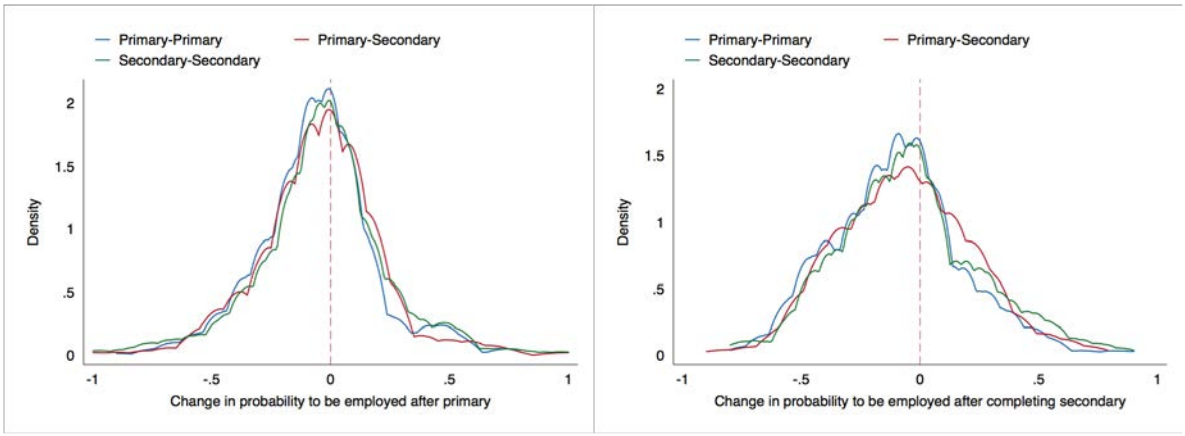
Note. Left panel shows the sample distribution of the expected income after primary school, while the panel on the right shows the expected income after secondary school. Income is reported in logarithms and expected income is computed using triangular distribution.

Figure 6: Change in expected return from baseline to follow-up



Note. Change is expected return is defined as the difference between the monetary return to secondary school education collected in 2012 and the one collected in 2010 for the same child. "Primary-Secondary" refers to children that went from being in primary school in 2010 to being enrolled or having completed secondary school in 2012. "Primary-Primary" refers to children that were enrolled or had completed primary school in 2010 and their status is unchanged in 2012.

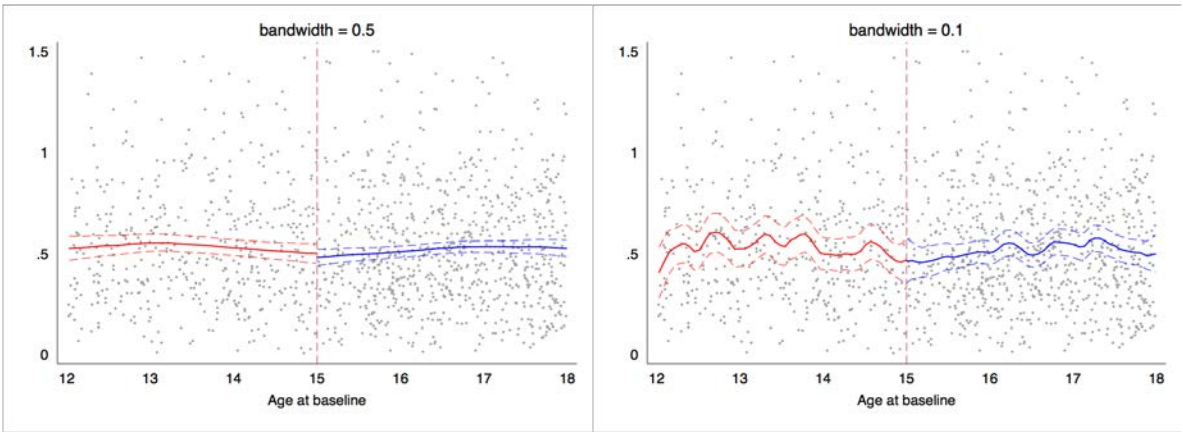
Figure 7: Change in expected probability of being employed at age 25 from baseline to follow-up



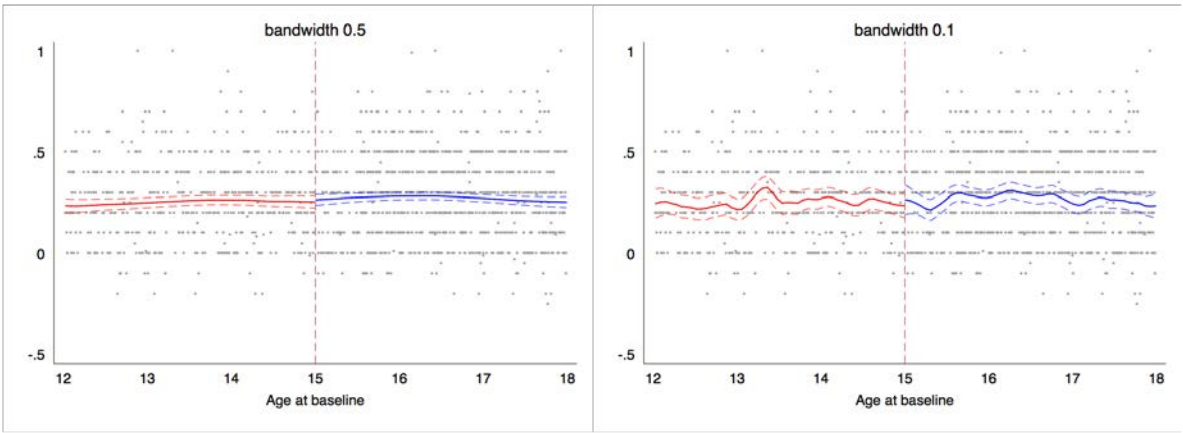
Note. The change in expected probability of being employed is defined as the difference between the probability of being employed after having completed primary school (left panel) or having completed secondary school (right panel) collected in 2012 and the one collected in 2010 for the same child. "Primary-Secondary" refers to children that went from being in primary school in 2010 to being enrolled or having completed secondary school in 2012. "Primary-Primary" refers to children that were enrolled or had completed primary school in 2010 and their status is unchanged in 2012.

Figure 8: Local polynomial regression for Expected Returns by age of the child

Panel A. Returns to schooling in monetary terms

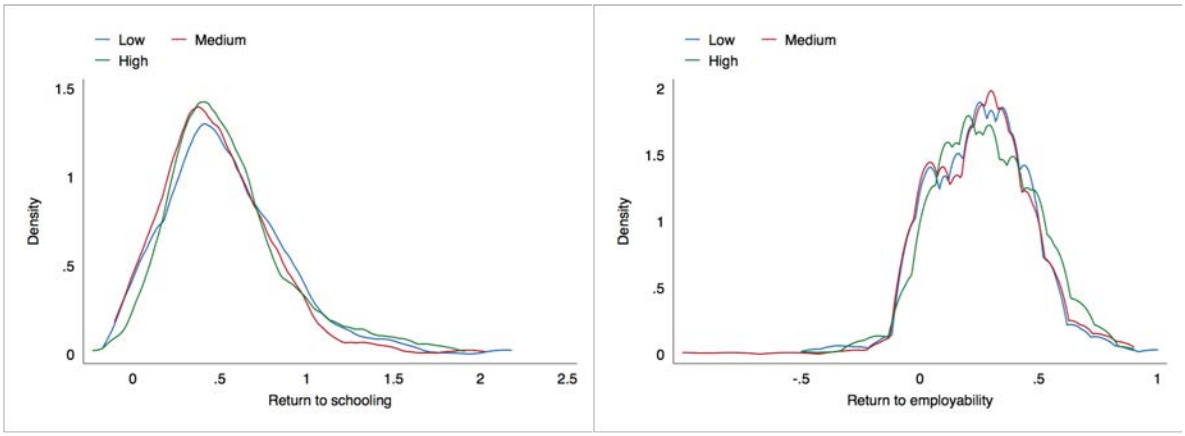


Panel B. Returns to schooling in employment terms



Note. The Figure present local polynomial regressions (at different bandwidth) around the cutoff age of 15, which divides the age group 12-17 years old into a primary school age group and a secondary school age group. Panel A presents the return to secondary school, computed as the difference between expected incomes after primary and secondary school (reported in logarithms and computed using triangular distribution). Panel B presents the return to schooling in employment terms, defined as the difference in the probability to find a job after secondary and after primary school. 95% confidence interval is represented using dotted lines, while the local regression is represented by the solid line. Age is determined from date of birth at December 31st 2010 and is expressed in years as a continuous variable.

Figure 9: Expected return to education by asset group



Note. Left Panel presents the return to secondary school, computed as the difference between expected incomes after primary and secondary school (reported in logarithms and computed using triangular distribution). Right Panel presents the return to schooling in employment terms, defined as the difference in the probability to find a job after secondary and after primary school. Asset groups (low, medium and high) are computed using principal component analysis on asset ownership at baseline and by dividing the distribution of the asset index derive for the first principal component into three terciles.

Table 2: Baseline descriptive statistics, by treatment status

	All	Household head	Mother	Difference	Normalized difference
	(1)	(2)	(3)	(4)	(5)
Household characteristics					
Household members	4.718	4.701	4.734	0.0334	0.0209
	[1.127]	[1.151]	[1.103]	(0.125)	
Mother characteristics					
Age	42.06	42.01	42.11	0.100	0.0125
	[5.689]	[5.873]	[5.502]	(0.487)	
Schooling (years)	7.105	7.117	7.092	-0.0252	-0.005
	[3.257]	[3.131]	[3.383]	(0.331)	
Father characteristics					
Age	45.43	45.24	45.64	0.399	0.0532
	[5.302]	[5.350]	[5.253]	(0.469)	
Schooling (years)	8.047	7.923	8.173	0.251	0.060
	[2.933]	[3.001]	[2.860]	(0.297)	
Expenditures					
P.c. monthly expenditure (MKD)	8136.4	8150.4	8122.0	-28.45	-0.003
	[7888.4]	[7832.0]	[7957.2]	(797.4)	
Education share (girls)	0.0616	0.0613	0.0619	0.001	0.003
	[0.159]	[0.156]	[0.163]	(0.016)	
Education share (boys)	0.0599	0.0592	0.0607	0.00145	0.001
	[0.148]	[0.146]	[0.149]	(0.015)	
Food share	0.485	0.479	0.491	0.0126	0.0501
	[0.178]	[0.179]	[0.177]	(0.019)	
Child characteristics					
Age	15.30	15.32	15.28	-0.041	-0.0174
	[1.645]	[1.585]	[1.704]	(0.096)	
Male	0.531	0.531	0.531	0.001	0.001
	[0.499]	[0.500]	[0.500]	(0.024)	
Enrolled in primary school	0.574	0.587	0.561	-0.0260	-0.0372
	[0.495]	[0.493]	[0.497]	(0.036)	
Enrolled in secondary school	0.341	0.321	0.361	0.0403	0.0600
	[0.474]	[0.467]	[0.481]	(0.030)	
Individual expenditure share on education	0.0390	0.0410	0.0371	-0.004	-0.0279
	[0.0976]	[0.0999]	[0.0954]	(0.009)	

Note. Standard deviations in brackets, standard errors in parenthesis. *** denotes significance at 1%, ** at 5%, and * at 10%. Difference in Column (4) is computed as (3)-(2). The standard errors on the differences are estimated from running the corresponding least squares regression allowing for the errors to be clustered at municipality level and controlling for strata dummies. The normalized difference is computed following Imbens and Wooldridge (2009) and allowing clustering at municipality level.

Table 3: Baseline descriptive statistics of Expectations, by treatment status

	All	Household head	Mother	Difference	Normalized difference
	(1)	(2)	(3)	(4)	(5)
Primary school expectations					
Lower bound	8.197	8.209	8.185	-0.0249	-0.0328
	[0.536]	[0.528]	[0.544]	(0.0625)	
Upper bound	8.822	8.842	8.802	-0.0405	-0.0693
	[0.412]	[0.388]	[0.434]	(0.0507)	
Expected income	8.532	8.548	8.516	-0.0321	-0.0506
	[0.448]	[0.430]	[0.466]	(0.0531)	
Variance income	0.0222	0.0227	0.0216	-0.00106	-0.0252
	[0.0297]	[0.0308]	[0.0287]	(0.00373)	
Prob. to find a job	0.216	0.209	0.223	0.0147	0.0544
	[0.191]	[0.174]	[0.206]	(0.0252)	
Secondary school expectations					
Lower bound	8.784	8.783	8.785	0.00260	0.00478
	[0.385]	[0.371]	[0.399]	(0.0529)	
Upper bound	9.301	9.320	9.283	-0.0376	-0.0746
	[0.356]	[0.335]	[0.376]	(0.0526)	
Expected income	9.060	9.070	9.050	-0.0199	-0.0410
	[0.343]	[0.318]	[0.367]	(0.0495)	
Variance income	0.0150	0.0162	0.0139	-0.00231	-0.0796
	[0.0205]	[0.0224]	[0.0183]	(0.00249)	
Prob. to find a job	0.481	0.492	0.471	-0.0219	-0.0724
	[0.214]	[0.225]	[0.202]	(0.0262)	
Return to secondary school	0.528	0.522	0.534	0.0122	0.0250
	[0.344]	[0.338]	[0.351]	(0.0458)	

Note. Standard deviations in brackets, standard errors in parenthesis. *** denotes significance at 1%, ** at 5%, and * at 10%. Difference in Column (4) is computed as (3)-(2). The standard errors on the differences are estimated from running the corresponding least squares regression allowing for the errors to be clustered at municipality level and controlling for strata dummies. The normalized difference is computed following Imbens and Wooldridge (2009) and allowing clustering at municipality level. Returns to secondary school are computed assuming a triangular distribution.

Table 4: Enrollment regression and interaction with returns to schooling

Dep.var.: Enrolled or completed secondary school			
	Probit (1)	Probit (2)	Probit (3)
A. No interaction			
Payment to mother	0.061		
	(0.032)		
B. Interaction with return to schooling			
Payment to mother * Return (1st tercile)		0.017	
		(0.046)	
Payment to mother * Return (2nd tercile)		0.046	
		(0.056)	
Payment to mother * Return (3rd tercile)		0.098**	
		(0.035)	
C. Interaction with return to schooling in terms of employment			
Payment to mother * Return (1st tercile)			-0.006
			(0.055)
Payment to mother * Return (2nd tercile)			0.105**
			(0.033)
Payment to mother * Return (3rd tercile)			0.066
			(0.047)
Observations	920	920	920

Note. Marginal effects. Standard errors clustered at municipality level in parenthesis. *** denotes significance at 1%, ** at 5%, and * at 10%. Significance level adjusted for multiple hypothesis testing (Romano and Wolf, 2005). In Panel A, I estimate Equation 11, while in Panels B and C I estimate Equation 12 using interactions with returns to schooling in monetary terms and in terms of employment. The dependent variable is an indicator variable that is equal to 1 if the child is enrolled or has completed any secondary school at the beginning of the school year 2012/2013 and is equal to 0 otherwise. Returns to schooling and expected incomes are computed assuming a triangular distribution and using log-income. I include controls for gender, age and education of mother and father, ethnicity, religion, household size, number of female and male children in age 14-19 and age 6-13, rural and Skopje dummies.Year and semester of birth dummies and Regional dummies are included.

Table 5: Effect on Individual expenditure shares on Education

Dep.var.: Ind. expenditure share on education			
	OLS (1)	OLS (2)	OLS (3)
A. No interaction			
Payment to mother	0.012		
	(0.011)		
B. Interaction with return to schooling			
Payment to mother * Return (1st tercile)		-0.011	
		(0.018)	
Payment to mother * Return (2nd tercile)		0.015	
		(0.018)	
Payment to mother * Return (3rd tercile)		0.038*	
		(0.014)	
C. Interaction with return to schooling in terms of employment			
Payment to mother * Return (1st tercile)			-0.016
			(0.016)
Payment to mother * Return (2nd tercile)			0.019
			(0.014)
Payment to mother * Return (3rd tercile)			0.039*
			(0.015)
Observations	911	911	911

Note. Standard errors clustered at municipality level in parenthesis. *** denotes significance at 1%, ** at 5%, and * at 10%. Significance level adjusted for multiple hypothesis testing (Romano and Wolf, 2005). In Panel A, I estimate Equation 11, while in Panels B and C I estimate Equation 12 using interactions with returns to schooling in monetary terms and in terms of employment. The dependent variable is computed as the ratio between the education expenditure on the children and the total expenditure of the household. Returns to schooling and expected incomes are computed assuming a triangular distribution and using log-income. I include controls for gender, age and education of mother and father, ethnicity, religion, household size, number of female and male children in age 14-19 and age 6-13, rural and Skopje dummies.Year and semester of birth dummies and Regional dummies are included. Return in terms of employment is defined as the difference between the probability of being employed after secondary school and the probability for being employed after primary school at age 25.

Table 6: Effect on Individual expenditure shares on Education, by gender

	Dep.var.: Individual expenditure share on education					
		Girls			Boys	
	OLS	OLS	OLS	OLS	OLS	OLS
	(1)	(2)	(3)	(4)	(5)	(6)
A. No interaction						
Payment to mother	0.004			0.020		
	(0.012)			(0.016)		
B. Interaction with return to schooling						
Payment to mother * Return (1st tercile)		-0.011			-0.012	
		(0.019)			(0.025)	
Payment to mother * Return (2nd tercile)		-0.024			0.060	
		(0.018)			(0.030)	
Payment to mother * Return (3rd tercile)		0.046*			0.029	
		(0.018)			(0.021)	
C. Interaction with return to schooling in terms of employment						
Payment to mother * Return (1st tercile)			-0.003			-0.025
			(0.014)			(0.022)
Payment to mother * Return (2nd tercile)			-0.008			0.038
			(0.018)			(0.018)
Payment to mother * Return (3rd tercile)			0.023			0.057*
			(0.020)			(0.024)
Observations	426	426	426	485	485	485

Note. Standard errors clustered at municipality level in parenthesis. *** denotes significance at 1%, ** at 5%, and * at 10%. Significance level adjusted for multiple hypothesis testing (Romano and Wolf, 2005). In Panel A, I estimate Equation 11, while in Panels B and C I estimate Equation 12 using interactions with returns to schooling in monetary terms and in terms of employment. The dependent variable is computed as the ratio between the education expenditure on the children and the total expenditure of the household. Returns to schooling and expected incomes are computed assuming a triangular distribution and using log-income. I include controls for gender, age and education of mother and father, ethnicity, religion, household size, number of female and male children in age 14-19 and age 6-13, rural and Skopje dummies.Year and semester of birth dummies and Regional dummies are included. Return in terms of employment is defined as the difference between the probability of being employed after secondary school and the probability for being employed after primary school at age 25.

Table 7: Effect on the Probability to talk to children about school daily

Dep.var.: Talked to children about school (daily)			
	Probit (1)	Probit (2)	Probit (3)
A. No interaction			
Payment to mother	-0.006		
	(0.017)		
B. Interaction with return to schooling			
Payment to mother * Return (1st tercile)		-0.019	
		(0.039)	
Payment to mother * Return (2nd tercile)		-0.023	
		(0.025)	
Payment to mother * Return (3rd tercile)		0.016	
		(0.016)	
C. Interaction with return to schooling in terms of employment			
Payment to mother * Return (1st tercile)			-0.030
			(0.028)
Payment to mother * Return (2nd tercile)			-0.012
			(0.025)
Payment to mother * Return (3rd tercile)			0.020
			(0.025)
Observations	663	663	663

Note. Standard errors clustered at municipality level in parenthesis. In Panel A, I estimate Equation 11, while in Panels B and C I estimate Equation 12 using interactions with returns to schooling in monetary terms and in terms of employment. The dependent variable is computed as the ratio between the education expenditure on the children and the total expenditure of the household. Returns to schooling and expected incomes are computed assuming a triangular distribution and using log-income. I include controls for gender, age and education of mother and father, ethnicity, religion, household size, number of female and male children in age 14-19 and age 6-13, rural and Skopje dummies.Year and semester of birth dummies and Regional dummies are included. Return in terms of employment is defined as the difference between the probability of being employed after secondary school and the probability for being employed after primary school at age 25.

Table 8: Time use: share of the day spent with children

	Dep.var.: Share of the day spent with children					
	Father	Mother	Father	Mother	Father	Mother
	OLS	OLS	OLS	OLS	OLS	OLS
	(1)	(2)	(3)	(4)	(5)	(6)
A. No interaction						
Payment to mother	0.011	0.001				
	(0.013)	(0.013)				
B. Interaction with return to schooling						
Payment to mother * Return (1st tercile)			0.016	0.014		
			(0.022)	(0.019)		
Payment to mother * Return (2nd tercile)			0.012	-0.010		
			(0.019)	(0.015)		
Payment to mother * Return (3rd tercile)			0.004	-0.002		
			(0.019)	(0.019)		
C. Interaction with return to schooling in terms of employment						
Payment to mother * Return (1st tercile)					0.031	0.015
					(0.019)	(0.018)
Payment to mother * Return (2nd tercile)					-0.008	-0.008
					(0.018)	(0.016)
Payment to mother * Return (3rd tercile)					-0.005	-0.003
					(0.018)	(0.016)
Observations	743	743	743	743	743	743

Note. Standard errors clustered at municipality level in parenthesis. In Panel A, I estimate Equation 11, while in Panels B and C I estimate Equation 12 using interactions with returns to schooling in monetary terms and in terms of employment. The dependent variable is computed as the share of the day spent on the activity. Returns to schooling and expected incomes are computed assuming a triangular distribution and using log-income. I include controls for gender, age and education of mother and father, ethnicity, religion, household size, number of female and male children in age 14-19 and age 6-13, rural and Skopje dummies.Year and semester of birth dummies and Regional dummies are included. Return in terms of employment is defined as the difference between the probability of being employed after secondary school and the probability for being employed after primary school at age 25.

Table 9: Correlates of Secondary School enrollment at follow-up

	Dep.var.: Enrolled or completed Secondary school		
	Probit	Probit	Probit
	(1)	(2)	(3)
Expected income (primary)	-0.055	-0.065	-0.017
	(0.048)	(0.054)	(0.058)
Expected income (secondary)	0.186***	0.192***	0.137*
	(0.068)	(0.069)	(0.078)
Variance of income (primary)		-0.315	-0.324
		(0.542)	(0.547)
Variance of income (secondary)		0.275	0.478
		(0.738)	(0.742)
Probability of employment (primary)			-0.260**
			(0.115)
Probability of employment (secondary)			0.281***
			(0.107)
Individual controls	✓	✓	✓
Municipality controls	✓	✓	✓
Observations	920	920	920

Note. Marginal effects. Standard errors clustered at municipality level in parenthesis. The dependent variable is an indicator variable that is equal to 1 if the child is enrolled or has completed any secondary school at the beginning of the school year 2012/2013 and is equal to 0 otherwise. Returns to schooling and expected incomes are computed assuming a triangular distribution and using log-income. Distance from School is computed as distance from the closest school providing educational program in the same ethnic language of the individual. I include controls for gender, age and education of mother and father, ethnicity, religion, household size, number of female and male children in age 14-19 and age 6-13, rural and Skopje dummies.Year and semester of birth dummies and Regional dummies are included.

Table 10: Secondary school enrollment and subjective expectations: robustness checks

	Dep.var.: Enrolled or completed Secondary school				
	(1) Probit	(2) Probit	(3) Probit	(4) Probit	(5) Probit
Expected income (primary)	-0.024	-0.014	-0.027	-0.023	-0.023
	(0.057)	(0.058)	(0.057)	(0.057)	(0.058)
Expected income (secondary)	0.152*	0.141*	0.144*	0.137*	0.137*
	(0.079)	(0.078)	(0.075)	(0.075)	(0.076)
Variance income (primary)	-0.583	-0.287	-0.336	-0.347	-0.349
	(0.556)	(0.551)	(0.524)	(0.520)	(0.527)
Variance income (secondary)	0.332	0.474	0.690	0.665	0.668
	(0.773)	(0.746)	(0.733)	(0.731)	(0.732)
Probability of employment (primary)	-0.262**	-0.264**	-0.251**	-0.259**	-0.259**
	(0.120)	(0.116)	(0.115)	(0.114)	(0.113)
Probability of employment (secondary)	0.277***	0.280***	0.268***	0.280***	0.280***
	(0.105)	(0.106)	(0.103)	(0.101)	(0.101)
Individual controls	✓	✓	✓	✓	✓
Municipality controls	✓	✓	✓	✓	✓
Wealth controls		✓	✓	✓	✓
Distance from school and quality			✓	✓	✓
Sex ratio				✓	✓
Crime market controls					✓
Observations	920	920	920	920	920

Note. Marginal effects. Standard errors clustered at municipality level in parenthesis. The dependent variable is an indicator variable that is equal to 1 if the child is enrolled or has completed any secondary school at the beginning of the school year 2012/2013 and is equal to 0 otherwise. Returns to schooling and expected incomes are computed assuming a triangular distribution and using log-income. Distance from School is computed as distance from the closest school providing educational program in the same ethnic language of the individual. I include controls for gender, age and education of mother and father, ethnicity, religion, household size, number of female and male children in age 14-19 and age 6-13, rural and Skopje dummies.Year and semester of birth dummies and Regional dummies are included.

Table 11: Kolmogorov-Smirnov test for equality of the distribution if changes in subjective probabilities from baseline to follow-up

Smaller Group and K-S combined	Returns to schooling		Probability of employment after... primary school		Probability of employment after... secondary school		Returns in terms of employment	
	Difference (1)	p-value (2)	Difference (3)	p-value (4)	Difference (5)	p-value (6)	Difference (7)	p-value (8)
Compare primary-primary and primary-secondary groups								
- Primary-Primary	0.042	0.626	0.052	0.459	0.088	0.111	0.068	0.268
- Primary-Secondary	-0.060	0.380	-0.017	0.922	-0.013	0.955	-0.024	0.852
- Combined K-S	0.060	0.688	0.052	0.805	0.088	0.205	0.068	0.497
Compare primary-primary and secondary-secondary groups								
- Primary-Primary	0.027	0.731	0.066	0.148	0.075	0.083	0.063	0.171
- Secondary-Secondary	-0.045	0.424	-0.019	0.856	-0.008	0.972	-0.035	0.587
- Combined K-S	0.045	0.760	0.066	0.279	0.075	0.156	0.063	0.323
Compare primary-secondary and secondary-secondary groups								
- Primary-Secondary	0.056	0.370	0.050	0.437	0.046	0.494	0.077	0.141
- Secondary-Secondary	-0.022	0.857	-0.022	0.856	-0.023	0.842	-0.031	0.732
- Combined K-S	0.056	0.676	0.050	0.778	0.046	0.851	0.077	0.265
Observations	383 / 236 / 562							

Note. Kolmogorov-Smirnov test is performed on the difference between the expectation at follow-up and at baseline. The group "Primary-primary" is composed by children whose maximum educational level achieved at baseline and follow-up is primary school reported for the same child. The group "Primary-secondary" is composed by children whose maximum educational level achieved at baseline was primary school, while at follow-up was secondary school. The group "Secondary-secondary" is composed by children whose maximum educational level achieved at baseline and follow-up was higher than primary school. P-values on combined Kolmogorov-Smirnov test are the exact p-values. For each comparison, the first line test the hypothesis that the values for the first group are smaller than the values for the second group, while the second line tests whether the values of the first group are larger than the values for the second group. Column Difference reports the largest difference between the groups. Observations are reported as number of children in each category: Primary-primary, Primary-Secondary, Secondary-secondary. Delta probability is defined as the difference between the probability of being employed at age 25 after secondary school and after primary school.

Appendix A. A collective model with human capital investment

The household decision to allocate income to either consumption (c) or human capital investment (h) is defined by the following maximization problem:

$$\begin{aligned} \max_{c,h} \quad & (1-\lambda)\left[u(c)+E\left[v_f(r\cdot h)\right]\right]+\lambda\left[u(c)+E\left[v_m(r\cdot h)\right]\right] \\ \text{subject to} \quad & y \geq c+p\cdot h \\ & c \geq \bar{c} \end{aligned} \tag{14}$$

where the Pareto weight $\lambda \in [0,1]$ reflects the weight of the mother in the household, p is the (relative) price for human capital investment and where $\bar{c}$ is a minimum (subsistence) consumption which is required for the household before investing in human capital, r is the rate of return of the investment in human capital which is unknown to parents. I assume that the return can have either a low value (r_L) or a high value (r_H) and that both parents share the same expectations, attributing a probability π_H to the higher return and a probability $(1-\pi_H)$ to the lower return.

With an interior solution, the problem lead to the following first order condition:

$$\begin{aligned} (1-\lambda)\left[(1-\pi_H)\,r_L\cdot v_f'(r_L\cdot h)+\pi_H r_H\cdot v_f'(r_H\cdot h)\right]+ & \\ \lambda\left[(1-\pi_H)\,r_L\cdot v_m'(r_L\cdot h)+\pi_H r_H\cdot v_m'(r_H\cdot h)\right] &= p\cdot u'\left(y-p\cdot h\right) \end{aligned} \tag{15}$$

If we define $\Phi_d = {\left((1-\pi_H)r_L\cdot v_d'(r_L\cdot h)+\pi_H r_H\cdot v_d'(r_H\cdot h)\right)}/{u'(c)}$ as the marginal willingness to pay for the human capital investment for each parent, we can rewrite the optimality condition (15) as:

$$(1-\lambda)\cdot\Phi^f+\lambda\cdot\Phi^m = p \tag{16}$$

Using Implicit Function theorem we can derive the derivative of human capital investment with respect to a change in the Pareto weight, $\frac{\partial h}{\partial \lambda}$. This is equal to the following expression:

$$\frac{\partial h}{\partial \lambda}=\frac{(1-\pi_H)\cdot r_L\cdot\left(v_m'(r_L\cdot h)-v_f'(r_L\cdot h)\right)+\pi_H\cdot r_H\cdot\left(v_m'(r_H\cdot h)-v_f'(r_H\cdot h)\right)}{D} \tag{17}$$

where

$$
\begin{aligned}
D = & - (1-\lambda)\left(p^2 \cdot U''(y-hp) + \pi_H \cdot r_H^2 \cdot v_f''(r_H \cdot h) + (1-\pi_H) \cdot r_L^2 \cdot (v_f''(r_L \cdot h)\right) + \\
& -\lambda\left(p^2 \cdot U''(y-hp) + \pi_H \cdot r_H^2 \cdot v_m''(r_H \cdot h) + (1-\pi_H) \cdot r_L^2 \cdot v_m''(r_L \cdot h)\right) = \\
= & - p^2 \cdot U''(y-hp) - (1-\lambda)\left((1-\pi_H) \cdot r_L^2 \cdot v_f''(r_L \cdot h) + \pi_H \cdot r_H^2 \cdot v_f''(r_H \cdot h)\right) \\
& -\lambda\left((1-\pi_H) \cdot r_L^2 \cdot v_m''(r_L \cdot h) + \pi_H \cdot r_H^2 \cdot v_m''(r_H \cdot h)\right)
\end{aligned}
$$

Since D is positive, $\frac{\partial h}{\partial \lambda}$ is larger than zero if $v_f'(r \cdot h) < v_m'(r \cdot h)$ for any $h \times r$.

Appendix B. Attrition and missing values

In this Appendix, I present some robustness checks related to sample bias related to attrition and missing expectation values.

Panel A of Table B1 reports the estimated difference in attrition rate for SFA households across treatment modalities. The dependent variable is a dummy variable equal to one if the household was interviewed only at baseline and equal to zero if the household was interviewed at baseline and follow-up. In Column 1 I estimate the difference across treatment modalities by controlling only for regional dummies, while in Columns 2 and 3 I control for household characteristics. Columns 1 and 2 are estimated using OLS, while Column 3 is using a Probit model. The coefficient is roughly equal to 2 percent and stable across specifications, but is never significant. This provides evidence that the 2-year attrition is not explained by being resident in municipalities where the payments are made to mothers rather than the other municipalities. We can observe that attrition is mainly driven by Roma households, households living in Skopje and families where the father has upper primary education. I observe lower levels of attrition among Macedonian households. Among most of dimensions there are no significant statistical differences between attrited households and non-attrited households. Similar conclusion can be drawn when we look at child-level characteristics.

In order to control for robustness of the results to attrition, Table B2 present the estimates for the effect on individual expenditure shares comparing the unweighted results with the weighted results using inverse probability weighting. In the latter case weights are the inverse on the estimated probability of being interviewed at baseline and follow-up (see Wooldridge 2002). This method allows increasing the weight of observations which had a higher attrition

at follow-up. I generate weights using estimates from Column 3 in Table B1. The weights are generated using a Probit regression of an indicator variable being equal to 1 if the observation was interviewed at baseline, but was missing at follow-up and 0 otherwise on a series of observable individual, household and municipality-level characteristics. From the regression, I compute predicted probabilities and I computed weights by taking the inverse of one minus the predicted probabilities.

Panel B of Table B1 reports the estimated difference in the probability of having a missing value for expectations at baseline. For each child in the household that was selected in order to collect subjective expectations, the dependent variable is a dummy variable equal to one if data is missing due to incomplete reporting or to refusal and is equal to zero if the data is complete. Columns 1 and 2 are estimated using OLS, while Column 3 is using a Probit model. The coefficient is very close to zero and stable across specifications, but is never significant. The treatment doesn't seem to influence the chance of having a missing data in the expectation section.

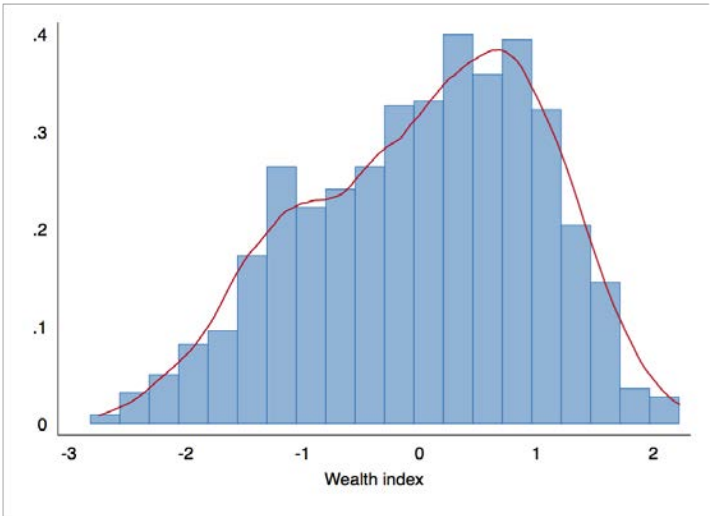
Appendix C. Construction of the wealth index

In order to control for pre-program household wealth, I construct an asset index using factor analysis (Filmer and Pritchett, 2001) by exploiting the information available at baseline. Following the Filmer-Pritchett (FP) procedure, I compute asset ownership or access to resources by using indicator variables for whether the household own the good (or has access to a resource) and I compute indicator weights by using Principal Component Analysis (PCA). As suggested by McKenzie (2005), I make use of only the first factors produced by PCA to represent the wealth index and I consider a wide range of asset variables to avoid issues related to clumping and truncation[30]. The variables used to build the index are the following: durable goods property[31], access to utilities (public water, sewerage, electricity, phone line), type of dwelling and type of property, use of shared toilet, land property and livestock ownership. I group variables in which ownership is limited to very few households (smaller than 30 households in the sample).

[30] Clumping occurs when the wealth index has limited variation (e.g. it groups households into a limited number of groups), while truncation occurs when there is limited variation in asset ownership.

[31] We collected information on several durable goods that the household could have owned. The variables used in the construction of the index are indicator variables equal to one if the household own at least one item of the good and zero otherwise. We collected information on the following items: cooker and stove (by type of fuel), boiler, refrigerator, washing machine, iron, sewing, vacuum cleaner, air conditioning, radio and tv, video recorder, personal computer, phone and mobile phone, musical instrument, bicycle, car and motorbike.

Figure C1: Wealth index distribution



Note: The wealth index is computed using Principal Component Analysis following Filmer and Pritchett (2001). The index is built using information on durable good ownership, access to utilities, type and property of the dwelling, land property and livestock ownership.

Figure C1 presents the distribution of the resulting wealth index. The first component explains roughly 11% of the total variation and the distribution has limited issues related to high skewness and kurtosis. In order to show internal coherence of the wealth index, I split the measure into three groups depending on the tercile of the distribution. I indicate these groups by low, middle and high wealth. Table C3 shows the share of households owning a specific asset and compares them by using the three wealth groups computed through PCA. We can observe that as the wealth quantile increases, households do own better assets and do have better access to utilities, suggesting that PCA methodology provides a credible method for grouping households into wealth groups.

Table B1: Treatment modality, attrition and missing expectations

	15-19 years old			*15-18 years old*		
	OLS (1)	OLS (2)	Probit (3)	OLS (4)	OLS (5)	Probit (6)
A. Attrition						
Payment to mother	0.005	0.005	0.005	0.018	0.014	0.011
	(0.024)	(0.023)	(0.021)	(0.024)	(0.025)	(0.021)
B. Missing expectation at baseline						
Payment to mother	0.001	-0.003	-0.004	-0.018	-0.021	-0.023
	(0.021)	(0.020)	(0.016)	(0.022)	(0.022)	(0.018)
Individual characteristics		✓	✓		✓	✓
Regional dummies	✓	✓	✓	✓	✓	✓
Observations	1233	1233	1233	795	795	795

Note. Standard errors in parenthesis. *** denotes significance at 1%, ** at 5%, and * at 10%. In Panel A, the dependent variable is equal to 1 if the household has been interviewed at baseline, but not at follow-up and 0 if it has been interviewed in both waves. In Panel B, the dependent variable is equal to one if the child has been selected for the expectations section (younger male and female child in age category older than 10 and younger than 18) and the data is missing for incomplete reporting or refusal and is equal to 0 is the child is selected and the information is complete. Columns 1 and 4 are OLS regressions on the treatment dummy and the regional dummies only, Columns 2 and 5 control for household and individual characteristics and Columns 3 and 6 use Probit estimation (marginal effects are reported). Individual and household characteristics include age, gender, gender of head, education of head, age of head, indicator dummies for level of assets, household size and number of female and male children, an indicator variable whether the household lives in a urban settlement and an indicator variable whether the household lives in Skopje.

Table B2: Effect on Individual expenditure shares on Education: attrition checks

	OLS	OLS (weighted)	OLS	OLS (weighted)	OLS	OLS (weighted)
	(1)	(2)	(3)	(4)	(5)	(6)
A. No interaction						
Payment to mother	0.012	0.013				
	(0.011)	(0.012)				
B. Interaction with return to schooling						
Payment to mother * Return (1st tercile)			-0.011	-0.010		
			(0.018)	(0.019)		
Payment to mother * Return (2nd tercile)			0.015	0.019		
			(0.018)	(0.019)		
Payment to mother * Return (3rd tercile)			0.038*	0.034*		
			(0.014)	(0.014)		
C. Interaction with return to schooling in terms of employment						
Payment to mother * Return (1st tercile)					-0.016	-0.023
					(0.016)	(0.017)
Payment to mother * Return (2nd tercile)					0.019	0.025
					(0.014)	(0.015)
Payment to mother * Return (3rd tercile)					0.039*	0.042*
					(0.015)	(0.017)
Observations	911	911	911	911	911	911

Note. Standard errors clustered at municipality level in parenthesis. The dependent variable is computed as the ratio between the education expenditure on the children and the total expenditure of the household. Returns to schooling and expected incomes are computed assuming a triangular distribution and using log-income. I include controls for gender, age and education of household head, ethnicity, religion, household size, number of female and male children in age 13-18, presence of mother and father in the household, rural and Skopje dummies. Year and semester of birth dummies and Regional dummies are included. Return in terms of employment is defined as the difference between the probability of being employed after secondary school and the probability for being employed after primary school at age 25.

Table C3: Share of households owning an asset, by type of good and wealth quantile

	Wealth quantile			
	Lower (1)	Middle (2)	Higher (3)	All (4)
Characteristics of the dwelling				
Owner of the dwelling	0.475	0.507	0.521	0.501
Public water available	0.552	0.781	0.948	0.760
Electricity available	0.938	0.988	0.998	0.974
Telephone line available	0.306	0.465	0.621	0.464
Toilet connected to sewerage	0.172	0.413	0.773	0.452
Toilet connected to septic tank	0.274	0.346	0.214	0.278
Toilet not connected to sewerage or latrine	0.118	0.053	0.003	0.059
Toilet not shared with other households	0.918	0.948	0.965	0.944
Asset ownership				
Solid fuel cooker	0.915	0.973	0.766	0.885
Electric or gas cooker	0.286	0.701	0.930	0.639
Boiler	0.214	0.794	0.978	0.661
Refrigerator	0.731	0.925	0.988	0.881
Washing machine	0.244	0.672	0.940	0.618
Vacuum cleaner	0.122	0.607	0.900	0.543
Personal computer	0.017	0.0970	0.382	0.165
Mobile phone	0.774	0.828	0.853	0.818
Bycicle	0.052	0.102	0.254	0.136
Land and livestock property				
Household owns land	0.021	0.019	0.010	0.017
Household owns cattle	0.107	0.060	0.010	0.059

Note. Wealth quantiles are determined by the tercile in the wealth index, which is computed using Principal Component Analysis following Filmer and Pritchett (2001). The index is built using information on durable good ownership, access to utilities, type and property of the dwelling, land property and livestock ownership. For limited space, I don't include in the table the following group of indicators that were used in the computation of the wealth index: other types of dwelling property or rental, ownership of other types of animals, type of stove.