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Abstract

The goal of this study is to examine whether promising a Conditional Cash Transfer (conditional on matriculation) at the start of junior high increases the rate at which disadvantaged students matriculate into high school. Based on a randomized controlled trial involving 1,418 disadvantaged (economically poor) students in rural China, we find that the promise of a CCT has no effect on increasing high school matriculation for the average disadvantaged student. We do find, however, that providing the CCT increases high school matriculation among the subset of disadvantaged students who overestimate the direct costs of attending high school.

Keywords: Conditional Cash Transfer, Voucher, Rural Education, Dropout, High School, Randomized Controlled Trial, China

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1. Introduction

A number of developing countries are making the transition from economies based on low-wage, labor-intensive manufacturing to economies based on higher value-added, high-wage industries. In the course of this transition, the demand for skilled labor increases (Glewwe, 2002; Duryea and Arends-Kuenning, 2003; De Brauw and Rozelle, 2007; Liu et al., 2009; Heckman and Yi, 2012). Students caught in the transition need to acquire skills taught at the level of high school or above—skills that will enable them to compete more effectively in the future labor market (Mayhew and Keep, 1999; Angrist and Lavy, 2009; Fiszbein et al., 2009). If students fail to acquire such skills, not only will they have a hard time finding high-wage employment in the future, but the industries they work in may also stagnate from a short supply of skilled labor and entire countries may suffer from slower development (Benhabib and Spiegel, 1994; Park and Cai, 2011).

Unfortunately in many low- and middle-income countries students from disadvantaged (poor, rural) backgrounds often fail to obtain a high school education (Duflo and Kremer, 2005; Reddy and Sinha, 2010; Wang et al., 2013). Low rates of high school matriculation among disadvantaged students come about in one of two ways. First, some students never finish junior high school. For example, in Mexico, nearly one-third of students drop out of junior high school (Behrman et al., 2005a). In India and Ghana, the official dropout rates for junior high school are approximately 27% and 21%, respectively (Choudhury, 2006; Sabates et al., 2011). Second, even among those disadvantaged students that do graduate from junior high school, many decide not to continue on to high school (Fiszbein et al., 2009).

A major reason why disadvantaged students fail to go to high school (either because they drop out during junior high or because they choose not to go to high school even after

graduating from junior high) is that attending high school can be costly (Banerjee et al., 2001; Angrist and Lavy, 2009). High school tuition rates in a number of both low- and middle-income countries, such as Bangladesh, Indonesia, and Mexico are high (World Bank Report, 2008). Attending high school can also be associated with high opportunity costs since the wages for unskilled labor, especially in middle-income countries, can be high (and rising) (Cai and Du, 2011; Huang et al., 2011).

To address the negative consequences associated with the high costs of high school, policymakers in a rising number of developing (low- and middle-income) and developed (high income) countries have provided disadvantaged students with conditional cash transfers (CCT) for staying in school or enrolling in higher levels of schooling. As of 2008, more than 20 low- and middle-income countries had such education-targeted CCT programs in place (Fiszbein et al., 2009). These CCT programs have been shown to raise education matriculation and attendance in many countries, such as in Colombia (Attanasio et al., 2010; Barrera-Osorio et al., 2011), Pakistan (Chaudhury and Parajuli, 2008), Mexico (Schultz, 2004; De Janvry et al., 2006; De Brauw and Hoddinott, 2011), and Brazil (Heinrich, 2007; Glewwe and Kassouf, 2012). A subset of these studies in Colombia and Mexico found impacts of CCT programs on matriculation and attendance at the high school level in particular (Heinrich, 2007; Attanasio et al., 2010; Barrera-Osorio et al., 2011).

However, there are reasons that CCT programs may not work in all situations. For example, it could be that in countries that have highly competitive education systems with restricted enrollment into high school, poor students will not be able to matriculate to higher levels of school regardless of the level of CCT (or other financial aid) that is offered (Clarke et al., 2000; Glewwe and Kremer, 2006). Many studies have found that providing CCTs conditional on student enrollment does not translate into higher student achievement (Behrman et al., 2005b; Banerjee et al., 2007; Filmer and Schady, 2009b). Therefore, to the extent that

students that are poor (economically) also are performing poorly in school, CCTs may not help students pass competitive high school entrance requirements. It may also be that the perceived costs, including the opportunity cost of attending school, are so high that, regardless of the presence of a CCT program (that is set at a level that only covers tuition or some share of direct costs), poor students choose not to attend high school because they would rather begin to enter the labor market and earn a wage. In short, it could be that CCTs will be less successful when implemented in countries with school systems that are highly competitive or too expensive (in terms of direct costs and the opportunity cost of attending school).

It is also possible that CCT programs are particularly effective for certain subsets of students. Since many developing countries have competitive high school admissions systems for which academic performance is a critical determinant of advancement (Hannum, 1999; Cheyney et al., 2005; De Janvry et al., 2012), it may be the case that the CCT has a differential impact on students with different academic ability. CCTs may have less impact on the high school matriculation rates of students with lower academic performance because they are constrained in their decision to continue on in school not only by financial concerns but also by their ability to qualify for academic high school in the first place. By contrast, higher achieving students are likely able to qualify for academic high school on their own merits but may need CCTs in order to afford high school tuition. We therefore might expect to see a differential impact of the CCT on students of different academic ability. However, it might also be that when disadvantaged students are high performing that their families have already figured out how to finance high school, despite the high costs. If this is so, the CCT may also not have an effect on high performing students.

CCTs could also have different impacts on students who have different expectations about their future schooling. Individuals living in poor, rural areas often have imperfect information. As shown in several papers (Nguyen, 2008; Jensen, 2010; Loyalka et al., 2013), a

significant proportion of students in developing countries overestimate the costs of attending high school. For the subset of students who overestimate the costs of attending high school CCTs may be effective because they reduce student expectations of that cost—either by reducing the *actual* costs of attending high school (through the cash transfer itself) or by giving students a signal (based on the size of the CCT offer) that the cost of attending high school is lower than what they previously thought. These students may then consider high school more seriously (and matriculate at higher rates) due to a decrease in expected costs.

The overall goal of this paper is to examine the long-term effectiveness of CCTs on the decisions of disadvantaged students to attend high school. Specifically, we are interested in examining the impact of a program that promises a CCT at the start of junior high school (three years before a student can matriculate to high school) on dropout from junior high school and high school matriculation (after three years). In addition to exploring the impact of the CCT on the average student, we also examine the potential heterogeneous impacts of the CCT by academic achievement and expected costs of attending high school.

To fulfill these goals, we draw on the results of a randomized controlled trial among 1,418 poor students across 132 schools in rural China. Like other middle-income developing countries, the cost of attending high school in China can be high (Liu et al., 2009) and students are often not aware of the high costs of attending high school (Loyalka et al., 2013). Also similar to other developing countries, China has a competitive education system with strict entrance requirements for attending academic high school (Hannum, 1999). Understanding whether CCTs are effective at increasing the long-term outcomes of students in China may therefore provide important lessons for other developing countries as well.

The rest of the paper is structured as follows. Section 2 presents the research design. Section 3 describes the data. Section 4 discusses our statistical approach. Section 5 presents the main and heterogeneous impact results. Section 6 discusses the findings and concludes.

2. Research Design

2.1 Sampling and Randomization

We conducted a randomized controlled trial (RCT) to measure the impact of Conditional Cash Transfers (CCT) among 1,418 poor seventh grade students in 132 rural, public junior high schools in 15 nationally-designated poor counties in Shaanxi and Hebei provinces. We chose these two provinces because they differ in terms of location and geography, allowing us to increase the generalizability of our findings. The 15 counties were located in three prefectures: Shangluo prefecture in Shaanxi province and Zhang Jiakou and Cang Zhou prefectures in Hebei province.

We used official records to create a sampling frame of all rural, public junior high schools in the 15 sample counties at the start of the program. A total of 150 rural junior high schools were identified. We then excluded 18 schools in Hebei because the administrative records reported that the number of seventh grade students in these schools was fewer than 50.[1] Our final sample, therefore, included 132 schools (71 in Shaanxi and 61 in Hebei). All seventh grade classes in each sample school were enrolled into our sample. We sampled all seventh grade students in these 132 schools (a total of 19,797 students in 473 classes). This sample (our *full sample*) is roughly representative of rural, public junior high schools in nationally-designated poor counties in provinces like Shaanxi and Hebei.

We conducted a baseline survey of all the seventh grade students and their homeroom teachers in our full sample at the beginning of the school year (in early October 2010). Students were asked to complete a checklist of major household assets. The homeroom teacher of each class also filled out a questionnaire. One of the most important parts of the homeroom teacher's form was a list of the poorest five students in his or her class based on his or her understanding.

1 In the aftermath of China's 2005 School Merger Policy, smaller schools are likely to be merged with more centrally located schools, which would complicate our data collection.

Following the baseline survey, we identified the four poorest students in each classroom in two steps. First, a monetary value was attached to each surveyed household asset to produce a single ranking of family asset value in each class.[2] Second, we used the list of poorest students in each class collected from homeroom teachers at the baseline survey. By matching these two pieces of information together, we identified the four poorest students in each class. In total, we identified 1892 poor students.

We next randomly assigned our sample schools into two groups (66 schools in each group). The first group of schools was called the *CCT schools*, which meant that students within these schools would have a chance to receive the CCT. The other group of schools was the *control schools*, in which no students would receive a CCT.

Next, within the CCT schools, we randomly selected two of our four poor students in each class to receive the CCT. These students were called the *treatment group.* Within the control schools, we enrolled all four poor students in each class as our *control group*, who would receive no CCT offer. In total, 1,418 poor students from 473 classes in 132 rural junior high schools were enrolled in our *poor students sample*. Since our intervention was conducted only among this sample, in the rest of the paper all references to our study 'sample' refer to this poor students sample. Among the 1,418 students in our poor students sample, 474 students were in the treatment group and 944 students were in the control group. Our assignment procedure is summarized in Figure 1.

This approach created a sample that was well balanced. The t-test results suggest that the treatment and control groups were balanced on all observable characteristics at the time of our baseline survey (Appendix B). To ensure that any small discrepancies do not influence our

2 Asset values were based on the National Household Income and Expenditure Survey, published by the China National Bureau of Statistics—CNBS, 2007.

results and to increase statistical efficiency, we control for all of these covariates in our regression analysis.

2.2 Power Calculations

We conducted power calculations to determine the minimum number of schools and students we would need for our experiment. We calculated that we would need approximately 108 schools and 8 students per school (or 432 students per treatment arm) to detect a standardized effect size of 0.25 with 80 percent power at the 5 percent significance level. Based on previous surveys, we conservatively assumed an intra-class correlation coefficient of 0.15 (limiting the sample to the poorest 4 students in each class in each school) and an R-squared of 0.3. To ensure that we have enough statistical power, we selected a sample size of 1,418 students in 132 schools (474 students in 66 treatment schools and 944 students in 66 control schools).

2.3 Experiment Arms and Implementation

Students in the treatment group received a CCT intervention shortly after the baseline survey (at the start of seventh grade in November 2010). We promised the CCT to students according to a strict protocol. In December 2010, we asked school principals to summon each CCT recipient individually to the principal's office along with the student's parents (or guardians). The CCT offers were then given in the form of a contract. To improve their legitimacy, the contracts were printed on the letterhead of the Chinese Academy of Sciences (CAS) and Peking University.[3]

The contract stipulated that if the student was actively enrolled in a three-year vocational or academic high school program by September 2013, CAS/Peking University would provide 1500 yuan (190 USD) per year in financial aid to roughly cover the costs of

3 The Chinese Academy of Sciences (CAS) and Peking University (PKU) are both located in Beijing and are two of the highest ranked universities in China with well-known roles as 'think tanks' for the government. The connection to these two prestigious institutions would lend the contract increased credibility.

three years of high school tuition. The contract further stipulated that CAS/Peking University would send the money to a post office near the recipient's high school for the students to retrieve themselves. All students and parents understood that Chinese post offices often serve as banks, especially in rural areas where banks are less prevalent. All of the students assigned to the treatment group (as well as their parents or guardians) signed the contract. Each contract had three copies; the student kept one copy, the school principal kept one copy, and CAS/Peking University kept the third copy. We also took a photograph of the contract signing ceremony and mailed the photograph to each student's family as a reminder of the agreement one week after the ceremony. Afterwards, we called each treatment student again once each year around May to remind them that the contract was still valid.[4]

Because we stated that the CCT would roughly cover three years of tuition, the intervention also gave students a price signal for the actual costs of high school tuition. As discussed above, one reason students may choose not to stay in school is that they are simply poorly informed about the costs of attending high school. Indeed, Loyalka et al. (2013) found that students in poor, rural areas of China greatly overestimate the costs of attending high school. If the CCT indicates to students that the costs of attending high school are not as high as they previously thought, this change in expectations may in of itself be enough to change student behavior, separate from the impact of the cash transfer itself.

3. Data Collection

3.1 Baseline Data Collection

As we mentioned above, baseline surveys were administered in four blocks in October 2010. In the first block students were asked to provide a checklist of their household assets,

4 We called in May because in most cases school summer holidays start at the end of June. During the summer holidays, some students migrate to urban areas to do short-term work which sometimes leads students to drop out of school afterwards. Therefore, May was a critical time to remind students of the outstanding CCT contract.

including almost all household durable goods. This variable was used as part of each student's household economic information to identify the poorest students in each class.

The second block was a 30-minute standardized math test using items from the Trends in International Mathematics and Science Study (TIMSS).[5] The baseline and evaluation math exams were both constructed on the foundation of a pilot in which we tested the exam questions with over 300 students in schools outside our sample. No one in the sample schools—neither teachers nor students—knew the test questions beforehand. Our enumerators closely proctored the students and enforced strict time limits. Finally, the scores were normalized by subtracting the mean and dividing by the standard deviation (SD) for each county. These normalized scores are used as our measure for math achievement.

The third block of the student survey asked students about expected costs for going on to higher levels of schooling. In particular, we asked students to predict the total direct costs of going to academic high school. Understanding student expected costs at different points in time will allow us to assess the extent to which the CCT is having a price-signaling effect for the cost of attending high school.

In the fourth block enumerators collected data that were used to create the study's control variables. Specifically, we collected data on student individual characteristics (gender and age) and family characteristics (number of siblings, parent health status, parent years of schooling, and whether parents had ever migrated). Previous studies have used similar variables to explain student-level differences in educational outcomes (Currie and Thomas, 2000; Behrman and Rosenzweig, 2002; Yi et al., 2012). We also asked students about their plans for the time period after junior high school. We allowed students to say that their plans included:

5 We chose math test scores because they are one of the most common outcome variables used to proxy educational performance in the literature (Glewwe and Kremer, 2006; Rivkin et al., 2005; Schultz, 2004).

academic high school, vocational high school, or the labor market. We also allowed the student to say that he or she was undecided.

When we carried out our baseline survey, no one in the schools (neither students, homeroom teachers, nor school principals) knew about the CCT program. During the baseline survey students were told that the survey was for a general study on education conducted by the Chinese Academy of Sciences and Peking University. Not even the enumerators knew about the CCT program during the baseline survey in order to avoid revealing any information about the program.

3.2 Follow-up Surveys

In May 2011 (at the end of the 2010 to 2011 academic year) enumerators revisited all the sample schools and asked all students in our poor students sample to participate in the first round follow-up survey. The first round follow-up survey was identical to the baseline survey except that enumerators did not ask students about their household assets or basic demographic/socioeconomic characteristics again.

During the follow-up survey enumerators also identified students who had dropped out of school in the time between the baseline and follow-up surveys. Dropouts were identified using the following protocol. If students were absent on the day of the evaluation survey, the enumerators asked teachers and classmates the reason for the absence (coded as transferred to other schools, dropped out, or on temporary leave due to illness). After the field survey was over, the enumerators called the relatives or neighbors of the students to confirm whether the students had actually dropped out of school (or were instead temporarily absent or had transferred schools). For treatment students, we also confirmed that the family still had the contract. While control students did not receive the CCT, students in the control group filled in the same number of surveys and were visited the same number of times as treatment students.

In May 2013 just as the students were finishing junior high school, we conducted a second follow-up survey. In the second follow-up survey we collected information on student dropout using the exact same procedure as in the first follow-up survey. Based on these two rounds of follow-up survey data, we identified whether students had dropped out of school before junior high school graduation or not. For a third time, we also collected information about students' expected costs of attending high school.

In October 2013, after the end of junior high school (the end of ninth grade), we did the third round follow-up survey. In this round, we confirmed whether students had: (a) matriculated into academic high school; (b) matriculated into vocational high school, or (c) left school to enter the labor market. We visited all the students who had matriculated into academic high school and vocational high school in person to confirm their status and administer a survey; for the students who left school after graduation, we solicited the help of their previous teachers and classmates and were able to track 88% of the sample students over the phone or by visiting them at their current place of residence (1244 students out of the original 1418). As shown in Appendix Table C, we retained good balance between treatment arms among this non-attrited sample. In particular, only one of the baseline factors was found to differ significantly across treatment arms within this sample—treatment students had slightly higher baseline math performance (Appendix Table C, row 5). As we control for baseline math performance in all of our analyses, this is unlikely to bias our results.

In order to further ensure that this attrition did not bias our results, we followed a strict tracking protocol. After tracking 88% of the sample students directly, we then designated 25% of the untracked students (12% of the full sample) as our 'must-follow' group. We visited all of these must-follow students in person. In our analyses, the must-follow subset of students were weighted so that each must-follow student counted for four times the value of the students

tracked through the original tracking procedure. The weighting allows us to estimate unbiased effects for the full sample even after attrition.

4. Statistical Approach

We examine the impact of the CCT on two primary outcomes. First, we examine the impact on student matriculation status into high school (two binary outcomes for whether students matriculated into academic high school and whether students matriculated into vocational high school). We also examine the impact of the CCT on student dropout status, which we define as dropping out between the time of the baseline survey and the second follow up survey (prior to the end of junior high school).

4.1 The Main Impacts of Receiving CCTs

To estimate the main impacts of the CCTs on student outcomes, we first use an ordinary least squares (OLS) model that does not adjust for covariates (we call this our *unadjusted model*):

$$Y_i = \alpha_0 + \alpha_1 T_i + \varepsilon_i \quad (1)$$

In equation (1) above, Y_i represents any one of the outcomes of interest for student *i*. T_i is a dummy variable that takes on a value of 1 if student *i* receives a CCT and 0 otherwise. ε_i is the random error term. We are primarily interested in α_1, which measures the impact of receiving CCTs on student outcomes.

To increase the efficiency of our estimates and also address slight imbalances in baseline covariates between treatment and control students, we also run the following OLS model that adjusts for covariates (we call this our *adjusted model*):

$$Y_i = \beta_0 + \beta_1 T_i + \beta X_i' + \varepsilon_i \quad (2)$$

Where X_i' represents a vector of baseline covariates including student age, gender, baseline plans to attend academic and vocational high school, baseline math test scores, parent characteristics (which include each parent's years of schooling, dummy variables for each

parent's health status and whether each parent had ever migrated), and family characteristics (which include number of siblings and family asset value). The means and standard deviations of the baseline covariates are given in Appendix Table A.

4.2 Heterogeneous Treatment Effect Analyses

To see whether the impact of the CCT differs between different types of students, we further conduct heterogeneous effect analyses. Specifically, we use the following model to estimate heterogeneous effects:

$$Y_i = \delta_0 + \delta_1 T_i + \delta_2 T_i * D_i + \delta X_i' + \varepsilon_i \quad (3)$$

where D_i is a binary indicator representing a particular baseline characteristic of students. In the model above, the coefficient δ_2 measures the differential impact of CCTs on students with that baseline characteristic (as opposed to students that do not possess that baseline characteristic).

We first measure the heterogeneous effects of CCTs across students that differ by levels of academic achievement. To examine these heterogeneous effects, we divide the sample students into three groups based on the percentile of their normalized baseline test score: upper tercile; middle tercile; and lowest tercile and examine the impact of the CCT on each sub-group.

We also look at the heterogeneous effects of CCTs across students that differ in their expectations about the costs of attending high school. If a student's expected cost of attending academic high school (collected at the baseline) was above the median they were categorized as having 'high expected cost.'

5. Results

5.1 Main Effects of the CCTs

We find that there is no significant impact of the CCT on the average student in our sample. Our unadjusted results (estimated with equation (1)) show no significant impact on dropout and a coefficient of only 0.001 (Table 1; Row 1; Column 3). After controlling for baseline covariates (estimated with equation (2)), the coefficient on dropout remains low (0.010) and insignificant (Table 1; Row 1; Column 6). We also see no long-term effect on student behavior three years after the CCT offer. In particular, both adjusted and unadjusted results show no significant impact of the CCT on matriculation to either academic or vocational high school (Table 1; Row 1; Column 1, 2, 4, and 5). Overall, we find that providing students with a CCT at the start of junior high school does not yield any discernable reduction in dropout rates or improvement in high school matriculation.

5.2 Heterogeneous Effects of the CCT

5.2.1 Impact of the CCT on Students with Different Baseline Academic Performance

We also do not find any impact of the CCT on student outcome variables for students with standardized math test scores that are in either the middle or upper tercile (Table 2; Row 2 and 5). Similarly, the CCT had no impact on matriculation rates or dropout rates for students at the lowest tercile (Table 2; Row 8). These results suggest that providing the CCT has no impact on matriculation or dropout decisions no matter the student's academic performance.

5.2.2 Impact of the CCT on Students with High Expected Cost of Academic High School

In contrast, we do find that providing the CCT has a significant and positive effect for students who overestimate the cost of attending academic high school.[6] Providing the CCT to this subset of students increases their final enrollment into academic high school by about 12

6 Over 30% of the students in the sample overestimated the cost of attending academic high school.

percentage points (Table 5; Row 2; Column 1). Importantly, the estimate is statistically significant even at the 5 percent level.

From this result it is not clear whether the increase in matriculation among this group of students is due to an information effect or the relief of financial constraint. While the lack of average treatment effect among our sample of poor students seems to suggest that relieving financial constraint may not be enough to incentivize change in schooling behavior, more information is needed to evaluate whether or not the CCT is having a price signaling effect for this subset of students with high initial expected costs of high school. As mentioned above, because we informed students that the CCT would roughly cover the cost of tuition for academic high school, this may have acted as a signal to these students that high school would not be as expensive as they had previously expected. These students may then have considered high school more seriously (and matriculated at higher rates) due to a decrease in expected costs rather than the impact of the cash transfer itself.

To examine this possibility, we assess how the expected cost of high school changed for the treatment students and control students over time. We find some evidence to suggest that receiving the CCT lowered treatment students' expected costs of attending high school. On the surface, receiving the CCT appears to reduce the average expected costs of attending high school (by the time of the first follow-up survey in 2011) by more than 1000 yuan per year across all models (Table 4, Columns 1-4). While the result is not statistically different from zero (likely due to the large standard error), the magnitude of the reduction in expected costs is meaningful. This suggests that the demonstrated impact of the CCT on students with high initial expected cost for academic high school was probably in part due to a price-signaling effect.

6. Conclusion

Drawing from a large scale randomized controlled trial, this paper has reported the effects of a Conditional Cash Transfer (CCT) on high school matriculation and junior high school dropout. We find that providing disadvantaged (poor, rural) students a CCT contract for 1500 yuan (190 USD) per year at the start of junior high school (conditional on matriculation into a three-year academic or vocational high school) has limited (or no measureable) effect on the average disadvantaged student. The paper also finds that the CCT does not have significant heterogeneous effects on students with low-/middle-/high-academic performance.

We do find, however, that providing the CCT does have a significant differential impact on the subset of students who overestimate the cost of attending academic high school. The CCT contract significantly increases the likelihood that these students will matriculate into academic high school and reduces the likelihood that they will drop out of junior high. We find some evidence that this may be due at least in part to a price signaling effect: receiving the CCT offer may be demonstrating to students that high school will not be as expensive as they originally thought, and this change in expectations may lead to a change in behavior.

Other research conducted both in other developing countries (Schultz, 2004; De Janvry et al., 2006; Heinrich, 2007; Chaudhury and Parajuli, 2008; De Brauw and Hoddinott, 2011; Barrera-Osorio et al., 2011;) and even in rural China (Mo et al., 2013) has shown that CCTs can be effective in boosting school enrollment and/or decreasing school dropout. So why did the CCT not have greater impact on the students in our sample? We can conclude with confidence that this result is not due to attrition in our sample (which was minimal and well balanced).

It is also possible that the value of the CCT offered in this intervention (1500 yuan) was simply not high enough to incentivize behavior change. In making the decision to stay in junior high school or attend high school, students in rural China face considerable opportunity costs. The unskilled wage rate in China has been rising since the early 2000s and today virtually all young, able-bodied rural individuals are able to find jobs off the farm (Cai and Du, 2011;

Huang et al., 2011). Indeed, recent China's statistics show that the monthly earnings of the typical unskilled worker (who had off-farm employment in both 2011 and 2012) was almost 2900 yuan per month during 2012 (CNBS, 2014). When compared with such high monthly wages in the unskilled labor-force, it is maybe not surprising that poor rural children are unwilling to change their behavior for only 1500 yuan per year. More research is needed to assess whether a CCT of a larger magnitude can have a greater impact.

However, it should be noted that international evidence suggests that CCTs can be effective with even modest cash transfer amounts. We note briefly that the size of the CCT used in this study (190 USD per year) is roughly equivalent to (or even higher than) other CCTs that have been shown to be effective in other developing country contexts (e.g. $45-$60 per year in Cambodia—Filmer and Schady, 2009a; $200-$250 per year in Mexico—De Janvry and Sadoulet, 2004). In addition, a review of the literature on CCTs, in general, has concluded that substantial impacts have been brought about in many programs despite the wide variation in transfer size (Filmer and Schady, 2009a). Indeed, although little research has explicitly examined the question of the magnitude of transfer required to bring about behavior change, what research has been conducted suggests that there are diminishing marginal returns to increasing the size of the transfer. Baird et al. (2011) found that the smallest transfer size tested ($5 per month) resulted in the same change in behavior as a CCT twice that size. A study from Cambodia by Filmer and Schady (2009a) compared the effectiveness of CCTs of $45 and $60 and found clear evidence of diminishing marginal returns as the size of the cash transfer is increased.

Some research suggests that disadvantaged rural students face many challenges to continuing on in school beyond the liquidity constraints and lack of motivation that CCTs seek to address. In light of the strict academic requirements for promotion to academic high school in China today, some students may be dissuaded from continuing on in school regardless of

financial concerns based simply on what they perceive as their low chances of being able to gain admission to academic high school (Shi et al., 2014).[7] While vocational high school—with minimal academic admission requirements—is an option for lower performing students, recent research suggests that vocational high schools in rural China are generally of low quality (Loyalka et al., 2013) and that that low quality is perceived by many rural students (Shi et al., 2014).

Finally, it may also be that anxiety and other mental/psychological issues in rural schools are driving dropout and non-matriculation. Wang et al. (2014a) found in a study in rural Shaanxi province that 74% of surveyed seventh and eighth grade students were deemed clinically at risk for mental health issues, a rate 12 times higher than that found among urban students. The same research team was also able to show that a counseling intervention designed to help students overcome anxiety issues was able to reduce dropout from junior high school (Wang et al., 2014b). If any of these issues are playing a major role in student decision-making, it may be that providing a CCT is simply not addressing the most important obstacles that these students face in continuing their education.

Whatever the case, the high school matriculation gap between rural and urban areas remains a significant problem in China today. We have shown in this paper that a CCT given out during the beginning of junior high school is not effective in reducing this gap. More research is needed to find alternative ways to increase educational attainment in rural areas. If this gap is not addressed, not only will rural individuals face exclusion in the future job market, China's economic stability and growth may also be threatened.

7 Admission to academic high school in China is almost entirely dependent on student scores on the high school entrance exam. While vocational high school admission is not dependent on test scores, academic high school is considered the most desirable path for students with the necessary academic credentials. Still, it should be noted that academic pressures cannot explain the lack of impact of CCT on matriculation to vocational high school.

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APPENDICES

Appendix A. Description of all variables

Variable	Obs.	Mean	Std. Dev.	Min	Max
Dependent Variables					
1. Matriculated into academic high school, 1=yes	1288	0.31	0.46	1	0
2. Matriculated into vocational high school, 1=yes	1288	0.16	0.37	1	0
3. Dropout from junior high school, 1=yes	1418	0.30	0.46	1	0
Treatment Variable					
4. Received CCT, 1=yes	1418	0.33	0.47	1	0
5. Control group, 1=yes	1418	0.67	0.47	1	0
Controlling Variables Collected at Baseline Survey					
6. Student age, in years	1418	13.51	1.05	10.81	18.03
7. Female student, 1=yes	1418	0.50	0.50	1	0
8. Plans to go to acad. high school at baseline, 1=yes	1418	0.45	0.50	1	0
9. Plans to go to voc. high school at baseline, 1=yes	1418	0.14	0.35	1	0
10. Normalized standard TIMSS test at baseline	1418	-0.09	1.00	-2.72	2.72
11. Student's expected cost of academic high school, in 1000 yuan	1418	11.30	11.30	0	60
Parents' characteristics					
12. Mother's years of schooling, in years	1418	5.25	3.46	0	20
13. Father's years of schooling, in years	1418	7.03	2.91	0	19
14. Mother's health status at baseline survey, 1=good	1418	0.37	0.47	1	0
15. Father's health status at baseline survey, 1=good	1418	0.47	0.49	1	0
16. Mother ever migrated at baseline survey, 1=yes	1418	0.49	0.49	1	0
17. Father ever migrated at baseline survey, 1=yes	1418	0.80	0.39	1	0
Household Characteristics					
18. Number of siblings at baseline survey, person	1418	1.01	0.81	0	5
19. Family asset value at baseline survey, 1000 yuan	1418	3.66	2.63	0	17.36

Notes:

1. Students in the 'must-follow' group were weighted to account for the attrited students.
2. Data source: Authors' survey

Appendix B. Covariates pre-balance test between experimental arms

Variable	Treatment Group (1)	Control Group (2)	Difference between treatment and control group, (3)= (1)-(2) (3)
Student characteristics at baseline			
1. Student age, in years	13.49	13.52	-0.03
	(0.06)	(0.06)	(0.09)
2. Female student, 1=yes	0.48	0.51	-0.04
	(0.02)	(0.02)	(0.03)
3. Plans to go to acad. high school at baseline, 1=yes	0.46	0.45	0.01
	(0.02)	(0.02)	(0.03)
4. Plans to go to voc. school at baseline, 1=yes	0.14	0.15	-0.01
	(0.01)	(0.01)	(0.02)
5. Normalized Standard TIMSS Test at baseline	0.00	-0.14	0.14
	(0.06)	(0.06)	(0.08)
6. Student's expected cost of academic high school, in 1000 yuan	11.82	11.02	0.80
	(0.59)	(0.47)	(0.76)
Parents' characteristics at baseline			
7. Mother's years of schooling, in years	5.35	5.20	0.15
	(0.25)	(0.20)	(0.32)
8. Father's years of schooling, in years	6.94	7.07	-0.13
	(0.17)	(0.12)	(0.20)
9. Mother's health status, 1=good	0.34	0.38	-0.04
	(0.02)	(0.02)	(0.03)
10. Father's health status, 1=good	0.46	0.48	-0.03
	(0.02)	(0.02)	(0.03)
11. Mother ever migrated, 1=yes	0.49	0.49	0.00
	(0.03)	(0.03)	(0.04)
12. Father ever migrated, 1=yes	0.81	0.80	0.01
	(0.02)	(0.02)	(0.03)
Family characteristics at baseline			
13. Number of siblings	1.04	1.00	0.04
	(0.05)	(0.04)	(0.06)
14. Family asset value, in 1000 yuan	3.66	3.66	0.00
	(0.28)	(0.29)	(0.40)
15. No. of observations	474	944	1418

Notes:

1. Cluster-robust standard errors in parentheses; ***p<0.01, **p<0.05;
2. Students in the 'must-follow' group were weighted to account for the attrited students.
3. Data source: Authors' survey

Appendix C: Covariates pre-balance check among students directly tracked in the third-round follow-up survey

Variable	Treatment Group (1)	Control Group (2)	Difference between treatment and control group, (3)= (1)-(2) (3)
Student characteristics at baseline			
1. Student age, in years	13.45	13.51	-0.06
	(0.06)	(0.06)	(0.09)
2. Female student, 1=yes	0.47	0.52	-0.05
	(0.02)	(0.02)	(0.03)
3. Plans to go to acad. high school at baseline, 1=yes	0.48	0.47	0.02
	(0.02)	(0.02)	(0.03)
4. Plans to go to voc. school at baseline, 1=yes	0.14	0.14	-0.01
	(0.01)	(0.01)	(0.02)
5. Normalized Standard TIMSS Test at baseline	0.05	-0.14	0.19**
	(0.06)	(0.06)	(0.08)
6. Student's expected cost of academic high school, in 1000 yuan	12.06	11.22	0.85
	(0.65)	(0.49)	(0.81)
Parents' characteristics at baseline			
7. Mother's years of schooling, in years	5.52	5.21	0.30
	(0.24)	(0.21)	(0.32)
8. Father's years of schooling, in years	7.01	7.15	-0.16
	(0.18)	(0.13)	(0.22)
9. Mother's health status, 1=good	0.34	0.38	-0.04
	(0.03)	(0.02)	(0.04)
10. Father's health status, 1=good	0.45	0.48	-0.03
	(0.02)	(0.02)	(0.03)
11. Mother ever migrated , 1=yes	0.48	0.49	-0.01
	(0.03)	(0.03)	(0.04)
12. Father ever migrated, 1=yes	0.80	0.81	-0.01
	(0.02)	(0.02)	(0.03)
Family characteristics at baseline			
13. Number of siblings	1.04	1.00	0.04
	(0.05)	(0.04)	(0.06)
14. Family asset value, in 1000 yuan	3.78	3.62	0.16
	(0.28)	(0.29)	(0.40)
15. No. of observations	443	801	1244

Notes:

1. Cluster-robust standard errors in parentheses; ***p<0.01, **p<0.05;
2. Students in the 'must-follow' group were weighted to account for the attrited students.
3. Data source: Authors' survey

Tables

Table 1. Impact of CCT on the average student

Dependent Variables	Enrolled in Acad. High	Enrolled in Voc. High	Dropout From Jr. High	Enrolled in Acad. High	Enrolled in Voc. High	Dropout from Jr. High
	(1)	(2)	(3)	(4)	(5)	(6)
1. Received CCT, 1=yes	0.009	0.025	0.001	-0.015	0.030	0.010
	(0.038)	(0.028)	(0.033)	(0.033)	(0.027)	(0.031)
2. Student, parents, and family characteristics controlled	NO	NO	NO	YES	YES	YES
Constant	0.293***	0.146***	0.299***	1.181***	0.197	-0.833***
	(0.023)	(0.018)	(0.021)	(0.187)	(0.128)	(0.180)
Observations	1,288	1,288	1,418	1,288	1,288	1,418
R-squared	0.000	0.001	0.000	0.173	0.024	0.133

Notes:

1. Cluster-robust standard errors in parentheses; ***p<0.01, **p<0.05;
2. Students in the 'must-follow' group were weighted to account for the attrited students.
3. Data source: Authors' survey.

Table 2: Heterogeneous impact of CCT by academic performance

Dependent Variables	Enrolled in Acad. High (1)	Enrolled in Voc. High (2)	Dropout From Jr. High (3)
	Panel A: Upper 33rd Percentile		
1. Received CCT, 1=yes	-0.023	0.020	0.025
	(0.036)	(0.031)	(0.040)
2. Received CCT* upper 33%	0.028	0.030	-0.047
	(0.061)	(0.054)	(0.047)
3. Student, parents, and family characteristics controlled	*YES*	*YES*	*YES*
Constant	1.174***	0.217	-0.846***
	(0.191)	(0.131)	(0.183)
Observations	1,288	1,288	1,418
R-squared	0.174	0.025	0.133
	Panel B: Middle 33rd Percentile		
4. Received CCT, 1=yes	-0.008	0.038	0.020
	(0.037)	(0.033)	(0.032)
5. Received CCT* middle 33%	-0.017	-0.024	-0.030
	(0.053)	(0.051)	(0.049)
6. Student, parents, and family characteristics controlled	*YES*	*YES*	*YES*
Constant	1.185***	0.197	-0.841***
	(0.186)	(0.128)	(0.179)
Observations	1,288	1,288	1,418
R-squared	0.174	0.024	0.133
	Panel C: Lowest 33rd Percentile		
7. Received CCT, 1=yes	-0.012	0.031	-0.016
	(0.040)	(0.030)	(0.033)
8. Received CCT* lowest 33%	-0.009	-0.004	0.075
	(0.055)	(0.046)	(0.055)
9. Student, parents, and family characteristics controlled	*YES*	*YES*	*YES*
Constant	1.180***	0.187	-0.823***
	(0.187)	(0.128)	(0.179)
Observations	1,288	1,288	1,418
R-squared	0.173	0.025	0.135

Notes:

1. Cluster-robust standard errors in parentheses; ***p<0.01, **p<0.05;
2. Students in the 'must-follow' group were weighted to account for the attrited students.
3. Data source: Authors' survey

Table 3: Heterogeneous impact of CCT by high (versus low) expected cost of academic high school

Dependent Variables	Enrolled in Acad. High (1)	Enrolled in Voc. High (2)	Dropout From Jr High (3)
1. Received CCT, 1=yes	-0.052	0.055	0.021
	(0.040)	(0.030)	(0.037)
2. Received CCT* high expected cost	0.125**	-0.088	-0.030
	(0.055)	(0.055)	(0.053)
3. Student, parents, and family characteristics controlled	*YES*	*YES*	*YES*
Constant	1.204***	0.172	-0.828***
	(0.188)	(0.126)	(0.181)
Observations	1,288	1,288	1,418
R-squared	0.178	0.030	0.135

Notes:

1. Cluster-robust standard errors in parentheses; ***p<0.01, **p<0.05;
2. Students in the 'must-follow' group were weighted to account for the attrited students.
3. Data source: Authors' survey

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Table 4: Impact of CCT on students' expected cost of going to acad. high school

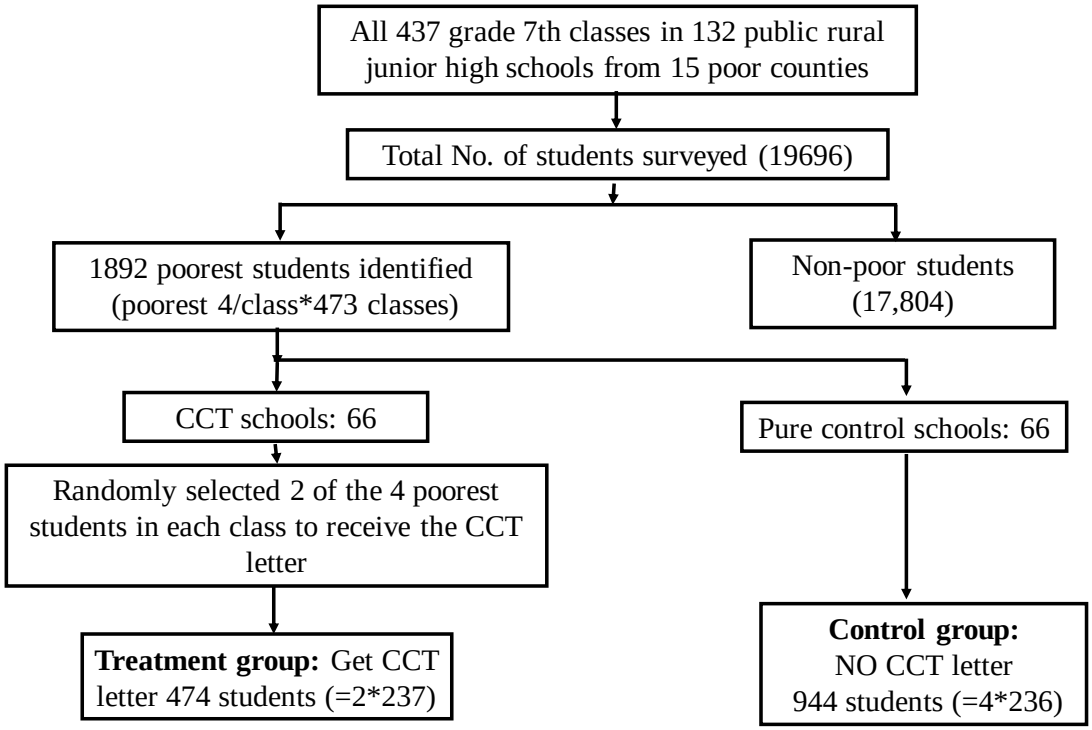
	Change in students' expected cost of going to acad. high school after one year (in 1000 yuan)			
	Without imputation		With imputation	
	Unadjusted model (1)	Adjusted model (2)	Unadjusted model (3)	Adjusted model (4)
Treatment variable				
1. Received CCT, 1=yes	-1.274	-1.324	-1.639	-1.765
	(1.086)	(1.082)	(1.216)	(1.178)
2. Student, parents, and family characteristics controlled	-	Yes	-	Yes
Constant	-0.708	-3.022	-1.007	5.510
	(0.693)	(6.723)	(0.679)	(9.816)
Observations	1,255	1,255	1,418	1,418
R-squared	0.001	0.007	0.001	0.009

Notes:

1. Cluster-robust standard errors in parentheses; ***p<0.01, **p<0.05;
2. Students in the 'must-follow' group were weighted to account for the attrited students.
3. Columns 3-4 have more observations because the analyses use imputed data for the dropouts (130 observations) and for the kids that did not answer the question in the endline (33 observations).
4. Data source: Authors' survey

Figures

Figure 1: Research Design



Note: See Appendix B for our pre-balance check, and appendix C for our attrition analysis.

Figure 2. Timeline of the CCT intervention