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# Can information and counseling help students from poor rural areas go to high school? Evidence from China

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ABSTRACT

**Loyalka, Prashant, Liu, Chengfang, Song, Yingquan, Yi, Hongmei, Huang, Xiaoting, Wei, Jianguo, Zhang, Linxiu, Shi, Yaojiang, Chu, James, and Rozelle, Scott**—Can information and counseling help students from poor rural areas go to high school? Evidence from China

Recent studies have shown that only about two-thirds of the students from poor, rural areas in China finish junior high school and enter high school. One factor that may be behind the low rates of high school attendance is that students may be misinformed about the returns to schooling or lack career planning skills. We therefore conduct a cluster-randomized controlled trial (RCT) using a sample of 131 junior high schools and more than 12,000 students to test the effects of providing information on returns or career planning skills on student dropout, academic achievement and plans to go to high school. Contrary to previous studies, we find that information does not have significant effects on student outcomes. Unlike information, counseling does have an effect. However, the effect is somewhat surprising. Our findings suggest that counseling increases dropouts and seems to lower academic achievement. In our analysis of the causal chain, we conclude that financial constraints and the poor quality of education in junior high schools in poor, rural areas (the venue of the study) may be contributing to the absence of positive impacts on student outcomes from information and counseling. The negative effects of counseling on dropout may also be due to the high and growing wages for unskilled labor (high opportunity costs) in China's transitioning economy. It is possible that when our counseling curriculum informed the students about the reality of how difficult were the requirements for entering academic high school, it may have induced them to revise their benefit-cost calculations and come to the realization that they are better off dropping out and/or working less hard in school. *Journal of Comparative Economics* **41** (4) (2013) 1012–1025. China Institute for Educational Finance Research (CIEFR), Peking University, China; Center for Chinese Agricultural Policy, Institute for Geographical Sciences and Natural Resources Research, Chinese Academy of Sciences, China; School of Economic Management, Northwest University, China; Center for Food Security and The Environment, Freeman Spogli Institute, Stanford University, United States.


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## 1. Introduction

As China's economy gradually shifts from one based on low-wage industries towards one based on higher-valued services, the demand for skilled labor will outpace that for unskilled labor (Zhang et al., 2011). If an individual wants to hold a stable, high wage job in the coming years, he/she will need to acquire skills (Zhang et al., 2011). To meet the challenge, individuals will need to be equipped with higher levels of schooling.

Unfortunately, when children in poor, rural areas today grow up, they may not be able to enjoy China's future economic prosperity because of their low levels of education. Recent studies have shown that only about two-thirds of the students from poor, rural areas in China enter high school (Yi et al., 2012a). Instead of continuing their education, most of these children enter the labor market and take unskilled jobs.

There are a number of reasons why poor, rural students from developing countries attain such low levels of education. Credit constraints combined with the high cost of attending school can induce poor, rural students to prematurely leave school (Banerjee et al., 2000). Even when schooling is free, there may be high opportunity costs of going to school (Angrist and Lavy, 2009). The competitive nature of education systems in many developing countries can also discourage poor, rural students from continuing their education (Glewwe and Kremer, 2006; Clarke et al., 2000).

Misinformation about the returns to schooling is another important, but less researched, factor that may keep students from continuing their education. Economists argue that individuals make educational choices based on perceived, rather than actual, economic returns to schooling (Manski, 1993). However, perceived returns may differ from actual returns if individuals have limited or imperfect information. With imperfect information about the returns to schooling, students may choose not to enroll in high school even though it will better prepare them to participate in the future economy.

Individuals living in poor, rural areas often are thought to have imperfect information about the returns to schooling because locating reliable information can be costly (Jensen, 2010; Nguyen, 2008). In such circumstances students obtain information about the returns to schooling by observing their parents and other community members (Jensen, 2010). However, in poor, rural areas parents and community members tend to have relatively low levels of education and work in low-skilled industries. As a consequence, students tend to underestimate actual returns to schooling, ultimately leading them to leave school (Jensen, 2010; Nguyen, 2008).

Imperfect information about the returns to schooling, however, may only be part of the problem. There may be a number of other constraints. Even if students understand that there are high returns to high school, they may not know how to prepare for high school. For example, students may not know the entrance requirements for attending different types of high school. Beyond economic returns, students may not see the links among their own interests and aptitudes, going to high school and their career options. We use the term *career planning skills* to refer to the knowledge about *how* to attend high school (requirements, options, planning, etc.) and the awareness of the links among one's own interests and aptitudes, high school and career options.

Unfortunately, students in developing countries rarely have been taught career planning skills. They may, therefore, lack an understanding of their own interests and aptitudes, education and employment options and how to plan for their future (Whiston, 2003; Savickas, 1999; Parsons, 1909). They may be unsure how to navigate transitions from one level of education

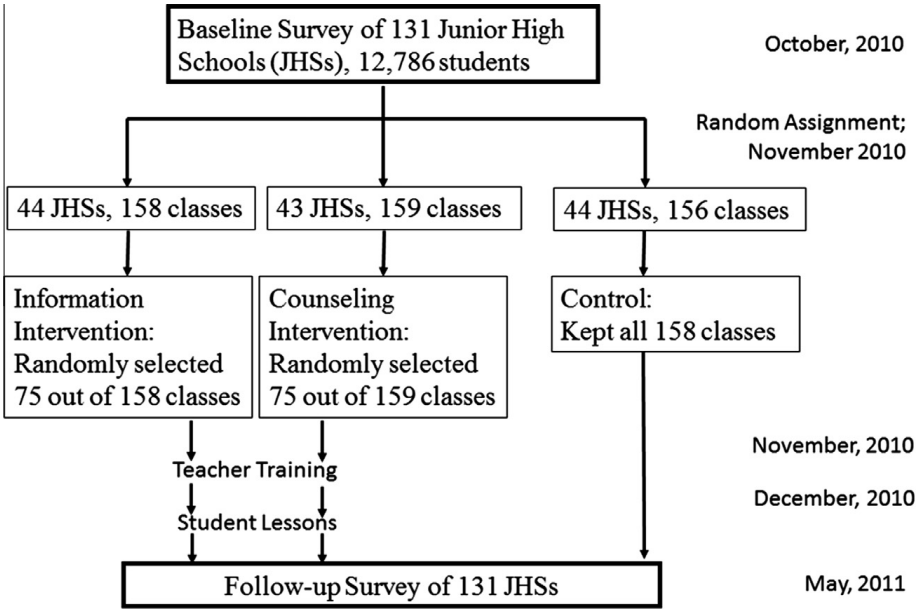


**Fig. 1.** Trial profile.

to another (Valentine et al., 2009; Vargas, 2004). Students from low-income backgrounds, especially, may not understand how to make the most out of their education and career opportunities (McSwain and Davis, 2007; McDonough, 2004). For these reasons, the lack of career planning skills may lead students to discontinue their schooling even if they know the returns to school are relatively high.

Studies from several countries show that providing information about the returns to schooling or teaching career planning skills can improve the educational outcomes of students. In the Dominican Republic students that received information about the returns to schooling went to school longer (Jensen, 2010). Students in Madagascar that received information on the returns to schooling scored higher on achievement tests (Nguyen, 2008). Career counseling interventions in the United States increased school enrollment rates among low-income students, improved their ability to secure financial aid and encouraged them to attend more selective colleges (Castleman et al., 2012; Koivisto et al., 2011; Whiston et al., 1998). However, no study has discussed the impact of offering information on the returns to schooling or teaching career planning skills on dropout rates, academic achievement and plans to go to high school among junior high students in China (for more on China's situation, see Appendix A).

The main purpose of this study is to measure the impact of providing information or career planning skills on dropout rates, academic achievement and plans to go to high school among grade 7 students in poor, rural areas in China. To meet this overall goal, we have three specific objectives. First, we determine the extent to which students are misinformed and lack career planning skills. Second, we analyze the impact of information about returns to schooling and career planning skills on dropout rates, academic achievement and plans of students to go to high school. We also look at the heterogeneous effects of the interventions on low-achieving, male, or poor students. Third, we explore why the interventions may or may not be affecting student outcomes in the context of junior high schools in poor, rural counties in China.

## 2. Research design, interventions, data and statistical approach

We conducted a cluster-randomized controlled trial (RCT) to estimate the impact of information and counseling interventions among 12,786 first-year students in 131 rural, public junior high schools located in 15 poor counties in Hebei and Shaanxi provinces. In Hebei our sample covered 10 poor counties, 60 junior high schools, 153 grade 7 classes and 6491 students. In Shaanxi the sample covered 5 poor counties, 71 junior high schools, 153 grade 7 classes and 6305 students. We chose Hebei and Shaanxi because they differ in terms of location and geography, allowing broader inferences from our data.

Using official records, we first created a sampling frame of all rural, public junior high schools in the sample counties. A total of 150 schools were identified (71 in Shaanxi and 79 in Hebei). We sampled all 71 schools in Shaanxi. In Hebei, we sampled 60 schools. We excluded 19 schools in Hebei because the number of grade 7 students in the schools was under 50. These schools were excluded on the basis of enrollment because smaller schools were likely to be closed as a part of a government school merger program. On average, there were 42 grade 7 students in each class. In the baseline, we surveyed all students in all 306 grade 7 classes in all 131 schools. Our sample is roughly representative of rural, pubic junior high schools in poor counties in provinces like Shaanxi and Hebei.

The next step of our study was to conduct a baseline survey at the beginning of the school year in October 2010. In the survey we collected data from all grade 7 students, grade 7 homeroom teachers and school principals. We asked each student to take a standardized mathematics examination (see "Data Collection" below).

After the baseline examination, we stratified the 131 sample schools into roughly 22 equal size blocks of six schools to increase the statistical power of our analyses (see Imai et al., 2009). The blocks were created by first ranking schools by grade 7 enrollments within each province (from lowest to highest), then choosing the first six schools for the first block, the next six schools for the second block, and so on.[1]

After blocking, our research team randomly assigned two schools in each block to one of two experimental arms and a control arm. In total, 44 schools were assigned to the information intervention, 43 schools to the counseling intervention and 44 schools to the control arm. Thereafter, we randomly selected half of the grade 7 homeroom teachers (and their respective classes) from the sample schools in the information and counseling intervention arms to attend training programs that were taught by professional counselors in November 2010. These teachers then went back to their schools and, depending on their respective treatment arm, implemented either the information or counseling interventions with the students in their own classes in December 2010. Fig. 1 depicts the flow of participants through each stage of the study and the project timeline.

The use of our baseline data and the approach to random assignment successfully created a sample that was balanced across a large number of variables. To test for balance, we ran regressions of various baseline covariates on the binary treatment indicators (information and counseling). We find that students in the counseling treatment arm are not statistically different from students in the control arm on a variety of baseline covariates (Table 1). Table 1 does show a slight discrepancy in the average number of siblings between students in the information and control arms. There is also a larger discrepancy in the percentage of male students between the information and control arms. To increase statistical efficiency and

[1] We chose to rank and block schools by the number of students in grade 7 as school size has frequently been found to be associated with our outcomes of interest (student dropout, academic achievement, and plans to go to high school at the end of grade 7) (Slate and Jones, 2005). One of the 22 blocks had 5 (instead of 6) schools.

**Table 1**
Covariate pre-balance test between experimental arms.

| | (1) Female | (2) Age | (3) Math 2010 | (4) Go acad. HS | (5) Go voc. HS | (6) Mom's edu | (7) Dad's edu | (8) #Sibs | (9) Mom migrated | (10) Dad migrated | (11) Mom's health | (12) Dad's health |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Counseling | −0.01 | 0.04 | −0.10 | −0.03 | 0.02 | −0.06 | −0.06 | 0.06 | 0.02 | 0.02 | 0.01 | 0.00 |
| | (0.01) | (0.07) | (0.08) | (0.03) | (0.01) | (0.21) | (0.13) | (0.05) | (0.02) | (0.02) | (0.03) | (0.03) |
| Information | −0.04*** | −0.04 | −0.02 | 0.01 | −0.02 | 0.04 | 0.22 | 0.07* | 0.01 | 0.02 | 0.03 | 0.04 |
| | (0.01) | (0.07) | (0.07) | (0.03) | (0.01) | (0.18) | (0.14) | (0.04) | (0.02) | (0.02) | (0.03) | (0.03) |
| Constant | 0.53*** | 13.30*** | −0.14 | 0.57*** | 0.08*** | 4.96*** | 7.40*** | 1.11*** | 0.69*** | 0.91*** | 0.36*** | 0.47*** |
| | (0.05) | (0.19) | (0.19) | (0.06) | (0.02) | (0.42) | (0.20) | (0.07) | (0.05) | (0.02) | (0.02) | (0.05) |
| Observations | 12,704 | 12,714 | 12,790 | 12,769 | 12,769 | 12,382 | 12,080 | 12,794 | 12,493 | 12,637 | 12,512 | 12,653 |
| *R*-squared | 0.003 | 0.026 | 0.036 | 0.022 | 0.015 | 0.059 | 0.013 | 0.023 | 0.133 | 0.063 | 0.027 | 0.016 |

Cluster-robust standard errors in parentheses.
* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

**Table 2**
Balance between treatment and control arms after accounting for missing data.

| | (1) Female | (2) Age | (3) Math 2010 | (4) Go acad. HS | (5) Go voc. HS | (6) Mom's edu | (7) Dad's edu | (8) # Sibs | (9) Mom migrated | (10) Dad migrated | (11) Mom's health | (12) Dad's health |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Panel A: Balance between treatment and control arms for the missing cases* | | | | | | | | | | | | |
| Counseling | −0.05 | 0.04 | −0.03 | −0.04 | 0.04 | 0.21 | −0.04 | 0.10 | 0.01 | 0.04 | 0.04 | −0.01 |
| | (0.04) | (0.09) | (0.09) | (0.04) | (0.03) | (0.21) | (0.20) | (0.07) | (0.03) | (0.03) | (0.04) | (0.04) |
| Information | −0.05 | −0.02 | −0.03 | 0.04 | −0.03 | −0.01 | 0.26 | 0.08 | 0.07** | 0.06** | 0.12*** | 0.08* |
| | (0.05) | (0.10) | (0.10) | (0.04) | (0.04) | (0.25) | (0.28) | (0.07) | (0.03) | (0.03) | (0.05) | (0.04) |
| Observations | 1353 | 1358 | 1364 | 1365 | 1365 | 1288 | 1276 | 1369 | 1305 | 1341 | 1310 | 1344 |
| *R*-squared | 0.023 | 0.089 | 0.044 | 0.040 | 0.031 | 0.094 | 0.022 | 0.027 | 0.162 | 0.074 | 0.059 | 0.032 |
| *Panel B: Balance between treatment and control arms for the non-missing cases* | | | | | | | | | | | | |
| Counseling | 0.00 | 0.02 | −0.10 | −0.02 | 0.01 | −0.09 | −0.06 | 0.06 | 0.02 | 0.01 | 0.01 | 0.00 |
| | (0.01) | (0.07) | (0.08) | (0.03) | (0.01) | (0.22) | (0.14) | (0.05) | (0.02) | (0.02) | (0.03) | (0.03) |
| Information | −0.04*** | −0.04 | −0.02 | 0.01 | −0.02 | 0.05 | 0.21 | 0.07* | 0.01 | 0.02 | 0.02 | 0.03 |
| | (0.01) | (0.07) | (0.07) | (0.03) | (0.01) | (0.19) | (0.14) | (0.04) | (0.02) | (0.02) | (0.03) | (0.03) |
| Observations | 11,351 | 11,356 | 11,426 | 11,404 | 11,404 | 11,094 | 10,804 | 11,425 | 11,188 | 11,296 | 11,202 | 11,309 |
| *R*-squared | 0.004 | 0.024 | 0.036 | 0.019 | 0.016 | 0.057 | 0.014 | 0.024 | 0.132 | 0.063 | 0.025 | 0.016 |

Cluster-robust standard errors in parentheses.
* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

ensure that this discrepancy does not influence our results, we control for the covariates in Table 1 in our analyses (see "Statistical Analysis" below).[2]

We also checked for attrition bias. Approximately 8% of the students in the baseline dropped out before an evaluation survey (in May 2011). To examine if this dropout led to attrition bias, we compare the baseline covariates of "non-missing" cases and "missing" cases (dropouts) across treatment and control arms. We find that there is little imbalance between the treatment and control arms of these subgroups (see Table 2A and B as well as Appendix C).

### 2.1. Experiment arms/interventions

We chose 131 schools so as to have enough statistical power to measure the effects of information and counseling. Using estimates from pilot studies, we calculated that we required at least 70 individuals per school and 40 schools per arm to detect a standardized effect size for the academic achievement outcome of .25 with 80 percent power at a five percent significance level. We conservatively assumed an intra-cluster correlation of 0.20, a pre- and post-intervention correlation of 0.6 and a ten percent loss to follow-up. The following section details the three experiment arms.

[2] The higher percentage of male students in the information arm in Table 1 may slightly bias our later experimental estimates. For example, male students are more likely than female students to dropout. It could be that the information intervention prevented the average student from dropping out, but because of the imbalance in the proportion of male students between information and control arms, the experimental estimates would show that there is no effect. Similarly, female students are more likely (in the absence of any intervention) to plan to go to high school and academic high school. The estimates from our analyses may show that the information intervention does not affect plans to go to high school or academic high school (because of the larger percentage of male students compared to the percentage of male students in the control arm), when in fact the information intervention does affect these plans.

*2.1.1. The information intervention arm*

In schools that received the information intervention, grade 7 homeroom teachers and their principals came to a central training location (in either province). At each location a professional counselor conducted a scripted, half-day training for the teachers and principals. The participants, in turn, learned how to give a scripted 45-min lesson to their grade 7 students. At the end of the training, each teacher received a teacher's manual, a DVD of the lesson and workbooks for their students. Teachers agreed to conduct the information intervention lesson during the week of December 20–24, 2010.

The information intervention presented statistics on the net returns (wages minus costs) associated with different levels of schooling in simple graphical and tabular forms. First, the lesson shared information on the average wage levels of graduates from different levels of schooling (junior high schools, high schools, three-year vocational colleges, four-year universities and graduate schools). Second, students were taught about the wage differences between high school and junior high school graduates in percentage terms.[3] Students were provided with national and provincial-level statistics on the average wage levels and wage differences associated with different levels of education. Finally, students were taught the levels of tuition (the costs) that students from Hebei or Shaanxi would pay for attending different levels of schooling and different types of schools available.[4]

*2.1.2. The counseling intervention arm*

In schools that received the counseling intervention, grade 7 homeroom teachers and their principals came to a central training location in each province. At each location a professional counselor gave them a scripted training for a day and a half.

During the counseling training, participants learned how to give four scripted 45-min lessons to grade 7 students on career planning skills. The first lesson discussed the importance of acquiring skills in China's growing economy; the second lesson focused on helping students identify their career interests; the third lesson was identical to the information intervention (discussed in the subsection above); and the fourth lesson helped students understand how to navigate China's education system after junior high (details of the lessons can be found in Appendix B). Each teacher received a teacher's manual, a DVD of the scripted lessons, and student workbooks. Teachers agreed to conduct one lesson each week for four consecutive weeks in December 2010.[5]

*2.1.3. Targeting and delivery*

We targeted the information and counseling interventions to grade 7 students as opposed to older students.[6] Although grade 7 students (typically 13 to 14 year olds) may find it difficult to process information about future opportunities, the literature suggests the contrary (Whiston et al., 1998). Two major studies from developing countries find positive results from targeting wage information at primary and secondary school students (Nguyen, 2008; Jensen, 2010). Given that 8% of the students in our survey dropped out before even completing grade 7 and that the three-year cumulative dropout rate in poor, rural counties is around 25% (Yi et al., 2012a), targeting information and counseling at students in grade 7 seems critical.

Furthermore, we adapted all materials so that they were appropriate for grade 7 students in China. We piloted the materials multiple times with different sets of grade 7 students in Hebei and Shaanxi. We modified the materials based on the feedback we received from principals, teachers and students in pilot schools. In feedback forms, students said that the program was helpful and effective (Table 3).

*2.2. Data collection*

We collected student information on the three primary outcome variables in our evaluation survey in May 2011: (a) student dropout (a binary variable); (b) academic (math) achievement; and (c) plans to go to high school at the end of grade 7 (three binary variables for plans to attend academic, vocational or any high school).

Academic achievement was measured using a standardized math exam that was administered during the evaluation (May 2011) and baseline (October 2010) surveys. We used item-response theory (IRT) to calibrate the scores from the math

[3] Average wages were estimated using the 2005 1% sample census. We provided students with information on the combined (average) wage levels of academic and vocational high school graduates.

[4] Specifically, the lesson included costs for tuition and room and board for different types of high schools (provincial-level academic high school; city-level academic high school; regular high school; and vocational high school). The lessons also included information on the cost of tuition and room and board for various types of colleges (three year vocational colleges and four-year universities) and for different major categories (“popular”, “regular” and “arts” majors) which tend to vary substantially in tuition.

[5] Our training and lesson logs show that trainers and teachers did, in fact, give the program interventions (both information and counseling) according to our schedule.

[6] We also could have targeted the intervention at parents, However, students in our sample report that parents play less of a role in making the decision to go to high school. Specifically, among students who planned to enter either academic or vocational high school, roughly 60% indicated they would make the decision on their own. Only 35% said their parents would make the decision. Among the students who planned to go into the labor market, almost three quarters (74%) said they would make this decision themselves. Less than 25% of the students said that their parents would make the decision. Interestingly, teachers (and others—e.g., friends or relatives), at least in the minds of students, have little impact on the decision to continue with schooling after grade 9. If, as these results indicate, most students in poor, rural areas are indeed the primary decision-makers when it comes to future schooling, targeting information and counseling at them is indeed appropriate. We also looked at whether there were heterogeneous effects on students who reported that they made the plan themselves versus students who listened to their parents or others. However, we did not find any heterogeneous impacts of information or counseling on students who claimed to make the plans themselves (results not shown).

**Table 3**
Feedback from Students that Participated in the Information and Counseling Lessons (% yes).

| Feedback form item | Information, single lesson (%) | Counseling, lesson 1 (%) | Counseling, lesson 2 (%) | Counseling, lesson 3 (%) | Counseling, lesson 4 (%) |
|---|---|---|---|---|---|
| The lesson was very useful | 80 | 82 | 81 | 82 | 81 |
| I will study harder and stay in school as a result of the lesson | 88 | 87 | 86 | 86 | 86 |
| I will share the content of the lesson with my parents | 75 | 67 | 65 | 66 | 67 |
| My parents will find the contents of the lesson useful | 74 | 63 | 62 | 66 | 66 |
| The lesson was presented clearly | 80 | 75 | 76 | 78 | 78 |
| The class discussion about the lesson was helpful | 82 | 87 | 82 | 83 | 83 |
| The duration of the lesson was appropriate | 92 | 89 | 90 | 92 | 90 |

exams. To do so, we piloted math exam items that would be used to construct the baseline and evaluation math exams with over 300 students. We then aligned the two exams on the same difficulty scale using a procedure suggested by Kolen and Brennan (2004). This procedure allows us to directly compare student baseline and evaluation scores (and thus look at student learning gains). Finally, the IRT-scaled scores were scaled into z-scores by subtracting the mean and dividing by the standard deviation (SD) of the IRT-scaled score distribution.

Plans to go to high school were measured in both the evaluation and baseline surveys. In particular, we asked students which educational track they planned to choose after junior high: academic high school, vocational high school, the labor market or "undecided." We also asked students to identify factors (such as family financial constraints) influencing their decisions. Finally, we asked each student to predict the monthly wage that he/she expected to earn after graduating from academic high school, vocational high school or entering the labor market directly after junior high.

We used other information from our baseline survey to generate a set of control variables that are used in the analysis. One part of the baseline survey collected data about student background characteristics, such as gender, age and contact information. We also collected information about each student's family characteristics, such as number of siblings, the health status of parents, whether parents had completed primary school and whether parents had ever migrated. We also asked students to fill out a checklist of household assets to help identify whether they were poor. A monetary value was assigned to each asset based on the National Household Income and Expenditure Survey (NBS, 2007) and the household's wealth was estimated by summing the individual asset values.

### 2.3. Statistical approach

We use unadjusted and adjusted ordinary least squares (OLS) regression analysis to estimate how dropout, academic achievement and plans to go to high school changed for students in the information and counseling intervention arms relative to students in the control arm. The basic specification of the unadjusted model is:

$$Y_{ij} = \beta_0 + \beta_1 I_j + \beta_1 C_j + \upsilon_b + u_{1ij} \quad (1)$$

where $Y_{ij}$ represents the outcome variable of interest of student $i$ in school $j$. $I_j$ is one of the two treatment variables, taking on a value of 1 if the school that the student attended was in the information treatment arm and 0 if the school that the student attended was not in the information treatment arm. The variable $C_j$ is also a dummy variable that takes a value of 1 if the school that the student attended was in the counseling treatment arm and 0 if the school the student attended was not part of the counseling treatment arm. We also adjusted for the blocking of schools by adding dummy variables for each block $\upsilon_b$. $u_{1ij}$ is a random error term.

We conducted "adjusted analyses" which control for baseline variables:

$$Y_{ij} = \alpha_0 + \alpha_1 I_j + \alpha_2 C_j + X_{ij}\alpha + \upsilon_{2b} + u_{2ij} \quad (2)$$

where the additional term $X_{ij}$ in Eq. (2) represents a vector of variables that includes control variables for student $i$ in school $j$. Specifically, this vector includes the student's expected plans as measured during the baseline survey (two indicator variables for whether the student expected to go to academic high school or vocational high school, respectively), household asset value, baseline academic achievement, gender, age, and family characteristics (whether the student has siblings, the education levels of the student's father/ mother, whether the father/mother are migrants, whether the father/mother are healthy). The estimated Huber–White standard errors are corrected for school-level clustering.

Our third analytical exercise of running heterogeneous effects analyses examines whether the information and counseling interventions affected certain subgroups of students more than others. We ran adjusted OLS regressions that interacted the information and counseling assignment variables in Eq. (2) with the following student background indicators: whether the student was in the lowest one-third of the achievement distribution, whether the student was female and whether the student was in the bottom one-third of the household asset value distribution.

**Table 4**
Monthly wages that entering grade 7 students perceive they would earn from graduating from different levels of schooling (at different percentiles of the reported wage distributions).

| Percentile (%) | Junior HS | Vocational HS | Academic HS | University |
|---|---|---|---|---|
| 10 | 500 | 800 | 1000 | 1300 |
| 25 | 800 | 1000 | 1200 | 2000 |
| 50 | 1000 | 1500 | 2000 | 3000 |
| 75 | 1500 | 2000 | 3000 | 5000 |
| 90 | 2000 | 3000 | 5000 | 10,000 |
| 95 | 3000 | 4000 | 6000 | 13,000 |

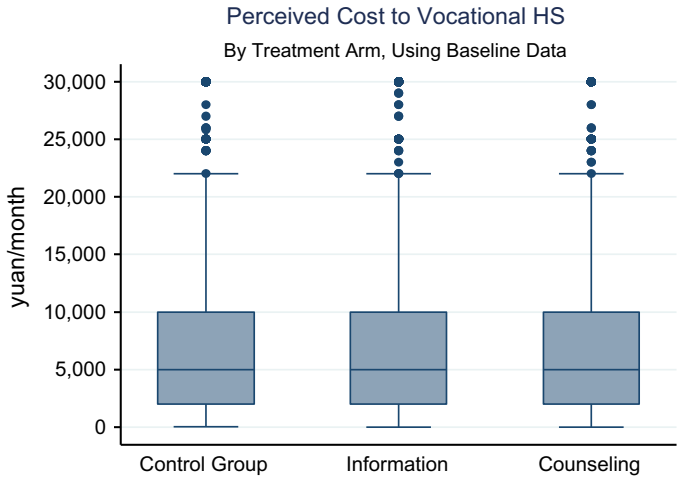


**Fig. 2.** Student perceptions of how much it costs to attend vocational high school.

**Table 5**
Changes in the% of students planning to go to high school or not.

| | Plans (or dropped out) at the end of grade 7 | | | | | |
|---|---|---|---|---|---|---|
| | Work (%) | Voc. HS (%) | Acad. HS (%) | Undecided (%) | Dropped out (%) | % Of total (start of grade 7) |
| *Plans at the start of grade 7* | | | | | | |
| Work | 27 | 15 | 10 | 21 | 26 | 5 |
| Voc. HS | 6 | 41 | 20 | 20 | 13 | 14 |
| Acad. HS | 3 | 8 | 73 | 13 | 3 | 52 |
| Undecided | 7 | 15 | 25 | 41 | 11 | 29 |
| % Of total (end of grade 7) | 6 | 15 | 49 | 23 | 8 | 100 |

## 3. Results

### 3.1. Descriptive results

According to our descriptive analysis, students seem to have imperfect information about the returns to schooling. First, students have incorrect estimates about the wages associated with different levels of schooling. Although students do perceive that higher levels of schooling lead to higher wages, there is substantial variation among students in perceived wages for each level of education (Table 4). For example, student estimates for wages earned by university graduates range from 1300 to 13,000 yuan per month. While it is true that part of this variation indicates students, in fact, will earn wages that will differ from individual to individual, the considerable variation is likely not explained by this fact alone. The wide range of estimates is suggestive that students do not have complete information about returns to schooling (Nguyen, 2008).

Second, students revealed their lack of understanding about the returns to high school by overestimating the costs of attending vocational school. In our baseline survey students expected that vocational high school would cost 5000 yuan/year (at the median—Fig. 2). The median expectation is 2000 yuan higher than the actual net cost, 3000 yuan/year.[7] Furthermore,

[7] The tuition cost for vocational high schools in Hebei is 3,300 yuan/year (maximum). Dorm fees are at most 1200 yuan/year. Furthermore, most vocational high school students receive 1500 yuan/year in financial aid for the first two years. Students from poor, rural areas may receive even higher amounts.

more than 25% of students believed that attending vocational high school would cost 10,000 yuan/year or more. This is 7000 yuan (or more than two times higher) than the actual net cost. In nationally designated poor counties where the average annual per capita income for rural households in 2008 was approximately 2600 yuan (State Council, 2010), these substantial overestimates of schooling costs might discourage students from attending high school.

In addition to having imperfect information about the returns and costs of high school, students also demonstrated poor career planning skills. Students entering grade 7 demonstrated unrealistic expectations about their plans to go to high school. In the baseline survey 52% of grade 7 students believed they would attend academic high school; only 14% of the students said that they planned to attend vocational high school. In actuality, the numbers of enrollments in both types of high schools are approximately equal (Yi et al., 2012a). Students may be overestimating the likelihood of going to academic high school if they are not aware of the requirements and realities associated with attending academic high school. The low share of students planning to attend vocational high schools also may suggest that students do not realize the benefits of attending vocational school.

Students also displayed unrealistic expectations regarding their time of entry into the labor force. According to our baseline data, only 5% of students planned to forgo high school and enter the labor market (Table 5, last column). However, in recent years only about two-thirds of poor, rural students entering grade 7 ultimately continued their schooling after grade 9 (Yi et al., 2012a). Hence, if students in our sample are similar to those in the recent cohorts, their expectations at the beginning of grade 7 are not consistent with the paths that they most likely will follow during or immediately after junior high.

Taken together, the evidence suggests that grade 7 students in poor, rural areas of China are misinformed and lack career-planning skills. Students lack information on the wages and costs associated with different levels of schooling. Students have unrealistic expectations about their future schooling plans. Perhaps most disconcerting, although at the beginning of grade 7 only a small share (5%) of students believe they will be entering the labor market at some time during their grade 7 year of school, by the end of the year, nearly three times as many (14%) plan to drop out of school and enter the labor market.

**Table 6**
Average outcomes (from the evaluation survey) across treatment arms.

| | (1) All students | (2) Counseling arm | (3) Information arm | (4) Control arm | (5) Difference between counseling and control arms | (6) Difference between information and control arms |
|---|---|---|---|---|---|---|
| Dropout | .08 | .09 | .08 | .07 | .02**(.01) | .01(.01) |
| Academic (math) achievement | .02 | −.08 | .03 | .06 | −.14*(.07) | −.02(.07) |
| Plan to go to academic high school | .53 | .54 | .52 | .53 | .00(.02) | −.02(.03) |
| Plan to go to vocational high school | .17 | .17 | .15 | .17 | .01(.01) | −.01(.01) |
| Plan to go to any high school | .70 | .71 | .67 | .70 | .01(.02) | −.03(.03) |

Cluster-robust standard errors in parentheses.
* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

**Table 7**
Effects of information and counseling on main student outcomes (Dropout (y/n), math scores, will attend academic, vocational, or any high school (y/n)).

| | Dropout | | Math 2011 | | Go to acad. HS | | Go to voc. HS | | Go to any HS | |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1) unadj | (2) adj | (3) unadj | (4) adj | (5) unadj | (6) adj | (7) unadj | (8) adj | (9) unadj | (10) adj |
| Counseling | .019** | .017** | −.137* | −.073 | .003 | .020 | .007 | .001 | .010 | .021 |
| | 26.8% | 25.8% | – | – | 0.6% | 3.8% | 4.1% | 0.4% | 1.4% | 3.0% |
| | (.011) | (.007) | (.073) | (.046) | (.025) | (.017) | (.014) | (.012) | (.022) | (.017) |
| Information | .011 | .011 | −.014 | −.005 | −.016 | −.014 | −.014 | −.011 | −.031 | −.025 |
| | 15.4% | 16.2% | – | – | −3.1% | −2.6% | −8.6% | −6.5% | −4.4% | −3.5% |
| | (.011) | (.009) | (.057) | (.046) | (.028) | (.021) | (.012) | (.011) | (.027) | (.022) |
| Observations | 12,786 | 11,633 | 11,426 | 10,451 | 11,414 | 10,439 | 11,414 | 10,439 | 11,414 | 10,439 |
| *R*-squared | .012 | .083 | .043 | .354 | .024 | .292 | .014 | .140 | .015 | .167 |

Cluster robust standard errors in parentheses.
*Notes*: (1) First row estimates are marginal effects estimates; second row estimates are relative effects estimates (for the dichotomous outcomes); third row (in parentheses) are standard errors of the marginal effects estimates. (2) Columns 2, 4, 6, 8, and 10 are adjusted for the following controls: female, age, baseline math score, baseline plans to go to high school, asset value, mother and father's education levels, number of siblings, mother and father migrated (yes/no), mother and father's health (poor or not). The coefficient estimates for the controls are not presented for the sake of brevity and are available from the authors upon request. (3) All estimates include "block" fixed effects.
* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

### 3.2. Impacts of information and counseling on student outcomes

Although students in China's poor rural junior high schools have imperfect information about the returns to schooling, students receiving the information intervention demonstrated no discernible differences in dropout rates, academic achievement or plans to go to high school at the end of grade 7 compared with students in the control schools. Looking at the unadjusted statistics (Table 6, columns 3, 4, and 6), we see that the average outcomes measured in the evaluation survey are not statistically different between the information intervention and control arms. Similarly, the multivariate results from the adjusted model in Table 7 shows that the coefficients of the information treatment variable are small in magnitude and not statistically significant at the 5% level (columns 2, 4, 6, 8, 10, row 1). Thus, there appears to be no statistically significant effect of the information treatment on student dropout, academic achievement or plans to go to high school.

The results of the descriptive/multivariate analysis of the impact of the counseling treatment on the study's outcome variables are similar to those for the information treatment: there is no positive effect. According to the descriptive statistics, we, in fact, see that the dropout rate is 2 percentage points higher and academic achievement is 0.14 SDs lower in the counseling arm compared to the control arm (Table 6, columns 2, 4, and 5). The percentage of students with plans to go to any high school is roughly the same between the counseling and control arms (Table 6, columns 2, 4, and 5). The coefficients of the counseling treatment variable in the adjusted model are similar with the exception that the impact of counseling on academic achievement is not statistically significant (Table 7, columns 2, 4, 6, 8, 10, row 2). The estimates therefore suggest that

**Table 8**
Heterogeneous effects of information and counseling.

| | (1) Dropout | (2) Math 2011 | (3) Go any HS | (4) Go acad. HS | (5) Go voc. HS |
|---|---|---|---|---|---|
| *Panel A: Heterogeneous effects of info and counseling (by baseline math scores). (math33 = 33% of the lowest scoring students on the baseline math exam)* | | | | | |
| Counseling | .010 | −.119* | .013 | .012 | .001 |
| | (.007) | (.064) | (.017) | (.019) | (.011) |
| Math33 | .020** | −.854*** | −.104*** | −.152*** | .047*** |
| | (.010) | (.045) | (.014) | (.017) | (.016) |
| Counseling ∗ math33 | .027* | .061 | .017 | .013 | .004 |
| | (.015) | (.081) | (.023) | (.027) | (.022) |
| Information | .001 | −.047 | −.030 | −.017 | −.012 |
| | (.007) | (.057) | (.024) | (.024) | (.011) |
| Information ∗ math33 | .033* | .083 | .011 | .002 | .009 |
| | (.018) | (.071) | (.027) | (.027) | (.023) |
| Observations | 11,641 | 10,451 | 10,441 | 10,441 | 10,441 |
| *R*-squared | .081 | .264 | .165 | .285 | .137 |
| *Panel B: Heterogeneous effects of information and counseling (by gender)* | | | | | |
| Counseling | .035*** | −.059 | .004 | .008 | −.004 |
| | (.011) | (.056) | (.020) | (.020) | (.018) |
| Female | −.017*** | .003 | .017 | .069*** | −.052*** |
| | (.006) | (.030) | (.013) | (.016) | (.013) |
| Counseling ∗ female | −.035** | −.029 | .033 | .024 | .009 |
| | (.014) | (.050) | (.022) | (.026) | (.022) |
| Information | .017 | −.002 | −.025 | −.016 | −.009 |
| | (.013) | (.053) | (.023) | (.022) | (.017) |
| Information ∗ female | −.013 | −.005 | −.001 | .003 | −.004 |
| | (.017) | (.047) | (.025) | (.024) | (.018) |
| Observations | 11,637 | 10,451 | 10,439 | 10,439 | 10,439 |
| *R*-squared | .084 | .354 | .167 | .292 | .140 |
| *Panel C: Heterogeneous effects of info and counseling (by poverty level) (According to our Household Assets Poverty Indicator, Poor33 = Poorest 33% Students in the Sample)* | | | | | |
| Counseling | .022*** | −.100** | .016 | .024 | −.008 |
| | (.008) | (.049) | (.017) | (.017) | (.014) |
| Poor33 | −.011 | .041 | −.003 | .018 | −.021* |
| | (.008) | (.028) | (.018) | (.019) | (.012) |
| Counseling ∗ poor33 | −.018 | .011 | .019 | −.015 | .034 |
| | (.012) | (.054) | (.026) | (.030) | (.023) |
| Information | .008 | −.034 | −.033 | −.013 | −.020 |
| | (.009) | (.049) | (.022) | (.021) | (.012) |
| Information ∗ poor33 | .010 | −.009 | .034 | −.003 | .038* |
| | (.016) | (.055) | (.028) | (.029) | (.019) |
| Observations | 11,637 | 10,451 | 10,439 | 10,439 | 10,439 |
| *R*-squared | .084 | .354 | .167 | .292 | .140 |

Cluster robust standard errors in parentheses.
Analyses adjusted for covariates (same covariates as Table 7).
* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

the counseling treatment may have had a small negative effect on academic achievement (significant at the 10% level) and no effects on plans to go to high school.

Both the unadjusted and adjusted estimates from Table 7 indicate that the counseling intervention increased dropout. The adjusted estimates show that students in schools with the counseling intervention were 1.7 percentage points (about 25%) more likely to dropout (Table 7, Row 2, Column 4). This was significant at the 5% level.

Why did the counseling intervention increase dropout? One explanation may be that some of the students that attended the counseling lessons concluded that the requirements to enter academic high school and college were too difficult. If these students also did not perceive the returns to vocational school as being particularly high (or if they were not interested in attending a vocational school) they may have felt it more prudent to enter the labor market early on. The relatively high starting wages for unskilled labor (as compared to starting wages for skilled labor) in China's current economy may have also been an important factor in this decision (Cai, 2009).

### 3.3. Heterogeneous effects analysis

Although, on average, the results were negligible or negative for our entire sample, certain subgroups of students could have benefitted. As such, we sought to understand whether (a) low-achieving; (b) male; or (c) poor students experienced differential impacts. According to our heterogeneous effects analyses, however, the information and counseling interventions have almost no positive effect among the different subgroups. In fact, the results show that assignment to the information/counseling interventions increases dropout rates among low-achieving students. The counseling intervention further increases dropout rates among boys.

Low-achieving students (those who scored in the bottom 33% of the score distribution of our baseline math exam) were also negatively impacted by the information and counseling interventions. Not only did they not improve in terms of academic achievement and plans to attend high school, low-achieving students in schools that received the information and counseling interventions were 3 percentage points more likely to drop out by the end of grade 7 (the effects are statistically significant at the 10% level—Table 8, Panel A, Column 2).

We found similar results among boys. Boys were not affected by the information intervention and were negatively affected by the counseling intervention. The counseling intervention increased the rate at which boys dropped out of junior high school by 3 percentage points. The result is significant at the 5% level (Table 8, Panel B, Column 1).

The interventions do appear to slightly improve the educational outcomes of relatively poor students. The OLS estimates of interaction effects from Table 8, Panel C show that the information intervention may have increased the likelihood that poor students planned to go to vocational high school by about 4 percentage points (the result is statistically significant at the 10% level).[8] From among all the results in this study, this result is the only one that produced a positive effect.

When assessing the results of the impact of the information and counseling interventions, there are two general conclusions. First, information had no significant, positive impacts on any of the outcomes, even for subgroups of low-achieving, male and poor students. Second, counseling increased dropouts, especially among male and low-achieving students, and may have decreased academic achievement.

## 4. Exploring the causal chain

In this section, we look at two factors that may help explain why the information and counseling interventions, as implemented, have negligible or even negative effects on dropout rates, academic achievement, or plans to go to high school.

### 4.1. Are students learning anything at school?

The first probable explanation for why students in poor, rural junior high schools do not respond positively to information and counseling is that their *gains* in academic achievement are too low. Low gains in academic achievement signal to students that the quality of the school is low (Hanushek, 2008). If students believe the quality of schooling is low, they are less likely to believe that more schooling will contribute to future income. Taken together, students that experience low gains may believe that the quality of schooling is low and may disregard interventions which tell them about the importance of further schooling.

Low gains in academic achievement also depress student perceptions that they can tackle future academic challenges and tasks (otherwise known as self-efficacy—Williams and Williams, 2010; Hailikari et al., 2007). Students with low gains in academic achievement may thus believe they lack the ability to learn well in the future (as opposed to being in a school system that is of low quality). If students feel they are unable to reap gains from additional schooling, they will not be persuaded by the information and counseling interventions (which tell them that more schooling will increase their income—Koivisto et al., 2011; Creager, 2010).

[8] For the sake of completeness, we also examined whether the interventions impacted outcomes for students who (1) underestimate the wages to attending vocational high school versus directly entering the labor market and (2) overestimate tuition prices for vocational high school. In both cases, the heterogeneous effect estimates were both small in magnitude and not statistically significant at the 5% level (table omitted for the sake of brevity).

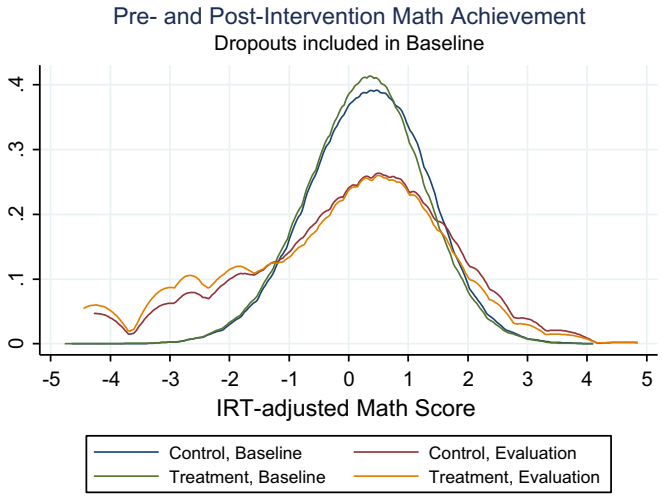


**Fig. 3a.** *Panel A*: Academic (Math) achievement scores in baseline & evaluation periods (for both information/counseling treatment and control groups).

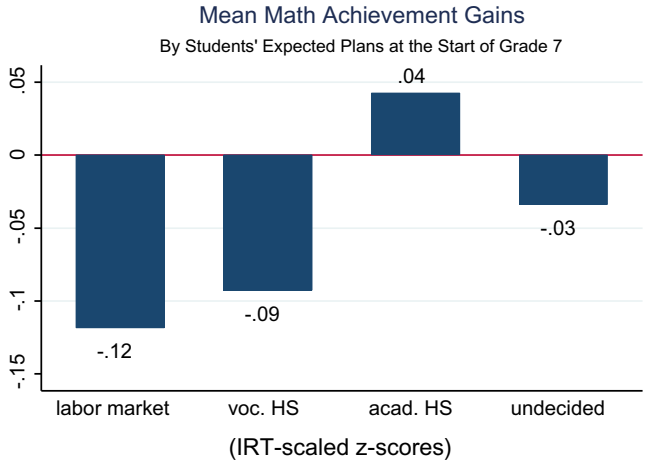


**Fig. 3b.** *Panel B*: Academic (Math) achievement gains in grade 7 for students with different expected plans in the baseline survey.

In fact, our data reveal that many students had zero or negative gains in academic (math) achievement from the start to the end of grade 7 (regardless of whether they were in treatment or control arms—Fig. 3, Panel A). The average gain in academic achievement among the 92% of students that had not dropped out was only .02 standard deviations—surprisingly close to zero (table not shown for the sake of brevity). Students who planned to go to the labor market, vocational school or who were undecided at the start of grade 7 all had negative average achievement gains (Fig. 3, Panel B).

Bringing these points together, one probable explanation for the lack of impact in providing information and counseling was student disbelief: students did not believe that additional poor quality schooling would yield increased future income.

### 4.2. Financial constraints

A second reason that we may not see an impact of information and counseling is that the families of students are financially constrained. For example, about 40% of students that stated that they planned to enter the labor market or that were undecided about their future plans in our baseline and evaluation surveys said they made this decision because of financial difficulties. In contrast, about 10% of the students stated that they would like to enter the labor force because of the chance to immediately earn relatively high wages (table omitted for brevity). Thus, some students do seem to face financial constraints when making decisions about their educational/work future.

If financial constraints are forcing kids to alter their educational plans, then information and counseling interventions may not be enough to improve educational outcomes. In fact, conditional cash transfers, which directly address these financial problems, are proven approaches to helping junior high school students in poor, rural China continue onto high school (Liu et al., 2013; Yi et al., 2012b). Liu et al., 2013 show that vouchers designed to cover the tuition costs of three years of high school increase the likelihood that poor, rural students will go to high school by roughly 9 percentage points. Providing cash transfers to grade 7 students, conditional that they stay in school, also reduces dropout rates in poor, rural counties by 13

percentage points or about 60% (Yi et al., 2012b). If these studies are representative of the situations in other poor areas in China, it might be concluded that financial constraints prevent information or counseling from affecting student outcomes.

## 5. Discussion and conclusion

Our study indicates that students from poor, rural junior high schools in China lack information about the returns to schooling and career planning skills. Given the often-cited positive impacts of information and counseling, it seemed feasible that interventions like the ones we undertook in this study would increase the willingness of grade 7 students to stay in school, improve their academic achievement and make plans to go to high school. Evidence from our cluster-RCT, however, suggests that information has negligible impacts on student outcomes and that counseling increases dropout and may lead to lower achievement.

There are several possible reasons why we get these results. Changing economic conditions in China—in particular, the recent shortage of unskilled labor which has led to higher unskilled wages—may make the provision of information and counseling less effective than in countries not undergoing similar transitions. During an economic transition, students may instead receive contradictory information about the differences in wages between skilled and unskilled workers. They may thus be less likely to believe that going to higher levels of schooling will substantially impact their long-term economic returns, even with an information or counseling intervention.

Providing information and counseling also seems to be less important than improving education quality. Our results indicate that students in our sample received a relatively low-quality education during grade 7. If indeed students are really not learning very much in their first year of junior high school, they will gradually lose their confidence in the school system and their willingness to stay in school.

Finally, credit constraints also likely explain why poor, rural students are not affected by the interventions. High tuition fees may have discouraged students from attending high school, as attested by other studies that have found conditional cash transfers increased the likelihood that students would go to high school.

Although more research is needed, our main finding suggests policymakers may initially focus on addressing the problem of low high school attendance in poor, rural areas by increasing the quality of education and decreasing the cost. Once sufficiently affordable and quality schooling are available, it is possible that information and counseling may then have the potential to improve student outcomes.

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## Appendix A. The lack of information and career planning skills in China

The lack of access to good information about the returns to schooling and the absence of career planning skills are policy-relevant concerns in China. Policymakers in China are aiming to improve high school matriculation. Yet, youth in poor, rural areas of China are dropping out before they even reach the stage of applying for high school (Yi et al., 2012a).

Indeed, in poor, rural areas of China, there are at least three reasons why misinformation and poor career planning skills must be tackled as early as grade 7 (the first year of junior high). First, students may not apply to high schools because of imperfect information about the net returns (the wages minus the costs) associated with going to higher levels of schooling (Liu et al., 2009). For example, tempted by rising wages for unskilled labor in the short-term, junior high students may decide not to continue to high school. Unfortunately, students are not aware that the wages of individuals with lower levels of education will on average rise more slowly over the course of a lifetime compared to the wages of individuals with higher levels of education (Cai, 2009). This problem is exacerbated by the fact that some companies, short on unskilled labor, aggressively recruit junior high school students and graduates (Yi et al., 2012a). Students might also be less likely to apply for high school if they overestimate the cost of going to school, including the level of net tuition (the level of tuition minus financial aid) associated with going to high school.

Second, the competitiveness of China's education system requires students to have career planning skills relatively early in their academic life—as early as grade 7. Students must take a high-stakes high school entrance exam at the end of junior high school (at the end of grade 9) to qualify for entrance into academic high school. If students do not recognize the importance of the high school entrance exam in grade 7, they may not be fully motivated to prepare for this exam. Similarly, students may not be aware of additional entrance requirements for academic or vocational high schools. However, if students make the decision to attend high school in grade 9, they may not have enough time to make the necessary preparations.

Third, students need to have clear plans as early as grade 7 to effectively choose among their future options, as compulsory education ends after junior high school. Upon graduating from junior high school, students have to make a decision to follow one of three tracks: a) pay to enter academic high school (the primary gateway to college); b) pay to enter various types of vocational high schools (albeit at lower rates than those for academic high school and without the need to pass an entrance exam); or c) enter the labor market. In addition to keeping their grades sufficiently high, students who wish

to continue their education beyond junior high must plan ahead to apply for the right type of academic or vocational school or risk attending a subpar school. Unfortunately, poor information about returns to schooling and poor career planning skills can impair the ability of grade 7 students to make and act on their plans. Without sufficient planning or an adequate understanding of how to choose and matriculate a particular high school, students in poor rural areas may ultimately opt for the most readily available option: entering the labor market.

## Appendix B. Lesson content in the counseling intervention

As mentioned in Section 2 (under "Interventions"), the counseling intervention consisted of four 45-min lessons. The first lesson invited students to learn about (a) the general meaning of work, (b) how occupations and wages would change and grow in China's rapidly transitioning economy, (c) how higher wage occupations would require relatively higher skills and corresponding levels of education, (d) the factors behind successful careers, (e) the importance of finding relevant information when making career choices, as well as (f) the social values that students might pay attention to when choosing a career.

The second lesson focused on identifying students' career interests by asking them to first participate in and discuss the results of the Holland Interest Inventory self-assessment exercise. This is a widely used self-assessment tool in career counseling which helps individuals think about their interests, personalities, and skills and how these fit with certain occupational themes or categories (see Holland, 1985). We thank Professor Junqi Shi at the Psychology Department in Peking University for providing us with the Chinese version of the Holland Interest Inventory. The second lesson then further discussed (a) the importance of being conscious of one's interests and abilities when choosing occupations and planning a career, (b) basic information about industries and occupations in China and the relative wages across industries, (c) the types of information that one should inquire about when choosing a job, and (d) avenues students could use to find more information about occupations and careers. Finally, the lesson also asked students to think about and discuss the educational and skill requirements of their ideal occupation.

The third lesson was identical to the information intervention described in Section 2 (under "Interventions") above.

The fourth lesson covered the types of choices that students could make after junior high, how to transition from junior high to vocational or academic high school, the financial aid options available in vocational and academic high school, the financial aid options available in college, and how to make personal plans to attend higher levels of schooling given the above information.

## Appendix C. Sensitivity to missing data

How sensitive were the results in Section 3 to missing data? Table 2, Panel A first shows that the balance in baseline covariates is maintained fairly well between each treatment arm and the control arm for the 8% of students who dropped out of school by the time of the evaluation survey. Looking at the baseline covariates of these "missing cases" only (row 1), we see that there is no obvious imbalance between the counseling and control arms. We do find some imbalance between the information and control arms in that students in the information arm are more likely to have mothers and fathers who are migrating (row 3, column 9 and 10) as well as mothers and fathers who are in better health (row 3, columns 11 and 12). Again the average difference between the information and control arms is rather small in these four variables.

Table 2, Panel B shows that the balance in baseline covariates is maintained fairly well between each treatment arm and the control arm for the 92% of students who remained in school at the time of the evaluation survey. We do find some imbalance (at the 5% statistical significance level) between the information and control arms in the female and father's education level covariates, but again the difference is quite small.

The impact evaluation analyses in Section 4 were conducted without making any missing data adjustments. This was a "listwise deletion" approach which is only viable under the missing completely at random assumption (Schafer and Graham, 2002). It is possible, however, that the students we could not find are missing non-randomly because of certain factors that simultaneously affect the treatment assignments and the student outcomes. We therefore test the robustness of our results after imputing the missing data using multiple imputation (see Schafer and Graham, 2002). In the end, we find that our results our substantively the same even after conducting analyses using multiple imputation (results not shown).

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