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The Impact Evaluation of Free Senior High School Education on Poor Students in Rural China

Xinxin Chen

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De La Salle University AKI Angelo King Institute

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RESEARCH PROPOSAL

Presented to

PEP Network

By

Xinxin Chen

&

Shaoqing Zheng

Chunlei Lang

Pingping Gu

Lijuan Guo

China

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1. Abstract (100 to 250 words)

More and more rural kids in China have received junior high education since it became free in 2006; however, there remains a huge gap in the rate of admission to senior high school when comparing urban and rural students. One reason for this gap may be the rocketing tuition and fees in both senior high schools and colleges. In this project, we propose to partner with Ningshan County in Shaanxi Province, one of the poorest counties in China, to evaluate the impact of the Free Senior High Education program for poor rural students. With baseline data collected in 2009 and follow-up data to be collected in 2010 and 2011, we will compare information from students in Ningshan County (the treatment group- where the High School Tuition is free) and students in two neighbouring counties (the comparison group- where High School Tuition is still high). Using advanced quasi-experimental methods, including Difference in Difference (DD), Propensity Score Matching and DD Matching, we will try to explore the following questions: a) whether there is an impact of this program on the effort, educational goal and matriculation rate to the academic senior high school for poor rural students; b) whether poor students are liquidity constrained when making their higher education decisions (and deciding to exert effort); and c) whether there is a gender difference between poor male and female students. Finally we try to show how much the nation would benefit from moving to a system that would make senior high school more affordable.

2. Main research questions and core research objectives

Background and Motivation

In China, higher education is expanding at a rate that is unprecedented anywhere in the world. China's economy in the coming years will demand that its rural labour force be educated. The expansion, in both size and scope, has helped create the foundation for China's challenging and transformative system of higher education. Education has contributed a lot to growth in the past. If the rural labour force can not upgrade its level of education dramatically in the very near future, growth could be severely constrained.

However, this accomplishment must be tempered by rocketing tuition and fees for both senior high school and college. The cost of going to school after entering senior high school now dramatically exceeds a rural family's per capita annual income by more than 20 times. [College education is even more.] Paying for high school tuition and fees for three years takes a poor rural family 10 years to earn. And, this does not account for the opportunity cost of going to senior high school. Since the child going to high school is unable to enter the work force for three years, the foregone wages more than triples the cost of going to senior high school. Nearly 90 percent of students in large cities in China attend senior high school; in poor rural areas, only about 1 in 4 does. And, while many rural kids are not competitive for a number of non-financial reasons, it is estimated that there are thousands of students that do not go to high school each year only because they can not afford it.

When a bright child can not further his/her education for financial reasons, it is a tremendous loss for the families of the bright kids who instead of studying math, advanced language, English and computers, end up working in factories in Shenzhen and on construction sites in the suburbs of Beijing. It is also a huge loss for China – especially as we think ahead to the needs of the nation in

the coming 10, 20, 30 years as China modernizes. Modern societies are always built primarily on an educated citizenry. A new paper from Japan points to mistakes made by Japan in the 1970s in the design of their education system with the recent sluggish growth of the past two decades (Godo and Hayami, 2009).

An Opportunity for Evaluation

While the Ministry of Education (at the national level) is slowly responding to the needs of many of these miraculous kids who have defied all odds and have scrapped and scratched their ways through 3 years of junior high school and have tested into a senior high school, in our proposed project, we would like to partner with one very poor but forward thinking county in Shaanxi Province—Ningshan County, to undertake the evaluation of a natural experiment (See the "Map for the Location of Ningshan County" at end of the proposal).

What is the Natural Experiment in this project?

1) to *sign a contract* with hundreds of junior high school students in one poor county in one of the poorest parts of China. The contract that is simple and potentially life changing: the Contractee (the student) works hard and gets into high school; the Contractor (the financial bureau of Ningshan County—under the direction of Magistrate Wang—the top official in Ningshan County) pays for the tuition in senior high school. This is called Ningshan **Contracting for Dreams Program**. They will seek to reward hundreds of poor rural students who—with the lower risk of financing senior high school—will be able to pursue their studies that will aim them towards education after junior high and towards college. This is the social objective of the program. At the end of July 2009 just before the new term began in fall, the government made this program known to the public, and now almost all the students in the junior high school in Ningshan know about this program.

2) to run the Contracting for Dreams program using state-of-the-art field experiment-based research approaches, in collaboration with the Shaanxi Department of Education (and the Bureaus of Education of 3 counties, Ningshan County (the treatment group), Hanyin County and Shiquan County(the comparison group), we will test the bold proposition: **it is not that poor rural students are less able or less willing to fight their way up the competitive educational ladder and compete for grades in junior high and test into senior high school, in many cases it is simply the high cost of education that is keeping poor, rural students out—and dampening their incentive.**

Main research questions and core research objectives

The core objective of this project will be to track the impact of this Free Senior High School Education Program (Contracting for Dreams Program) on the effort, educational goal and matriculation rate to the academic senior high school of the poor rural students in junior high school in the treatment and comparison groups.

The main outcome variables will be:

- the scores in a standardized test (administered by our research team) given to all sample students in the first wave of the survey in fall 2009 and in every wave of the follow-up surveys,
- the results of the senior high school admission test
- the rank of the scores of the students (in Math; Chinese; English) in the senior high school admission test,
- future plans (educational goals) of students which will be collected by asking the following question: what do you expect to do after junior high school is over? Do you expect to attend the academic Senior High School, Vocational High School or go straight to work?
- AND, ULTIMATELY, the rate of matriculation to academic senior high school.

We will be mostly interested in the effort (scores) of poor students.

This natural experiment will allow us to answer—jointly with the participation of the government—the following fundamental questions:

1) Are there any impacts of the Free Senior High School Education Program on the effort of the poor rural students, on their future plans after they complete junior high school and on their matriculation rate to the academic senior high school?

2) Are the poor students in junior high school in rural China are liquidity constrained when making their higher education decisions (or deciding to exert efforts)?

3) Is there a gender difference between poor boy students and girl students when facing liquidity constraint (if there is any) to enter academic senior high schools?

4) How much would the nation benefit from moving to a system that would make high school more affordable?

3. Scientific contribution of the research

As discussed above, there is a huge education gap between urban and rural students in China in terms of the enrolment rate to senior high school and colleges. Surprisingly, little empirical work has been done to find out what determines the low enrolment rate of rural students to senior high school, whether poor students are liquidity constrained to be admitted to the senior high school, and what the government should do to narrow this gap. Some existing studies focused only on specific expenditure line items in senior high school to explain the financial obstacles the students were facing (Lei, 2005), used data from before many of the higher education reforms took place (Lei, 2003), or not going further than to describe that the cost of high school is increasing over time in real terms (Wang 2005). Similarly, little work has been done to evaluate the government intervention in the junior high and senior high school education system with rigorous empirical methods in China.

A key empirical contribution of this project is to evaluate the government intervention in education system, and try to track the impact of the Free Senior High School Education program on the effort and performance of the junior high school students in the treatment and comparison counties. Finally we try to definitely show how much the nation would benefit from moving to a system that

would make high school more affordable to all without any of the uncertainties that have always surrounded academic studies in the past.

A list of key reference is presented at the end of the proposal.

4. Policy relevance

Since China's compulsory education (including grades 1 to 9) became free for rural students in 2006, almost all the rural students are now attending and completing their studies in junior high school. However, there remains a huge gap in the rate of admission to senior high school when comparing urban and rural students. As mentioned above, nearly 90 percent of students in large cities in China attend senior high school; in poor rural areas, only about 1 in 4 does. Although many rural kids are not competitive for a number of non-financial reasons, it is estimated that there are thousands of students (or tens of thousands / or more) that do not go to high school each year only because they can not afford it.

In this project, we will examine whether the rural students are affected by the fact that there is a high level of tuition for attending high school when they are making their decisions to go to senior high school. Is this a problem for the poor (which would suggest it could be a liquidity constraint)? In addition, based on the analysis from our proposed quasi-experimental empirical work, we would like to explore whether or not the Free Senior High School Education Program would benefit the poor students in rural China in other ways—e.g., whether it will make them exert more effort.

To be specific, in this project we will seek to examine whether or not this free tuition program improves the effort of the poor rural students, changes the future educational plans of the poor rural students (after the students complete junior high school) and/or helps more poor rural students matriculate to senior high school. Based on the results from this project, we would like to provide the government with evidence about whether or not they (the government) should extend such programs to other poor rural areas in order to help narrow the education gap between rural and urban students.

This work is highly relevant for policy for several reasons. First, we are not the original initiators of this project. Although we are advocates of finding ways to improve access of poor rural students to higher levels of education, this free tuition program was originally proposed by a forward-thinking, innovative county magistrate in one of China's poorest counties (Ningshan County in Shaanxi Province). The county leader believes that if high school were free, more poor students would attend. However, he told us that he lacked evidence to prove his point. Therefore, we have been asked to design an evaluation project to generate high quality information on the effectiveness of his policy initiative. Importantly, it is the goal of this county magistrate (upon completion of the project and our report) to take our findings (and the overall experience of Free Senior High School Education Program) to the provincial department of education in Shaanxi (Xi'an is the provincial capital) as well as directly to the Ministry of Education in Beijing. He knows that there are people in these agencies that share his vision of expanding high school education. He believes that with solid, research-based evidence that he will be able to more effectively push for central support for high school tuition reduction. Also, if upper level officials are convinced, such a project at the very least can serve as a model for further dissemination to other local governments.

Besides our work indirectly through the county magistrate, we also have other avenues for conveying our policy messages to China's policy makers. For example, we are planning to publish a number of policy briefs and disseminate the results to provincial departments of education and policy research sections of the government in Shaanxi (with the help of our close collaborator in Shaanxi, the Northwest Social Development Research Center (NSDRC) in Northwest University in China). In addition, we plan on writing policy briefs that will directly be read by officials in the Ministry of Education in China as well as by high ranking leaders in the Premier's office. This work will be facilitated by our close collaboration with the Center for Chinese Agriculture Policy in Chinese Academy of Science (who has direct access to the Premiere and Vice Premiere in charge of education).

5. Methodology

Learn by Experimenting

To achieve the objectives mentioned above, we will learn by doing – learning by experimenting in society. How? We offered Ningshan Contracting for Dreams contracts to all the 7th graders and 8th graders in all the 6 junior high schools in Ningshan County (covering more than 750 7th graders and 750 8th graders in total). In other words all 7th and 8th graders in Ningshan counties will be offered a free high school education if they pass the high school admittance exam after their third year of junior high school. In short, the 7th graders and 8th graders in Ningshan will be the treatment group.

The comparison group in the Natural Experiment will be drawn from junior high school classes in the two poor counties that neighbour Ningshan County—Hanyin County and Shiquan County. We will be using 1/3 of the 7th and 8th graders in Hanyin and Shiquan counties (about 4500 7th and 8th graders) in the comparison group. Unlike the 7th and 8th graders in Ningshan County that all know about the Free Senior High School Education Program, those students in the comparison group who are in their first year or second year of junior high school (and their parents) will be well aware of the fact that if they want to go to high school they will have to pay more than 20,000 yuan in tuition and fees and forego more than 30,000 yuan in wages.

One problem with the Natural Experiment in our project is that the use of Ningshan County students as the treatment group and the use of Hanyin and Shiquan County students as the comparison group is not a true randomized experiment. Because of this, we propose to use Difference in Difference Matching (DDM) as a way to compare the effort and educational goal of those students covered by this program and those not covered by the program. We propose to use Difference in Difference, traditional Propensity Score Matching and Covariate Matching to estimate the impact of this program.

Basic Estimation Methodology

The objective of this study is to examine the impact of the Free Senior High School Education Program on children's effort, future plan and matriculation rate. In order to evaluate the impacts of this program, the intervention in this program (providing the free education in senior high school) is considered as the treatment and our sample students are divided into a treatment group and a

comparison group. The treatment group includes all the 7th and 8th graders in Ningshan County. The comparison group includes 1/3 randomly selected 7th and 8th graders in Shiquan and Hanyin County. With this set up, we are interested in understanding the mean impact of "treatment on the treated" which is the average impact of the program among those treated (Smith and Todd, 2005):

$$TT = E\left((Y_1 - Y_0) \mid X, D=1\right) = E\left(Y_1 \mid X, D=1\right) - E\left(Y_0 \mid X, D=1\right) \quad (1)$$

where we denote Y_1 as the outcome (for example, student score in our case) if the student is from the treatment group, Y_0 as the outcome if a student is from the comparison group, D=1 stands for the group of students who participated in the program in 2009 (who knew that they would be offered free senior high school) for whom Y_1 is observed, D=0 stands for those who did not participated in the program in 2009 (who knew that they would pay high tuition for senior high school) for whom Y_0 is observed. In reality we do not observe the counterfactual mean, $E\left(Y_0 \mid X, D=1\right)$, or the mean outcome for the students who participated in the program had they not participated in 2009. Therefore, we employ a difference-in-difference method (DD) to compare the outcomes before and after the intervention status change for students affected by the change (the students in Ningshan County) to students not affected by the change (those from Shiquan and Hanyin County). In equation (1) Let *t* and *t'* denote the time after the intervention (2010) and time before the intervention (2009). The standard DD estimate is given by:

$$DD = \left[E(Y_t \mid D=1) - E(Y_{t'} \mid D=1)\right] - \left[E(Y_t \mid D=0) - E(Y_{t'} \mid D=0)\right] \quad (2)$$

The idea of using a DD estimator to produce DD estimates is that it allows us to correct the simple differences before and after the intervention for the treatment group (or the students participated in this program) by subtracting the simple difference for the comparison group (students didn't participate in this program). By comparing the before-after change of treated groups with the before-after change of comparison groups, any common trends, which will show up in the outcomes of the comparison group as well as the treated group, get differenced out (Smith 2004).

In addition to the standard DD estimator, we implement three other DD estimators: an "unrestricted" version that includes $Y_{t'}$ as a right hand variable, an "adjusted" version that includes other covariates in addition to the treatment variable (in our case they are a series of control variables from 2009 or the pre-program period), and an unrestricted/adjusted model that combines the features of both the "unrestricted" and "adjusted" model. The unrestricted and adjusted DD estimators relax the implicit restrictions in the standard DD estimator that the coefficient associated with $Y_{t'}$ (pre-program outcome) and covariates in *t'* (pre-program period) equals one. The combination of unrestricted and adjusted DD estimators relaxes both of these assumptions. In summary, the models to be estimated are:

Model (1), Restricted & Unadjusted: $\Delta Score_i = \alpha + \delta Program_i + \varepsilon_i$

Model (2), Unrestricted & Unadjusted: $\Delta Score_i = \alpha + \delta Program_i + \gamma Score\_02_i + \varepsilon_i$

Model (3), Restricted & Adjusted: $\Delta Score_i = \alpha + \delta Program_i + \beta X_i + \varepsilon_i$,

Model (4), Unrestricted & Adjusted: $\Delta Score_i = \alpha + \delta Program_i + \gamma Score\_02_i + \beta X_i + \varepsilon_i$

where, *i* is an index for the student, $\Delta Score_i$ is the change of the score of student i between 2009 and 2010; $Program_i$ is the treatment variable (which makes δ the parameter of interest). In our analysis, $Program_i$ =1 if the student i participated in the program ($Program_i$ =0 if the student i didn't participate in the program). Finally, the term $\mathbf{X}_i$ is a vector of covariates that are included to capture the characteristics of student, his/her parents and household.

It is important to remember that the identification of the causal effect using DD relies on the assumption that absent the policy change (or intervention of the program in our case), the average change in $Y_t - Y_{t'}$ would have been the same for the treated and the comparison groups. Formally, this is called the "parallel trend" assumption, which can be expressed as:

$$E(Y_{0,t} \mid D=1) - E(Y_{0,t'} \mid D=1) = E(Y_{0,t} \mid D=0) - E(Y_{0,t'} \mid D=0) \qquad (3)$$

As might be expected, the effectiveness of DD depends on the validity of this assumption. Whether or not the assumption is valid, however, depends on the context of the study and on how similar the comparison and treatment groups are. In general, the more similar are the treatment and comparison groups, the more convincing the DD approach. Using the students from neighboring counties as the comparison groups, we aim to make our samples in the comparison group and the students in the treatment group not significantly different in most respects in 2009.

Alternative Estimation Approaches

Unfortunately, the reality of our question (understanding the effect of the intervention on the scores of children) may mean that even though we control for a large number of observable variables in 2009 in the adjusted and unrestricted versions of the DD estimates, there could be other unobservable factors that may compromise the parallel trend assumption. Because of the potential existence of other differences between students who participated in and students who didn't participate in the program, we also use a series of propensity score matching method (PSM) that is an approach that does not require the parallel trend assumption. PSM allows the analyst to match the treated and the comparison group when observable characteristics of students in the treatment group and students in the comparison group are continuous, or when the set of explanatory factors that determine participation contains multiple variables (Rosenbaum et al. 1985). With the right data, it is possible to estimate the propensity scores of all students and compare the outcomes of students who participated in and students who didn't participate in the program that have similar propensity scores.[1] We can obtain the mean impact of the treatment on the treated by the following equation (Dehejia and Wahba, 2002; Smith and Todd, 2005):

$$E(Y_1 - Y_0 \mid D=1) = E(Y_1 \mid D=1) - E_{Z|D=1}\left\{E(Y_0 \mid p(Z), D=0)\right\} \qquad (4)$$

where $p(Z) \equiv \Pr(D=1 \mid Z)$ is the propensity score. Matching is based on the assumption that outcomes (Y_0, which in our case is the score of the students) are independent of participation conditional on a set of observable characteristics (Rosenbaum and Rubin, 1983). So we do not need to worry about unobservable heterogeneity. By matching students who participated in and students who didn't participate in the program with similar values of $\Pr(D=1 \mid Z)$, any differences in $E(Y_0)$ between the two groups are assumed to be differenced out when calculating the above equation. The assumption of matching is that $E(Y_0 \mid Z, D=1) = E(Y_0 \mid Z, D=0)$. The observable covariates Z should include the characteristics that determine participation. In our analyses, Z includes a number of variables including the characteristics of the student, his/her parents and household. We will also include township fixed effects to control for unobservable factors at the township level.

To implement PSM successfully, however, the nature of the samples of students who participated in and students who didn't participate in the program in 2009 must meet certain criteria and several

other choices must be made. Importantly, the common support of the propensity scores for participating and non-participating students should be fairly wide. Intuitively, wide common support means that there must be a fairly large overlap in the propensity scores between the treated and comparison groups. In our sample, we will try to examine whether the common support is fairly wide or not before using PSM.

Once we determine that PSM is feasible, we next need to choose the method of matching. In our analysis, we will choose to use the nearest neighbor matching method with replacement. Following Smith and Todd (2005), we will match on the log odds-ratio and standard errors will be bootstrapped using 1000 replications. We will also use a balancing test that follows Dehijia and Wahba (1999, 2002) that is satisfied for all covariates.

While PSM is often used in program evaluations, it relies on a key underlying assumption: outcomes are independent of participation conditional on a set of observable characteristics. Formally, this assumption can be written as:

$$E(Y_0 \mid P(Z), D = 1) = E(Y_0 \mid P(Z), D = 0) \qquad (5)$$

In other words, there would be no need to worry about unobservable heterogeneity. However, even though we control for unobservable differences at the township level using fixed effects when estimating the propensity score, there may still be systematic differences between the outcomes of students who participated in and students who didn't participate in the program. The systematic differences could arise, for example, because the student's decision to participate is based on some unmeasured characteristics. Such differences could violate the identification conditions required for matching (Smith and Todd, 2005).

To eliminate the bias due to time-invariant unobservable differences between students who participated in and students who didn't participate in the program, we will extend the cross-sectional PSM approach to a longitudinal setting and implement a difference-in-differences matching (DDM) strategy. With DDM we can exploit the data on the students in the treatment in 2009 to construct the required counterfactual, instead of just using the data in 2010 (as is used in the PSM analysis). The advantage of DDM is that the assumptions that justify DDM estimation are weaker than the assumptions necessary for DD or the conventional PSM estimator. DDM only requires that in the absence of treatment, the average outcomes for treated and controls would have followed parallel paths:

$$E(Y_{0,t} \mid P(Z), D = 1) - E(Y_{0,t'} \mid P(Z), D = 1) = E(Y_{0,t} \mid P(Z), D = 0) - E(Y_{0,t'} \mid P(Z), D = 0) \qquad (6)$$

Assumptions embedded in equation (6) are weaker than the assumptions necessary for DD. Intuitively, DDM removes time invariant unobservable differences between students who participated in and students who didn't participate in the program conditional on P(Z), a clear advantage over cross-sectional PSM.[ii]

In performing DDM we match by using the log odds-ratios and the same nearest neighbour matching methods with replacement used in our PSM approach (which were described above). In addition, we will also compute the "adjusted" version where the control units are weighted by the number of times that they are matched to a treated unit. The standard errors will also be bootstrapped using 1000 replications.

6. Data requirements and sources

All the data for the analysis in this project will be collected in Ningshan County, Shiquan County and Hanyin County in Shaanxi province in China.

With close collaboration with local government in Shaanxi province (especially the three sample counties), we collected the baseline data in early September, 2009 when the new term just began. Since the program was announced at the end of July, 2009 when the students were on summer vocation, the information we collected in September could actually be used as the pre-program outcomes.

Now we are seeking for financial support from PEP for the two waves of follow-up survey, the second wave in fall 2010 and the third wave in fall 2011.

Baseline Data Collection Effort

To achieve the objectives mentioned above, as the first step, 21 enumerators (most of them are graduates in Northwest University in China) were selected and had been trained in Xi' an for 3 days. Afterwards, the pre-test was done in Xi'an and the survey last for a week in Ningshan, Hanyin and Shiquan. **In our sample, there are more than 6000 students** (about 1500 students in Ningshan and more than 4500 students in Hanyin and Shiquan) in 36 schools in total in these three counties.

The blocks of the survey consist of:

1. two Student forms, including the math test and the form on the characteristics of the student, his/her family members (especially the employment status of his/her parents), and his/her household (especially the assets in his/her family), information on his/her schooling history, the goals of the student after graduating from the junior high school, and at last his/her self esteem evaluation test is followed.

2. four teacher forms for the homeroom teacher, math teacher, Chinese teacher and English teacher. These forms mainly aim to collect information on the characteristics of the teachers and some general information of the whole class.

3. one form for the school principal, which is to collect information on the facilities, composition of the teachers and students, some waive programs for the students in this school from the school principal.

4. one form for the director in the education bureau in the surveyed county to collect general information of the composition of the junior high schools, the enrolment of the junior high and senior high students and some requirements for the enrolment in this county.

Follow-up Data Collection Effort
We are planning to do three waves of follow-up survey:

In fall 2010, we will finish the second wave of evaluation surveys. During this wave of the survey, we will collect the information on both of the effort (test scores) and educational goals (e.g., answers to the questions asked above) of the students who are in both 8th and 9th graders (and who were in 7th and 8th grade during the baseline survey). As a consequence, we will be able to have a first report done by winter 2010.

In fall 2011, we will finish a third wave of the survey (being done under this study). During this survey, we will collect information (once again) on the effort and the educational goals of both 9th graders and 10th graders (either those in high school/vocation school/or we will follow up with those that left schools for work—by contacting their parents). At that time (fall 2011) we also will know the matriculation rate to academic senior high school for the students who started the study (fall 2009) as 8th graders. Since we completed the first round of analysis and already wrote a preliminary report during the fall/winter of 2010 (using data from the second wave of data collection/new evaluation survey), we will be working from a template and finishing a second (or the final) report should be doable using the new data of the fall of 2011.

The final follow-up survey is scheduled to be done in fall 2012 to collect the rate of matriculation for the 10th graders (either those in high school/vocation school/or we will follow up with those that left schools for work) who were in 7th grade in our baseline survey in 2009. We will have additional grant from LICOS (Centre for Institutions and Economic Performance) in the Katholic University of Leuven in Belgium for the final follow up survey.

7. Consultation and Dissemination Strategy

The ultimate aim of this project is to provide and disseminate evidence-based results, leading to the formation of informed policies that will help increase the human capital of poor students in rural China. We hope that in some small way we can contribute to a narrowing of the educational gap between rural and urban students.

During our implementation of previous projects in Shaanxi, one of the poor provinces in West China, we have developed strong partnerships with government institutions and academics. The officials from local governments often join us for workshops on rural education. They listened to our findings. We asked them to present their comments and proposed projects.

It was during one of these meetings that the magistrate from Ningshan County approached us and asked us to help him evaluate a project that he had been formulating to try to increase access for poor rural students to high school (the Fee Senior High School Education Program). After we agreed to help, our collaboration deepened. For example, a number of officials in the local department of education gave us a number of valuable comments when we were designing and implementing our pilot survey in September 2009. They also have continued to be involved in helping us set up the logistics of the project. To be specific, we have the direct support from the education departments in all of the sample counties: Ningshan County (the treatment county), Shiquan County and Hanyin County (the control counties) during this pilot survey. We expect (and have their promise) that their aid will continue. In return, we have a steady set of findings that we are sending to the education officials. For example, during our survey we discovered that students in some schools had not been fully informed of this Free Tuition Program, we advised the county officials of this and they held of

series of meetings to even more thoroughly publicize the new program (to teachers, parents and students).

Besides our work indirectly through the county magistrate, we also have other avenues for conveying our policy messages to China's policy markers. For example, we are planning to publish a number of policy briefs and disseminate the results to provincial departments of education and policy research sections of the government in Shaanxi (with the help of our close collaborator in Shaanxi, the Northwest Social Development Research Center (NSDRC) in the University of Northwest). In addition, we plan on writing policy briefs that will directly be read by officials in the Ministry of Education in China as well as by high ranking leaders in the Premier's office. This work will be facilitated by our close collaboration with the Center for Chinese Agriculture Policy in Chinese Academy of Science (who has direct access to the Premiere and Vice Premiere in charge of education).

In addition, we are planning of organizing workshops inside China (for domestic and international participants). We hope to invite scholars and policy makers to participate in the workshops in order to be able to attract more attention to our results. These workshops will be an input into our efforts to publish at least 2 papers in English and 2 papers in Chinese and submit them to international peer-reviewed journals. Before becoming published (because of publishing delays), we would like to put all of the research out as working papers and post them on our website to make our results more accessible.

8. List of team members

Team leader

Xinxin Chen will be the team leader of this project. She got her PhD from Zhejiang University in China in agricultural economics and did a one-year post doctoral research in Stanford University in US where she became familiar with the techniques of program evaluation and published 2 papers in peer-reviewed international journals on rural education. Besides this, she has participated in the following training workshops and learned the applied econometrics and empirical methods in detail: in January 2006, she attended the training workshop for senior Chinese agricultural economists sponsored by Ford Foundation and the Center for Chinese Agriculture Policy in Chinese Academy of Science; from June 2005 to May 2006, she participated in the training Program for Chinese Women Economists, sponsored by Ford Foundation and Peking University. Furthermore, she spent half a year in Peking University in 2006 as a visiting scholar and focused on development economics. As to the experience in data collection, she was one of the team leaders in the pilot survey in 2008 for CHARLS (China health and Retirement Longitudinal Study) sponsored by The National Natural Science Foundation of China and the National Institute on Aging of the National Institutes of Health in the United States. And she is currently collaborating with REAP (Rural Education Action Program) and is responsible for the baseline data collection for the Free Senior High School Education Program in Ningshan County.
Her role in this project involves the overall project management, overall supervision and guidance.

Other team members

Shaoqing Zheng (male): 41 years- an associate professor in the college of economics in Zhejiang Gongshang University, majors in development economics. His role in this project will involve

design of the questionnaires, oversight of data collection; analysis and dissemination activities.

ChunLei lang (female): 31 years- an assistant professor in the college of economics in Zhejiang Gongshang University, majors in labour economics, and has a strong background in survey design and impact evaluation. Her role in this project will involve data analysis and methodology refinement.

Lijuan Guo (female): 25 years- a graduate student in applied economics in Zhejiang Gongshang University, good at applied econometrics. She is currently a research assistant in the college of economics. Her role will involve data cleaning and data analysis.

Pingping Gu (male): 24 years- a graduate student in applied economics in Zhejiang Gongshang University, has a strong background in applied econometrics as well. He is also a research assistant in the college of economics. His role will involve data collection, data cleaning and data analysis.

9. Expected capacity building

This research will contribute to the improvement of the knowledge and research capacity on program evaluation not only for all the team members in this project, but also for about 50 graduates students in this college since most of them will participate in the field survey as enumerators. The involvement of this project will help them have a better understanding of the questionnaire design and data cleaning. In addition, this project will provide a good chance for Xinxin Chen, the team leader to give lectures on program evaluation to these graduate students using this project as a case after the participation. The empirical methods of program evaluation such as Difference in Difference, instrument variable, propensity score matching will be taught and STATA codes for our findings will also be presented in these lectures. Furthermore, the international and national conferences and workshops organized in our university to disseminate our results will benefit most of the other faculty in our university in terms of improving the research capacity in empirical research as well.

In this project, Xinxin Chen will be the team leader coordinating day to day running of the project activities. She will play a leading role in project management and data analysis. The graduate students, Chunlei, Lijuan and Pingping will basically be involved in literature review, data cleaning and bringing together panel variables for data analysis while learning from the more experienced project leader, and report writing. Each of them is pursuing a doctoral degree or master degree, involvement in this project will help improve their research capacity in doing empirical work.

10. Any ethical, social, gender or environmental issues or risks that should be noted.

None.

11. List of past, current or pending projects in related areas involving team members

The National Natural Science Foundation of China, and the National Institute on Aging of the National Institutes of Health in US, “China health and Retirement Longitudinal Study”, Xinxin Chen

The National Natural Science Foundation of China, "Effect of Migration on Children's Educational Performance in Rural China", Xinxin Chen, Shaoqing Zheng, Chunlei Lang, and Lijuan Guo

The National Social Science Foundation of China, "Scale of arable land, efficiency and institutional innovation in rural China" Xinxin Chen, Shaoqing Zheng, and Chunlei Lang

The Ministry of Education, "Globalization, Marketization and Grain Production in China", Xinxin Chen and Shaoqing Zheng

The Natural Science Foundation of Zhejiang Province, "Globalization, trade and production of the main produce in Zhejiang Province", Xinxin Chen and Chunlei Lang

The Social Science Foundation of Zhejiang Province, "Determinants of rural-urban Migration in Zhejiang Province" Xinxin Chen

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Attachment : Map of the Location of Sample Counties

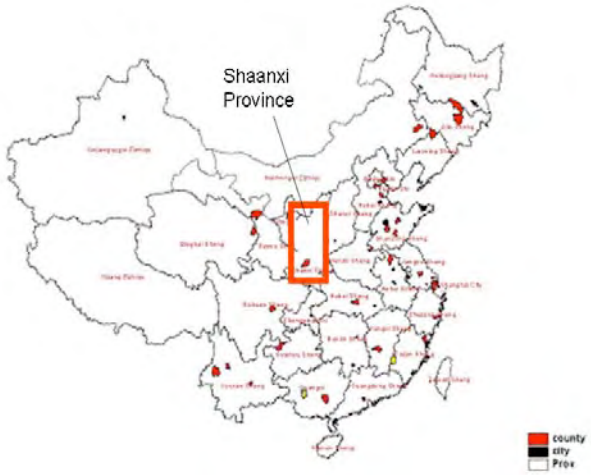

Figure 1 Location of Shaanxi Province in China

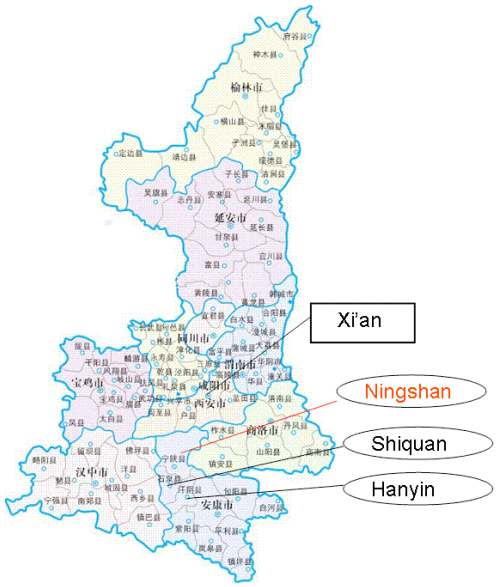

Figure 2 Location of the three sample counties (Ningshan, Hanyin and Shiquan) in Shaanxi

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[i] We need to note, however, that a recent study found that the propensity score matching method is sensitive to the covariates used to estimate the scores and that combination of matching with DD was superior (Smith and Todd 2004).

[ii] Using outcomes from experimental data as a benchmark, Smith and Todd (2004) found that DDM performed better than DD or PSM methods.