

Quality of migrant schools in China: Evidence from a longitudinal study^{*}

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Abstract

Migrant children in Chinese cities are officially excluded from the public education system due to lack of *hukou*, and a substantial number of them have to enter private migrant schools. This paper studies the quality of migrant schools using data collected in Shanghai in 2010 and 2012. Although students in migrant schools perform considerably worse than their counterparts in public schools, the test score difference in mathematics has almost been halved between 2010 and 2012, due to increasing financial subsidy from the government. On the other hand, we also report evidence suggesting substantial outside institutional barriers for migrant schools.

Key words: migrant school; school quality; institutional barrier

JEL Classification: I28; J15; O15

1. Introduction

According to the 2010 Chinese Census, there are around 220 million people who live in a city different from where they are officially registered based on the Household Registration System (commonly referred to as “*hukou*” in Chinese). Among these non-*hukou* people, of which most are rural-to-urban migrants, an estimated 20 million are children aged between 6 and 14 (NBS, 2012). Under China’s current system of elementary education, non-*hukou* migrant children are not entitled to receive free compulsory education stipulated by law at the place they actually live. The issue of migrant children’s education has received widespread attentions in China, and is considered as one of the major challenges to the building of a “harmonious” society.

A significant proportion of the 20 million migrant children now study in the so called “migrant schools” — low-cost private schools that admit children without local *hukou*.¹ Migrant schools started in the early 1990s as informal schools to serve migrant children’s education needs. Because migrant schools are marginalized in the system, and in some places even considered as illegal, they lack the necessary resources to develop, and tend to have inexperienced teachers and school administrators, crowded classrooms, and inferior facilities. It is therefore no surprise that migrant schools are widely believed to have much worse quality than public schools. Previous academic research has also largely confirmed such a belief. Both Lai et al.

¹ The proportions of migrant students studying in migrant schools vary by city. By 2010, around 30% of all students without local *hukou* are enrolled in migrant schools in Shanghai, while the corresponding percentages are around 50% in Beijing and 60% in Guangzhou.

(2011) and Chen and Feng (2013) use standard test scores to find that students in migrant schools perform considerably worse than their more fortunate counterparts in public schools.

Nevertheless, migrant schools are also undergoing constant changes. On the one hand, thanks to the attentions from the society - even Premier Wen Jiabao visited some migrant schools to show sympathy² – situations of migrant schools have improved considerably in recent years. Local governments are also taking a more proactive approach and in some cases providing financial subsidies to migrant schools. Many NGOs and volunteers work with migrant schools directly to help them improve effectiveness of teaching. On the other hand, some migrant schools are forced to close down as they cannot meet certain minimum standards on security and hygiene, others simply fail or are merged by competitors because they can no longer attract sufficient enrollments. As a result, average quality of migrant schools becomes better. Giving such rapid changes within a relatively short period of time, we believe that the dynamics of migrant schools is more important than a snapshot of the status quo, and the most relevant question to ask is whether migrant schools are catching up in terms of quality of education they provide to students.

The “catching up” question is essential to evaluate whether past policies have been effective. In the education literature, there has been a long-standing debate on whether money matters in education since the famous Coleman report (Coleman et al., 1966; Hanushek, 1986). This debate also applies to migrant schools in China.

² Please refer to the Chinese web link:
http://news.xinhuanet.com/edu/2004-11/17/content_2227120.htm

Despite the increased investments on migrant schools, some still argue that migrant schools cannot be improved due to some inherent limitations. For example, because school owners are private businesspersons, one might expect that outside investments, such as donations or government subsidies, might completely crowd out private investments by the school owners. Others argue that since parents of migrant children do not care and are not able to help with their children's education, any further improvements on the school side would be a waste and won't advance student learning. Only carefully designed and implemented empirical work could shed light on this important issue and aid relevant policy discussions.

Due to data limitations the catching-up question has not yet been answered. This paper employs unique panel data that the authors collected in Shanghai in 2010 and 2012 to address exactly this question. We show that migrant students in migrant schools have gained relatively compared to their counterparts in public schools. We find similar results for parental self-assessed school quality, suggesting a relative improvement of the quality of migrant schools, which can be attributed to increased funding assistance and monitoring from the government. Nevertheless, significant disparities remain in terms of parental overall satisfaction. Students graduated from migrant schools are also much less likely to have the opportunity to continue their middle school education in Shanghai, irrespective of their academic performance. Our results thus suggest that in addition to efforts to improve learning within migrant schools, it is also necessary to remove institutional barriers discriminating migrant schools in the current educational system.

Although our study is based on Shanghai, we believe it is of more general relevance. Shanghai's approach to heavily subsidize migrant schools differs markedly from that of many other big cities, such as Beijing and Guangzhou. If policies in Shanghai are found to be effective, similar practices can be applied in other cities so that more migrant children in the country can benefit. More broadly, from an international perspective, the performance of migrant schools in China can be investigated together with other low-cost private schools serving disadvantaged children in other developing countries. The work of James Tooley has identified many successful stories of low-cost private schools in places such as India and some African countries (Tooley et al., 2011). Evidence from China could also contribute to this literature and deepen our understanding regarding low-cost private schools, especially how they interact with their institutional, economic, and social environments.

The rest of the paper goes like follows. Section 2 provides background information on the education of migrant children in China in general and migrant schools in particular, and briefly reviews existing studies. This is followed by a description of the data sources and the empirical methodology in section 3. Section 4 presents the main results on the change of relative qualities of migrant schools and public schools. In Section 5, we examine possible reasons for the change of the quality of migrant schools and rule out alternative explanations. We also consider other outcome variables and discuss institutional barriers facing migrant schools. Section 6 concludes with some policy recommendations.

2. Background and the existing literature

2.1 Education of migrant children and migrant schools in China

The educational problem of migrant children is directly linked to China's *hukou* system, established in the 1950s to regulate internal migration of people. The *hukou* system has both a "rural/urban" dimension and a geographic dimension. Since the reform and open-up policy in late 1970s, the *hukou* system has gradually evolved towards a weakening of the rural/urban divide, but a strengthening of the geographic element, due to increased regional inequality (Kanbur and Zhang, 2005; Zhang, 2006) which led to a divergence in benefit levels attached to *hukou*. Currently, *hukou* is still one of the most important mechanisms determining entitlements to health, education and social services, which are mainly funded by local governments (Chan and Buckingham, 2008). Under the current system, migrant children without local *hukou*, as outsiders, are not entitled to free compulsory education stipulated by Chinese laws. The education budget for primary schools and middle schools is allocated through local governments at the county/district level. State funding for compulsory schooling differs vastly by locality and is not portable across different cities. If migrant children were allowed to attend local schools, it would increase the financial burden of the local government (Liang and Chen, 2007).

In the early 1990s, many children migrated with their parents and lived in cities. However, it was difficult for them to enter public schools due to hefty "out-of-district" fees and requirements on various documents and certificates that

many migrant parents were unable to provide. Even if some migrant parents were able to afford the tuition and to provide all necessary documentations, they might still not be able to enroll their children in a public school as spaces were limited. As a result, migrant schools were established as informal unlicensed private schools. Owing to substantial demand, migrant schools flourished quickly and their enrollments had skyrocketed in a very short period of time. By the early 2000s, migrant schools admitted more migrant children in cities than public schools.

Before 2000, migrant schools were typically owned and operated by entrepreneurs as private businesses, and offered inferior conditions as school owners tried to minimize their costs and the schools were subject to constant closures and changes of places due to lack of a clear legal standing within China's educational system (Han, 2004). In more recent years (post-2000), the conditions in many migrant schools have improved substantially, thanks to donations from the society and in some cases subsidies from local government. Meanwhile, as many migrant schools were shut down by local governments, others failed or are merged by competitors due to mismanagement and low education quality, today's migrant schools are believed to be significantly better than 10 years ago. Still, migrant schools and their students are "not-in-the-system" and face substantial institutional barriers. Because a student can only take the college entrance exam in the municipality where his/her *hukou* is, migrant children face more and more difficulties as they go up the educational ladder.

There are considerable heterogeneities regarding how migrant schools are treated in different cities. The Chinese central government issued a directive in 2003 stating

that educating migrant children was the “responsibility” of the local government in the destination areas, and public schools should be the primary channel through which migrant children receive education. Nevertheless, local governments only complied with this directive partially, and to different degrees, as no specific funding was provided for such purposes. Generally speaking, in small cities where there are relatively few migrants, most migrant children are able to enroll in local public schools. However, in big cities such as Beijing, Shanghai and Guangzhou, spaces in public schools are limited, especially in peripheral areas, and migrant schools play a more important role in the education of migrant children.

2.2 Education of migrant children and migrant schools in Shanghai

Our study is based in Shanghai, one of the largest migrant-receiving cities in China. Among all major cities, Shanghai is probably among the most accommodating ones in terms of meeting migrant children’s education needs. In 2008, Shanghai government launched a “three-year action plan for the education of migrant children”, which was characterized by further opening up public schools to migrant children and providing financial subsidies to migrant schools. In Shanghai’s central districts, all migrant schools were shut down and migrant students in these districts were transferred to public schools. In peripheral districts, as there were not enough public schools for all migrant children, government allowed migrant schools to continue operating and started to subsidize them.

Among around half a million migrant students in Shanghai, about 70 percent

are enrolled in public schools while the rest study in migrant schools.³ No tuitions are charged on students in both types of schools. The schools, however, usually charge some other fees that cover the costs of lunch and some extra-curriculum activities. The fees ranged from around RMB200 to RMB800 per semester for the schools that we surveyed and there were no additional fees charged to migrant students in public schools. Usually, it is the district education bureaus who assign students to a specific public school, with the principle to first satisfy the education needs of Shanghai *hukou* students within the school district, then the needs of migrant students.

In recent years, Shanghai government has increased both financial and administrative support for migrant schools. In terms of financial support, per pupil subsidy has increased from RMB2000 in 2008, to RMB4500 in 2010 and RMB5000 in 2012 (see Figure 1). Although it represents only around one third to one fourth of the per pupil funding for public schools, such subsidies are sufficient to cover the operating expenses of migrant schools. In terms of administrative support, local district education bureau has given more training opportunities to teachers in migrant schools and conducted more demanding monitor programs including annual check-ups.

Similar to those in other cities, Shanghai's migrant children face considerable institutional barriers. While almost all migrant children can go to a primary school (either a public or a migrant one), not all of them can go to a local middle school as migrant middle schools are not allowed to operate and there are not enough public

³ Please refer to the Chinese web link:
http://news.xinhuanet.com/edu/2011-01/07/c_12955674.htm.

middle schools. Beyond middle school, migrant youths have few educational opportunities if they choose to stay in Shanghai, except for some vocational high schools.

2.3 Previous studies

The issue of migrant children's education has received considerable attention from domestic and international scholars, including Han (2004), Kwong (2004), Zhou (2006) and Goodburn (2009), etc. However, most of these studies are qualitative and fall short of quantitatively assessing the relative qualities of migrant schools and public schools.

Only two studies that we are aware of have used standardized test scores to study the academic performance of migrant children. Lai et al. (2011) compares Math scores of students in migrant schools in Beijing with those in rural public schools in Shaanxi. They find that students in migrant schools perform better than their counterparts in rural public schools in one of the poorest regions of the country. While it is interesting to contrast migrant schools in cities with rural public schools where the migrant children came from, we believe it is more policy-relevant to compare migrant schools with urban public schools, as most migrant children are expected to stay in cities. Actually, Lai et al. (2011) also compare migrant students in migrant schools with those in public schools in Beijing, and find they score significantly lower. Nevertheless, their sample only includes four public schools in Beijing and they choose not to report the empirical results in their paper.

Chen and Feng (2013) compare migrant students in migrant schools and public schools in Shanghai based on both Chinese and Mathematics scores. In doing so, they carefully control for other confounders such as student characteristics and family background, and correct for possible self-selection biases using an instrumental variables approach. They find that school type is the most important determinant of Chinese and Mathematics test scores, as well as parental satisfaction and parental assessed school quality. The effect of school type on test scores is large, and overwhelms many important student and family effects - if all migrant students in migrant schools are reassigned to public schools, holding everything else constant, the overall test score gap between migrant students and shanghai students would be reduced by 40% for both Chinese and Mathematics.

Both Lai et al. (2011) and Chen and Feng (2013) are cross-sectional studies, and only analyze migrant children's academic performance at one point of time. To date, no one has tempted to examine the changes in test scores to shed light on the dynamics of the quality of migrant schools. We do exactly that in this paper.

3. Data and Methodology

3.1 Description of the Data

Data for this study were collected by the authors of this paper from 20 elementary schools in Shanghai for two waves. Table 1 presents the sample size in both waves. In November 2010, we conducted the first wave study and selected 11 public schools and 9 migrant schools. All fourth grade students from these schools

were interviewed and given the same tests on Chinese and Mathematics. Because the municipality government had shut down all migrant schools in the central districts of Shanghai, all 9 migrant schools were from the peripheral districts. On the other hand, 5 public schools were from the central districts and the rest were from the peripheral districts. All public schools we selected admitted a significant number of migrant students, with the percentage of non-*hukou* students ranging from 27 percent to 83 percent. Each school had between 2 to 6 classes in the fourth grade. Class size ranged from 18 to 59 students. Thanks to the cooperation from school administrators, our response rate of school survey was close to 100%. For migrant schools, we surveyed 1,323 migrant students from 30 fourth grade classes. For public schools, 664 migrant students and 597 Shanghai students from 42 fourth grade classes were surveyed.

The second wave study was conducted in May 2012. By then, our sampled students were in their second term of the fifth grade which was the last term in primary school. We were able to successfully revisit all 20 schools. We interviewed and gave Mathematics and IQ tests to all 5th grade students from these schools. In terms of number of students covered, we had 1,343 migrant students from the 9 migrant schools, which was more than the first wave due to net transfer-ins. The number of migrant students and Shanghai students surveyed from the 11 public schools were 619 and 582, respectively. Compared to the first wave, the sample attrition rates were around 20% for migrant schools and 7% for public schools.

In both waves of study, we collected information at the school, class, student

and parent level through the following: 1) a school survey completed by a school administrator; 2) a class survey completed by the master teacher of the class; 3) a student survey completed by students in class under the instruction of our surveyors; 4) a student information sheet completed by the master teacher; and 5) a parent survey completed by parents. The school survey collected basic information about the school, such as its history, number of classes and students, basic characteristics of all teachers, sources of funding, enrollment requirements for students without Shanghai *hukou*, fees, and so on. The class survey included questions about the whole class, such as its curriculum, educational background and teaching experiences of course instructors. The student survey asked the students questions such as their prior history of school transfer, time use after school, whether parents helped them with study after school, personal feelings about going to school, etc. The student information sheet collected basic information about each student in a class, such as their *hukou* status, gender, age, height and weight, disability status, class performance evaluated by the master teacher. Lastly, the parent survey asked information about parents, including their age, education and income, migration history, expectations on their children's education, self-assessment of school quality, and overall satisfaction with the current school, among other things. Students were instructed to give the parent survey questionnaires to their parents to complete, and bring back the questionnaires on the next school day. In case of unfilled questions, our interviewers would work with the master teacher to resolve the issue, and check

by telephone with parents directly if necessary.⁴

It is worth emphasizing again that we have given identical tests to students in both public schools and migrant schools. Because migrant schools are considered as only “informal” schools and not part of the local educational system, the education bureaus do not give standardized tests to students in migrant schools. The school self-administered tests also do not reflect the true performance gap between migrant schools and public schools. Actually, because migrant schools are private schools and face competition in terms of student enrollment, many are reported to give inflated scores to their students.⁵ Our Mathematics tests were designed by experts outside the sample schools, and incorporate different curriculum requirements by Shanghai and other provinces. Test time for Mathematics was 20 minutes and for IQ was 10 minutes, proctored by both the master teacher of the class and one of our interviewers.

Finally, we conducted a telephone follow-up survey and called parents of all migrant students (from both migrant schools and public schools) in October 2012. Because these students had graduated from primary schools in June 2012, we asked whether the student entered middle schools and whether they stayed in Shanghai after graduation. The response rate was close to 80%.

3.2 Empirical methodology

⁴ All questionnaires are available from the corresponding author upon request.

⁵ Even though migrant schools in Shanghai were funded by the government in our sample period, they still have incentives to compete for student enrollment, as the amounts of government subsidy are based on the number of students.

In our empirical work, we use the following model to examine the relative change of migrant schools:

$$Y_{it} = \beta_0 + \beta_1 M_{it} + \beta_2 D_{it} + \beta_3 M_{it} * D_{it} + X'_{it} \delta_1 + X'_{it} * D_{it} \delta_2 + \varepsilon_{it} \quad (1)$$

Where Y_{it} is the education outcome variable that we are interested in for student i at time t ($t=0$ for wave 1 and $t=1$ for wave 2). M_{it} is a dummy variable for the type of school, which equals to 1 if student i is enrolled in a migrant school, 0 if in a public school. D_{it} is a dummy variable for the second wave conducted in 2012 ($D_{it}=0$ if $t=0$ and $D_{it}=1$ if $t=1$). X_{it} is a vector of control variables including student and parental characteristics, such as age, gender of the student, parental education and family income. ε_{it} is the error term which includes all other factors that also affect the educational outcome. In our empirical work, we cluster the error term at the class level to capture within-class correlations in ε_{it} .

When test score is used as the outcome variable, the coefficient β_1 corresponds to the test score gap between migrant students in migrant schools and public schools in 2010, holding everything else unchanged. The coefficient β_2 represents the change of score between 2010 and 2012 for students in public schools. Our primary interest is β_3 , which captures the relative improvement in test score for migrant children in migrant schools compared to their counterparts in public schools between the two waves.

4. Empirical Results

4.1 Summary Statistics

Table 2 compares migrant schools with public schools in our sample. On a per student basis, there are more teachers in public schools. The average class size of the public schools is only around 60% of that of the migrant schools. Similarly, the student-teacher ratio of the public schools is only half of that of the migrant schools. In addition, public school teachers are more experienced, have worked in the present school longer, have higher levels of education, and earn more.

Comparing the two waves, we see that there have not been much change regarding class sizes, i.e., quantities of teachers at the per student level in both types of schools stayed the same. However, qualities of teachers in migrant schools seem to have improved relatively. The percentage of teachers with at least 6 years' experience has increased from 39% to 54% in migrant schools, while this ratio stayed the same in public schools. Similarly, while 66% of teachers in migrant schools had only worked in the school for less than 3 years in wave 1, in the second wave this percentage has declined to 18%, suggesting a rapid drop in teacher turnover. There has not been much change in terms of teacher's level of education. Regarding monthly salary, while 80% migrant school teachers only earned less than RMB3,000 in 2010 (wave 1), by 2012 (wave 2) more than half earned more than RMB3,000.⁶

Table 3 lists summary statistics at the student level, by three groups separately: students with Shanghai *hukou* (Shanghai students) in public schools, students without Shanghai *hukou* (migrant students) in public schools, and migrant students

⁶ The official monthly minimum wage level in Shanghai was RMB1,120 in year 2010 and RMB1,450 in year 2012.

in migrant schools. The sample includes all students appearing in both waves with no missing values for important variables that are used in our regressions. Sample sizes for the three groups are 430, 455, and 784 respectively.

Panel A of Table 3 presents basic student and family characteristics. Compared with Shanghai students, migrant students are older, more likely to be boys with siblings, and less likely to have attended kindergarten. This is especially so for migrant students from migrant schools. Parents of migrant students from migrant schools have significantly lower levels of education and lower family incomes than migrant parents from public schools. Shanghai parents have much higher education levels than migrant parents, but their family incomes do not differ much from migrant parents in public schools. Because family incomes (expressed as intervals) are similar in both waves, we only report the distributions for the second wave. It is also important to note that parents of Shanghai students in our sample are not representative of the *hukou* population in Shanghai, as the public schools we have selected are in the lower end of the distribution in terms of school quality among all public schools. Parents of Shanghai students from these public schools are thus of relatively lower social economic status relative to other Shanghai parents who could transfer their students to better schools.

We then report test scores for the three groups in Panel B of Table 3. In both waves, Shanghai students have the highest average test scores in Mathematics, although the differences with migrant students in public schools are quite small. The raw Math score gaps between Shanghai students and migrant students in public

schools are 2.5 and 4.9 points in the two waves, respectively. By contrast, the Math score gaps between migrant students in public schools and migrant schools are much more pronounced, at 15.5 in the first wave and 10.7 in the second wave. To make the test scores between the two waves comparable, we standardize the test scores by deducting the mean from the raw score and dividing its standard deviation in the two waves separately, such that in both waves the mean standardized test score is zero and the standard deviation is one. Noticeably, the score gap between migrant students in the two types of schools shrank from 0.75 standard deviations (s.d. hereafter) in the first wave to 0.56 s.d. in the second wave. The Raven's IQ test scores, based on 15 questions, are also reported for the three groups. Shanghai students and migrant students in public schools essentially have the same IQ scores, but migrant students in migrant schools score around one point lower. Previous studies suggest that IQ scores are affected both by genetics and environments children are exposed to. The correlation coefficient between the IQ score and Math score is around 0.4 in our sample, consistent with findings in the literature.

Panel C of Table 3 shows some alternative outcome variables other than test scores. Firstly, all parents are asked about the overall satisfaction level about the school their children attend. Among the three groups, parents of migrant children in public schools are the most satisfied, with 44% of them reporting "very satisfied" in the first wave, as compared to 27% for parents of Shanghai students and 23% for parents of migrant children in migrant schools. This pattern remains unchanged in the second wave. Secondly, parents of migrant children are also asked to directly

assess the quality of schools as compared to the average-quality schools in their hometown. Not surprisingly, parents from public schools are significantly more likely to give more favorable assessments, with around 80% of them rating the quality of the current school “better than” their hometown schools in both waves. While this ratio stays basically unchanged in the two waves for parents from public schools, it has significantly improved for parents from migrants schools, from 47% to 55%. Lastly, we report post-graduation outcomes for migrant students based on the telephone follow up survey with their parents. After graduating from the primary school, only around half of all migrant school students stayed in Shanghai, and another one fourth went back to their hometown. For those migrant students in public schools, around 72% stayed in Shanghai and only 6% returned hometown. We were unable to obtain precise information for slightly more than 20% of the sample due to wrong telephone numbers, no answers, and other reasons.

4.2 Main Results on Test Scores

Table 4 reports OLS regression results of equation (1) using standardized Math score as the dependent variable. Since we are mainly interested in the differential effect of school type in both waves, the regression sample includes only 455 migrant students in public schools and 784 migrant students in migrant schools that appear in both waves of the study. Therefore, our results would not be biased due to changes in sample composition between waves, i.e., students transferred in might be different from those who dropped out of the sample.

In column (1) of Table 4, we do not control for any student and family background variables. Migrant school students scored 0.75 s.d. lower than public school students in the first wave, but the gap diminished by 0.19 s.d. in the second wave. Column (2) controls for student characteristics, including gender, age, single child, rural *hukou*, kindergarten, and number of hours student spent on homework per day. These variables are also interacted with the wave 2 dummy, although coefficients of these interaction terms are not reported in the table for brevity (similar hereafter). The test score gap in the first wave declined to 0.68 s.d. after these controls, but the change in test score gap increased to 0.25 s.d.. In column (3), we control additionally for family characteristics, including parental education, family income, number of years since parents first migrated, provinces of origin, and fathers' occupation. As expected, the test score gap in the first wave declined further to 0.61 s.d.. However, the coefficient of the interaction term of migrant school and wave 2 dummy stayed basically unchanged. Lastly, in column (4) of table 4, we further control for IQ score. While the first wave score gap declined substantially to 0.5 s.d., as IQ are highly correlated with the Math score, the interaction term coefficient stayed the same at 0.25 s.d..

The nonrandom selection of students into different types of schools is likely to cause bias to the coefficient of the first wave score gap (see Chen and Feng, 2013 for more thorough discussions on this point). Given that IQ scores are highly correlated with Math scores and are likely partly caused by genetics and partly affected by study environments, we treat 0.61 s.d. in column (3) as an upper bound and 0.5 s.d.

reported in column (4) as a lower bound for the estimate of the first wave score gap. However, it is very important to notice the robustness of the interaction term coefficient estimate. To the extent that it stays unchanged in specifications with different control variables, we interpret this as suggesting that any potential biases from nonrandom selection are likely to be cancelled out in the two waves.

Table 5 reports some subgroup results to show possible heterogeneous effects. First, panel A divides students by quartile of math score in the first wave. It is clearly shown that migrant school students who scored low in the first wave have improved more relative to their low-performing counterparts in public schools. For those who were in the first and second quartiles in terms of first wave math score, migrant school students improved by 0.35 s.d. and 0.30 s.d. relatively. On the other hand, we do not see relative improvements of migrant students who scored above median in the first wave. This is consistent with the notion that the quality of migrant schools have improved relatively. Because migrant schools are worse than public schools, an improvement of quality is expected to benefit weaker students more.

Panel B of Table 5 shows that the relative gains of boys and girls are very close. Thus there does not seem to be any gender-specific story behind the relative improvements of migrant school students. On the other hand, when we divide students by parental income level, those in migrant schools with lower incomes have gained more, as shown in panel C. Similarly, panel D shows that migrant school students who have never transferred improved relatively less than those who have transferred. In both cases, relatively weaker students in migrant schools gained more,

consistent with the results shown in panel A.

The results reported so far suggest that the test score gap between migrant students in migrant schools and public schools has declined significantly, by one fourth s.d., or about half of the initial score gap (based on column (4) of Table 4). Students scored below median in the first wave in migrant schools have experienced the most relative progress. To the extent that we have already controlled for a wide range of student and family characteristics, the results can be interpreted as a relative improvement of the quality of migrant schools.

4.3 Robustness Checks

We then perform a series of robustness checks. First, we have used *hukou* status to identify migrant students as opposed to Shanghai students. All children without Shanghai *hukou* are classified as migrant students, including those from other cities and from well-off families. This conceptualization is slightly different from the popular view of “migrant children” who usually come from poor uneducated farm households. To examine the extent to which our definition of migrants affects the results, we restrict the sample along several different dimensions. In Panel A of Table 6, we include only those with rural *hukou*, thus exclude anyone who comes from a different city than Shanghai. Panel B excludes students whose parents own an apartment in Shanghai, as it signifies good economic status. Similarly, panel C excludes migrant students whose parents earn more than RMB10,000 per month. Panel D excludes all students whose parents have at least college education. In all

four cases, the coefficients on the migrant school dummy and the interaction term of migrant school and wave 2 are similar to our baseline results in Table 4.

In addition, our estimation of the relative changes might reflect decline in math scores of migrant students in public schools, instead of the improvement in migrant schools. For instance, if migrant students are discriminated in public schools, their test scores may fall. Although previous study (Chen and Feng, 2013) show that students in public schools indeed gain in public schools, we still perform a further test to rule out this possibility. We include both migrant students and Shanghai students in public schools in the regression, as shown in Panel E of Table 6. When IQ is also controlled, the coefficient of the interaction term is 0.28 s.d., which is only slightly larger than 0.25 s.d. as shown in Table 4. This shows that our estimates reflect relative changes in the quality of schools rather than just migrant students in the two types of schools.

Lastly, although we restrict our sample to those students who appear in both waves, our estimates may still be biased if students in the two types of schools follow different patterns of attrition between the two waves.⁷ In panel F of Table 6, we use a parametric approach developed by Fitzgerald, Gottschalk and Moffitt (1998) to formally correct for possible biases introduced by attrition. We first estimate the attrition probability of each student in the first wave, allowing covariates to have different effects for students in different types of schools, and then use the inverse of

⁷ Our regression results also suggest no systematic difference in terms of attrition patterns for migrant schools and public schools, although students in migrant schools are more likely to drop out of the sample. Most importantly, in both types of schools, students who scored lower in the first wave are more likely to attrite. The results are not shown in this paper due to space constraints but available from the corresponding author upon request.

the predicted attrition probability to weight the main regression equation. The results are quite close to the baseline estimates, suggesting that possible biases from sample attrition are negligible.

In all robustness checks, we show results both with and without controlling for the IQ score. As explained previously, due to nonrandom selection into different types of schools, the coefficient for the wave 1 test core difference is likely to be overestimated when IQ is not controlled for, but underestimated when IQ is controlled for. For our robustness checks, the coefficients on the migrant school interacted with wave 2 dummy are unaffected whether IQ is controlled for or not, suggesting that any possible biases on the interaction term from self-selection are cancelled out.

5. Discussions

5.1 Has the quality of migrant schools indeed improved relative to public schools?

Although we have controlled for many important observable student and family characteristics in our regressions, the decline in the test score gap cannot be readily interpreted as relative improvement of the quality of migrant schools, as unobserved student and family factors might have changed between the two waves. For example, if student in migrant schools studied harder before wave 2 as they face more competition in terms of entering middle schools, then this would also generate convergence of test scores between the two types of schools. Table 7 provides some additional pieces of evidence that hopefully help to rule out these alternative stories.

All regression results reported in Table 7 use the specification as stated in equation (1), with the same explanatory variables as in Table 4, but the dependent variables are now measures of efforts/expectations/attitudes of students and parents, not test scores. We examine the following: (i) Time spent on home work per day as reported by the student (choose from: more than 2 hours, between 1 hour and 2 hours, or less than 1 hour); (ii) Frequency with which the student asks the teacher for help when necessary, also reported by the student (choose from: very often, sometimes, or never); (iii) Frequency with which parents tutor the student on homework, as reported by the student (choose from: very often, sometimes, or never); (iv) Number of hours parents spend on tutoring homework per day, as reported by the parents (parents fill in a number directly); (v) Parents' view on whether study is important for the child's future, also reported by parents (choose from: very important, somewhat important, or not important); (vi) Parental expectation on child's ultimate level of education, as reported by parents (choose from: four-year college with bachelor's degree and above, two-year college with associate degree, high school, or middle school and below); (vii) The extent parents care their children's study, as reported by the master teacher of the class (choose from: care very much; care sometimes; or not at all).

In all cases with categorical answers, we run ordered probit regressions and report the marginal effects of changing to the most positive choice from the second most positive one. For example, for (v) we report marginal effects of switching from parents feeling "somewhat important" to "very important". For (iv) we just run an OLS regression similar to Table 4.

Overall we do not find evidence suggesting that students/parents in migrant schools have made more efforts or cared more about study in wave 2 as compared to wave 1, relative to their counterparts in public schools. Among all coefficients on the interaction term of migrant school and wave 2 dummy reported in Table 7, only (i) has a marginally significant effect at the level of 10%, but with the “wrong” sign, suggesting that migrant school students have reduced homework time per day relative to public school students. This does not necessarily mean that migrant school students worked less hard in the second wave, though, as sometimes spending more than 2 hours on homework per day merely indicates having difficulties in completing the homework.

Next, we provide one more piece of evidence that suggest qualities of migrant schools have indeed improved relative to public schools. In Table 8, we use parental self-assessed quality of schools as the outcome variable and run the same regression as in Table 4. For migrant parents, in both waves we have asked them to report whether they think the quality of the current school is “better than”, “similar to”, or “worse than” schools from their hometown. Parents migrated from their hometown as adults, and they should have a fairly good idea about the quality of schools in their hometown based on their own experience and constant interactions with people still living in their hometown. In addition, any time-unvarying measurement error should be cancelled out with our estimation strategy. For example, if a parent underestimates the quality of schools in his hometown in both waves to the same extent, this would not bias our estimates.

The first column of Table 8 presents results from a simple specification without any additional controls. Compared to parents from public schools, parents from migrant schools do have worse assessments of the schools their children attend. In the first wave, the probability of reporting “better than schools from hometown” is 30% lower for parents from migrant schools. However, in the second wave, this disparity in probability has decreased by 8%, which is significant at the 5% level. Column (2) controls for student characteristics and their interaction terms with wave 2 dummy. In Column (3) of Table 8, we additionally control for family background variables. Finally, the last column of Table 8 reports results that also control for standardized Math score and its interaction with the wave 2 dummy. All results suggest that migrant schools have received better quality assessments in the second wave relative to public schools, consistent with our previous results on test scores.

To better understand the causes of the improvement of quality of migrant schools, we conducted in-depth interviews with 4 migrant schools and 2 public schools from our sample in early 2013. In each occasion, we talked with a major school administrator (most of the cases the school principal) for around two hours. All migrant school administrators identified increasing financial assistance from the government as the most important factor underlying the improvement of the school quality. Other than government funding, the financial aids from other social organizations are negligible, so crowding out effect is not important. Before 2008, migrant schools rely mainly on tuition income for daily operations and paying teacher salaries, with tuition level of around RMB600-800 per pupil in year 2007. Since 2008,

although schools no longer charge tuitions, the per pupil subsidy provided by the government was several times the level of tuition. This allows migrant schools to upgrade teaching facilities, and more importantly, recruit better teachers and incentivize them to work harder (see Rivkin, Hanushek and Kain, 2005 for the importance of teachers on quality of education, for example). Because migrant schools are now essentially government-funded, it is no longer profit-driven as before, and government ensures that all revenues are properly spent on improving the schools rather than go into the pockets of school owners. In particular, the government requires that no less than 60% of the funding has to be spent on teacher's salary. Thanks to the ever rising subsidy levels⁸, median teachers' monthly salary has increased from around RMB1,500 in 2009 to around RMB3,500 in 2012. According to the school administrators that we have interviewed, the increase in teachers' wage has made the teaching jobs in migrant schools much more attractive, which has significantly reduced the turnover rate of teachers and improved their work efforts. On the other hand, there have been virtually no changes in the median salary levels of public school teachers.

5.2 Beyond the quality of migrant schools.

Despite evidence presented on the relative improvements of the quality of migrant schools, it is interesting to evaluate whether such improvements have been

⁸ Average per student subsidy provided by the government was RMB1,500 during the three years prior to our first wave study (2007-2009), and have more than doubled to almost RMB4,000 for the three years prior to our second wave study (2009-2011).

translated into higher parental satisfaction levels. After all, parents of migrant children are “consumers” of the educational service, thus ultimately only their satisfaction matters. In our survey, parents are asked to report whether they are “very satisfied”, “satisfied”, or “not satisfied” with the current school their children attend. Based on the same specification in equation (1), Table 9 shows results on the marginal effects changing from “satisfied” to “very satisfied”. The four different columns differ in the control variables included, with column (4) controls for all student and parental characteristics as well as standardized Math scores. The marginal effects for the migrant school dummy and the interaction term of migrant school with wave 2 are both robust across the four columns.

Unsurprisingly, parents in migrant schools are overall significantly less satisfied with schools than their counterparts in public schools. Based on column (4) of Table 9, holding everything else constant, if a student is transferred from a migrant school to a public school, then the probability of reporting “very satisfied” (as compared to “satisfied”) would increase by 22% in the first wave. However, there are no relative improvements for migrant school parents in terms of overall satisfaction between waves, as shown by the insignificant interaction term. This is somewhat surprising given that migrant parents have had better assessments of quality of migrant schools.

We believe one has to look beyond the quality of schools or learning happened in schools, to understand the non-convergence of satisfaction levels. Despite the relative improvements of migrant schools per se, they still face considerable institutional barriers under China’s current education system, which make them not on a leveled

playing field with public schools. Migrant schools are still “not-in-the-system”. Teachers receive significant less pay, less training, and their job security is by no means guaranteed as compared to public school teachers.

One important aspect of the institutional barriers related to parental satisfaction is the chance of entering middle schools in Shanghai. Because migrant middle schools are not allowed in Shanghai, and there are not enough spaces in public middle schools, many migrant children are forced to leave after they finish primary school. This is an undesirable outcome for most families, as it means the child become “left-behind” and has to be separated from her parents who stay in Shanghai for job’s sake.

Table 10 examines the determinants of a student’s probability of entering a middle school in Shanghai after she graduated. The information was collected through telephone interviews of parents in October 2012. The main results are shown in Column (1) of Table 10, with the dependent variable being attending middle school in Shanghai. Student and parental characteristics are also controlled for, including Math score and its interaction term with migrant school. The results show that migrant school graduates are significantly less likely to enter middle schools in Shanghai. Math scores seem not to matter. Although students with higher IQ scores are more likely to stay in Shanghai, the effect is small in magnitude as compared to that of school type. For someone in a migrant school to have the same probability of entering Shanghai’s middle school, holding everything else constant, she needs to have an IQ score 11 points higher than her counterparts in a public school, which is almost impossible given that the total IQ score is only 15. Most of the other factors are not

statistically significant in the regression. The results are consistent with the institutional arrangements in Shanghai. Middle school entrance is not merit-based, as no formal tests are allowed.⁹ Migrant schools students are only accepted conditional on there are still vacancies after students from public schools are enrolled.

The next several columns of Table 10 show some robustness check results. Column (2) excludes students whose parents answered that they preferred to go to a migrant school in the first place. These parents may choose not to go to middle schools in Shanghai after graduation. Column (3) excludes parents who plan to leave Shanghai in 5 years, and column (4) excludes those who have stayed in Shanghai for less than 5 years. Both groups of students are likely from temporary migrant families, who may prefer not to stay in Shanghai anyway. Finally, in columns (5) and (6) of Table 10, we also include students for which we do not know for sure whether they have stayed in Shanghai, and treat them either as all going back to hometown (column 5) or all staying in Shanghai (column 6). The results suggest that unknowns do not alter our results significantly. In all cases, the marginal effect of graduating from a migrant school on the probability of entering a middle school in Shanghai remains large in magnitude and highly significant statistically.

6. Conclusion

This paper studies migrant children in migrant schools and public schools in Shanghai, drawing on two waves of surveys and standardized tests conducted in 2010

⁹ Tests may be used in some cases for some highly competitive elite middle schools.

and 2012. We find that although migrant school students still perform worse than their counterparts in public schools, the test score gap has narrowed considerably. In particular, those worse-than-average migrant school students have gained more relatively. In addition, parental subjective evaluations of migrant schools have also improved relative to those of public schools. We argue that such improvements are unlikely driven by changes on the parts of students and parents, but rather reflect relative quality upgrading of migrant schools. We associate such improvements to policies adopted by the Shanghai government toward migrant schools since 2008, especially the ever-increasing level of financial subsidies, which allow schools to keep better teachers and properly incentivize them. In some sense, money matters here. This result is probably unsurprising given that migrant schools have very low levels of resources, thus the marginal impact of increased investments is relatively large. Given that other big cities, such as Beijing and Guangzhou, have provided essentially no financial support to migrant schools, what happened in Shanghai seems remarkable and should serve as a model to other cities.

On the other hand, there has been little change in the general environment in which migrant schools exist. Despite the gains in test scores, we find that the overall satisfaction level of parents of migrant schools have not improved relative to public school parents. Migrant schools, as low quality private schools in China's current educational system, face considerable institutional barriers. Conditional on test score, students in migrant schools are significantly less likely to enter public middle schools in Shanghai, leaving many migrant children to return to their hometown and away

from their parents. To truly promote equality in education opportunities, governments should not only provide more financial assistance to migrant schools so that they become better teaching institutions, but also remove external institutional barriers to level the playing field for migrant schools and public schools alike. One policy recommendation for Shanghai is to allow migrant middle schools to exist so that migrant students can continue their education without being left behind.

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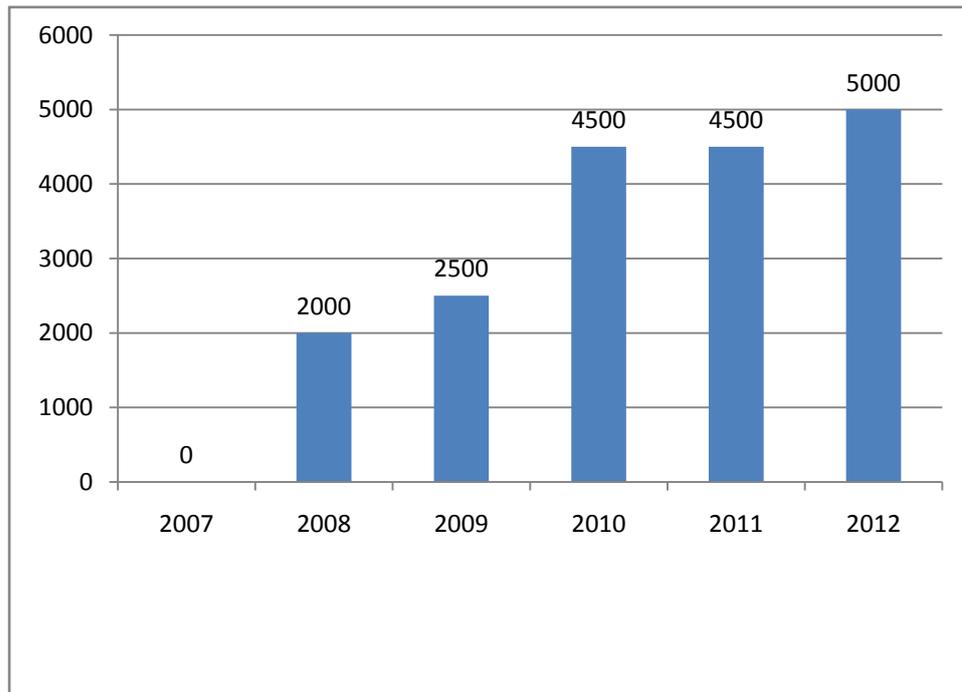
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Figure 1. Per Pupil Government Subsidy for migrant schools in Shanghai (RMB)



Note: Information provided by Shanghai Education Bureau.

Table 1. Sample size in public and migrant schools

	Public schools	Migrant schools
Number of schools	11	9
In central districts	5	0
In peripheral districts	6	9
Number of classes	42	30
Number of students		
Wave 1 (Nov. 2010)	1261	1323
Shanghai students	597	0
Migrant students	664	1323
Wave 2 (May 2012)	1201	1343
Shanghai students	582	0
Migrant students	619	1343
Students in both waves	1173	1046
Attrition Rate	7%	20%

Table 2. Characteristics of teachers in the sampled schools

	Wave 1		Wave 2	
	Migrant School	Public School	Migrant School	Public School
Number of Schools	9	11	9	11
Class Size	47.5	31.5	50.0	31.1
Student Teacher Ratio	22.3	11.4	23.6	11.7
Teachers' Overall Experience				
- Less than 3 years	0.23	0.04	0.13	0.04
- 3 to 5 years	0.38	0.06	0.34	0.06
- More than 6 years	0.39	0.90	0.54	0.90
Teachers' Tenure with Current School				
- Less than 3 years	0.66	0.07	0.18	0.05
- 3 to 5 years	0.27	0.10	0.69	0.12
- More than 6 years	0.06	0.83	0.13	0.83
Teachers' Level of Education				
- High school and below	0.24	0.05	0.21	0.02
- Associate degree	0.59	0.36	0.60	0.32
- Bachelor's degree and above	0.16	0.58	0.19	0.66
Teachers' Monthly Salary				
- Below RMB3000	0.80	0.01	0.41	0.00
- RMB3000 to RMB4000	0.18	0.03	0.35	0.03
- RMB4000 to RMB5000	0.02	0.26	0.23	0.11
- Above RMB5000	0.00	0.71	0.01	0.87

Note: Authors' calculations based on surveys conducted in Shanghai.

Table 3. Sample summary statistics

	Public schools		Migrant schools
	Shanghai students	Migrant students	
Sample Size	430	455	784
<i>Panel A: Student and family characteristics</i>			
Age (Wave 2)	11.4	11.6	11.6
Female	0.50	0.45	0.42
Rural hukou	0.06	0.71	0.93
Single Child	1.00	0.45	0.31
Kindergarten	1.00	0.96	0.89
Father High School & Above	0.81	0.45	0.27
Mother High School & Above	0.78	0.29	0.18
Family Income (Wave 2)			
-Below RMB3K	0.18	0.16	0.31
-RMB3-5K	0.31	0.37	0.45
-Above RMB5K	0.52	0.47	0.24
<i>Panel B: Test scores</i>			
Raw Math (Wave 1)	65.51	63.03	47.48
Raw Math (Wave 2)	61.05	56.19	45.45
Standardized Math (Wave 1)	0.55	0.43	-0.32
Standardized Math (Wave 2)	0.54	0.29	-0.27
IQ (Wave 2)	11.60	11.61	10.47
<i>Panel C: Other outcome variables</i>			
Parental Satisfaction (Wave 1)			
-not satisfied	6.0%	2.7%	10.1%
-satisfied	67.3%	53.4%	67.0%
-very satisfied	26.7%	43.9%	23.0%
Parental Satisfaction (Wave 2)			
-not satisfied	6.3%	2.0%	8.6%
-satisfied	67.6%	50.7%	63.8%
-very satisfied	26.1%	47.4%	27.7%
Parental Assessed School Quality (Wave 1)			
- worse than hometown		4.7%	11.9%
- similar to hometown		14.9%	40.9%
- better than hometown		80.4%	47.2%
Parental Assessed School Quality (Wave 2)			
- worse than hometown		4.9%	10.1%
- similar to hometown		16.5%	35.5%
- better than hometown		78.6%	54.5%
Middle-School Outcome			
- school in Shanghai		71.6%	53.5%
- school in hometown		6.0%	25.2%
- don't know		22.5%	21.3%

Table 4. OLS results on standardized math scores

	(1)	(2)	(3)	(4)
Migrant school * Wave 2	0.19** (0.09)	0.25*** (0.09)	0.27*** (0.09)	0.25** (0.10)
Migrant school	-0.75*** (0.12)	-0.68*** (0.12)	-0.61*** (0.12)	-0.50*** (0.11)
Wave 2	-0.14** (0.06)	-0.17 (0.43)	-0.43 (0.45)	-0.19 (0.48)
IQ				0.14*** (0.01)
Rural hukou		-0.19 (0.13)	-0.17 (0.12)	-0.13 (0.11)
Female		-0.08* (0.04)	-0.09** (0.04)	-0.07 (0.04)
Age in month		-0.01*** (0.00)	-0.01* (0.00)	-0.00 (0.00)
Single child		0.12** (0.06)	0.10* (0.06)	0.09 (0.06)
Kindergarten		0.07 (0.09)	0.00 (0.09)	-0.03 (0.09)
1-2h homework time		0.24*** (0.07)	0.24*** (0.07)	0.17*** (0.05)
>2h homework time		0.19*** (0.07)	0.17** (0.07)	0.11 (0.07)
Family income 3-5K			0.10 (0.06)	0.06 (0.06)
Family income>5K			0.10 (0.06)	0.05 (0.06)
Father high school & above			0.06 (0.07)	-0.01 (0.06)
Mother high school & above			0.17* (0.09)	0.20** (0.08)
Years since migration			0.01*** (0.01)	0.01*** (0.00)
Province of origin dummies	No	No	Yes	Yes
Father's occupation dummies	No	No	Yes	Yes
Number of Observations	2,478	2,478	2,478	2,478
Adjusted R-squared	0.109	0.142	0.162	0.263

Note: Numbers reported in parentheses are robust standard errors clustered at the class level. ***, **, * stand for statistical significance at 1%, 5% and 10%, respectively. Wave 2 dummy is also interacted with all other variables but results are not included in the table.

Table 5. Subgroup OLS results on standardized math scores

	Not controlling for IQ	Controlling for IQ	Sample Size	% in migrant schools
Panel A: by wave 1 math score quartile				
1st quartile (lowest 25%)	0.36*** (0.13)	0.35** (0.13)	634	88.3%
2nd quartile	0.27** (0.11)	0.30*** (0.11)	612	70.6%
3rd quartile	-0.12 (0.12)	-0.12 (0.12)	654	53.5%
4th quartile (highest 25%)	-0.25 (0.15)	-0.25* (0.15)	578	39.1%
Panel B: by gender				
Boys	0.28** (0.11)	0.23** (0.11)	1,418	64.5%
Girls	0.29** (0.11)	0.28** (0.12)	1,060	61.6%
Panel C: by parental income				
Family income>5000	0.03 (0.15)	0.06 (0.15)	659	44.8%
Family income<5000	0.34*** (0.10)	0.31*** (0.10)	1,819	70.0%
Panel D: by school transfer history				
Ever transferred	0.31** (0.12)	0.27** (0.12)	1,328	73.8%
Never transferred	0.19* (0.10)	0.18* (0.11)	1,150	51.1%

Note: The numbers reported are coefficients and clustered standard errors (in parentheses) for the interaction term of wave 2 dummy with migrant school dummy. The specifications in the first and second columns are the same as (3) and (4) in Table 3, respectively. ***, **, * stand for statistical significance at 1%, 5% and 10%, respectively.

Table 6. Robustness checks

(1)	(2)	(3)	(4)	(5)	(6)
NOT Controlling for IQ		Controlling for IQ		Sample size	% in migrant school
Migrant School	Migrant School *wave2	Migrant School	Migrant School *wave2		
A. Include only rural hukou students					
-0.66*** (0.13)	0.30*** (0.10)	-0.54*** (0.12)	0.27** (0.11)	2,087	69.10%
B. Exclude students whose parents own an apartment in Shanghai.					
-0.60*** (0.12)	0.30*** (0.09)	-0.47*** (0.11)	0.27*** (0.09)	2,240	66.20%
C. Only include students with family monthly income less than RMB10,000					
-0.61*** (0.12)	0.25*** (0.09)	-0.49*** (0.11)	0.24** (0.09)	2,315	65.30%
D. Only include students with parental education lower than college					
-0.61*** (0.12)	0.26*** (0.10)	-0.50*** (0.11)	0.25** (0.10)	2,335	64.80%
E. Include Shanghai students in public schools as well					
-0.66*** (0.12)	0.29*** (0.09)	-0.54*** (0.11)	0.28*** (0.09)	3,338	46.97%
F. Adjust for attrition between waves					
-0.64*** (0.12)	0.28*** (0.10)	-0.54*** (0.11)	0.25** (0.11)	2,478	63.28%

Note: all the regressions include the same set of variables in Table 3. ***, **, * stand for statistical significance at 1%, 5% and 10%, respectively.

Table 7. Regression results on students' and parental efforts/expectations/attitudes

		Migrant School * Wave 2	
		Marginal effect	s.e
(i)	Time Spent on Homework per day (&&)	-0.07*	(0.04)
(ii)	How often do you ask your teacher to help you? (&&)	0.07	(0.04)
(iii)	How often do your parents tutor your homework? (&&)	0.05	(0.04)
(iv)	Number of Hours parents spend on tutoring homework (^)	0.01	(0.04)
(v)	Whether parent think study is important? (^)	0.06	(0.06)
(vi)	Parental expectation of children ultimate education level (^)	0.02	(0.03)
(vii)	Whether parents care children's study? (##)	0.03	(0.06)

Note: Numbers reported in parentheses are standard errors clustered at the class level. The explanatory variables are the same as in column (4) of Table 3. (&&), (^), and (##) stands for information provided by the student, parent, and master teacher, respectively. ***, **, and * stands for statistical significance at the 1%, 5% and 10% level, respectively

Table 8. Ordered probit regression results on parental self-assessed school quality

	(1)	(2)	(3)	(4)
Migrant school * Wave 2	0.08** (0.04)	0.09** (0.04)	0.11*** (0.04)	0.11*** (0.04)
Migrant school	-0.30*** (0.03)	-0.30*** (0.03)	-0.32*** (0.03)	-0.31*** (0.03)
Wave 2	-0.02 (0.03)	-0.33 (0.24)	-0.38 (0.24)	-0.36 (0.23)
Standardized Math				0.02 (0.01)
Standardized Math * Wave 2				0.01 (0.02)
IQ		0.00 (0.01)	0.00 (0.01)	-0.00 (0.01)
Student characteristics	No	Yes	Yes	Yes
Family background	No	No	Yes	Yes
Province of origin dummies	No	No	Yes	Yes
Number of Observations	2,478	2,478	2,478	2,478

Note: Numbers reported in parentheses are robust standard errors clustered at the class level. ***, **, * stand for statistical significance at 1%, 5% and 10%, respectively. Student characteristics variables include age in month, and dummy variables on rural hukou, female, single child and kindergarten. Family characteristics include parental education, family income, number of years since parents first migrated, provinces of origin, and fathers' occupation. Wave 2 dummy is also interacted with all other variables but results are not included in the table.

Table 9: Regression results on parental overall satisfaction

	(1)	(2)	(3)	(4)
Migrant school * Wave 2	0.02 (0.04)	0.02 (0.04)	0.03 (0.04)	0.03 (0.05)
Migrant school	-0.21*** (0.03)	-0.22*** (0.03)	-0.24*** (0.03)	-0.22*** (0.03)
Wave 2	0.03 (0.02)	0.24 (0.22)	0.26 (0.25)	0.27 (0.25)
Standardized Math				0.03** (0.02)
Standardized Math * Wave 2				0.01 (0.02)
IQ		0.01 (0.00)	0.01 (0.00)	0.00 (0.00)
Student characteristics	No	Yes	Yes	Yes
Family background	No	No	Yes	Yes
Province of origin dummies	No	No	Yes	Yes
Number of Observations	2,478	2,478	2,478	2,478

Note: refer to note in Table 8.

Table 10. Regression results on the probability of entering middle schools in Shanghai

	(1)	(2)	(3)	(4)	(5)	(6)
Migrant school	-0.22*** (0.03)	-0.20*** (0.03)	-0.18*** (0.04)	-0.22*** (0.03)	-0.16*** (0.03)	-0.19*** (0.03)
Standardized Math	0.01 (0.02)	0.01 (0.02)	-0.01 (0.02)	0.01 (0.02)	0.05*** (0.02)	-0.00 (0.02)
Migrant school * Standardized Math	-0.02 (0.03)	-0.01 (0.02)	-0.00 (0.03)	-0.02 (0.03)	-0.07** (0.03)	-0.00 (0.02)
IQ	0.02*** (0.00)	0.02*** (0.01)	0.01*** (0.00)	0.02*** (0.01)	0.02*** (0.01)	0.01*** (0.00)
Student characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Family background	Yes	Yes	Yes	Yes	Yes	Yes
Province of origin dummies	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	1,144	963	852	1,074	1,467	1,467

Note: Results shown are marginal effects, not Probit regression coefficients. For additional note, please refer to note in Table 8.