Who Will Teach the Poor and Remote?

Teacher Distribution and Job Satisfaction in Rural China[1]

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Abstract

Teachers are a crucial element of educational opportunity structures. In China, the recent opening-up of labor markets, in general and within the school system, has raised concerns about retaining qualified teachers in schools serving poor communities. This paper considers the question: what factors keep teachers serving poor communities satisfied with their work?

The stratification of teacher qualifications in rural China as well as differential rates of teacher turnover are analyzed using ANOVA. Then, using bivariate and multivariate analyses of a survey of rural primary school teachers, principals and village leaders in one of China's poorest provinces, I investigate the role of individual teacher background, school environment, and community factors as influences on three measures of teacher work satisfaction. Consistent with research elsewhere, results show that younger, better-educated teachers are less satisfied, and that teachers in better-resourced schools with favorable organizational characteristics characterized by fewer discipline problems are more satisfied.

More surprisingly, models show that indicators of economic status of communities such as village income per capita and presence of rural enterprises are associated with lower levels of teacher satisfaction.

These results underscore the challenge that faces rural, impoverished communities as they seek to retain teachers, and especially well educated teachers. Results also suggest that economic development alone may not ameliorate the problem.

I. Introduction: The Stratifying Effects of Teacher Quality on Student Outcomes

The unequal distribution of qualified teachers is an important element in the stratification of educational opportunity in both the US context and the wider context of global society. Recruitment of qualified teachers tends to be most difficult in areas of high poverty such as in inner city schools in the US (Boe & Gilford, 1992; Boyd, Lankford, Loeb, & Wyckoff, 2003; Darling-Hammond & Green, 1994; Rosenholtz, 1985) and the rural areas of developing nations (Farrel & Oliveira, 1993). Studies have found the quality of the teacher to be one of the most salient and significant factors influencing student achievement (see for example Rivkin, Hanushek, & Kain, 2002). While the most qualified teachers are unequally distributed and concentrated mainly in pockets serving the children of the most privileged, teacher quality conceivably has a much larger impact on the achievement of underprivileged and minority students. In the words of James Coleman:

> "One must also be aware of the relative importance of a certain kind of thing to a certain kind of person. Just as a loaf of bread means more to a starving man than to a sated one, so one very fine textbook or, better, one very able teacher, may mean far more to a deprived child than to one who already has several of both." (1966, p. 22)

In developing countries, Bruce Fuller's extensive reviews of school factors that raise student achievement highlight factors such as teachers' knowledge of subject matter, verbal and math proficiency scores and, to a certain extent, formal education and post-secondary training (Fuller, 1987; Fuller & Clarke, 1994). In rural China, evidence suggests that teachers matter for student achievement: approximately one fourth of student test score variation may be attributable to teacher differences (Park & Hannum, 2001).

In addition to having an important impact on student achievement, teachers may also play a crucial role in educational attainment. Hanushek (1995) highlights the problem of the poor efficiency of low quality schools in developing countries. He argues that higher school quality results in lower dropout rates and that teacher quality is the most important factor contributing to overall school quality. Dropout rates would be much lower if the

quality of teaching could be raised such that students perceive schooling to provide valuable skills and learning. Using data from Kenya, Lloyd, Mensch and Clark (2000) find that teacher characteristics, in particular teacher attitudes, have an important impact on attainment, especially for girls. Earlier work in China has shown that attributes of teachers can be significantly linked to students' attachment to the schooling process (Hannum & Park, 2003).

In this paper, I first demonstrate that teachers are indeed unequally distributed in China, even in the rural areas of one of China's poorest provinces. In order to do this, I test the hypothesis that schools in villages that are poorer and more remote have fewer qualified teachers and higher rates of turnover. I then move on to test three hypotheses about how community, school and individual teacher characteristics relate to teacher job satisfaction in rural China. My three hypotheses regarding factors affecting teacher satisfaction are as follows:

1. Community factors: Teachers in villages that are poorer and more remote have lower levels of satisfaction.
2. School factors: Higher levels of teacher job satisfaction can be found in schools where there are more plentiful resources for a) teaching and b) teacher and student welfare; where teachers have higher levels of remuneration and salaries are paid on time; where there are higher levels of administrative support for teaching; and where there are fewer discipline problems.
3. Teacher background factors: Young teachers, female teachers, and more qualified teachers are all likely to be less satisfied with the teaching profession, while teachers who have more ties to the local community are likely to be satisfied with the teaching profession.

II. What Factors Keep Teachers Satisfied?

Despite the importance of teachers as an element of educational stratification, especially in poor settings where dropout rates are high, little research in developing countries has considered the factors that help under-resourced schools retain teachers. Discussing the U.S. case, Rosenholtz (1985) identifies the central problem of establishing effective schools in poor settings as being that "good teachers are difficult to recruit and

almost impossible to retain because the rewards of teaching do not outweigh the frustrations." (p. 354) The rewards and frustrations of teaching can be linked, conceptually and sometimes empirically, to aspects of the community contexts in which teachers function, to the schools where they work, and to the individual characteristics of the teachers themselves.

Community Factors

Around the world, community poverty presents significant challenges to teachers in under-resourced schools, ranging from the social problems that often attend impoverished communities to stringent limitations on the tax base for school funding. In China, as in other developing countries, teachers serving in rural communities experience particular challenges. Physical conditions brought about by poverty often make even daily necessities difficult to come by. In addition, teachers in rural villages may face a lack of access to transportation and cultural or educational facilities. Recreation and opportunities for enrichment and personal advancement are often limited relative to those available in towns and cities. Teachers may feel isolated, especially if they are from the outside or if there is a wide educational gap between themselves and the local community.

Further, with global trends toward educational decentralization, teachers and schools in many developing countries are increasingly dependent on the degree of financial and other support for education in the local community. Tsang (2003) describes the challenges that China has faced in the funding of basic education. The 1985 policy for the financial reform of basic education consisted of both: decentralization in educational administration and financing, and resource diversification. While the policies have been successful in accruing greater resources for educational funding overall, regional disparities in access to education have been exacerbated and rural communities have experienced the greatest difficulty in acquiring adequate resources for their schools.

In the case of some villages in post-reform China, local governments[2] have controlled the development of collectively owned enterprises to ensure that the village gets a portion of revenues. These revenues have then been directed to public needs such as education (see Oi, 1998; & Unger, 2002: 148-9). After decollectivization of agricultural production in the late 1970s and early 1980s, villages that were unable to establish industries and enterprises were left without revenue (O' Brien, 1994). Rural residents have been burdened with educational levies in addition to the school fees they must pay for their children to attend school and, though they must shoulder a disproportionate burden for the funding of education as compared with urban residents, rural schools have access to much fewer resources, including relative lack of access to qualified teachers. The poorest villages can get some minimal support in the form of various kinds of categorical grants from higher levels of government (Tsang, 1996), but, even with this assistance, collecting enough money to fund village schools has been challenging. Village governments have frequently been unable to come up with adequate funds to cover personnel expenses, which constitute the main cost of education. Teachers have instead been paid with IOUs and sometimes have had to wait for months to get their salary (Hannum & Park, 2002; Tsang, 2003).

With these factors in mind, I hypothesize that teachers in 1) villages with fewer economic resources, including where revenues are low and work opportunities few, and 2) remote villages where connections to the outside are limited and the population is small might have lower levels of job satisfaction. However, I acknowledge an alternative possibility: teachers in villages where there are state or privately-owned enterprises may be presented with a greater number of alternative employment opportunities and teachers in more connected, better educated, or higher income villages may have more access to information about the outside world, leading them to feel more dissatisfied with teaching as a career than those teachers in the poorest, most remote areas.

[2] Village governments take different shapes and forms and the role they play in financing village schooling is heavily influenced by the degree of industrialization in the village and their relationship to it. See Jonathan Unger (2002), Jean Oi (1998) and Lianjiang Li and Kevin O'Brien (1999) for more on this topic.

School Environment

Economic and organizational resources in schools may be linked to teacher satisfaction. Economic resources in the school that may affect teacher satisfaction include the teacher's level of remuneration, the conditions of the teachers' daily working environment and the resources that are available to facilitate their teaching tasks. Concerns with remuneration may be paramount. In the 1991-1992 Teacher Follow-Up Survey, a component of the 1990-1991 School and Staffing Survey in the U.S., poor salary was one of the most important reasons given for leaving teaching due to dissatisfaction in urban, high-poverty public schools and attrition due to dissatisfaction for teachers in small private schools (see Ingersoll, 2001). Schlechty and Vance (1983) also propose that low salaries and truncated salary scales are among the main reasons that the most academically able—those with alternative career options—leave teaching.

Ding and Lehrer (2003) provide a comprehensive description of the salary incentives employed in Chinese schools. In China, teacher remuneration is tightly tied to a comprehensive performance based ranking system. Teachers are evaluated by both subjective and objective mechanisms. Pay differentials between ranks are substantial, creating strong monetary incentives for teachers to attain the subsequent rank. Teachers are rewarded for their teaching skills (measured by both student examination scores and classroom observations performed by administrators and outstanding teachers from outside of the school); the quality and level of their own educational background and credentials; and the number of articles that they have published in teaching journals. Teachers are also evaluated on their ability to evaluate, monitor and mentor students and on their work ethic. This systematic linking of salary to teacher rank may have implications for teacher satisfaction.

The organizational conditions of schooling have garnered considerable attention in research on the effects of school characteristics on teacher retention and satisfaction (Ingersoll, 2001; Lee, Dedrick, & Smith, 1991; Little, 1982; Rosenholtz, 1985, 1989). Scholarly interest in organizational characteristics of schools in the U.S. in the 1980s and early 1990s coincided with a belief that school size was an important element. It was hypothesized that small, private schools were characterized by higher levels of the

ingredients for collegial cohesion and organizational consensus. Later studies found no evidence for this hypothesis (see Ingersoll, 2001; Lee et al., 1991) and instead found school size to be positively associated with teacher satisfaction (i.e. larger schools tend to have a higher proportion of satisfied teachers). Other aspects of school organizational climate that have been linked to higher levels of teacher satisfaction in the U.S. include collegiality and professional interactions among the staff (Lee et al., 1991; Newmann, Rutter, & Smith, 1989; Rosenholtz, 1985); administrative support for teaching in the form of mechanisms of teacher induction and organizational socialization, such as internships and mentoring programs (Ingersoll, 1997, 2001; Rosenholtz, 1985) and student discipline (Ingersoll, 2001).

In China, to my knowledge, there is no research on how either the school resources and working conditions or the organizational attributes of the school environment link to teacher satisfaction. I thus adopt a working hypothesis that teachers are less satisfied in schools with lower economic support for teaching and teacher and student welfare, lower levels of and less reliable remuneration; and a less favorable organizational climate characterized by problems with student discipline and lower levels of administrative support for teaching.

Teacher Background

In the U.S., a number of background attributes of teachers themselves have been found to be linked to levels of satisfaction. Demographic factors appear to matter. Young teachers have been shown to be more likely to leave than older teachers (Ingersoll, 2001; Murnane, 1987; Perie, Baker, & Whitener, 1997), though this might be partly a selection story. In addition, women have been found to be more satisfied than men (Chapman & Lowther, 1982; Ma & MacMillan, 1999). Perhaps more concerning is the finding that better qualified teachers tend to be more dissatisfied than less qualified teachers, and thus more likely to leave teaching (Darling-Hammond, 1984; Schlechty & Vance, 1983). This finding may be in part attributable to the fact that teachers with better qualifications perceive more alternative opportunities.

Whether relationships between teacher satisfaction and teacher background characteristics that prevail in the U.S. also apply in the context of rural China remains an

empirical question. Teacher demographics in China differ substantially from those of other nations. In a multi-country study of teachers using the World Education Indicators data, China was the only country with a majority of male primary and middle school teachers (OECD, 2001: 125). The gender balance is shifting, however. The teaching force is gradually becoming more feminized, as evidenced by the fact that among younger teachers, female teachers are in the majority (OECD, 2001: 125). Different levels of teacher job satisfaction by gender may provide insights into this trend. Further, China's teaching force is relatively young, with 60 percent of teachers under 40 years of age (OECD, 2001: 125).

Based on this previous research, I test the hypothesis that young teachers, male teachers and better-educated teachers have lower levels of satisfaction in rural China as well. In addition, I hypothesize that teachers who are more socially similar to the surrounding communities are more satisfied and I investigate this by looking at teachers place of origin and whether or not the teacher is also a farmer.[3]

III. Data and Methods

Sample and Study Site

Data for this study come from an add-on component to the Gansu Survey of Children and Families (GSCF), a survey conducted in Gansu Province in the summer of 2000. The main survey employed a multi-stage cluster sample, selecting first rural counties, then townships, then villages, and finally 2000 children, along with their mothers, fathers, and homeroom teachers.[4] The add-on component employed here comes from three questionnaires administered to all village leaders and to all primary school teachers and principals in sampled villages. Data consist of 100 village leaders, 128 principals, and 1003 teachers.

Gansu is one of China's interior northwestern provinces, and stretches across flat Loess Plateau, parts of the Gobi desert, mountainous and hilly areas, and vast grasslands. Map 1 shows Gansu, with the GSCF sample counties marked. In the year 2000, Gansu

[3] Whether or not the teacher is also a farmer, like other community residents, may have implications for the extent to which he or she feels connected to other members of the rural community.
[4] A full description of the sampling technique is provided in Park and Hannum (2001).

province had a population of 25.62 million, 76 percent of which resided in rural areas (UNESCAP, 2003). Gansu has one of the highest incidences of rural poverty among provinces in China (World Bank, 2000).

[Map 1 about here.]

Variables Used in the Analysis

Distribution of Qualified Teachers

My measure of qualified teachers in the schools comes from the average years of teacher education in the school. Teacher turnover is a measure of the number of teachers who left the school in the past year due to retirement, transfer or attrition from teaching entirely. (See Table 1 for full definitions of variables included in the analysis and Table 2 for descriptive statistics.)

[Table 1 and 2 about here.]

Teacher Satisfaction

My three teacher satisfaction outcome variables are based on the following questions: "Is teaching your ideal profession?"; "Do you want to change your profession?"; and "Are you satisfied with the local education bureau?". These questions allow for an investigation of teachers' attitudes toward the teaching profession in general and toward their particular local education bureau, which is responsible for many of the policies and financing that directly and indirectly affect the teachers' daily working lives. I investigate how teachers' attitudes are affected by community, school and individual factors.

Community Factors

I use several measures to test my community hypotheses. Per capita income is measured as village income from agriculture and industry divided by the total village population. The presence of enterprises is measured as the proportion of the village labor force employed in county, township, village and household enterprises.[5] I use a remoteness scale generated from a series of nine variables that measure access to telecommunications, transportation and shopping for necessary goods.[6] I also consider village population size as a measure of remoteness.

School Environment

My indicator of economic resources available in the school is semester expenditures on a per-student basis, excluding teacher salaries. This measure of school expenditure is a total of expenses for the daily running of the school. It includes the following components: water, electricity and heating fees, purchase of teaching equipment such as science lab or physical education supplies, and teachers' bonus and welfare. I also measure teacher remuneration in the school which includes the average monthly salary of an official "government employed"[7] teacher plus the teacher bonus per month. The

[5] There has been rapid growth of the non-farm sector in the post-reform era with the development of township and village enterprises. At the national level, employment in these enterprises grew from accounting for 7 percent of the total rural employment in 1978 to accounting for 29 percent in 1997 (Fan, Zhang, & Zhang, 2002). The proportion of the village labor force employed in township and village enterprises in our sample was very low, with an average of 5 percent. About 32 percent of the village leaders reported that there were no villagers employed in enterprises located in the village. In communities where they exist, township and village enterprises have contributed greatly to the increase in the average income of rural dwellers and to available support for schooling.

[6] Telecommunication and transportation infrastructure has been increasing rapidly in China's northwest, including in Gansu, due to substantial public investment in the development of the interior regions (see Fan et al., 2002 Appendix C for tables comparing various measures of rural development across China's provinces). Relative to national averages however, Gansu lags behind in rural development measures, and many villages still offer very difficult living conditions for teachers.

[7] Historically there have been two kinds of teachers: *gongban* teachers and *minban* teachers. These two categories of teachers predate the reform era. *Gongban* teachers are trained, qualified teachers. They are government employees who are paid a government salary and guaranteed all the benefits of urban residence and the "iron rice bowl." Rural schools, up until recently, relied almost entirely on *minban* teachers. *Minban* teachers are teachers recruited from among local middle school graduates to fill the need for village teachers in the late 1950s and through the Cultural Revolution during the expansion of basic education in rural areas (Thogersen, 2002). Up till the current time they have played an important role in

recent important phenomenon of late payment of teacher salaries is accounted for by including a measure of whether salary is never, sometimes, usually or always paid on time.

Regarding organizational characteristics of the school, I first consider size, measured as the total number of students. As a measure of administrative support for teaching, and also collegiality and professional interactions among the staff, I use teacher reports of hours per week attending *jiaoyanzu* (teaching and research section) activities (see Paine, 1992, 1998). Teachers are required to participate in the weekly activities of the *jiaoyanzu*, where they engage in joint lesson planning and professional discussion. It is through this structure that new teachers are inducted into teaching and into the norms and values of the school. Older, more experienced teachers support and mentor younger teachers. The *jiaoyanzu* also operates as an instrument of dissemination for information from the county and provincial level to the level of classroom practice.

The student discipline measure comes from ten items on the homeroom teacher questionnaire that are aggregated at the school level. The measure is composed of reports of the total number of disciplinary problems in a month including the number of times: students arrive late or leave early; skip school; fight; argue; lose belongings; cheat on exams; insult teachers and staff; are rude towards teachers; are disruptive and bully other students.

Teacher Background

I measure teacher age and gender, demographic factors that have been linked to levels of teacher satisfaction in previous studies. Teachers' level of education is the indicator used for teacher qualifications. This variable has three categories: middle school and below, secondary school graduate and college level graduate. [8] I also test ties

staffing village schools as it is difficult to attract *gongban* teachers to some of the more remote village schools and as the teacher salaries need to be covered by the local education bureau it is cheaper to hire *minban* teachers.

[8] There is also a group of teachers who graduated from middle school and later bypassed high school graduation and acquired college level *(dazhuan)* certification usually by correspondence course. Due to data limitations, this level of education is counted in our measure as equivalent to high school graduation (Park & Hannum, 2001).

to the local community with two variables: whether or not teachers come from the same village and whether or not they also engage in farm work.

Methods of Analysis

There are three main components to my analysis.

1. I first use one-way and two-way ANOVA to investigate whether the mean years of teacher education and teacher turnover differ significantly between schools in three quantiles of remoteness and three quantiles of village income per capita.
2. I then conduct bivariate descriptive analyses to provide context and background to the analysis of teacher satisfaction.
3. Finally, I test random effects logit models[9] of the effects of community, school and teacher characteristics on my three teacher satisfaction outcome variables: "Is teaching your ideal profession?"; "Do you wish to change your profession?" and "Are you satisfied with the local education bureau?" Use of random effects in the analysis of clustered data corrects for the standard error bias that is a result of inter-group correlations, as in my study where teachers are clustered within schools.[10] Random effects models also allow for the calculations of subject specific coefficients which describe what happens to a single individual when the covariate is increased by one rather than what happens to the whole population.[11] The models used thus take the following form:

$$\eta_{ij} = \beta_0 + \beta_{1r}*X_{rij} + \beta_{2s}*X_{sj} + U_j, \qquad (1)$$

where η_{ij} is the log odds of teacher satisfaction (*ideal*: teaching is ideal profession=yes, *change*: want to change profession=yes, or *local education bureau*: satisfaction with the local education bureau=yes) for individual teacher *i* in school *j*, X_{rij} is a vector of teacher variables, X_{sj} is a vector of school and village variables, β_{1r}

[9] I use STATA's xtlogit command followed by quadchk to check numerical soundness of this particular numerical approximation.
[10] Although the data used also includes global measures at the village level, and a 3-level model with schools nested within communities would make sense conceptually, the small number of villages containing more than one school makes this strategy untenable.
[11] See Allison (2002)

and β_{2s} are vectors of parameters to be estimated, and U_j is a random intercept at the school level.

IV. Results

Distribution of Qualified Teachers

Results provide evidence that there is a stratified distribution of qualified teachers in China. Figure 1 shows the difference in means of average years of teacher education in schools by levels of remoteness[12]. The ANOVA F-test rejects the null hypothesis that the mean years of teacher education is equal in all regions and the Bonferroni multiple comparison method indicates that, while the means of average teacher education do not differ significantly for least remote and mid-remote villages, teachers in schools in the most remote communities have significantly fewer years of education than teachers in both the least remote and mid-remote communities (See Tables 3a and 3b). [13] The results presented here are an extremely conservative demonstration of the inequality of access to quality teachers in China as they reflect the stratification of teachers within the rural areas of one of the poorest provinces in China. We can thus expect the stratification between urban and rural areas, and across regions of China to be much more pronounced.

[Figure 1 and Tables 3a and 3b about here]

Rates of Teacher Turnover

The descriptive statistics indicate that, on average, 13% of teachers in the rural schools in our sample transferred out of the school in the previous year for reasons other

[12] In my analysis of the distribution of qualified teachers, I convert the remoteness scale into a categorical variable with three categories, where category 1 consists of the bottom third of villages on the scale that correspond to those villages that are "least remote" and category 3 are the top third of the villages on the scale that correspond to villages that are "most remote."

[13] In the two-way ANOVA results for the main effects of both remoteness and village income on average years of teacher education in the school, the main effect of remoteness remains significant but there is no evidence to support the hypothesis that average teacher education differs by measure of village income.

than retirement. One-way and two-way analysis of rates of teacher turnover[14] by remoteness and village income provide some evidence that there may be variation in rates of teacher turnover across village communities. Rates of teacher turnover appear to be correlated with levels of village income (See Figure 2). In one-way ANOVA, the overall F-test for difference between means by village income level is significant and the Bonferroni multiple comparison tests suggest a marginally significant difference between those schools in the wealthiest villages and those in the second and third village income quantiles (See Tables 4a and 4b).[15] This may suggest that wealthier villages have higher incomes due to the presence of industry and private enterprise, which may translate into a wider range of employment opportunities for teachers who are thinking about changing their career.

[Figure 2 and Tables 4a and 4b about here]

Descriptive Analysis of Teacher Satisfaction

The previous two sections show evidence to support the notion that there is a stratification of access to qualified teachers and also evidence for varying rates of teacher turnover by village prosperity. I now move on to address the question: "What factors might contribute to teacher job satisfaction?" To shed light on the social location of satisfied and unsatisfied teachers, Tables 5 and 6 show teacher satisfaction measures by community, school, and individual factors included in the analysis. Table 5 shows means of selected community, school and individual factors by teacher satisfaction, and Table 6 shows school and individual characteristics tabulated by teacher-reported levels of satisfaction.

[Tables 5 and 6 about here.]

[14] In my analysis of the rates of teacher turnover, I convert the measure of village income per capita into a categorical variable with three categories, where category 1 consists of the bottom third - villages that have the lowest income and category 3 are the top third - villages with the highest income.
[15] Two-way ANOVA statistics which include a measure of remoteness in addition to village income do not support the hypothesis that rates of teacher turnover differ by remoteness of the school location.

Community Factors

Several community-level factors differ, on average, for satisfied and dissatisfied teachers. For *ideal,* where differences emerge, they suggest that teachers in more economically developed communities are less satisfied. For example, satisfied teachers live in villages with significantly lower income per capita, villages with significantly fewer residents working in village enterprises, and villages that are significantly more remote. Satisfied teachers in the sample live in slightly smaller villages, though this difference is only marginally significant.

For the *change* outcome, the only community factor that significantly differentiates satisfied and dissatisfied teachers is village income. Consistent with the *ideal* measure, teachers who wish to change their career are living in significantly wealthier villages than teachers who do not wish to do so. For the *local education bureau* outcome, levels of satisfaction do not differ by conventional tests of significance. Overall, these findings suggest that better-off villages do not necessarily have more satisfied teachers; in fact, teachers may be less satisfied in these villages.

School Environment

Economic resources in the school appear to operate in the opposite direction of those in the community. Greater semester expenditure per student is negatively associated with teachers desire to change their profession and positively associated with satisfaction with the local education bureau. Although amount of teacher remuneration is not significant teachers who receive payment of salary usually or always on time are more likely to regard teaching as their ideal profession and are more likely to be satisfied with the local education bureau. 77 percent of teachers who reported that their salary was never on time were satisfied, compared to 90 percent of teachers whose salary was usually or always on time (see Figure 3).

[Figure 3 about here]

Among the organizational factors in the school, the number of hours that a teacher spends in *jiaoyanzu* activities is greater among satisfied than dissatisfied teachers as measured by *ideal*. The negative relationship of disciplinary problems to teacher satisfaction is highly significant for whether or not a teacher regards teaching as his or her ideal profession and also whether or not the teacher is satisfied with the local education bureau. School discipline problems also have a marginally significant positive effect on teacher desire to change profession.

Overall, results suggest that both economic and organizational features of schools may be important in determining teacher satisfaction.

Teacher Characteristics

Teacher demographic characteristics work in the expected fashion, based on research in other settings. Most notably, dissatisfied teachers by each of the three measures were likely to be significantly younger than satisfied teachers, and for two of the three outcomes (*ideal* and *change*), less educated teachers displayed significantly higher levels of satisfaction (see Figure 4). For *ideal*, local teachers reported higher levels of satisfaction; for *ideal* and for *change* (marginally), teachers who engaged in farm work were more satisfied. Gender does not have a significant bivariate relationship with teacher satisfaction on any of the three measures.

[Figure 4 about here]

These results suggest three insights. First, just as in the U.S., younger teachers are less satisfied than older teachers. To some degree, it is possible that this may be a survival effect, as the composition of older teachers is likely to be weighted toward teachers who liked the profession enough to persist in it. However, the previous difficulty of changing careers in China due to strict controls on labor mobility in the past argues against this interpretation. Second, also like the U.S., more educated teachers are less satisfied with their profession, perhaps due to perceived alternative opportunities. Finally, these results suggest the importance of ties to local areas: those from the local village and those who, like local villagers, are also farmers, are more satisfied.

Multivariate Analysis of Teacher Satisfaction

To analyze the net effects of specific community, school and teacher background characteristics I perform multivariate analyses for each of the three outcome variables. Table 7 shows coefficients from random effects logistic regression models for the three teacher satisfaction measures.

[Table 7 about here.]

Community Environment

Like the bivariate results, multivariate analysis also suggests that greater economic resources in the village do not contribute to teacher satisfaction, and in some cases are linked to lower levels of teacher satisfaction. Per-capita income is not significantly related to *ideal* or *local education bureau*, but it is positively related to the desire to change professions. Teachers in more remote villages are also more likely to regard teaching as their ideal profession. Such results may suggest that in more prosperous communities alternate career paths may be more visible and teachers may be less satisfied than in settings where no such paths are evident. In the multivariate analysis there are, however, no significant effects for the presence of private enterprise in the village and no significant effects of population size.

What emerges strongly here is the lack of conclusive evidence that teachers in villages that are more developed and less remote are more satisfied. In fact, the evidence appears to support the converse of my hypothesis with regard to village economic conditions. Teachers in more prosperous village communities tend to be those who are least satisfied.

School Environment

Results from the multivariate analyses of economic resources and organizational attributes of schools are, by and large, consistent with the findings of the bivariate analysis. School expenditure per student has a significant negative effect on *change*. Similarly, payment of salary on time shows strongly significant positive links to *local*

education bureau and significant positive links to *ideal*. Teacher remuneration and school size are still insignificant. However, time spent in *jiaoyanzu* activities has a significant positive relationship with *ideal*, and an increase in occurrence of discipline problems in the school corresponds to a decrease in both the likelihood that teachers feel that teaching is their ideal profession and their satisfaction with the local education bureau. Together, these findings suggest that both economic resources in the school as well as organizational conditions of the school are both important in predicting teacher job satisfaction. Specifically on-time payment of salary and school discipline appear to be the most strongly related factors.

Teacher Background Characteristics

The relationships of teacher background characteristics to teacher satisfaction show certain results that are consistent with findings elsewhere. Net of other factors, younger teachers are less satisfied than older teachers, and women are more likely to state that teaching is their ideal profession. Teachers with higher levels of education are significantly less satisfied with the teaching profession and significantly more likely to state that they wish to change their profession. This finding is consistent with the interpretation that more qualified teachers are less satisfied. Finally, controlling for other factors, whether the teacher is from the local village is not significant and whether teacher also works as a farmer is marginally significant providing some evidence that teachers who are also farmers are less likely to be inclined to leave the teaching profession.

V. Discussion and Conclusions

Sociologists and economists have expended considerable efforts to illuminate elements of educational stratification and to identify those attributes of families and schools that promote favorable student outcomes in developing countries (Buchmann & Hannum, 2001). Teachers are an essential part of educational opportunity in such settings. Using a case study of factors associated with teacher work satisfaction in a poor rural province in China, this paper seeks to contribute to an identification of those factors

that might be conducive to maintaining the teacher work force in such low-resource communities.

My starting hypothesis regarding teacher distribution in rural China was that schools in poor, remote villages would have less access to qualified teachers and would experience higher rates of teacher turnover. Boyd et al.'s (2003) study of teacher distribution in the U.S. reveals striking disparities in teacher qualifications across schools. Most notably teachers in suburban schools tend to be more highly qualified for their jobs than those in urban schools, and the poorest, most disadvantaged students are likely to have the least qualified teachers. In China, access to qualified teachers is stratified regionally across provinces, and then by degree of urbanization such that rural areas have less access to qualified teachers than urban areas. In this paper I find preliminary evidence to suggest that even among the poorest of the poor there is unequal access to educational opportunity. ANOVA results suggest that there is indeed a stratification of qualified teachers in rural China, with the most remote schools having a larger proportion of teachers whose highest level of educational attainment is middle school graduation or below. The variation within rural Gansu is striking as this suggests there is certainly even greater variation between our sample and urban areas and nationally across regions.

The problem of teacher turnover has drawn considerable attention from researchers in the U.S (See Ingersoll, 2001 for a review). In his in-depth study of village schools in Zouping County, Thogersen (2002) writes that the problem of teachers leaving teaching to find more highly paid jobs in the rural enterprises in the 1990s became so serious that the county Education Bureau heavily restricted teachers' right to leave the profession. "Each year only twenty teachers (out of seventy-two hundred) were allowed to quit before retirement age, and they had to have specific reasons such as serious health problems." (p. 220) With the further opening up of teacher labor markets it is unlikely that the education bureau will be able to continue to control the labor mobility of teachers for much longer.

Those villages with a greater presence of rural enterprises are likely to be the wealthier villages. ANOVA results in this study support the notion that teacher turnover in rural China may increase with increasing village income. This is inconsistent with my original hypothesis but is consistent with the findings from the analysis of teacher

satisfaction measures, which indicate that teachers in wealthier villages are more likely to wish to change their profession; and teachers in more remote villages are more likely to feel that teaching is their ideal career. Evidence from the bivariate analyses suggests that teachers in villages with greater enterprise presence are also less likely to feel that teaching is their ideal profession. Lower levels of job satisfaction in more prosperous and less remote villages could feasibly be related to the presence of increased job opportunities and the relative availability of alternative careers in such communities.

The alternative careers that are perceived as available by teachers may be important elements of teacher satisfaction. In developing countries, Farrel and Oliveira (1993) warn that qualified teachers are likely to abandon teaching if what they earn in teaching differs too greatly from what they could earn in an alternative career. Based on a study in Jamaica, Rodgers-Jenkinson and Chapman (1990) postulate that teacher job satisfaction is decreasing as the modern sector of the economy develops and teachers have more job alternatives. The results presented here provide evidence suggesting that development in poor rural areas could just as easily exacerbate as ameliorate problems of teacher satisfaction in schools.

In general, the results regarding the school environment factors support the original hypothesis that schools with better working conditions, or more ample economic resources for the support of teaching and teacher and student welfare, have more satisfied teachers. Timely payment of salaries was the variable that was most strongly linked to increased teacher satisfaction with the local education bureau. The measure of average amount of teacher remuneration that I included in my model was not significantly related to any of my measures of teacher satisfaction, however. Collection of follow-up data from teachers who have transferred schools or left teaching altogether may more accurately determine the extent to which salary differentials are a factor in teachers' decisions to leave. (c.f. the Teacher Follow-up Survey that complements the US Census Bureau's School and Staffing Survey[16]).

There is certain evidence to support the hypothesis that the activities of the *jiaoyanzu* enhance teacher satisfaction. Teachers in schools with more hours devoted to *jiaoyanzu*

[16] See Ingersoll (2001)

activities were significantly more likely than teachers in other schools to feel that teaching was their ideal career and marginally significantly less likely to wish to change their careers. This may be due to higher levels of support for teaching that this structure provides, to its mentoring function, to the degree that it facilitates collegial interaction and professional collaboration among the teachers, or to the extent that the *jiaoyanzu* operates at the school level to ensure that the educational system from highest to lowest levels of administration is bound in a tightly integrated structure where all agencies work to establish a strong sense of central purpose and shared value system.[17] Lee, Dedrick and Smith (1991) discuss the differences between authority structures that are characterized by "loosely coupled structure" (Weick, 1976) and those that have a more "integrated structure." In loosely coupled structures the actual teaching practice of teachers is only weakly influenced by supervisors and peers, collegial interaction is limited and there is little consensus among members of the school community about goals and mission. The empirical evidence from their study indicates that teachers are more effective and also more satisfied in more integrated systems in which schools are united around a strong central purpose and a shared value system. Integrated systems, however, also tend to curtail teacher autonomy, which has been found elsewhere to be associated with higher levels of teacher satisfaction. Lee et al. resolve this apparent contradiction by hypothesizing that teacher autonomy may be more important to teachers' sense of efficacy and satisfaction in loosely coupled structures. They suggest that this effect is attenuated in schools with a strong communitarian organization and shared value system since such organizations support general functioning by a reduction in the "uncertainty and ambiguity of roles."

Consistent with findings elsewhere the satisfaction of teachers in rural China is also negatively impacted by the severity of student discipline problems in the school. In this paper student discipline affects both teachers' sense of satisfaction with the teaching profession in general and the level of satisfaction with the local education bureau in particular. The fact that disciplinary problems are strongly related to satisfaction with the

[17] Lynne Paine (1992) argues that the induction process through the *jiaoyanzu* inhibits teacher innovation and creativity (i.e., teacher autonomy) due to the value it assigns to seniority and the dominance of textual knowledge. On the other hand, it is likely that teachers in Chinese elementary schools experience both substantial administrative support and also collegial cohesion through the activities of the *jiaoyanzu*.

local education bureau may suggest that, along with late payment of salary, disciplinary issues are perceived as being a result of poor management from the higher levels of educational administration.

Finally, the results regarding teacher background characteristics were very consistent with findings elsewhere in the literature on teacher satisfaction. Across the board, younger teachers and more qualified teachers as measured by educational attainment are less satisfied. There is also evidence in the multivariate analyses to suggest that female teachers may be more satisfied and weaker evidence that teachers with ties to the local community who are also farmers are more satisfied.

The dissatisfaction of younger, more qualified teachers underscores the important challenge that impoverished communities face in retaining qualified teachers, as teacher labor markets and general labor markets continue to evolve. While concerning, this result is unsurprising, given research in the U.S. showing that better qualified teachers tend to be more dissatisfied than less qualified teachers, and thus more likely to leave teaching (Darling-Hammond, 1984; Schlechty & Vance, 1983).

The weaker evidence that teachers from the same village and who also do farm work are more satisfied with the teaching profession may be related to the perceived prestige and comfort of teaching relative to farming. One young Chinese teacher from a farming family reminisces about the day she gained admission into the teacher's college in the nearby county:

> *"Finally the news came on a rainy afternoon that I was enrolled into the English Language Department of Xinzhou Teachers' College. My father said that was the best moment in his whole life. My grandma said that was a revolutionary event in the whole family's history. For me, I could see myself working as a teacher, away from the field and sweat, not looked down upon as a peasant."*[18]

Thus teacher satisfaction in rural China may be a function of the varying community environments that individual teachers inhabit, and the perceptions they hold of the relative advantage and disadvantage of alternative occupations, as well as the objective economic and organizational conditions of the schools in which they work.

[18] From the narrative of Xu Hongmei, Unpublished manuscript, 2003.

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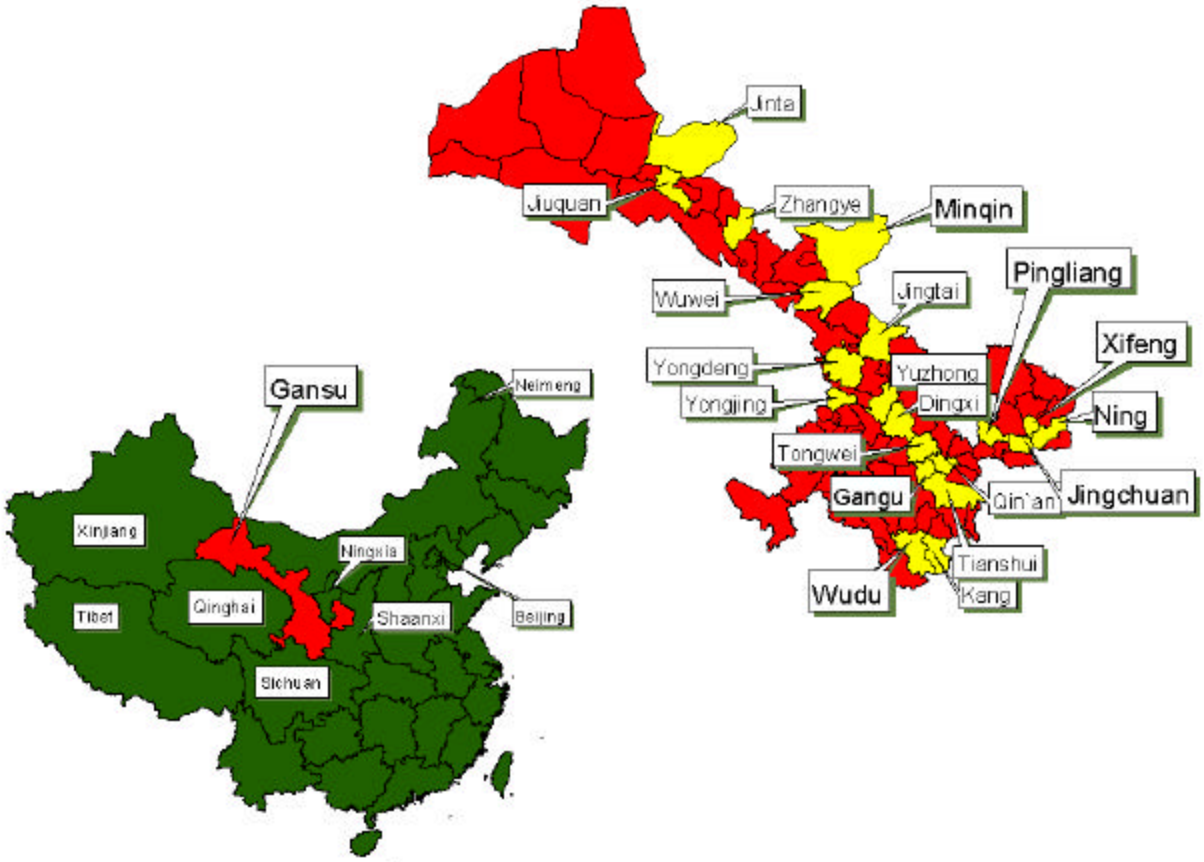

Map 1. Gansu Province, GSCF Counties Marked

Table 1: Definitions of Measures used in the Analysis

OUTCOME VARIABLES

- Average years of teacher education in the school
- Teacher turnover: Number of teachers who left the school (not including teachers who retire) in the past 12 months as a proportion of total teachers in the school.
- "Is teaching your ideal profession?" 1=yes, 0=no
- "Do you want to change your profession?" 1=yes, 0=no
- "Are you satisfied with the local education bureau?" 1=yes, 0=no

COMMUNITY FACTORS

Economic resources:

- Previous year village income per capita from industry and agriculture.
- Enterprise presence: the proportion of the village labor force that works in county, township, village, or household enterprises located in the village

Remoteness:

- Remoteness scale: nine measures of remoteness were standardized, summed, and divided by the number of measures to generate a scale. The nine measures consisted of four dichotomous variables that measured access to telephone, postal services, radio broadcasts, and bus, and five continuous variables measuring distance to nearest railway, highway, bus station and shops for daily necessities and durable goods. More positive values indicate more remote villages. Cronbach's alpha for the reliability of the scale was 0.74.
- Village population

SCHOOL ENVIRONMENT

Economic resources in the school:

- Semester's school expenditure per student: a total of expenses for the daily running of the school divided by the number of students in the school. It includes the following components: water, electricity and heating fees, purchase of teaching equipment such as science lab or physical education supplies, and teachers' bonus and welfare.
- Teacher remuneration: average teacher salary plus bonus
- Payment of salary on time: a categorical variable where 0=never, 1=sometimes, 2=usually or always*

Organizational characteristics:

- School size: total number of students in the school
- Teachers' report of number of hours spent per week on *jiaoyanzu* activities*
- Student discipline: a total of homeroom teachers' reports of frequency per month of a variety of disciplinary issues aggregated to the school level. Disciplinary issues include the following: tardiness, absenteeism, fighting, arguing, loss of belongings, cheating, insulting and being rude to teachers, disruptive behavior and bullying.

TEACHER BACKGROUND

Teacher demographics:

- Age
- Female: 1=female teacher and 0=male teacher

Teacher ties to the local community:

- Teacher from the same village: 1=yes 0=no
- Teacher also does farm work: 1=yes 0=no

Teacher human capital:

Teacher education: a categorical variable measuring teacher's highest level of educational attainment where: 0=middle school or below, 1=high school or post middle school training, 2= college

*Attributes of the school environment measured at the individual teacher level.

Table 2: Teachers' Satisfaction, Community and School Environments, and Teacher Background Characteristics in Rural Gansu

	Mean or Proportion (SD)	N*
Outcome Variables		
Average years of teachers' education	12.14 (1.21)	125
Average rate of teacher turnover (not including teachers who retire)	.13 (.16)	125
Proportion who feel that teaching is their ideal occupation	.83 (.38)	1003
Proportion who wish to change profession	.17 (.38)	1003
Proportion satisfied with the local education bureau	.79 (.41)	991
Community factors		
Income per capita (Yuan)	1289.63 (2248.84)	118
Proportion labor force working in enterprises	.05 (.08)	125
Remoteness	-.10 (.50)	128
Total village population	1738.77 (933.40)	128
School environment		
School size	275.97 (281.77)	128
Semester's expenditure per student (Yuan)	29.94 (53.79)	128
Average teacher remuneration	578.10 (157.65)	123
Payment of salary on time		999
Never	31.63	316
Sometimes	55.76	557
Usually or always	12.61	126
Hours per week on *jiaoyanzu* activities	4.25 (2.61)	1003
Student discipline problems (total occurrences per month)	10.96 (8.82)	1002
Teacher Background		
Age	36 (11)	1000
Proportion female	.38 (.48)	998
Proportion from the same village	.35	1003
Proportion engaged in farm work	.49 (.50)	1001
Teacher education		1003
Middle school or lower	.23	234
High school	.63	628
College	.14	141

*Note: Ns reported for village leader, principal and teacher according the source questionnaire

Table 3a :Analysis of Variance of Teachers Average Years of Schooling by 3 Quantiles of Remoteness

Source	SS	df	MS	F	Prob > F
Between groups	22.90	2	11.45	9.76	0.0001
Within groups	143.16	122	1.173		
Total	166.06	124	1.34		

Table 3b: Bonferroni Multiple Comparison Test for Group Means of Teachers Average Years of Schooling by 3 Quantiles of Remoteness

Remoteness Quantile	1	2
2	-.06 1.000	
3	-.94 0.000	-.89 0.001

Figure 1: Average years of Teacher Education in the School by Remoteness

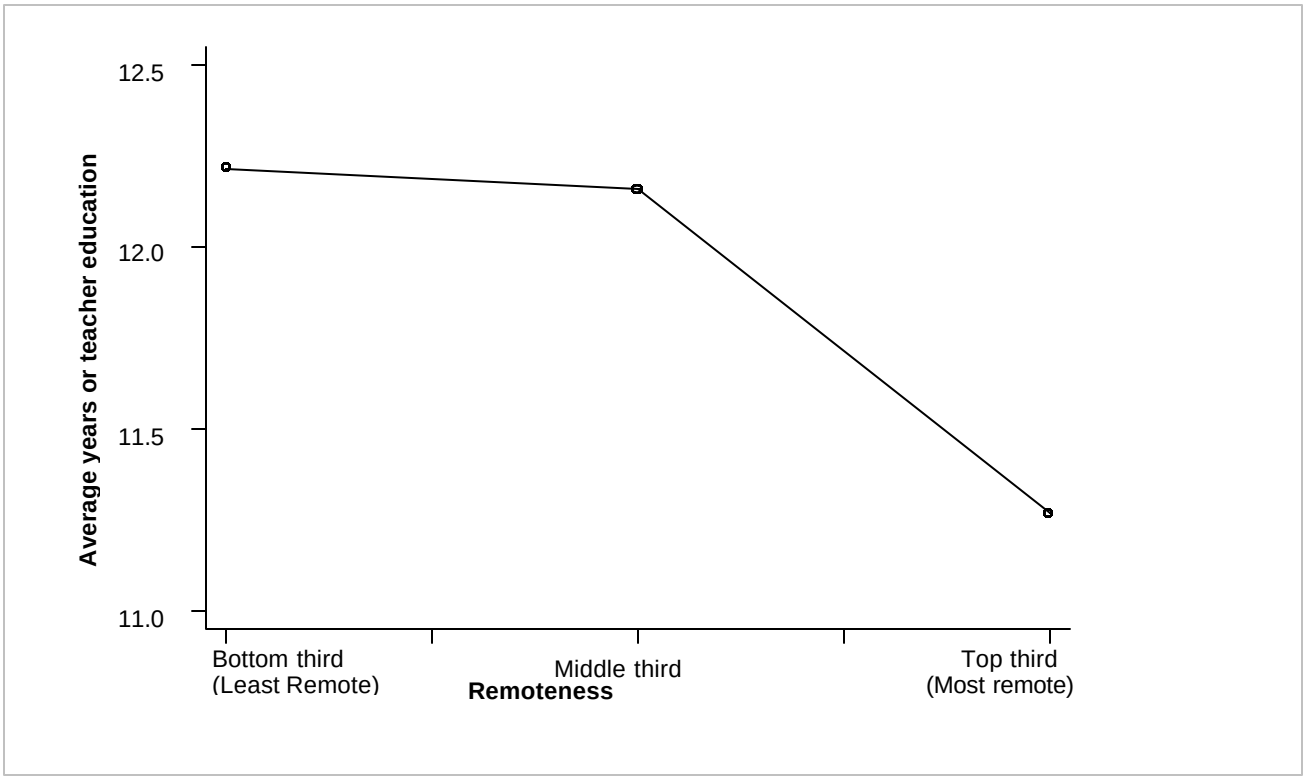

Table 4a: Analysis of Variance of Rate of Teacher Turnover by 3 Quantiles of Village Income

Source	SS	df	MS	F	Prob > F
Between groups	.18	2	.092	3.75	0.0265
Within groups	2.74	112	.024		
Total	2.92	114	.026		

Table 4b: Bonferroni Multiple Comparison Test for Group Means of Rate of Teacher Turnover by 3 Quantiles of Village Income

Village Income Quantile	1	2
2	.002	
	1.000	
3	.086	.083
	0.056	0.060

Figure 2: Mean Rate of Teacher Turnover by Village Income

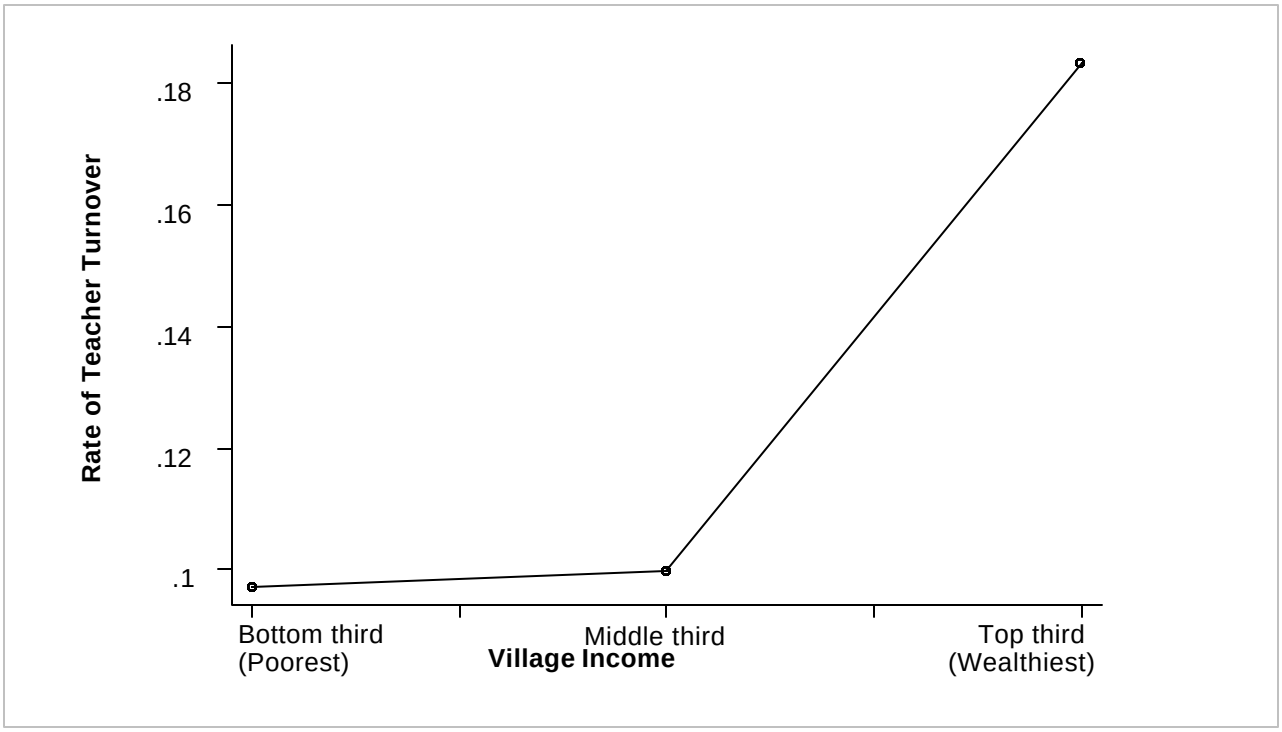

Table 5: Mean Levels of Selected Community, School and Teacher Characteristics by Teacher Satisfaction

	Teaching is ideal career			Teacher wants to change career			Satisfied with local education bureau		
	No	**Yes**		**No**	**Yes**		**No**	**Yes**	
Community factors									
Village income per capita (Yuan)	1912.44 (132)	1179.62 (741)	**	1205.29 (725)	1710.22 (147)	*	1194.70 (175)	1325.6 (689)	
Proportion of village labor force working in enterprises	.08 (164)	.05 (782)	**	.05 (780)	.06 (166)		.05 (205)	.05 (731)	
Remoteness	-.24 (170)	-.07 (831)	**	-.10 (824)	-.10 (176)		-.09 (210)	-.10 (781)	
Total village population	1847.64 (170)	1716.50 (831)	+	1720.42 (824)	1811.37 (176)		1703.61 (210)	1764.57 (781)	
School environment									
Semester's school expenditure per student (Yuan)	23.75 (170)	30.55 (831)		31.47 (824)	19.59 (176)	*	22.39 (210)	31.53 (781)	*
Teacher remuneration	580.83 ((156)	574.62 (799)		578.88 (794)	558.85 (160)		580.74 (193)	573.91 (752)	
School size: Total number of students	341.31 (170)	342.48 (831)		346.57 (824)	326.88 (176)		327.02 (210)	342.13 (781)	
Hours per week on *jiaoyanzu* activities	3.79 (170)	4.35 (831)	*	4.31 (824)	3.98 (176)		4.20 (210)	4.30 (781)	
Disciplinary problems (occurrences per month)	13.05 (170)	10.50 (830)	**	10.74 (823)	12.07 (176)	+	13.98 (210)	10.13 (780)	**
Teacher background									
Age	30.81 (170)	36.59 (828)	**	36.11 (821)	33.31 (176)	**	32.74 (210)	36.32 (778)	**

Two tailed t-test: + 0.10 level, * 0.05 level, ** 0.01 level indicating means are significantly different for satisfied and unsatisfied teachers
(N) Number of observations in parentheses

Table 6: Teacher Satisfaction by Selected School and Teacher Characteristics

	Proportion of teachers who feel that teaching is their ideal career		Proportion of teachers who wish to change their career		Proportion teachers satisfied with the local education bureau	
School Environment						
Salary payment on time:		**				**
Never	.77		.20		.68	
Sometimes	.85		.17		.81	
Usually or always	.90		.13		.93	
Teacher Background						
Teacher gender						
Male	.83		.17		.80	
Female	.82		.19		.77	
Teacher comes from the same village		**				
Yes	.90		.16		.79	
No	.79		.19		.79	
Teacher also works on a farm		*		+		
Yes	.86		.15		.79	
No	.80		.20		.79	
Teacher education		**		*		
Middle school or lower	.88		.14		.83	
High school	.84		.17		.78	
College	.71		.26		.75	

Chi-square test of independence: + 0.10 level, * 0.05 level, ** 0.01 level

Figure 3: Teacher Satisfaction by On-time Payment of Salary

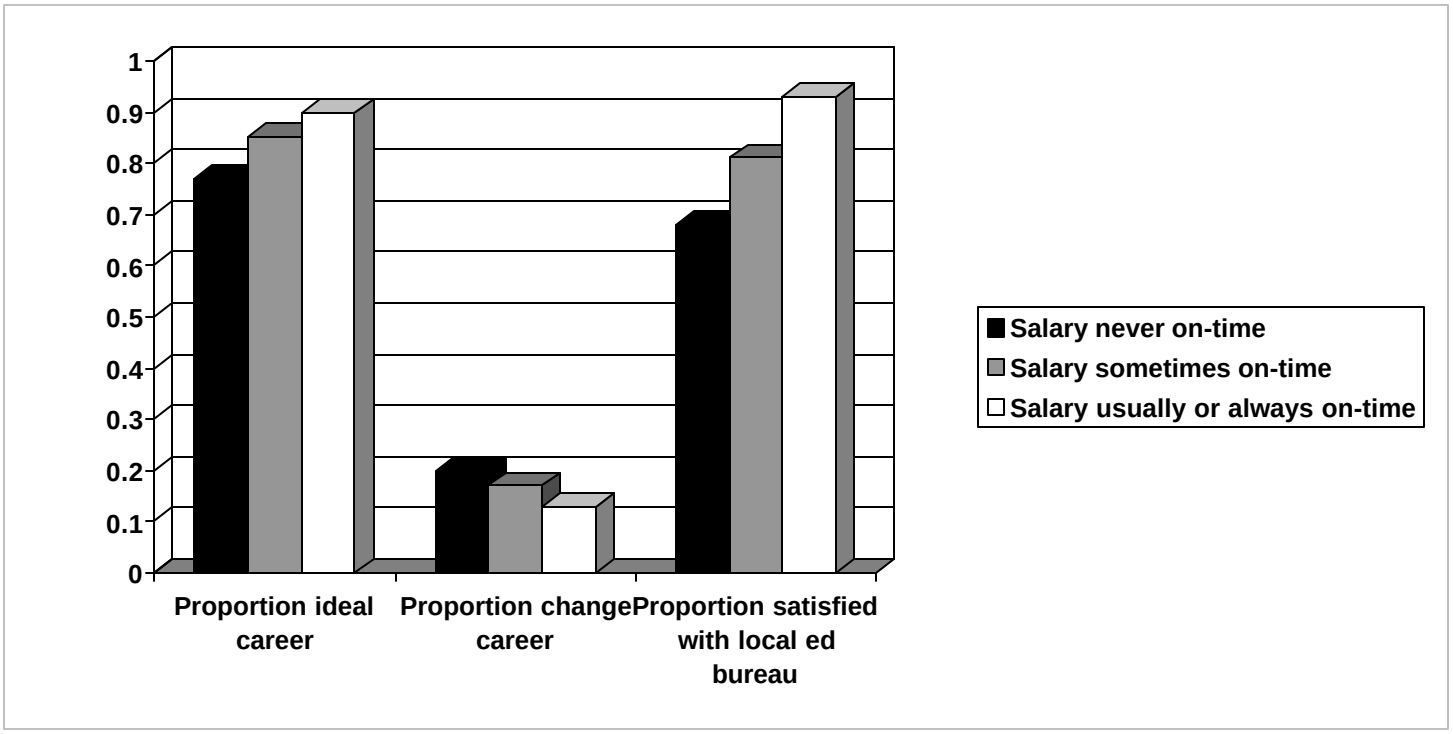

Figure 4: Teacher Satisfaction by Teacher Education Level

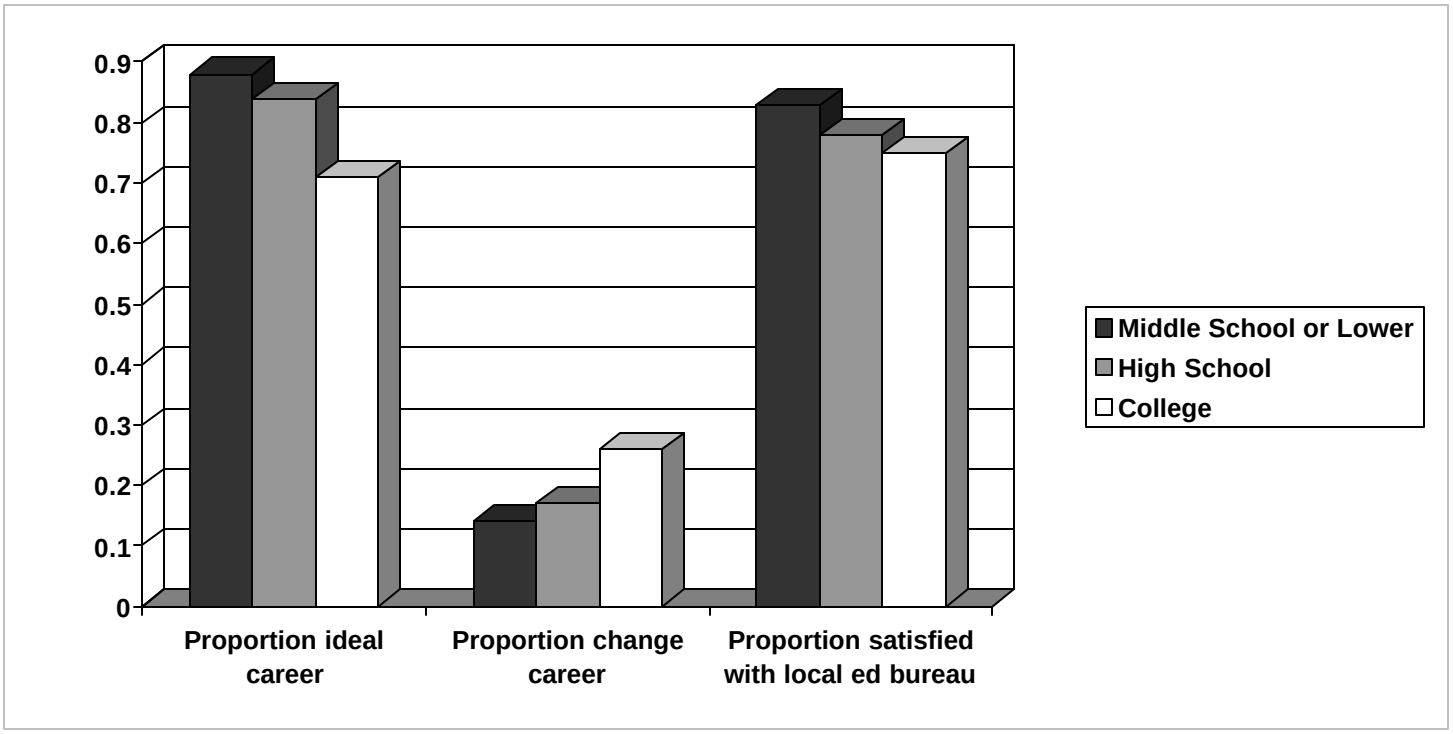

Table 7: Random effects logit models for Teacher Satisfaction Outcomes

	(1) Ideal		(2) Change		(3) LEB	
	b	s.e.	b	s.e.	b	s.e.
Community Factors						
Village income per capita (x100)	0.006	(0.000)	0.010*	(0.000)	0.007	(0.000)
Proportion of village labor force working in enterprise	-1.852	(1.230)	-0.250	(1.457)	0.626	(1.993)
Remoteness	0.777**	(0.283)	-0.188	(0.265)	0.379	(0.325)
Village Population (x100)	0.008	(0.000)	0.006	(0.000)	0.009	(0.000)
School Environment						
School Size (Total no. of students x100)	0.003	(0.000)	0.001	(0.000)	0.029	(0.000)
Expenditure per student (x100)	0.510	(0.003)	-0.818*	(0.004)	-0.054	(0.003)
Payment of salary on time (ref. Never)						
-Sometimes	0.363+	(0.218)	-0.018	(0.219)	0.802**	(0.222)
-Usually or always	0.763*	(0.376)	-0.391	(0.356)	1.805**	(0.455)
Teacher remuneration (x100)	0.024	(0.001)	-0.121	(0.001)	0.048	(0.001)
Jiaoyanzu	0.108*	(0.043)	-0.069+	(0.040)	-0.002	(0.038)
Discipline	-0.029**	(0.011)	0.016	(0.011)	-0.046**	(0.015)
Teacher Characteristics						
Age	0.076**	(0.012)	-0.030**	(0.010)	0.040**	(0.011)
Female	0.794**	(0.224)	-0.342	(0.219)	0.141	(0.221)
Teacher education (ref. Middle school or below)						
-Secondary	-0.567*	(0.269)	0.329	(0.248)	-0.424+	(0.253)
-College	-1.021**	(0.331)	0.892**	(0.316)	-0.223	(0.341)
Teacher comes from the same village	0.239	(0.242)	0.205	(0.217)	-0.229	(0.220)
Teacher also engages in farm work	0.237	(0.214)	-0.337+	(0.204)	-0.216	(0.215)
Constant	-0.946	(0.770)	-0.029	(0.749)	0.935	(0.914)
Observations	941		940		931	
Number of Schools	122		121		122	

Notes:

1. Standard errors in parentheses
2. + significant at 10%; * significant at 5%; ** significant at 1%
3. Missing variable dummies were used to adjust for missing observations on village income per capita and proportion of village labor force working in enterprise. The dummy for village income per capita was significant in model 1.