What Do Teachers Want, and Does It Matter?

Job Satisfaction and Employee Performance[1]

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Abstract: This paper uses a nationally representative school and teacher survey from Indonesia to jointly investigate the determinants of a teacher's satisfaction level and its impacts on performance. First, we establish some stylized facts about satisfaction, showing that satisfaction with salary is systematically lower (and different) than satisfaction with other aspects of job performance. Second, we show that the strongest predictors of higher satisfaction are employment status (with civil servants having higher satisfaction) and proximity of educational/cultural amenities, while multigrade teaching enters significantly with opposing signs for different measures of satisfaction. Third, analysis using an IV probit model shows that teachers' satisfaction with their salary and work environment has a strong and significant impact on a key performance measure: the teacher's school attendance. Moreover, the effect is large: reducing the teacher's satisfaction with salary from "satisfied" to "indifferent" doubles the predicted teacher absence rate to nearly 40 percent. Finally, certain policy variables (such as greater job security for teachers) appear to reduce teacher absence only indirectly through satisfaction, while others (such as teacher-recognition programs) have an independent effect on absence, presumably by providing incentives at the margin.

Key words: salary satisfaction, teacher absenteeism, teacher incentives, happiness, service delivery, IV probit, Indonesia.

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1. Introduction

Despite the recent growth of the literatures on service delivery and on job satisfaction, little research has been done on the job satisfaction of service providers in developing countries, and on how job satisfaction affects work performance. Where performance is monitored only poorly and the threat of sanctions is not credible – as in many developing-country public education systems – an employee's performance may be heavily influenced by his or her commitment to and satisfaction with the job.

This paper uses a nationally representative school and teacher survey from Indonesia to jointly investigate the determinants of a teacher's satisfaction level and its impacts on performance. First, we establish some stylized facts about satisfaction, showing that satisfaction with salary is systematically lower (and different) than satisfaction with other aspects of job performance. Second, we show that the strongest predictors of satisfaction are employment status (with civil servants having higher satisfaction), school with multigrade teaching, and proximity of educational/cultural amenities. Third, analysis using an IV probit model shows that teachers' satisfaction with their salary and/or work environment has a strong and significant impact on a key performance measure: the teacher's school attendance. Moreover, the effect is large: reducing the teacher's satisfaction with salary from "satisfied" to "indifferent" doubles the predicted teacher absence rate to nearly 40 percent. Finally, certain policy variables (such as greater job security for teachers) appear to reduce teacher absence only indirectly through satisfaction, while others (such as teacher-recognition programs) have an independent effect on absence, presumably by providing incentives at the margin.

This paper consists of 6 sections. Section 2 provides a brief literature review, section 3 describes the data. Section 4 defines the econometric framework and section 5 interprets estimation results. Section 6 concludes.

2. Literature review

This paper stands at the intersection of two rapidly expanding literatures – on the delivery of public services (most notably, education and health), and on work satisfaction. World Bank (2003), which

summarizes well the literature on service delivery in developing countries, points out the many difficulties of ensuring that funds allocated to the social sectors – including funds for teacher salaries – wind up improving social outcomes. As Filmer and Pritchett (2000) point out in the case of the health field, there are many "weak links in the chain" from finance to results. In the education sector, the same is true: for example, money intended for education often fails to reach the schools (Reinikka and Svensson 2004), teachers themselves frequently fail to show up at school (PROBE Team 1999, Glewwe, Ilias, and Kremer 2004, Chaudhury and others 2006), and teachers often use time inefficiently even when they are in school (Abadzi 2006). Following on the growing literature describing these service-delivery problems, rigorous evaluation studies on interventions to deal with them have now begun to emerge (Banerjee and Duflo 2006; Duflo and Hanna 2005; Muralidharan and Sundararaman 2006; Vegas 2005).

One consistent finding of this literature is that public school teachers are rarely held accountable: they are typically not well monitored by administrators or parents, nor do formal incentives promote good performance. Teachers face few rewards for good teaching or high levels of effort, whether in the form of merit pay or through a predictably merit-based promotion ladder (Vegas 2005). And poor performers face few sanctions, because of poor monitoring, union protection, and seeming voter indifference to the quality of social services (Keefer and Khemani 2004). In India, for example, a companion survey found that despite a national-average teacher absence rate of 25 percent, only one head teacher out of 3000 had ever dismissed a teacher for excessive absence (Kremer and others 2006).

In environments with so few incentives for performance, perhaps the real mystery is why so many teachers bother to turn up at work most days. The standard principal-agent framework is unlikely to provide more than a partial answer to this question. Other elements of the answer will likely include intrinsic motivation and professionalism (Reinikka and Svensson 2003, Besley and Ghatak 2005). These other elements can be hard to measure, but they suggest a need to focus not just on rewards and punishments, but on a teacher's satisfaction with the work he or she is doing. When satisfaction is higher – abstracting away from problems of endogeneity, which we tackle below – it seems likely that for any given structure of rewards and punishments, the teacher will work more diligently and perform better.

The second related literature concerns the determinants and effects of work satisfaction. In recent years a large literature in economics has explored job satisfaction, beginning with the seminal papers by Hamermesh (1977) and Freeman (1978) on how job satisfaction affects job quits, and by Borjas (1979) on the

determinants of job satisfaction.[4] Recent studies have investigated job satisfaction as a function of individual, family, and work characteristics. These studies have identified certain types of workers as having higher job satisfaction—for example, the youngest and oldest workers (Clark, Oswald and Warr, 1996), more educated workers (Vila and Garcia-Mora, 2005), women compared to men (Bender and Heywood, 2006), non-unionized workers compared to unionized workers (Heywood et al., 2002), those with job training opportunities (Gazioglu and Tansel, 2006), and those with higher pay (Clark and Oswald, 1996). Higher job satisfaction levels have been found to reduce job quits (Ward and Sloane, 2000; Levy-Garboua et al., 2005) or the intentions to quit (Shield and Price, 2002), as well as teacher absence from work (Michaelowa, 2002).

However, these studies focus mainly on developed countries, and very few studies investigate job satisfaction in a developing country context. Furthermore, to our knowledge, the existing studies on the impact of job satisfaction have not properly addressed the endogeneity of job satisfaction. It can be easily imagined that there can exist unobserved characteristics that can affect both an employee's job satisfaction and his or her decision to quit or to be absent from work. One example is a person's disposition: a cheerful and outgoing person may be more likely to be satisfied with life in general and his or her work in particular, making it more likely that this person will enjoy going to work. If the endogeneity of job satisfaction is not controlled for, all estimation results may suffer from inconsistency.

To the best of our knowledge, Michaelowa (2002) is the only study so far that controls for teacher, school and work characteristics in investigating the determinants of teacher job satisfaction and teacher job satisfaction impact on teacher absenteeism. Using data from Burkina Faso, Cameroon, Cote d'Ivoire, Madagascar, and Senegal, Michaelowa finds school factors that reduce teacher job satisfaction include larger classes and isolation of the school, while the availability of electricity in the classroom increases predicted satisfaction. High-school-educated male teachers living alone are found to be less satisfied than their female colleagues. Michaelowa finds also that while multigrade teaching increases teacher absence from the classroom, teacher job satisfaction decreases it. However, the approach used in that study raises at least two concerns. First, an endogeneity problem arises when the paper includes variables such as whether the teachers teach as private tutors or have other income-earning activity besides teaching, and whether the teacher belongs to a teacher union. It is not hard to imagine a scenario where a teacher dissatisfied with her meager salary decides to join the union to fight for a raise or to teach private tutoring classes to supplement her salary. The endogeneity problem becomes even more serious when the paper uses uninstrumented

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[4] However, sociologists and psychologists have researched job satisfaction for quite a long time. See, for example, Warr (1999).

teacher job satisfaction as an explanatory variable in the teacher absence regression, together with the same explanatory variables from the previous regressions where satisfaction is used as the dependent variable. Second, as recognized in the paper, the numbers of days the teacher is absent is collected based on self-reporting instead of direct objective observations, thus leading to possible mismeasurement (and most likely systematic understatement) of teacher absence rates.

Methodologically, our paper addresses the limits in Michaelowa (2002) by considering teacher satisfaction and teacher absenteeism in a simultaneous system, where teacher satisfaction is recognized to be an endogenous explanatory variable in the equation for teacher absence and it is estimated in a reduced-form equation using an instrument. In terms of data, we use direct observation during surprise school visits to collect information on teacher absence, so that we can avoid the problem of measurement error and bias. Further details on the data are given in the next section.

3. Data and some descriptive statistics

The data for this paper were gathered through a unique survey of teachers at a nationally representative random sample of 110 Indonesian primary schools in 2002-03. The interviews were conducted during surprise visits to the schools, which allowed measurement of teacher absence from school would not be contaminated by observation bias. Data on the school and community were provided by the head teacher or acting head teacher, and enumerators interviewed each teacher directly to get information on his or her demographic and educational background, life circumstances, and job satisfaction. Each school was visited twice, allowing the enumerators to get two observations of attendance for each teacher; each teacher was interviewed only once, however, so the data include only one set of response on satisfaction for each teacher. Further details on the methodology and findings on teacher absence can be found in Chaudhury, Hammer, Kremer, Muralidharan, and Rogers (2006), which sets Indonesia's teacher absence rate of 19 percent in the context of a multicountry comparison.

The satisfaction questions came at the end of each teacher interview, and consisted of the following:

How satisfied or dissatisfied are you with your job from the following points of view?
⇒ *Salary?*
⇒ *Appreciation from parents?*

$\Rightarrow$ *Social status in the community?*

$\Rightarrow$ *Work environment?*

For each satisfaction variable, the answers allowed were: 4=Very Satisfied; 3=Satisfied; 2=Indifferent; 1=Dissatisfied; 0=Very dissatisfied.[5] The response rate for these questions was quite high: **883** teachers answered all four questions, out of the total sample of **890** teachers included in this analysis.

In this section and Section 5, we draw on these data to answer three sets of questions:

- *Levels of satisfaction:* How satisfied are Indonesian public-school teachers with various aspects of their work, and is salary systematically different from other aspects of the job for which we have satisfaction data?

- *Predictors of satisfaction:* What factors predict teachers' satisfaction with their pay and other aspects of the job?

- *Effects of satisfaction:* Can we identify the effects of teacher satisfaction on performance and outcome variables – specifically, on teacher absence? And do certain variables seem to be mediated only through satisfaction, as opposed to having direct effects on performance?

Each of these questions has important policy implications, including the last one. As noted above, teacher management systems in most developing countries are characterized by poor monitoring and a lack of pecuniary or career-based incentives for good performance. In a standard principal-agent model, it is the combination of monitoring, rewards, and punishments that drives performance. In this paper, we explore the possibility that policy can affect other variables that independently improve a teacher's motivation and performance. Kremer et al. (2005) posits that day-to-day incentives for attendance at work, including pleasing aspects of the work environment such as good infrastructure and equipment, may improve motivation and performance, *ceteris paribus*. For policymakers who lack the tools or political influence to change pecuniary motivations and monitoring, knowing these other variables may be important.

Descriptive statistics: How satisfied are Indonesian teachers with their jobs?

On three of the four satisfaction questions, the modal teacher response was "satisfied" (3 on our 0-4 scale). The exception was satisfaction with salary, which appears to be fundamentally different from the other three aspects of the job. First, consider the levels of satisfaction reported. (See Figure 1.) Among teachers at government schools, only 30 percent pronounce themselves satisfied or very satisfied with their

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[5] The scale was originally from 1 to 5, and in the reverse order; we have transformed it for expositional convenience.

salaries, with roughly as many reporting themselves as dissatisfied or very dissatisfied. By contrast, satisfaction with the non-salary aspects of work ranges from 58 percent to 77 percent.[6]

Moreover, within public schools, the pattern holds at each level of aggregation. In each of the 10 districts, average satisfaction with salary is lower than average satisfaction with any of the other three aspects. And even at the school level, the pattern is nearly universal: in all but five of the 110 government schools, the average reported satisfaction with salary is below the average satisfaction with the other three job aspects (Figure 1).

Could this difference in mean levels reflect strategic behavior on the part of teachers? Perhaps teachers fear that expressing satisfaction with pay will reduce future salary increases, and therefore they systematically underreport their satisfaction with salary. But there are other indications that salary satisfaction is different from satisfaction with other job characteristics. All four measures are significantly correlated with each other (Table 1), but the correlation is much weaker between salary satisfaction and the other three measures (correlation coefficient of .06 to .11) than among those other measures (.28 to .48). If the salary were similar to the others but was simply understated in some systematic linear way, we would not expect to see this pattern.

The empirical analysis in Section 5 uses two of the four measures of satisfaction: satisfaction with *salary*, and satisfaction with the *work environment*. We choose to focus on these variables for three reasons. First, these measures are more general than the social-status and parental-support measures, and together they cover what most people would consider the two main determinants of job satisfaction. Second, in a theoretical sense, it is conceivable that salary satisfaction could serve as a summary measure of an employee's feelings about his or her job. That is, respondents may be giving their assessment of the utility they derive from salary *conditional on* the other conditions of work, because whether they consider themselves well-paid or not will likely depend in part on what satisfaction they derive from other aspects of the work. Also, in our survey, respondents were always asked first about their satisfaction with salary; since they may not have known how many other satisfaction questions would follow, they may have tried to incorporate as much relevant information as possible into their first responses. Finally, empirically we find that salary and work-environment satisfaction are the two measures that are correlated with performance. It is worth noting that the other measures are not, but we choose to focus below on the measures that are.

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[6] Interestingly, despite the differences between the two sectors, we see virtually the same pattern among private-school teachers (not shown here).

4. Econometric framework

Both observable and unobservable factors can affect both a teacher's satisfaction and his or her decision to be absent from work. For example, one characteristic unobserved by the econometrician can be a teacher's disposition. A cheerful and outgoing teacher may be more likely to be satisfied with life in general and his work in particular, and he may also enjoy going to work to interact with his colleagues and students. On the other hand, a grumpy teacher can often complain about his work, and try to avoid it whenever the opportunity arises. Another unobserved factor may be the school work atmosphere. It is understandable that a collegial work environment can both have a beneficial impact on a teacher's job satisfaction and his conscience to show up for work.

To address the endogeneity of the satisfaction variables, we use an instrumental probit econometric model. In this framework, the dependent variable for the first-stage regressions is the teacher's satisfaction (with salary and work environment, respectively), while the dependent variables for the second-stage regressions is teacher absence. For estimation purpose, the salary and work environment satisfaction variables are considered continuous variables. In practice, this can be argued to be a good approximation since these variables have five values very dissatisfied, dissatisfied, indifferent, satisfied and very satisfied. Teacher absence is indicated by a dummy variable which assumes the value 1 when the teacher is absent in either survey round, and 0 otherwise. While some teachers are observed to be absent in both survey rounds, these observations cannot be used since information on satisfaction cannot be directly obtained from the teachers in these cases. Consequently, we dropped these observations from our analysis.

The model is defined as follows. For teacher i, i=1,…, n, let D_i be a dummy variable equal to 1 if the teacher is satisfied, and 0 otherwise; and let Y_i be a binary variable that equals 1 if the teacher is absent, and 0 otherwise. Assume D_i and Y_i are generated by the following structure

$$D_i = Z_i \alpha + \upsilon_i$$

$$Y_i = 1[Y_i^* \geq 0 \mid X_i, D_i] = 1[D_i \gamma + X_i \beta + \varepsilon_i \geq 0] \tag{1}$$

where Z_i, X_i are vectors of the observables, υ_i and ε_i are vectors of the unobservables in the satisfaction and work outcome equations respectively. 1[.] is the indicator function.

Assume that

i) $Z_i\alpha$ is a non-degenerate random variable conditional on X = x.

ii) $(\upsilon_i, \varepsilon_i)$ are independent of Z given X

and $(\upsilon_i, \varepsilon_i)$ are normally distributed with zero mean vector and covariance matrix

$$\Sigma = \begin{bmatrix} \sigma^2 & \rho\sigma \\ \rho\sigma & 1 \end{bmatrix}.$$

with the variance of ε_i normalized to 1, and the variance of υ_i being σ^2, and the correlation coefficient between υ_i and ε_i being ρ.

The log likelihood function for observation i, i = 1,…, n is

$$\ln L_i = Y_i \ln \Phi(k_i) + (1-Y_i)\ln(1-\Phi(k_i)) + \ln \phi(\frac{D_i - Z_i\alpha}{\sigma}) - \ln \sigma \tag{2}$$

with $k_i = \dfrac{D_i\gamma + X_i\beta + \rho(D_i - Z_i\alpha)/\sigma}{\sqrt{1-\rho^2}}$

and $\Phi(.)$ and $\phi(.)$ being the standard normal distribution and density function respectively. [7]

As a primary instrument for the IV estimates, we use the distance to the nearest college or university. This instrument is intended to capture the desirability of being near to cultural amenities (for both consumption reasons and because of the greater status associated with such locations), and also represents the opportunity cost of further professional development. There are both theoretical and empirical evidence supporting the validity of this instrument. Theories on job satisfaction emphasize the need for professional learning and development as an important factor determining an individual's job satisfaction.[8] Empirically, in

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[7] *Add citation.*

[8] For example, an influential theory on job satisfaction is the Job Characteristic Theory (JCT) which was developed by Hackman and Oldham (1976, 1980). The theory posits that there are five job characteristics that can be summarized in a

the neighboring country of Brunei, the Yong study (1994) finds the first reason that young teacher trainees are attracted to teaching is because they want to take advantage of the opportunity to improve their education through degree courses. In a US study, Card (1995) uses college proximity as an instrument for educational attainment and finds that controlling for other factors, living near a college raises education by 0.32 years. College proximity then should have important impact on a teacher if we are ready to assume that teachers are eager, at least more than other people, to improve their education by either taking a university course, or attending seminars or cultural activities, or just making use of the libraries or computers in the university.

If teachers often availed themselves of the opportunity to take university courses, this could conceivably pose problems for our IV estimation strategy. In theory, having to attend courses at the university could directly increase teachers' absence rates, violating the IV exclusion restriction. However, we believe this is unlikely to be a problem, for two reasons. First, we expect that for most teachers in our sample, proximity to a university serves primarily as a proxy for cultural opportunities, since the large majority of teachers would not have been enrolled in university courses at the time of the survey.[9] Second, any direct effect, if it existed, would tend to *increase* teacher absence – whereas we show below that proximity is associated with higher teacher satisfaction and *lower* rates of teacher absence.

In addition, a measure of school quality is also used as a second set of instruments. The quality of school is represented by whether the school has multi-grade teaching and a school infrastructure index. This school infrastructure index is created by taking the average of dummy variables indicating whether the school has running water, electricity, a toilet, a library, computers, and a room for the staff. These instruments arguably affect teacher satisfaction directly and affect teacher absenteeism indirectly through teacher satisfaction. However, estimation results are presented using distance to the nearest college as the only instrument and using both distance to the nearest college and school quality as instruments.

The explanatory variables used in the regressions are at the individual, school, community, and regional levels. Individual-level variables include teacher gender, experience, education, and marital status, as

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scalar score called the Motivating Potential Score (MPS), which affects a multitude of personal and work outcomes—including high quality work and absenteeism. The theory proposes that there is one important individual characteristic: the Growth Need Strength (GNS) or strength of a person's need for personal accomplishment, learning and development, which determines the intensity of the jobholder's response to his job MPS. A person with a high GNS will value the opportunities that a high MPS job brings to him and will responds positively to them consequently, and a person with a low GNS will act vice versa.

[9] This changed in 2006, with the passage of a law doubling salaries for teachers who met certain educational qualifications, including having a four-year college degree or its equivalent. But our data were collected in 2002-03, well before this law was envisioned.

well as dummy variables indicating whether the teacher's native language is the local language and whether the teacher has recent undergone teacher training. The native-language variable can proxy for the teacher's affinity for the local area and potential for integration into local activities, which could affect his or her job satisfaction and performance. To control for teacher income and job security, we include two dummy variables indicating whether the teacher is a head teacher (or deputy) or other permanent civil-service teacher. School and community variables in the regressions include information on whether the school has multi-grade teaching, whether the school has a teacher recognition program, the distance from the school to the nearest paved road and the distance to the nearest Education Ministry office, a school infrastructure index, a school discipline index, and parental education. The school discipline index is a dummy variable which equals 1 if the school's head teacher has ever dismissed, suspended or transferred a teacher or stopped a teacher's salary as a form of punishment. The parental education variable is proxied by the share of parents for each school that completed lower secondary school or higher. Regional characteristics are represented by dummy variables indicating districts, with Pasuruan district serving as the omitted reference district.

5. Estimation results

This section presents two sets of results: regressions explaining teacher satisfaction along two dimensions (salary and work environment), and regressions explaining teacher absence using a similar set of variables, together with the instrumented satisfaction variables.

5.1. The determinants of teacher satisfaction

Estimation results for the determinants of teacher satisfaction are shown in Table 2. In columns 1-3, the dependent variable is the teachers' *satisfaction with salary*; in columns 4-6, it is the teachers' *satisfaction with work environment*. While the specifications in columns 1 and 4 control only for a teacher's individual characteristics, columns 2 and 5 include controls only for the school and community characteristics associated with a teacher. Both of these sets of specifications are presented for comparison purposes only, however; our attention should focus on columns 3 and 6, which include all teacher individual, school, and community characteristics as regressors. Although none of the teachers' individual characteristics are significant in column 6 specification, some are highly significant in column 3.

It is possible that teachers' satisfaction with salary may affect teachers' satisfaction with work environment or vice versa. The specifications in columns 7 and 8 address this concern. While the specification in column 7 controls for additive effects by adding teachers' satisfaction with salary and work environment together, the specification in column 8 controls for multiplicative effects by multiplying teachers' satisfaction with salary and teachers' satisfaction with work environment. However, because of this transformation, care should be taken for comparisons between the different specifications since the satisfaction index ranges from 0 (very dissatisfied) to 4 (very satisfied) in the specifications in columns 1 to 6, from 0 to 8 in the specifications in column 7, and from 0 to 16 in the specifications in column 8.

All the regressions in Table 2 are estimated by the OLS method, so that the impact magnitudes can be easily read off from the coefficients. Ceteris paribus, a one-unit change in the explanatory variable will create a change equivalent to its corresponding coefficient, with each unit change in teacher satisfaction representing the move from being in one satisfaction category to the next (e.g. from being "indifferent" to being "satisfied" or vice versa). As discussed earlier, while some characteristics make teachers more or less satisfied with their salaries, these same characteristics do not necessarily affect their satisfaction with their work environment, or vice versa.

After all characteristics are controlled for, *individual characteristics* affect only the teachers' satisfaction with salary and teachers' satisfaction with salary combined with work environment (and not satisfaction with work environment alone). These variables include a teacher's civil-service status (which comes with greater job security and higher salary) and his or her familiarity with the local language. Speaking the local language as a mother tongue increases a teacher's predicted salary satisfaction by 0.14, while holding the rank of head (or deputy head) teacher or permanent teacher raises predicted teacher salary satisfaction almost four times as much – by 0.54, an increase of more than half a point.[10] A comparatively similar relationship holds for combined satisfaction with salary and work environment: the corresponding numbers are .19 and .75 for the specification in column 7 (additive effects) and .60 and 1.95 for the specification in column 8 (multiplicative effects). Surprisingly, there is no significant difference between holding a head teacher position and holding a permanent (civil-service) teacher position in its impact on predicted teacher satisfaction with salary and salary combined with work environment; what appears to matter is *not* being a contract teacher.

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[10] This latter point is consistent with the findings of Chomitz and others (1999) in their analysis of compensating differentials for Indonesian doctors: "A large value is attached to civil service appointment by public school graduates . . . . An increase in the probability of appointment from 0% to 100% is valued on average at Rp 2,189,000/month [then around $800/month] by male public school graduates from Java/Bali."

Turning to *community and school characteristics*, teachers are more satisfied with their salaries and less satisfied with their work environment if the school has multi-grade teaching. While a multi-grade environment increases predicted salary satisfaction by almost one full point, it reduces predicted satisfaction with the work environment by around half a point. Since multi-grade teaching is considered demanding and may require more work for teachers (Thomas and Shaw, 1992), and even undesirable in most developing countries (Benveniste and McEwan, 2000), it is understandable that multi-grade teaching can reduce teacher work satisfaction. However, it is less clear why multi-grade schooling is associated with higher teacher salary satisfaction. A possible explanation may be that teachers are paid more in these schools, but further investigation would be necessary to establish whether this is the case. Compared to teachers' satisfaction with work environment, teachers' satisfaction with salary seems to have a dominant impact on teacher absenteeism, because when teachers' salary satisfaction and teachers' work-environment satisfaction are combined, multi-grade teaching has a positive impact.

Two other variables are significant predictors of only one type of satisfaction or the other. While the disciplinary action taken by a school may decrease teacher salary satisfaction by around .20 (and also decrease teacher salary and work environment satisfaction combined), it does not affect predicted teacher work satisfaction alone. Interestingly, a greater distance to the nearest Education Ministry office positively affects teacher satisfaction with the work environment alone, perhaps because distance from the Education Ministry office may be correlated with less rigorous supervision of teachers.

The distance to the nearest college or university has a highly statistically significant and negative impact on both teacher salary satisfaction and work satisfaction. It can be calculated from Table 2 that when this distance increases from between 1 and 5 kilometers to between 25 and 100 kilometers, teacher salary satisfaction and work-environment satisfaction decrease by around 0.3 and 0.16 points, respectively. This is consistent with the hypothesis that teachers care about local cultural amenities and their opportunities for professional development.

5.2. The impact of teacher satisfaction on absenteeism

We turn now to the question of whether job satisfaction, properly instrumented, can help explain a key aspect of job performance: the teacher's attendance at school. We use this variable because it is a

relatively straightforward and observable measure of teacher effort, compared with, for example, the amount of time a teacher spends preparing lesson plans. While exogenous factors such as sickness and unavoidable out-of-school duties can reduce teacher attendance, the recent literature discussed in section 2 suggests that high levels of absence are indicative of low levels of accountability and teacher effort. By common sense, we expect that when teachers are more satisfied with their salary, or their work environment, they will come to work more often. Econometrically speaking, in a regression of teacher absenteeism on teacher salary satisfaction or teacher work-environment satisfaction, the signs on the coefficients of the satisfaction variables are expected to be negative.

The regressions presented in Tables 3a and 3b explore this hypothesis. As in Table 2, each observation represents an individual teacher. Here, the dependent variable is a dummy variable indicating whether the teacher was absent during either of the two visits by the survey team.[11]

Because of the potential for endogeneity, we would not necessarily expect the hypothesized negative relationship between satisfaction and teacher absence to show up in uninstrumented regressions. And indeed, the uninstrumented probit regression in columns 1 of Table 3a shows that, controlling for other factors, salary satisfaction is positively correlated with teacher absenteeism and it is statistically significant at the 5% level. While satisfaction with work environment has the expected negative sign, the coefficient is small and insignificant.

The results are very different once we instrument for satisfaction with distance to the nearest college (column 2). In this specification, salary satisfaction is strongly significant at the 1% level and has a negative impact on teacher absenteeism. When additional instruments representing school quality which consists of a dummy variable indicating multi-grade teaching school and a school infrastructure index is used, the coefficient on teacher salary satisfaction is positive, although it is no longer statistically significant (column 3). In the first-stage regression with all the instruments, school infrastructure index is not significant. In a regression not shown here, when this instrument is excluded, while distance to the nearest college is strongly significant at the 1% level, the dummy variable indicating multi-grade teaching school is significant only at the 10% level. In the second-stage regression, the coefficient on teacher salary satisfaction is negative although it

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[11] Alternatively, our dependent variable could have been the number of times each teacher was absent in two visits (0, 1, or 2). We chose not to take this approach, because of a lack of reliable satisfaction data for the teachers who were absent on both visits. In most such cases, we had no satisfaction data; in the few cases where there were responses to these questions, their reliability was uncertain, as we could not be sure that they had not been provided by a co-worker of the absent teacher.

is not statistically significant. However, as discussed above, since multi-grade teaching can make teachers more satisfied with their salary possibly in an indirect way through a higher pay system in these schools, this variable may not be a good instrument for the salary satisfaction regression. Thus it may be safer to use just the distance to the nearest college as the instrument in the salary satisfaction regression and the specification in column 2 is the model for interpretation of impact of salary satisfaction on teacher absenteeism.

With the endogeneity properly taken into account, work environment satisfaction has the expected negative sign on teacher absenteeism. Furthermore, the coefficients on work environment satisfaction are strongly statistically significant at the 1% level and similar whether the instruments include distance to the nearest college alone or both distance to the nearest college and school quality.

The predicted effects of satisfaction on absence are quite high. Figure 3 plots the probabilities of teacher being absent against teacher satisfaction with salary and work environment, using distance to the nearest college as the only instrument. The slopes of the lines are fairly steep. For example, the predicted probability of teacher absenteeism is reduced by around 25% when teacher satisfaction with either salary or work environment is raised by one point – from "dissatisfied" to "indifferent", for example. The effect of satisfaction with work environment on absence is even stronger: a one-point increase reduces predicted absence by as much as 35%. The predicted absence rates at the far left side of the graph should not be taken too literally, given the relative lack of support in that part of the satisfaction range, but the evidence is consistent with a substantial satisfaction effect.

Not only is satisfaction important as a predictor of absence, but it also seems to mediate the effects of other variables. Being a native speaker of the local language and holding a civil-service position are both associated with lower teacher absence in columns 1 and 4, but once we properly account for satisfaction in columns 2, 5 and 6, those variables lose their statistical significance. (This variable is significant in the specification in column 3, but as discussed above, it is better to use estimation results in the specification in column 2 for interpretation). Particularly in the case of the civil-service position, this makes sense. In a standard principal-agent framework, the direct effect of higher job security on teacher absence would be expected to be positive: teachers who have little fear of job loss will find it easier to be absent. Thus we would expect job security to reduce teacher absence only by increasing job satisfaction and professional commitment.

Surprisingly, after instrumenting for work environment satisfaction, we see no significant effects - on teacher absence – of the education level of the parents of students at the teacher's school. Higher levels of parental education could conceivably affect teacher performance through a variety of mechanisms. Education could increase parents' ability to assess school quality or their ability to hold teachers accountable, for example; or teachers could find that the non-pecuniary rewards of teaching are higher where students come from more educated families (Chaudhury and others 2006). But the results in columns 2, 3, 5 and 6 suggest that in Indonesia, teachers working in schools with more educated parents tend to be more satisfied with their salary and not their work environment.

When teachers' combined satisfaction with salary and work environment are instrumented for, it also has a negative impact on teacher absenteeism (columns 1, 2, and 3 Table 3b). While the specifications in columns 1 and 3 use distance to the nearest college as the only instrument, the specifications in the columns 2 and 4 use in addition for instruments a dummy variable indicating school with multi-grade teaching. However, in the first-stage regression, school with multi-grade teaching is never significant. Thus the specifications in column 1 and 3 are the main specifications for interpretation.

While schools with a teacher recognition program has a negative impact on teacher absenteeism in all specifications, school discipline index has a negative impact in the work environment satisfaction regression, and schools with more educated parents has a negative impact in the salary satisfaction regression. Being native speaker of the language and the civil rank as head teacher has a positive impact on teacher absenteeism; these results are inconsistent with the earlier results in Table 3a. However, these results hold only if our assumption that teachers' salary satisfaction and work environment satisfaction interact with each other in a multiplicative way.

6. Conclusion

This paper establishes stylized facts about satisfaction for teachers in Indonesia, using an empirical structure that accounts for the possible endogeneity of satisfaction and job performance. First, satisfaction with salary is systematically lower (and different) than satisfaction with other aspects of job performance. Second, the strongest predictors of satisfaction are employment status (with civil servants having higher satisfaction), school with multigrade teaching, and proximity of educational/cultural amenities. Third,

analysis using an IV probit model shows that teachers' satisfaction with their salary and/or work environment has a strong and significant impact on a key performance measure: the teacher's school attendance. Finally, certain policy variables (such as greater job security for teachers) appear to reduce teacher absence only indirectly through satisfaction, while others (such as teacher-recognition programs) have an independent effect on absence, presumably by providing incentives at the margin.

We believe that the results indicate the value of further research into what determines teachers' job satisfaction, and how satisfaction levels affect performance. Especially as long as monitoring, incentives, and accountability remain highly imperfect, the performance of developing-country teachers will likely depend substantially on their satisfaction with the school environment and with their salaries. If this is the case, it requires economic analysis of teacher motivation that moves beyond a straightforward principal-agent framework, in which salary levels and formal rewards and sanctions take center stage, to a broader approach that recognizes the many factors that affect teacher satisfaction and performance. Future empirical research along these lines may include applying the same analysis framework to other developing countries for which data are now available, or investigating the impact of teacher satisfaction on other outcomes such as student academic performance and teacher work performance.

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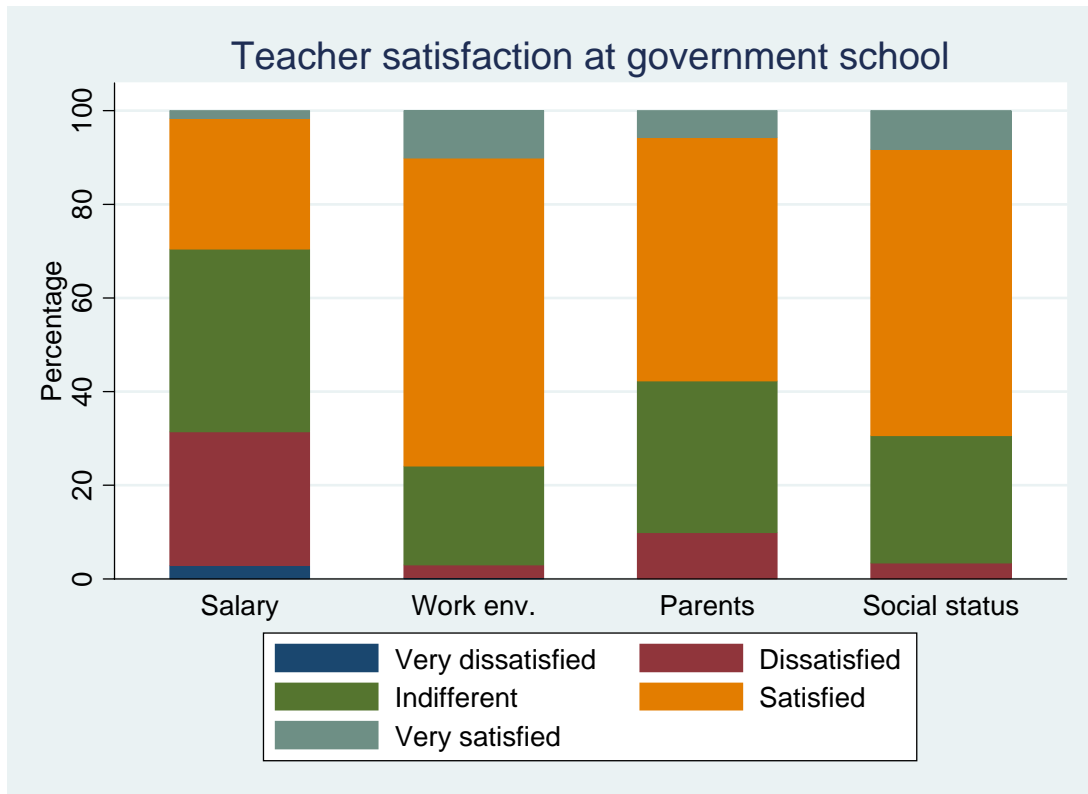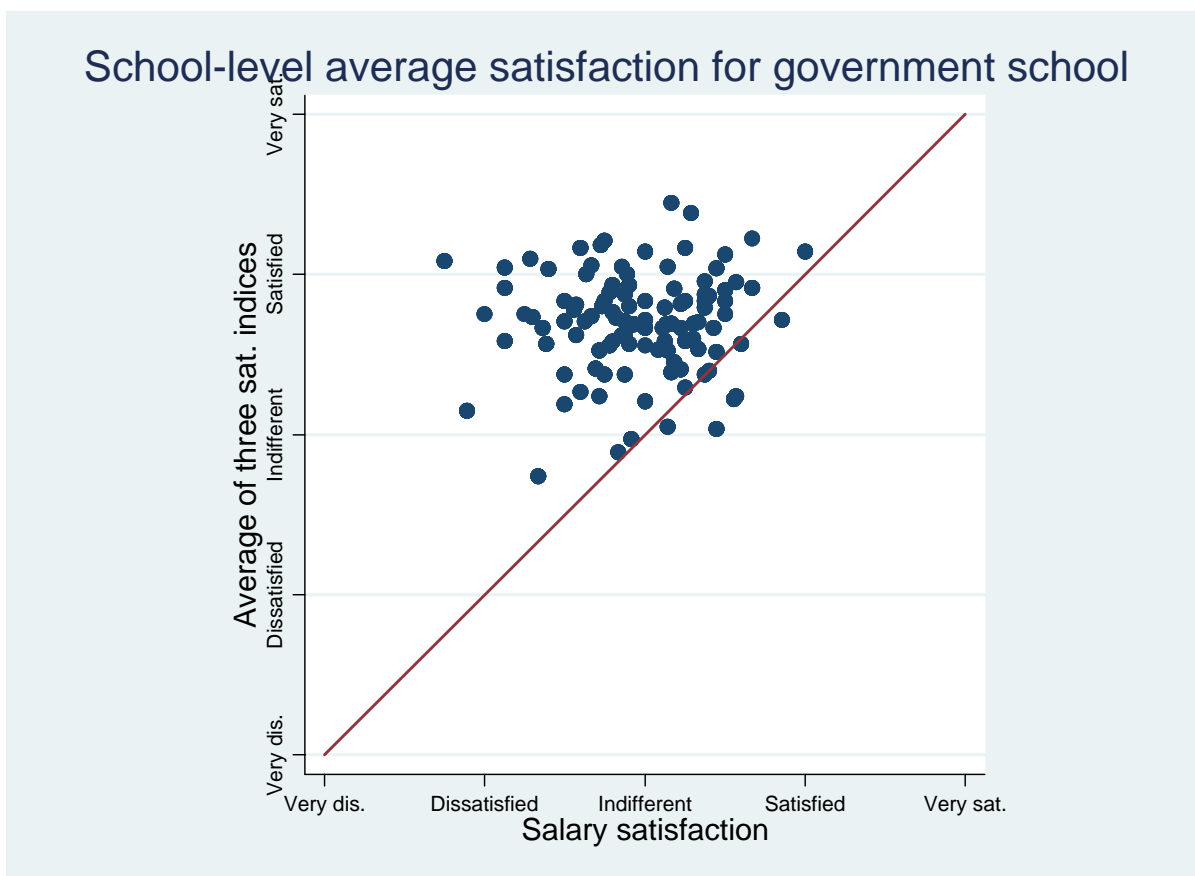**Figure 1: Teacher satisfaction levels for a random national sample of Indonesian primary-school teachers**

Figure 2: Average teacher satisfaction with salary vs. satisfaction on other dimensions

School-level average satisfaction for government school

**Table 1: Correlations among different satisfaction measures
(at the level of the individual teacher)**

Satisfaction with	Salary	Social status	Work environment	Appreciation from parents
		Satisfaction with		
Salary	1.000			
Social status	0.092***	1.000		
Work environment	0.059*	0.381***	1.000	
Appreciation from parents	0.112***	0.475***	0.281***	1.000

Note: 883 observations

Table 2: Determinants of teacher satisfaction

	Salary satisfaction			Work env. satisfaction			Salary & work sat.	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female	0.071		0.092	-0.033		-0.02	0.073	0.267
	(0.058)		(0.060)	(0.062)		-0.057	(0.084)	(0.213)
Experience	0.004		0.001	0.003		-0.001	-0.000	-0.004
	(0.005)		(0.005)	(0.004)		-0.004	(0.007)	(0.015)
Recent teacher training	0.212*		0.167	-0.089		-0.033	0.134	0.429
	(0.108)		(0.105)	(0.074)		-0.075	(0.148)	(0.405)
College-educated	-0.091		-0.128	-0.017		-0.046	-0.174	-0.588
	(0.100)		(0.096)	(0.071)		-0.078	(0.144)	(0.399)
Married	-0.065		-0.066	-0.032		-0.061	-0.127	-0.174
	(0.123)		(0.124)	(0.078)		-0.08	(0.145)	(0.395)
Native speaker of local lang.	0.206***		0.145*	0.114*		0.049	0.194**	0.596***
	(0.073)		(0.074)	(0.058)		-0.061	(0.078)	(0.212)
Head teacher or deputy head teacher	0.468**		0.531***	0.174		0.222	0.754***	1.953***
	(0.184)		(0.202)	(0.155)		-0.154	(0.255)	(0.647)
Other permanent teachers	0.426***		0.529***	0.119		0.161	0.689***	1.795***
	(0.140)		(0.149)	(0.106)		-0.113	(0.206)	(0.473)
School is multigrade		0.894***	0.928***		-0.467***	-0.463***	0.465*	1.741**
		(0.171)	(0.179)		(0.114)	-0.12	(0.269)	(0.690)
Teacher rec. program		0.047	0.054		-0.009	-0.02	0.035	-0.011
		(0.090)	(0.080)		(0.073)	-0.072	(0.110)	(0.278)
Distance to paved road		0.029	0.030		-0.019	-0.02	0.009	0.081
		(0.054)	(0.052)		(0.038)	-0.037	(0.072)	(0.189)
Distance to Edu. Min. office		0.018	0.015		0.136***	0.134***	0.149	0.270
		(0.065)	(0.068)		(0.045)	-0.046	(0.094)	(0.202)

School infra. index		-0.063	-0.067*		0.056*	0.055*	-0.012	-0.081
		(0.040)	(0.038)		(0.031)	-0.03	(0.051)	(0.127)
School discipline index		-0.200**	-0.183**		-0.015	-0.006	-0.189*	-0.628**
		(0.085)	(0.083)		(0.070)	-0.072	(0.114)	(0.285)
Share of parents with junior sec. edu. or higher		0.034	0.020		0.044	0.06	0.080	0.312
		(0.136)	(0.128)		(0.127)	-0.126	(0.178)	(0.433)
Distance to nearest college		-0.140***	-0.144***		-0.101***	-0.105***	-0.248***	-0.598***
		(0.047)	(0.047)		(0.027)	-0.028	(0.061)	(0.156)
District = Bandung		-0.063	-0.040		0.218*	0.234*	0.194	0.283
		(0.133)	(0.124)		(0.117)	-0.119	(0.173)	(0.408)
District = Cilegon		-0.018	0.033		0.400***	0.414***	0.447**	0.808*
		(0.137)	(0.135)		(0.112)	-0.111	(0.191)	(0.470)
District = Gowa		-0.369**	-0.331*		0.525***	0.494***	0.163	-0.264
		(0.176)	(0.189)		(0.125)	-0.127	(0.245)	(0.611)
District = Surakarta		0.258**	0.315**		-0.103	-0.087	0.228	0.604
		(0.130)	(0.133)		(0.108)	-0.108	(0.191)	(0.465)
District = Lombok Tengah		0.241	0.266		0.642***	0.640***	0.905***	2.126***
		(0.173)	(0.168)		(0.130)	-0.13	(0.222)	(0.576)
District = Magelang		0.441**	0.379**		0.552***	0.522***	0.901***	2.065***
		(0.180)	(0.160)		(0.142)	-0.145	(0.233)	(0.559)
District = Pekanbaru		0.349**	0.378***		0.150	0.145	0.522**	1.344**
		(0.157)	(0.140)		(0.136)	-0.133	(0.225)	(0.557)
District = Rejang Lebong		-0.001	0.018		0.057	0.039	0.057	0.005
		(0.178)	(0.184)		(0.099)	-0.116	(0.236)	(0.641)
District = Tuban		0.522***	0.490***		0.516***	0.507***	0.997***	2.560***
		(0.168)	(0.170)		(0.114)	-0.119	(0.240)	(0.614)
Constant	1.261***	2.627***	2.019***	2.717***	2.269***	2.249***	4.268***	4.621***
	(0.187)	(0.413)	(0.456)	(0.134)	(0.310)	-0.322	(0.578)	(1.428)
Observations	882	882	882	882	882	882	882	882
R-squared	0.04	0.09	0.13	0.02	0.10	0.11	0.13	0.13
F-test	6.13	6.02	7.57	2.08	7.38	5.37	5.73	6.71

Note: Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 3a: Impact of teacher satisfaction on teacher absenteeism

	(1)	(2)	(3)	(4)	(5)	(6)
Salary satisfaction	0.113**	-0.775***	0.103			
	(0.052)	(0.280)	(0.778)			
Work environment satisfaction				-0.002	-1.080***	-1.114***
				(0.075)	(0.390)	(0.239)
Female	-0.077	0.021	-0.076	-0.070	-0.048	-0.020
	(0.091)	(0.087)	(0.110)	(0.091)	(0.097)	(0.057)
Experience	-0.003	-0.001	0.001	-0.003	-0.001	-0.001
	(0.007)	(0.006)	(0.007)	(0.007)	(0.006)	(0.004)
Recent teacher training	0.125	0.200	0.167	0.146	0.046	0.036
	(0.220)	(0.196)	(0.254)	(0.223)	(0.208)	(0.203)
College-educated	0.158	0.050	-0.128	0.147	0.075	0.075
	(0.214)	(0.193)	(0.095)	(0.214)	(0.199)	(0.075)
Married	0.082	0.019	0.082	0.079	-0.030	-0.034
	(0.190)	(0.182)	(0.196)	(0.195)	(0.181)	(0.169)
Native speaker of local lang.	-0.221**	-0.033	0.145**	-0.203**	-0.092	-0.085
	(0.095)	(0.128)	(0.146)	(0.095)	(0.125)	(0.112)
Head teacher or deputy head teacher	-0.325	0.241	-0.319	-0.257	0.006	0.222
	(0.226)	(0.337)	(0.200)	(0.224)	(0.259)	(0.248)
Other permanent teachers	-0.694***	-0.047	-0.689	-0.634***	-0.294	-0.275
	(0.171)	(0.335)	(0.147)	(0.171)	(0.267)	(0.214)
Teacher rec. program	-0.456***	-0.327**	-0.456***	-0.458***	-0.355**	-0.021
	(0.153)	(0.161)	(0.078)	(0.153)	(0.150)	(0.136)
Distance to paved road	0.069	0.060	0.030	0.068	0.011	0.008
	(0.072)	(0.071)	(0.052)	(0.072)	(0.078)	(0.037)
Distance to Edu. Min. office	-0.008	-0.010	-0.008	-0.008	0.045	0.045
	(0.065)	(0.071)	(0.065)	(0.065)	(0.063)	(0.045)
School discipline index	0.124	-0.116	-0.184**	0.094	0.082	0.078
	(0.166)	(0.174)	(0.082)	(0.164)	(0.164)	(0.070)
Share of parents with junior sec. edu. or higher	-0.494**	-0.363*	-0.495**	-0.505**	-0.287	0.059
	(0.235)	(0.206)	(0.126)	(0.234)	(0.245)	(0.124)
District = Bandung	0.861***	0.647**	-0.040	0.863***	0.861***	0.845***
	(0.318)	(0.291)	(0.123)	(0.318)	(0.290)	(0.114)
District = Cilegon	-0.003	0.092	-0.002	0.005	0.386	0.416***
	(0.179)	(0.170)	(0.199)	(0.183)	(0.261)	(0.228)
District = Gowa	0.525**	0.134	-0.329	0.493**	0.596***	0.590***
	(0.237)	(0.253)	(0.301)	(0.234)	(0.221)	(0.225)
District = Surakarta	-0.115	0.252	0.315**	-0.072	-0.128	-0.131
	(0.235)	(0.242)	(0.130)	(0.235)	(0.217)	(0.214)
District = Lombok Tengah	0.250	0.327	0.252	0.270	0.774**	0.787***
	(0.257)	(0.242)	(0.282)	(0.263)	(0.311)	(0.288)
District = Magelang	-0.534	-0.076	0.379**	-0.501	0.078	0.109
	(0.418)	(0.358)	(0.480)	(0.425)	(0.458)	(0.144)
District = Pekanbaru	1.407***	1.352***	0.378***	1.453***	1.186***	1.149***
	(0.202)	(0.266)	(0.406)	(0.204)	(0.323)	(0.132)
District = Rejang Lebong	0.255	0.250	0.256	0.261	0.208	0.203
	(0.260)	(0.242)	(0.184)	(0.260)	(0.230)	(0.231)

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District = Tuban	0.441*	0.652**	0.445	0.489*	0.825***	0.506***
	(0.250)	(0.257)	(0.408)	(0.258)	(0.271)	(0.260)
Constant	-0.158	0.907	2.018***	-0.001	2.615**	2.695***
	(0.394)	(0.620)	(0.465)	(0.456)	(1.074)	(0.726)
Instruments						
Distance to nearest college	No	Yes	Yes	No	Yes	Yes
School quality	No	No	Yes	No	No	Yes
Observations	882	882	882	882	882	882
Wald chi2	171.16	264.02	177.30	159.96	231.89	250.80
d.f.	23	23	23	23	23	23

Note: Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 3b: Impact of teacher satisfaction on teacher absenteeism

	(1)	(2)	(3)	(4)
Salary satisfaction plus work satisfaction	-0.507**	-0.481*		
	(0.221)	(0.281)		
Salary satisfaction multiplied by work satisfaction			-0.205**	-0.170
			(0.084)	(0.133)
Female	-0.008	-0.012	0.232	0.243
	(0.094)	(0.097)	(0.093)	(0.101)
Experience	-0.001	-0.001	-0.006	-0.006
	(0.006)	(0.007)	(0.015)	(0.006)
Recent teacher training	0.153	0.134	0.170	0.170
	(0.216)	(0.217)	(0.220)	(0.224)
College-educated	0.068	-0.168	-0.554	-0.577
	(0.212)	(0.216)	(0.397)	(0.393)
Married	-0.003	0.002	-0.132	-0.144
	(0.189)	(0.195)	(0.183)	(0.192)
Native speaker of local lang.	-0.064	-0.073	0.594***	0.594***
	(0.124)	(0.136)	(0.127)	(0.157)
Head teacher or deputy head teacher	0.165	0.142	2.025***	0.110
	(0.317)	(0.251)	(0.634)	(0.635)
Other permanent teachers	-0.167	-0.196	-0.133	1.801***
	(0.313)	(0.203)	(0.466)	(0.467)
Teacher rec. program	-0.380**	-0.388**	-0.394***	-0.418***
	(0.150)	(0.156)	(0.279)	(0.157)
Distance to paved road	0.044	0.009	0.056	0.087
	(0.077)	(0.071)	(0.076)	(0.075)
Distance to Edu. Min. office	0.014	0.013	0.347*	0.343*
	(0.070)	(0.085)	(0.184)	(0.178)
School discipline index	-0.040	-0.198*	-0.681**	-0.047
	(0.178)	(0.114)	(0.182)	(0.284)
Share of parents with junior sec. edu. or higher	-0.365*	0.069	0.255	0.283
	(0.216)	(0.227)	(0.220)	(0.429)
District = Bandung	0.827***	0.837***	0.774***	0.338
	(0.285)	(0.167)	(0.394)	(0.288)
District = Cilegon	0.244	0.455***	0.193	0.894**
	(0.216)	(0.174)	(0.199)	(0.426)
District = Gowa	0.369	0.215	0.255	0.014
	(0.227)	(0.203)	(0.518)	(0.518)
District = Surakarta	0.104	0.233	0.642	0.082
	(0.246)	(0.258)	(0.468)	(0.271)
District = Lombok Tengah	0.582*	0.905***	2.129***	0.517
	(0.298)	(0.215)	(0.291)	(0.560)
District = Magelang	-0.005	-0.034	2.139***	2.163***
	(0.426)	(0.470)	(0.411)	(0.491)
District = Pekanbaru	1.440***	1.453***	1.423***	1.473***
	(0.238)	(0.239)	(0.242)	(0.232)

District = Rejang Lebong	0.264	0.071	0.080	0.250
	(0.246)	(0.233)	(0.627)	(0.247)
District = Tuban	0.816***	0.803**	0.826***	2.579***
	(0.304)	(0.237)	(0.298)	(0.348)
Constant	1.816*	1.724	0.533	0.437
	(0.999)	(1.191)	(1.059)	(0.596)
Instruments				
Distance to nearest college	Yes	Yes	Yes	Yes
School quality	No	Yes	No	Yes
Observations	882	882	882	882
Wald chi2	185.60	179.78	201.27	176.94
d.f.	23	23	23	23

Note: Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Figure 3: Teacher absence probabilities versus satisfaction levels