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Why Some Countries Attract More High-Ability Young Students to Teaching: Cross-National Comparisons of Students' Expectation of Becoming a Teacher

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Abstract

Using data from 37,570 students in 23 OECD countries in PISA 2006, we examine how national contexts shape the expectation of being a teacher at age 30 among high-achieving students in secondary schools. Our results show considerable between-country differences in the degree of students' expectation of a teaching job. To address sources of this cross-national variation, we use two-level logit models by linking student-level data with country-level data. Consistent with earlier findings, we find that teachers' economic status matters for students' expectation of becoming a teacher. Moreover, our results show that teachers' social status also matters. Countries' levels of professionalization of teaching, indicated by whether teachers have a bachelor's degree and are fully certified, are also related to students' expectation of the teaching profession. Specifically, in countries with higher levels of professionalization, we see a reduced gender gap in students' expectation of becoming a teacher.

Introduction

The renewed attention to the role of K–12 teachers in enhancing student achievement has spurred a variety of scholarly work on teacher quality, effectiveness, recruitment, and tenure in the United States (Hanushek and Rivkin 2006; Ingersoll 2004; Teaching Commission 2006) and also in comparative perspective.¹ In addition, recognizing the importance of qualified teachers, policy makers around the world have increasingly become interested in not only expanding the overall pool of teachers (i.e., quantity) but also, more importantly, attracting highly qualified individuals to the teaching profession (OECD 2005, 2011a). Attracting high-achieving students into the teaching profession can create a virtuous circle, whereby “students are better prepared in subject matter knowledge, so the curriculum they teach when they become teachers can be more demanding” (Carnoy 2007, 84). In contrast, the failure to attract high-achieving students to join the teaching profession may create a vicious circle: students are poorly prepared in subject matter knowledge so the curriculum

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¹Akiba and LeTendre (2009); Cooper and Alvarado (2006); Darling-Hammond and Lieberman (2012); Ingersoll (2007); OECD (2005, 2011a); Paine and Zeichner (2012); Tatto et al. (2012).

they teach when they become teachers may be less demanding. As such, attracting students of high academic ability—often indicated by high academic test scores, class ranking, or GPA—to the teaching profession has an important policy implication for improving teacher quality and ultimately student learning in a nation.

However, not all countries succeed in drawing high-achieving students to the teaching profession. In some countries, such as Germany, Poland, and Switzerland, many future teachers enrolled in teacher education programs achieved at average or below-average levels in secondary school (Tatto et al. 2012). By contrast, in other countries such as Finland and South Korea, students entering education majors in college tended to be at the top rung of the achievement ladder (Barber and Mourshed 2007). Under what conditions do high-achieving students choose the teaching profession relative to other competing professions? Why are some countries more successful in attracting young students, particularly those of high ability, to a teaching job than other countries? To date, little research has investigated the roles of national contexts in shaping the expectation of becoming a teacher among high-achieving students. Instead, past research has focused mainly on the determinants of teaching career at the individual level and in single-nation cases.

Using standardized data on 15-year-old students in 23 OECD countries that participated in the Program for International Student Assessment (PISA) 2006, this study addresses the lack of comparative perspective by identifying how national contexts shape the expectation of becoming a teacher among high-achieving students in secondary schools. Given the importance of attracting highly qualified individuals to the teaching profession, the current study focuses on *high-achieving students*, defined as those in the top third of the distribution of math and science average test scores within a country. Specifically, we are interested in examining how countries differ in their teachers' economic and social statuses and how these differences across countries are related to between-country differences in the extent to which high-achieving students expect to become a teacher.

Improving teachers' salaries relative to those of other professionals, a major indicator of economic status, has been of particular interest to scholars and policy makers as a potential initiative for attracting more students, especially high-ability students, to seek teaching positions (Hanushek and Pace 1995). Of course, some students may still want to be a teacher over other competing professions when the teaching profession is socially recognized or respected despite its relatively poor monetary rewards. Accordingly, we examine whether the social status or prestige of the teaching profession may also make a difference in students' expectation of becoming a teacher.

In addition, when teaching as a profession is highly professionalized, young students may consider teaching an attractive job compared to other professional jobs. Therefore, we also investigate whether between-country differences in the level of professionalization of teachers are related to between-country differences in 15-year-old students' expectation of becoming a teacher, even after individual and familial characteristics of students are taken into account. Among many possible indicators of professionalization, we focus on credentials and licenses (Ingersoll and Merrill 2011).

Review of Literature: Who Wants to Become a Teacher?

Numerous studies in various countries have identified many reasons why people want to become teachers, including loving to work with children, material benefits and security, the enjoyment of sharing knowledge, and the influence of students' parents and former teachers.² Studies have also looked at demographic characteristics, particularly age, gender, and race/ethnicity, of teachers or preservice teachers to examine the current demographic profile of the teaching profession and its implications for the future teaching labor force (Brookhart and Freeman 1992; OECD 2005).

Among various motivation factors, the most appealing factor for policy makers has been teacher salary (Hanushek and Pace 1995). This is because teachers' relative salary reflects "the basic economic principle that higher wages increase the supply of labor" (Milanowski 2008, 6). By contrast, the other factors loosely called "altruism" offer little directions for policy makers on how to attract young students to the teaching profession, even though they offer important insights into the motivation for a teaching career. As a result, much research especially in the field of economics of education has focused on the role of economic incentives in attracting to the teaching profession (Chevalier et al. 2007; Dolton 1990; Manski 1987). This line of research has provided evidence that generally supports the positive effects of increased teachers' salary. Determining the career decision to teach among UK college graduates, for instance, Chevalier et al. (2007) showed that as the predicted wage as a teacher relative to the predicted wage as a nonteacher increased, the probability for a UK college graduate to choose a teaching job increased to a substantial degree. An earlier study by Manski (1987) reported a similar result for US college graduates.

However, some studies question the impact of teachers' salaries (e.g., Ballou and Podgursky 1995; Hanushek and Pace 1995). Ballou and Podgursky (1995, 335), for example, found that the result of paying teachers more (i.e., a 20 percent raise in teacher salaries) is "not encouraging" since "average cognitive ability among teachers remains below the mean for the college educated population." Hanushek and Pace (1995) also reported that variation in relative teacher earnings across states had no significant relationship with the likelihood for students to attain a bachelor's degree in education.

Meanwhile, much research on teaching motivations focused either on college students enrolled in teacher-training programs or on college graduates from teacher education institutions. Few studies have examined how students in earlier stages of life (e.g., in high schools) form their expectation to become a teacher. This lack of interest in early expectations is in sharp contrast to the literature on scientists, which highlights the critical role of students' expectations in high schools for their science careers (Maple and Stage 1991; Xie and Shauman 2003).

Another major limitation of previous literature is that most research focused on a single-nation case. The lack of comparative perspective on the issue is surprising given the growing need for global efforts "to help countries share innovative and successful initiatives and to

²Alexander et al. (1994); Brookhart and Freeman (1992); Joseph and Green (1986); Richardson and Watt (2005); Schutz et al. (2001).

identify policy options for attracting, developing and retaining effective teachers” (OECD 2005, 3). Despite increased academic and policy efforts to compare teacher education programs, teacher policies, and teacher quality across countries,³ comparative research on teachers has not systematically addressed how students across countries differently develop their expectation of becoming a teacher, and why some countries are more successful than others in attracting the best and brightest young students to a teaching job. Although students can change their expectation of becoming a teacher over time, it is reasonable to expect that countries where a large share of students aspire to a teaching job early in their life course face less difficulty in recruiting teachers than countries where only a tiny proportion of students do so.

The Current Study: Roles of National Contexts

Prior research relying on a single-country case tends to view a teaching career as the result of individual decisions. Such views, however, offer limited insights into cross-national differences in the extent to which students expect to become a teacher. By contrast, cross-national comparative research may identify macro contexts conducive to interesting students in the teaching profession. Accordingly, in this study, we conceptualize students’ occupational aspirations to teach as a multilevel process. We hypothesize that cross-national differences in the levels of teachers’ (economic and social) status (relative to other professional occupations) and professionalization of teaching would be systematically related to between-country differences in 15-year-old students’ expectation of becoming a teacher.

Specifically, we argue that the economic status of the teaching profession in a country can influence individuals’ decisions to become a teacher beyond and above their individual background characteristics. Countries differ considerably in teachers’ relative salaries (OECD 2005). Moreover, as noted above, much evidence suggests a positive effect of increased teachers’ salaries on students’ decisions to become a teacher, suggesting a potential connection between cross-national differences in teachers’ relative salaries and cross-national differences in students’ expectation of becoming a teacher. In that regard, we expect that 15-year-old students in countries where teachers’ relative salaries are higher will be more likely to expect to be a teacher at age 30 than their peers in countries where teachers’ relative salaries are lower, even after individual and familial characteristics of students are taken into account.

We acknowledge that young students likely consider not only monetary rewards but also the social status or prestige of a profession when they aspire to it. Therefore, we hypothesize that not only the economic status but also the social status of teachers should matter for students’ interest in the teaching profession. Indeed, there seems to be variation across countries in the social status of teaching. For example, generally speaking, teachers in many East Asian countries, such as Japan (OECD 2002), South Korea (Kim and Han 2002), and Taiwan (Fwu and Wang 2002), enjoy a relatively high social status, compared with other job holders with similar years of education and experience. In contrast, in the United States, the

³Akiba and LeTendre (2009); Darling-Hammond and Lieberman (2012); OECD (2005, 2011a); Tatro et al. (2012).

teaching profession is less prestigious than other traditional professions such as law, medicine, and engineering, even though “it is more prestigious than most blue collar work, such as truck driving, and pink collar work, such as secretaries” (Ingersoll and Merrill 2011, 194). Such cross-national differences in the social status of the teaching profession may account for cross-national differences in students’ expectation of becoming a teacher.

However, a measure of teachers’ social status across many countries has not been easily available. Recently, an attempt was made to compare teachers’ social status across 21 countries by creating a global index of teacher status (Dolton and Marcenaro-Gutierrez 2013). Specifically, an online survey was conducted for adults ages 16–70 in each country to collect information on how respondents ranked the respect accorded to primary school teachers and secondary school teachers, separately, relative to 12 other occupations.⁴ Respondents also named an occupation that they thought similar in status to teaching. Moreover, respondents indicated the extent to which they agreed with the statement that “pupils respect teachers.” The so called “global teacher status index” was created by summarizing respondents’ answers to these four questions about teachers’ social status. It is notable that these four questions directly ask about “status” and “respect” of teachers and are therefore straightforward measures of the social status of teachers, likely yielding a high level of face validity. Moreover, by simultaneously considering four different, but related, dimensions of social status, the summary index should measure social status more reliably than a separate indicator that may tap into only one aspect of social status. Unfortunately, this global teacher status index was available for only 12 out of 23 countries included in our current study. Therefore, we can carry out the analysis of teachers’ social status for only 12 countries. This small number is an important limitation and therefore our findings below on the impacts of teachers’ social status should be interpreted with caution. However, at this point we are not aware of any alternative measures of teachers’ social status that are comparable across many countries.

Teachers’ status is likely to be enhanced when teaching as an occupation is highly professionalized. Therefore, we include the level of professionalization of teaching as another factor that may account for cross-national differences in students’ expectation of becoming a teacher. Occupations tend to be prestigious if they involve highly complex work and thus require a high level of education or a license (Ingersoll and Merrill 2011; Rowan 1994). Literature suggests that credentials are important indicators of the degree of professionalization (Ingersoll and Merrill 2011) as well as of teacher quality (Akiba et al. 2007; Darling-Hammond 2000; Luschei 2012). Many countries such as the United States have made efforts to raise certification standards (Constantine et al. 2009; Darling-Hammond and Sykes 2003) in order to strengthen professionalization of teaching as well as to improve teachers’ quality. In sum, we reason that professionalization of teaching can be indicated by credentials (the extent to which a bachelor’s degree is required to become a teacher) and licenses (the proportion of teachers with a full certification). We hypothesize

⁴Unfortunately, we cannot determine when the survey was conducted. Since the report was published in October 2013, there was probably a time gap between the survey and PISA 2006. Nonetheless, we doubt that people’s perception of the social status of teachers within a country changes quickly, and therefore believe that it still makes sense to link the global teacher status index to our data from PISA 2006.

that students in countries with a higher degree of professionalization of teaching should be more likely to expect to become a teacher than their counterparts in countries with a lower degree of professionalization.

Finally, we examine whether teachers' economic and social status and the professionalization of teaching affect not only the overall likelihood for students to expect to become a teacher but also the gender gap in students' expectations. Boys and girls may respond differently to county-level conditions in forming their expectations to teach. With growing feminization of the teaching profession, scholars and policy makers in various countries are increasingly interested in promoting gender balance in their teaching force (OECD 2005; UNESCO 2011). As will be seen later in the article, in all 23 countries analyzed, 15-year-old female students are more likely to expect to become a teacher than their male peers. Therefore, it will be useful to identify which countries show a relatively narrower gender gap in students' expectations to teach as well as a higher level of expectations overall, and whether such between-country differences in the gender gap are systematically related to teachers' status and professionalization of teaching.

We acknowledge that young students' occupational expectation can change over the life course. However, this fact does not reduce the importance of understanding the process through which students' expectations of becoming a teacher are formed at earlier ages. In fact, stratification research in sociology has accumulated evidence of the significant role of earlier occupational expectation or aspiration for one's later occupational attainment, highlighting the need to identify social factors affecting adolescents' occupational expectations (Morgan 2006; Sewell et al. 1969).

Data and Methodologies

Data

We use the data on 15-year-old students in 23 countries that participated in the 2006 PISA. Administered by OECD, PISA has assessed levels of 15-year-old students' skills in reading, mathematics, and science across a large number of countries every three years since 2000. PISA has also collected a variety of information on students' demographic and socioeconomic backgrounds, attitudes toward and interest in school subjects, and school experiences as well as their schools' environments (OECD 2007). PISA 2006 is the most recent survey that collected information on students' occupational expectations, which is a key variable for our study. The target population of PISA is 15-year-old students who attend a school regardless of school types. Therefore, 15-year-olds who are not enrolled in school are excluded from PISA, which means that researchers should be aware of potential selection of PISA samples especially for developing countries where a substantial proportion of 15-year-old children are out of school. This concern about potential bias associated with the sample selection in developing countries led us to decide to include only OECD countries in the current study.

Among all 30 OECD countries whose students were assessed in PISA 2006, we exclude 7 countries from the analysis due to missing variables either in the student level or in the country level. Specifically, teachers' relative salary, which is a key country-level variable in

our analysis, is not available for four countries (Canada, Mexico, Switzerland, and Turkey). Students' expected occupations in Japan were not coded according to four-digit International Standard Classification of Occupations (ISCO): only two-digit ISCO codes were used, in which K–12 teachers are not distinguished from higher education teaching professionals (including university professors). All school-level variables obtained from principals' reports are missing for all schools in France. Finally, we exclude Luxembourg, where there were only 31 schools in which the entire population of 15-year-old students was enrolled (whereas in most PISA countries about 150 schools or more were sampled). Luxembourg is also deviant with its exceptionally high percentage (27 percent) of 15-year-old female students expecting to become a teacher.

Typically, around 5,000 students were sampled in each country in PISA. However, a few countries, including Australia ($N = 14,170$), Austria ($N = 8,857$), Italy ($N = 21,773$), Spain ($N = 12,192$), and the United Kingdom ($N = 13,152$), sampled more than 5,000 students. In order to prevent these countries with the large samples from disproportionately affecting the result, for multivariate analysis we randomly sampled only 5,000 students from each of the five countries. Furthermore, as mentioned above, we focused on high-ability students within each country, given the importance of attracting high-ability students to teaching profession. We separated students into three groups within each country according to their average scores on math and science tests, and then selected only students in the highest tertile to represent high-ability students within a country. In the end, our final data consisted of 37,570 15-year-old high-ability students in 23 OECD countries.

Measures

Expectation of becoming a teacher—PISA 2006 asked students the following question: “What kind of job do you expect to have when you are about 30 years old?” PISA coded the occupation titles students reported according to the ISCO's four-digit classification numbers. Among those occupations, we classify the following occupations into the category of “teachers”: secondary education teaching professionals (2320); secondary teachers, academic track (including middle school teacher) (2321); secondary teachers, vocational track (including vocational instructor) (2322); primary and pre-primary education teaching professionals (2330); primary education teaching professionals (2331); preprimary education teaching professionals (2332); special education teaching professionals (2340); primary education teaching associate professionals (3310); preprimary education teaching associate professionals (3320); and special education teaching associate professionals (3330). We simply distinguish students into two groups: those who expect to become a teacher and those who do not. Given that our samples are high-ability students, the majority of students expect to become a professional or technician/associate professional if they do not expect to become a teacher.⁵

Student, family, and school characteristics—In the student-level equation, we control for individual and familial characteristics of students that may affect students'

⁵Specifically, 71 percent of all students in our sample expected to become a professional or technician/associate professional. Twenty percent of all students either did not answer the question (or the answer was too vague) or did not know what they expected. In other words, only 9 percent of all students expected a nonprofessional or a nontechnician/associate professional job.

expectation. On the basis of previous literature on choice of the teaching profession reviewed above, we consider the following individual and familial characteristics: gender, student's academic performance, family socioeconomic status (SES), whether a student's mother is currently a teacher, and whether a student's father is currently a teacher. Students' academic performance is measured as the average of PISA math and science test scores.⁶ Each PISA score was measured on the scale of 500 points as a mean and 100 points as a standard deviation across OECD students. To measure a student's overall socioeconomic background, PISA created the so-called PISA index of economic, social, and cultural status, on the basis of three family background measures: parental occupation, parental education, and home possessions (OECD 2007). The index was scaled to have a mean of 0 and a standard deviation of 1 among OECD students. In the PISA background questionnaire, students were asked to report occupations of their mothers and fathers, respectively, which were then coded according to ISCO, as were students' expected occupations. We create two separate dichotomous variables indicating whether students' fathers and mothers are teachers.

In addition to these individual and familial characteristics, we also control for five additional school-related variables. The first is the location of schools. Specifically, we classify students into three groups depending on where their schools are located: city (100,000 or more people), town (15,000–100,000 people), and village (less than 15,000 people). We also include the proportion of female students in schools. Given that female students are more likely to expect the teaching profession, having more female peers in school may affect an individual student's expectation of becoming a teacher through peer group effects. Although it does not directly apply to student's expectations to teach, literature on the gender composition of schools and

We also take into account a school's academic selectivity, given that students attending academically more selective schools may form different views on teachers from those of students attending academically less selective schools. PISA classified schools into four categories, depending on whether schools consider students' academic record and the recommendation of feeder schools for student admissions: (1) schools that consider none of the two; (2) schools that consider at least one of the two; (3) schools that give high priority to at least one of the two; and (4) schools that use at least one of the two as a prerequisite (OECD 2009, 308). This index, therefore, has values from 1 to 4, and schools with higher values indicating more selective admissions.

Moreover, we control for two variables related to school resources. Students in schools with more resources may see teachers working in better environments and thus may have more favorable views on teaching than students in schools lacking resources. The first school-resource variable is the ratio of the number of computers to school size (i.e., the number of students in school). The second school-resource variable is teacher shortage, which indicates the extent to which the shortage of qualified teachers in science, math, language, and other

⁶Although reading was also assessed in PISA 2006, the reading scores are not available for students in the United States. Therefore, we use only mathematics and science scores to measure overall academic performance. classrooms has shown some significant effects (Lavy and Schlosser 2011; Park et al. 2013).

subjects hinders instruction. Based on school principals' reports, PISA created the index of teacher shortage to have a mean of 0 and a standard deviation of 1 across OECD countries. Higher values indicate schools with higher shortage of teachers (OECD 2009).⁷ Table 1 presents descriptive statistics for students' individual, familial, and school-related variables included in our analysis.⁸

Country-level characteristics—As an indicator of teachers' economic status, we rely on teachers' relative salary, which is measured as the ratio of salaries of teachers with at least 15 years of experience to earnings of 25–64-year-old, full-time, full-year workers with tertiary education (OECD 2010). Considering the difficulty of comparing teachers' salaries across countries and also with other professionals within a country, this measure is probably the best for a cross-national comparison. Importantly, compiled in the OECD education statistics report (OECD 2010), this measure is available for all of our 23 countries. The OECD report provides the ratios separately for primary, lower secondary, and upper secondary school teachers in each country.⁹ We use the average of three separate ratios for each country.

As introduced above, we use the global teacher status index created by Dolton and Marcenaro-Gutierrez (2013) to compare teachers' social status across countries. Among 21 countries included in the original report, only 12 countries belong to our sampled countries for the current study: the Czech Republic, Finland, Germany, Greece, Italy, Korea, the Netherlands, New Zealand, Portugal, Spain, the United Kingdom, and the United States. Based on the principal component analysis with the four indicators of teachers' social status, the global teacher status index was originally scaled to have 100 points for the country with the highest level of teacher status among 21 countries. We standardize the teacher status index to have a mean of 0 and a standard deviation of 1 among our 12 countries. Positive values of the teacher status index indicate a higher than average level of teachers' social status among our 12 countries.

In regard to professionalization of teaching, we first focus on whether a bachelor's degree is required for the teaching profession. In PISA 2006, school principals reported the number of teachers with a bachelor's degree (International Standard Classification of Education 5A qualification) in their schools as well as the total number of teachers. But the extent to which teachers in a country have a bachelor's degree depends also on the overall degree of university education in the society. Therefore, instead of simply looking at the absolute

⁷Every student in our 23 countries, except for one in the United States, reported gender. We combine those who did not report their expected occupations at age 30 with those who did not expect a teaching job so that we do not have any missing case on this variable. We also include a small proportion of students who did not report their mothers' and fathers' occupations into the same group with their peers whose mothers and fathers are not teachers. Similarly, a very small proportion of respondents who are missing on the school location are included in the category of village. We substitute mean values for those missing on family SES, which accounts for only 0.3 percent of all students. For the percentage of female students, school's academic selectivity, ratio of computers to school size, teacher shortage, we substitute national means for those schools with missing values. The percentage of students missing on each school-level variable is generally minor, ranging from 2.3 percent to 4.7 percent. To check robustness of our findings, we conducted a supplementary analysis with models that additionally included three dummy variables indicating missing cases on academic selectivity, the number of computers per student, and teacher shortage. The three dummy variables were not significant at all, and the results were hardly different from what we report here. Therefore, in the final models we did not include the dummy variables.

⁸Table 1 presents unweighted descriptive statistics. We do not use weights for the multivariate analyses because we deal only with high-ability students in each country, rather than all of students.

⁹The data on teachers' salaries are those in the year 2006, 2007, or 2008, depending on the country; see table D3.1 in the OECD (2010) report. The data for Ireland and Slovak Republic are available from the 2011 report (OECD 2011b).

proportion of teachers with a bachelor's degree, we consider how the proportion of teachers with a bachelor's degree is compared with the proportion of people with a bachelor's degree among all others in professional occupations. Specifically, we calculate the odds ratios by comparing the odds of having a bachelor's degree among teachers to the odds of having a bachelor's degree among adult workers in other professional occupations (i.e., occupations with ISCO 1000–2460, except for teachers).¹⁰ To calculate the odds of having a bachelor's degree among teachers, we take the national average of schools' proportions of teachers with a bachelor's degree in each country. Since we do not have any other data sources, the odds of having a bachelor's degree among all other professionals are calculated with the information from PISA 2006 students' reports on their father's occupations (i.e., the total number of fathers who are professionals other than a teacher, and the number of professional fathers with a bachelor's degree). The ratio of the two odds of having a bachelor's degree among teachers and among all other professionals indicates the extent to which teachers are advantaged over other professionals in possession of a bachelor's degree.¹¹ In other words, teachers are more likely to have a bachelor's degree than other professionals in countries with higher odds ratios. In the analysis, we include this variable in the form of log odds ratios.

The second indicator for professionalization of teaching is the proportion of fully certified teachers in a country. On the basis of school principals' reports on the number of total teachers and the number of teachers fully certified, PISA 2006 created a school-level variable, the proportion of teachers in each school who were fully certified.¹² Note that the PISA school principal questionnaire did not ask specifically which authorities in a country certified teachers. We use the average proportion of all schools in a country whose principals reported the relevant information in PISA 2006. Table 2 displays country means of the four country-level variables in addition to the percentage of students expecting to become a teacher in each country.

Analytic Strategies

Our dependent variable is whether a student expects to be a teacher or not at age 30. Considering the feature of our data that students are nested into countries as well as the dichotomous nature of our dependent variable, we use a two-level logit model that simultaneously estimates student-level equations and country-level equations (Raudenbush and Bryk 2002).¹³ Specifically, the two-level model has the following specifications in the

¹⁰An important feature of the odds ratios is their invariance to changes in the marginal distribution (Powers and Xie 2008). Countries differ in the distribution of university-educated population as well as the size of teachers in their total workforces. In order to compare across countries that differ in the marginal distributions, therefore, we need a relative measure of having a bachelor's degree, free from the marginal distributions.

¹¹Since Spain is missing on the proportion of teachers with a bachelor's degree in PISA 2006, we used the PISA 2009 data instead for Spain. Moreover, in Spain, it was reported that 100 percent of teachers have a bachelor's degree, which prevents calculation of the odds ratios. To be able to calculate the odds ratios, we replaced 100 percent with 99 percent.

¹²Denmark and Spain are missing on this variable in PISA 2006. Therefore, we used the data from PISA 2009 for these two countries.

¹³We could have considered a three-level model that took into account students nested within schools, which in turn are nested within countries. However, because we selected only high-achieving students and because many schools have only one or a very small number of students, it would be difficult to apply a three-level model. Note, however, that our selection of high-achieving students did not mean that only a few best schools in each country were represented. On the contrary, about 87 percent of the original schools were included in our sample of high-achieving students (except for Italy and Spain where we randomly selected 5,000 students from the original sample).

student level when p_{ij} indicates the probability for a student i in j country to expect to become a teacher:

$$\log \left(\frac{1-p_{ij}}{p_{ij}} \right) = \beta_{0j} + \sum_{q=1}^{11} \beta_{qj} X_{qij}. \quad (1)$$

The intercepts and the coefficients of independent variables estimated in the student level become outcomes to be modeled by each of the country-level variables: teachers' economic and social status, and two indicators of professionalization of teaching. Given that we have only 23 countries in the country-level equation, we only model the intercepts and the female coefficients to vary across countries according to a country-level variable, postulating the effects of all other student-level variables to be constant across countries. Recall that we have only 12 out of 23 countries in which to examine the effect of teachers' social status as measured by Dolton and Marcenaro-Gutierrez (2013). The following equations in the country level show models when we examine how the intercepts (β_{0j}) and the female slopes (β_{1j}) depend on countries' teacher salary:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{Teacher Salary}) + u_{0j(1)} \quad (2)$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11}(\text{Teacher Salary}) + u_{1j(1)} \quad (3)$$

$$\beta_{2j} = \gamma_{20}; \beta_{3j} = \gamma_{30}; \dots \beta_{11j} = \gamma_{110} \quad (4)$$

We estimate the same sets of models for each of the country-level variables, separately. In other words, in equations (2)–(4), we model the effects of the global teacher status index, log odds ratios of having a bachelor's degree, and teacher certification, separately, in addition to the effects of teachers' salary. Our main focus in the country-level analysis is on the effect of a country-level variable on the intercepts (γ_{01}) and the effect on the female slopes (γ_{11}). The effect on the intercepts indicates how each country-level variable is associated with the overall likelihood for students in a country to expect to become a teacher after student-level variables are taken into account. Since we include the variable for females in the student-level equation, the intercept specifically indicates the likelihood for male students to expect to become a teacher. The effect of a country-level variable on the female slopes indicates how female coefficients (i.e., gender gaps in students' expectation of becoming a teacher) vary across countries according to the country-level variable.

Results

We now discuss the results of the two-level logit model for students' expectation to be a teacher at age 30. Before we move to our final model, we briefly discuss the result of an

unconditional model that includes no predictors at either student or country level (Raudenbush and Bryk 2002). The unconditional model provides the intraclass correlation coefficient that indicates the degree of variation between countries in students' expectation of becoming a teacher. Our unconditional model reveals that 17 percent of total variation in students' expectation of becoming a teacher is between countries.¹⁴ In other words, there is a substantial degree of between-country variation in students' expectation of becoming a teacher, although the majority of variation is within country. Therefore, we can move on to explore sources of cross-national variation in students' expectation of becoming a teacher.

Roles of Teachers' Economic and Social Statuses

Table 3 presents the results of the two-level logit model for teachers' salary and the teacher status index. In the country-level equation, countries' relative salaries of teachers turn out to be positively related to the intercept. Specifically, the coefficient 0.256 indicates that a country's overall odds for its students to expect to become teachers are 1.29 ($= \exp^{0.256}$) times the odds in another country where teachers' relative salary is lower by 0.1 (see the "Odds Ratio" cols. in table 3). With the dichotomous variable for female students included in the student-level equation, the intercept specifically indicates the extent to which male students in a country expect to become a teacher. As seen in table 2, teachers' salaries relative to earnings of 24–64-year-old workers with tertiary education are 0.81 in Korea and 0.51 in Czech Republic (i.e., difference of 0.3). Therefore, the coefficient of 0.256 from the two-level logit model indicates that the overall odds for male students to expect a teaching job in Korea are 2.16 times ($= \exp^{[0.256*3]}$) greater than the corresponding odds in Czech Republic, with the student-level variables held constant. In short, the significant positive coefficient of teachers' relative salary (0.256) on the intercept means that countries with higher teachers' relative salaries show a significantly higher likelihood for male students to expect the teaching profession than do countries with lower teachers' salaries.

We also model the female slope to vary across countries according to teachers' salary. The result in table 3 shows that the relationship between teachers' salary and the female slope is not statistically significant. In the student-level equation, the female coefficient is significantly positive. Specifically, the odds of expecting to become a teacher among female students are three times greater than those for male students. Therefore, the statistically nonsignificant relationship between the female slope and teachers' salary means that although the overall level of students' expectation to become a teacher increases along with teachers' salary, the gender gap favoring female students in students' expectation of becoming a teacher does not change according to teachers' salary.

To facilitate interpretations of coefficients presented as odds ratios in table 3, we present figure 1 showing the relationship between teachers' salary and the overall likelihood for students in a country to expect to teach. Here, the likelihood is presented as log odds of expecting to teach. Since log odds are the dependent variable of the logit model in table 3, we can easily examine the linear relationship between log odds of expecting to teach and

¹⁴We used HLM to estimate two-level hierarchical models specified in equations (1)–(4). However, HLM software does not provide the intraclass correlation coefficient for the logit model. Therefore, we used `melogit` command in STATA 13 to obtain the intraclass correlation coefficient.

teachers' salary. Reflecting that Slovak Republic has the lowest value of 0.44 for teacher's salary and Spain has the highest value of 1.22 (as seen in table 2), the x-axis in figure 1 stretches out from 0.4 to 1.3. For figure 1, we set independent variables as grand mean values (i.e., mean values across all students in the data) and assume that a student's mother is a teacher but her/his father is not a teacher. In other words, figure 1 shows how countries with different levels of teachers' salary vary in their students' overall likelihood of expecting to teach when student- and school-level differences are taken into account. For both female and male students, teachers' salary and log odds are positively related, suggesting that the overall likelihood for students to expect the teaching profession is higher in countries with higher teachers' salaries. However, note that the two lines for female and male students do not converge, indicating that teachers' salary does not change the gender gap in log odds of expecting to become a teacher.

To provide more intuitive interpretation, we translate log odds to the predicted probabilities of expecting to become a teacher in figure 2. Compared to log odds that linearly change across teachers' salary, probabilities change nonlinearly. As for figure 1, to calculate predicted probabilities, we fix independent variables as their grand means and assume that a student's mother, but not father, is a teacher. The probabilities increase more rapidly in the higher ranges of teachers' salary. Figure 2 shows that only 3 percent of female students are predicted to expect to become a teacher in a country with the lowest level of teachers' salary (0.4). The predicted probability of expecting to become a teacher increases up to 17 percent in a country with the highest level of teachers' salary (1.3). In other words, the probability for a female student to expect to become a teacher is 14 percentage points higher in a country with the highest teachers' salary than that in a country with the lowest. The predicted probability for male students also increases nonlinearly from 1 percent to 7 percent across the whole range of teachers' salary.

Turning to the effect of the teacher status index, we find the same pattern seen in teachers' salary. The teacher status index is related to the increased odds of expecting to become a teacher, albeit at a lower level of statistical significance, 10 percent. The significantly positive coefficient of 0.4 indicates that the odds for (male) students to expect a teaching job are 1.49 times greater in a country with the teacher status index being a standard deviation higher than those in a country with the teacher status index being a standard deviation lower. The female slope does not significantly vary according to the teacher status index, implying that the gender gap in students' expectation of a teaching job remains constant across countries with the varying index of teacher status. With the statistical significance only at the 10 percent level, however, we are cautious to draw any strong conclusion on teachers' social status.

To facilitate interpretation of statistical results, we present figures 3 and 4, which parallel figures 1 and 2 for teachers' salary. Figure 3 shows how log odds of expecting to become a teacher increase along with teachers' social status (as measured by the global teacher status index). As described above, the global teacher status index was standardized to have a mean of 0 and a standard deviation of 1 across our 12 countries. We present changes in log odds from 2 standard deviations below and 2 standard deviations above the mean (which is 0). Although the two lines for female and male students seem to slightly converge, the gender

gap in expectation of becoming a teacher remains more or less constant regardless of teachers' social status, as indicated by the negative but nonsignificant coefficient (-0.132) of teachers' social status on the female slope in table 3.

Changing log odds to probabilities, Figure 4 illustrates how probabilities of expecting to become a teacher change by teachers' social status for students who are typical in characteristics across 12 countries and whose mothers, but not fathers, are teachers. Only 4 percent of female students in a country, where the global teacher status index is 2 standard deviations below the mean of 12 countries, are predicted to expect to become a teacher, whereas 12 percent are predicted to do so in a country where the global teacher status is 2 standard deviations above the mean. For reference, the global teacher status index in Greece (1.97) is almost 2 standard deviations above the mean, while the index in Czech Republic (-1.29) is 1.3 standard deviations below the mean (see table 2). The corresponding probabilities for male students increase from 1 percent to 6 percent for the range of teachers' social status.

The statistical significance of teachers' social status at the 10 percent level should be interpreted with caution given that it may lead to the increased chances of Type 1 error. Therefore, our conclusion about the relationship between teachers' social status and students' expectation of becoming a teacher is tentative. However, as figure 4 illustrates, the probability of a student expecting to become a teacher substantially increases as teachers' social status rises. Given that we could analyze only 12 countries for the analysis of teachers' social status, we highlight the substantial change in the predicted probability by teachers' social status over the concern for statistical significance.¹⁵

Considering the small number of countries, we also do not attempt to examine the effect of teachers' social status after controlling for teacher's relative salary. One may expect a high correlation between teachers' salary and social status, but the correlation between the two measures among our 12 countries is only modest (0.20). In fact, including both teachers' salary and social status hardly changes the coefficient of teachers' social status, although we lose statistical power (not shown).¹⁶ In other words, controlling for teachers' salary would not significantly affect practical significance of the social status effect.

As for the effects of student- and school-level variables in the student equation, higher test scores are associated with the smaller odds of expecting to enter the teaching profession. This pattern is similarly observed for the effect of SES: students from families of higher SES are less likely than their peers from families of lower SES to expect to become a teacher. Having a mother who is a teacher and having a father who is a teacher are both significantly associated with the increased odds for students to expect to become a teacher. Students living in a town are less likely to expect to become a teacher compared to students living in a village, although students living in a city do not differ significantly from students living in a village. A higher percentage of female students in the school a student attends seems to

¹⁵Carbonaro (2006) even argues that conventional statistical significance may not be applied to this kind of two-level model because countries are not randomly selected. Although this argument is debatable, his point of "the practical significance of the estimates" over statistical significance is well taken.

¹⁶The result is available from the authors upon request.

increase the chance that a student will expect to become a teacher, although the effect is not significant in the analysis of the teacher status index. A school's academic selectivity and teacher shortage are not significantly associated with the odds of students' expectation of becoming a teacher. Students attending schools with more computers available per student are less likely to expect to become a teacher than students attending schools with fewer computers.

Results of Teacher Credential and Certification

Table 4 displays the results of the two-level logit model for each indicator of teaching professionalization. First, regarding the extent to which teachers have a bachelor's degree compared to other professionals, the log odds ratios of teachers having a bachelor's degree are significantly and positively associated with the intercept. In other words, in countries where the likelihood for teachers to have a bachelor's degree is higher relative to other professionals, students (specifically male students, who are the reference group) are more likely to expect to become a teacher than their counterparts in countries with a lower likelihood. Interestingly, professionalization of teaching measured by bachelor's degree is significantly related to the decreased female slope. In other words, countries with a higher degree of professionalization of teaching tend to show not only a higher level of expectation among male students but also a narrower gender gap favoring females.

The teacher certification analysis shows a similar pattern. The percentage of fully certified teachers has a significant and positive relationship with the intercept, suggesting that the degree of teachers' certification is significantly associated with the increased odds that (male) students will expect to become a teacher. Moreover, teachers' certification is negatively related to the female slope, indicating that the gender gap in students' expectation of becoming a teacher is diminished in countries with higher percentages of fully certified teachers. The consistent impacts of the two measures suggest that professionalization of teaching matters not only for the overall likelihood but also for the gender gap in students' expectation of becoming a teacher.¹⁷

Conclusion

The overall goal of the current study was to document cross-national differences in high-achieving students' expectation of being a teacher at age 30 and to identify sources of these cross-national differences at the macro level among OECD countries. First, our analyses of PISA 2006 data for 23 countries showed that there was substantial cross-national variation in the degree to which high-achieving young students aspired to the teaching profession. Considering that attracting students of high ability into the teaching profession is a critical challenge many OECD countries face (OECD 2005), the evidence of substantial cross-national variation in high-achieving students' expectation of becoming a teacher provides a good motive to examine why some countries have fewer difficulties than others in attracting academically talented students into teaching profession from an early age.

¹⁷Instead of the two separate measures, we also estimated the model with an index that summarizes bachelor's degree and certification on the basis of the factor analysis. The result with the index shows the same pattern as reported in each measure of teaching professionalization.

Importantly, we found that students in countries where the economic and social statuses of teachers were higher (indicated by a higher level of teachers' relative salary and the global teacher status index) were more likely to expect to be a teacher in their future than their counterparts elsewhere, even after controlling for family, student, and school characteristics. We also found that countries' levels of professionalization of teaching (indicated by relatively high credentials and by full certification) were systematically related to between-country differences in students' expectation of becoming a teacher. Further, we found that the gender gap (favoring female students) in the expectation to become a teacher among high-achieving students was smaller in countries where the level of professionalization of teaching was higher.

Together, these findings support our hypotheses about the positive role of the economic and social statuses of teaching profession in shaping high-achieving young students' expectation of becoming a teacher. Our finding of the positive relation of the economic status of teaching profession to 15-year-old students' expectation of becoming a teacher is consistent with evidence highlighting the importance of economic incentives for college graduates to choose a teaching profession (Chevalier et al. 2007; Manski 1987). However, our study highlights that the social status of the teaching profession, which is related but somewhat distinct from its economic status, also matters for cross-national differences in students' expectations. In our view, the social status of teachers has not received attention as much as the economic status of teachers.

Our study has important policy implications. Many countries are concerned not only about teacher shortages per se but also about the low quality of the teaching workforce (OECD 2005, 2011a). Indeed, our results indicate that, all else being equal, high-SES and high-achieving students are less likely to expect to become a teacher. At the same time, however, our results suggest that improving the economic and social statuses of the teaching profession relative to other professions can encourage academically talented students to aspire to the teaching profession at an early age and thus potentially attract them later into the teaching workforce. Therefore, educational policy makers should make continuous efforts to improve the economic and social conditions of teachers by offering various types of incentives in terms of salaries, compensation, and benefits (e.g., housing support, leave). Moreover, policies for enhancing professionalization of teaching should be also considered, as our study shows the positive relationship between professionalization of teaching and students' expectation of becoming a teacher.

The current study has several limitations that could be addressed in future research. First, our study investigated the expectation of becoming a teacher among 15-year-old students of high academic ability. Therefore, it remains to be investigated to what extent these young children, who want to be a teacher, realize or abandon their occupational dreams as their lives progress. Second, although in the current study we treated teachers as a uniform group, they can differ in their economic and social statuses depending on various factors (e.g., private vs. public school teachers) even within a country. We acknowledge that our focus on between-country differences may not adequately address within-country differences among teachers. Third, our study focused on a limited number of OECD membership countries that are economically wealthy, and thus our results should be interpreted cautiously when

applying to other countries, especially less economically developed countries. Future research also should investigate how various aspects of national contexts that we did not take into account shape the future expectations of becoming a teacher among young children in more diverse countries, including developing countries.

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Fig. 1.
Log odds of expecting to become a teacher by teachers' salary

Fig. 2.
Probabilities of expecting to become a teacher by teachers' salary

Fig. 3.
Log odds of expecting to become a teacher by teachers' social status

Fig. 4.
Probabilities of expecting to become a teacher by teachers' social status

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Table 1

Descriptive Statistics of Individual, Familial, and School-Related Characteristics at the Student Level

	Female (%)	SES ^a	Academic Achievement ^b	Mother Is a Teacher (%)	Father Is a Teacher (%)	School Location			% of Female Students in School	School's Academic Selectivity ^c	Ratio of Computers to School Size	Index of Teacher Shortage ^d	Sample N
						Village (%)	Town (%)	City (%)					
Australia	45.4	.55	619	10.4	3.2	11.0	19.8	69.2	48.4	1.98	.36	.10	1,666
Austria	44.3	.53	610	9.3	4.3	41.2	23.3	35.4	45.7	3.52	.24	−.37	1,642
Belgium	43.5	.63	623	12.6	5.3	31.4	54.5	14.1	49.8	2.11	.16	.16	1,666
Czech Republic	45.6	.60	647	13.6	2.4	28.2	52.3	19.5	53.2	3.35	.14	−.31	1,977
Denmark	47.5	.67	594	9.3	5.4	50.4	35.2	14.4	49.8	1.58	.21	.03	1,510
Finland	47.6	.53	640	9.6	3.6	45.3	33.0	21.6	50.4	1.35	.19	−.32	1,571
Germany	43.7	.76	613	6.8	3.0	25.5	50.1	24.4	51.8	2.87	.09	.15	1,630
Greece	49.5	.33	559	12.1	5.6	20.8	37.1	42.2	51.9	1.46	.11	−.43	1,624
Hungary	44.3	.45	593	13.7	3.4	13.4	38.3	48.4	53.6	3.36	.20	−.77	1,496
Iceland	51.6	1.08	593	13.3	3.6	41.2	25.1	33.7	48.9	1.60	.21	−.01	1,263
Ireland	47.8	.37	596	10.6	3.1	50.0	17.8	32.2	49.6	1.64	.11	−.16	1,528
Italy	47.1	.26	578	12.7	3.3	22.4	47.5	30.0	50.0	1.63	.19	.28	1,666
Korea	46.7	.30	627	6.2	3.4	1.5	8.3	90.3	47.4	2.78	.21	−.62	1,725
Netherlands	45.8	.68	627	12.0	5.5	10.8	62.9	26.3	51.0	3.55	.14	−.05	1,623
New Zealand	48.8	.47	632	10.1	1.7	13.1	26.1	60.7	51.5	1.68	.26	.25	1,607
Norway	47.4	.67	584	13.4	5.4	63.5	22.9	13.6	49.0	1.10	.30	.33	1,564
Poland	48.6	.20	596	9.2	1.3	45.8	20.2	34.0	50.3	2.11	.10	−.87	1,849
Portugal	48.9	.04	566	7.1	2.5	32.3	39.7	28.0	52.1	1.46	.10	−.84	1,703
Slovak Republic	46.4	.33	589	9.1	1.8	27.2	54.4	18.4	51.5	3.04	.09	−.24	1,577
Spain	44.8	.28	590	6.4	3.1	30.5	22.8	46.7	49.2	1.20	.13	−.71	1,666
Sweden	48.2	.55	598	9.7	3.8	42.0	33.9	24.1	48.8	1.26	.17	−.39	1,481
United Kingdom	45.6	.51	608	9.2	2.9	33.4	38.4	28.2	50.0	2.11	.31	−.26	1,666
United States	46.5	.61	585	9.1	2.0	31.3	37.1	31.6	48.9	1.71	.31	−.02	1,870

^aThis PISA index was originally scaled to have a mean of 0 and a standard deviation of 1 across OECD students.

^bThis achievement score refers to the average of each student's mathematics and science scores. In PISA, each mathematics and science score was scaled to have a mean of 500 points across OECD students.

^cEach school is classified into one of four categories in terms of the degree of academic selectivity. Higher values indicate more selective admissions to school. See the text for details.

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This PISA index has a mean of 0 and a standard deviation of 1 across OECD countries. Positive values indicate higher levels of teacher shortage at a school than the average level across OECD countries, as reported by school principals.

p

Table 2

Descriptive Statistics of Country-Level Variables

	% of Students Who Expect to Be a Teacher at Age 30			Ratio of Teachers' Salaries to Earnings of Workers Ages 25-64 with Tertiary Education ^a	Teacher Status Index ^b	Log Odds Ratios of Having a BA Degree between Teachers and Other Professionals ^c	% Of Teachers Fully Certified ^d
	Total	Female	Male				
Australia	5.1	7.1	3.4	.94		3.45	97.8
Austria	2.7	5.5	.6	.76		.29	91.0
Belgium	8.7	13.2	5.2	.96		-.69	88.0
Czech Republic	2.4	3.9	1.2	.51	-1.29	1.79	87.9
Denmark	2.9	4.2	1.6	.92		2.45	91.4
Finland	6.7	10.7	3.0	.94	-.40	1.55	85.6
Germany	6.1	9.6	3.5	.97	-.79	.67	91.1
Greece	7.5	11.1	4.0	.74	1.97	2.46	96.5
Hungary	2.1	3.3	1.2	.53		3.06	96.3
Iceland	1.1	1.8	.3	.54		.83	84.9
Ireland	8.6	12.6	4.9	.88		4.24	97.4
Italy	2.3	3.6	1.3	.57	-1.24	1.87	84.6
Korea	7.3	9.2	5.7	.81	1.35	4.92	99.3
Netherlands	5.7	8.3	3.4	.87	.20	1.15	89.0
New Zealand	1.9	3.3	.6	.97	.93	2.54	92.6
Norway	1.5	2.3	.9	.67		1.47	88.6
Poland	.2	.3	.0	.68		-.06	96.5
Portugal	1.9	3.2	.6	.72	-.55	.21	90.0
Slovak Republic	1.0	1.6	.4	.44		-1.61	75.6
Spain	2.3	3.6	1.2	1.22	-.31	4.42	100.0
Sweden	3.7	4.8	2.6	.94		1.24	90.4
United Kingdom	5.4	8.8	2.5	.86	.02	-.82	95.3
United States	4.1	5.5	2.9	.62	.11	2.80	94.4
Country Mean	4.0	6.0	2.2	.79	.0	1.66	91.5

^aThe data come from OECD (2010), except for Ireland and Slovak Republic (from OECD 2011b).^bThis index is the standardized version of the Global Teacher Status Index reported by the Varkey GEMS

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Foundation. Higher values indicate higher levels of teacher status. See the text for details on the index.

_c The odds of having a BA degree among teachers are calculated from school principals' reports in PISA 2006, while the odds for other professionals are calculated from students' reports on their fathers' occupations in PISA 2006.

_d The values indicate the averages of the proportions of teachers fully certified among schools in a country, calculated from PISA 2006 (or 2009).

Table 3

Two-Level Logit Models of Students' Expectations of Becoming a Teacher (Teachers' Economic and Social Status)

	Teachers' Relative Salary			Teacher Status Index		
	Coef.	SE	Odds Ratio	Coef.	SE	Odds Ratio
Country-level equation:						
Effect on the intercept:						
Teachers' relative salary ^a	.256	(.116) [*]	1.29			
Teacher status index				.400	(.211) ⁺	1.49
Effect on the slope of female:						
Teachers' relative salary ^a	-.027	(.054)	.97			
Teacher status index				-.132	(.108)	.88
Student-level equation:						
Intercept, γ_{00}	-4.156	(.216) ^{***}	.02	-3.869	(.203) ^{***}	.02
Female	1.110	(.098) ^{***}	3.04	1.086	(.109) ^{***}	2.96
Academic achievement ^b	-.026	(.007) ^{**}	.97	-.031	(.010) ^{**}	.97
SES	-.134	(.036) ^{***}	.87	-.080	(.045) ⁺	.92
Mother is a teacher	.359	(.087) ^{***}	1.43	.286	(.116) [*]	1.33
Father is a teacher	.525	(.121) ^{***}	1.69	.631	(.155) ^{***}	1.88
School location (ref: village):						
Town	-.341	(.077) ^{***}	.71	-.334	(.102) ^{**}	.72
City	-.097	(.068)	.91	-.036	(.091)	.96
% of female students in school	.004	(.002) [*]	1.00	.001	(.002)	1.00
School's academic selectivity	.049	(.030)	1.05	.058	(.037)	1.06
Ratio of computers to school size	-1.391	(.282) ^{***}	.25	-1.303	(.378) ^{**}	.27
Index of teacher shortage	.029	(.032)	1.03	.051	(.042)	1.05
Sample Size	37,570 students in 23 countries 20,328 students in 12 countries					

Note.—Coef. = coefficient; SE = standard error; SES = socioeconomic status.

^aThe coefficient of this variable refers to the change per 0.1 change in country's relative salary of teachers.^bThe coefficient of this variable refers to the change per 10 points in academic achievement.

$P < .001$

 $P < .01$
**
 $P < .05$
*
 $P < .10$
+

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Table 4
Two-Level Logit Models of Students' Expectations of Becoming a Teacher (Teacher Credential and Certification)

	Log Odds Ratio of Bachelor's Degree			% of Teachers Fully Certified		
	Coef.	SE	Odds Ratio	Coef.	SE	Odds Ratio
Country-level equation:						
Effect on the intercept:						
Log odds ratio of bachelor's degree	.306	(.132) *	1.69			
% of teachers fully certified				.075	(.040) +	1.08
Effect on the slope of female:						
Log odds ratio of bachelor's degree	-.160	(.044) **	.76			
% of teachers fully certified				-.036	(.016) *	.96
Student-level equation:						
Intercept, γ_{00}	-4.167	(.222) ***	.02	-4.153	(.219) ***	.02
Female	1.114	(.078) ***	3.05	1.104	(.083) ***	3.02
Academic achievement ^a	-.026	(.007) **	.97	-.026	(.007) **	.97
SES	-.135	(.036) ***	.87	-.134	(.036) ***	.87
Mother is a teacher	.357	(.087) ***	1.43	.357	(.087) ***	1.43
Father is a teacher	.526	(.121) ***	1.69	.527	(.121) ***	1.69
School location (ref: village):						
Town	-.343	(.077) ***	.71	-.341	(.077) ***	.71
City	-.100	(.068)	.90	-.098	(.068)	.91
% of female students in school	.005	(.002) **	1.00	.004	(.002) *	1.00
School's academic selectivity	.043	(.031)	1.04	.044	(.031)	1.05
Ratio of computers to school size	-1.398	(.282) ***	.25	-1.388	(.283) ***	.25
Index of teacher shortage	.028	(.032)	1.03	.029	(.032)	1.03
Sample size	37,570 students in 23 countries		37,570 students in 23 countries		37,570 students in 23 countries	

Note.—Coef. = coefficient; SE = standard error; SES = socioeconomic status.

^aThe coefficient of this variable refers to the change per 10 points in academic achievement.

$P < .001$

 $P < .01$
**
 $P < .05$
*
 $P < .10$
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