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Experimental Evidence from  
an Information Intervention

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# **Civil Service Reform and Self-Selection into Teaching: Experimental Evidence from an Information Intervention**

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## **Abstract**

Teachers are the most important within-school factor to improve student achievement and educational outcomes, and education systems interested in improving educational results need to attract, develop and retain highly effective teachers. Thus, a key challenge that education systems face is to make the teaching profession attractive to talented youth. Since 2012, Peru has made considerable changes to its teaching career in order to make it more attractive and modify its incentive structure. This paper presents the results of an experiment in which we delivered information to high school seniors regarding recent changes incorporated into the Peruvian teaching career. We find positive effects both at the extensive and intensive margins. Treated students were more likely to enroll in higher education, and to pursue an education major. Our results show that career incentives and information can not only affect the current stock of teachers but also future cohorts.

## 1. Introduction

There is an extensive economic literature on the role of pay incentives and schemes in teacher performance (Springer and Podgursky, 2007). The focus has largely been on the effects of these incentives on the current stock of teachers, and most studies have found that these instruments have positive impacts. Much less is known about the effect of said schemes on future cohorts of teachers and their composition. During the past decades, several countries in Latin America have been implementing changes to the teacher career, particularly in terms of wage incentives. These policy changes could help us understand the impact that these incentives have on who becomes a teacher.

Teacher effectiveness, generally measured by value added in students' standardized test scores, is associated with better learning outcomes (Koedel et al. 2015), higher university attendance rates, and higher salaries for their students after graduation (Chetty et al., 2014). Historically, Latin American countries have not attracted the best candidates to education and, as a result, teaching and education quality are low (Elacqua et al., 2018). Teacher salaries are generally low and present less variation than other professions. There is usually a single salary schedule, so the rewards for teaching quality or tenure are low (Mizala and Ñopo, 2014). The mechanisms established for promotions and salary increases are typically linked to seniority rather than merit. Current teachers find few incentives to exert efforts conducive to improving student learning (Hanushek and Pace, 1995, Podgursky et al., 2004, Dolton and Marcenaro-Gutierrez, 2011). As a result, the teaching profession is also perceived as one with greater job stability than other segments of the labor market (Elacqua et al., 2018). Thus, a hypothesis of this study is that talented high school graduates prefer to study professions other than education, in which their skills are better rewarded.

Since 2012, Peru has been advancing a series of reforms to its teaching career. In the context of these reforms, this study focuses on the process by which young Peruvians decide to enter the teaching career, and how these changes are affecting both the perception of the teaching career as well as its attractiveness for young people. We first analyze the behavior of young people who are in their last year of high school and about to make decisions regarding their post-secondary educational and occupational choices. We compare the cognitive and socio-emotional abilities of those who intend to study education-related majors with those who aspire to study other

professions, while also analyzing how much they know about the changes introduced by the government to the teaching career. We also delivered an information treatment focused on motivating students to choose a career in education, to later determine whether this intervention had an impact on attracting more and better prospective candidates to the teaching profession. We do this by following the students three years after the information intervention was conducted and collecting data on their actual post-secondary paths.

We find that exposure to the information treatment affected the decisions of the treated high school students both in the extensive and intensive margins. On the former, we find that the treatment resulted in a 3% growth in the probability of pursuing higher education compared to non-treatment. On the latter, we find that the treatment incremented the odds of enrolling in an education major by 70%.

Our results are in line with the related literature on pay-for-performance incentives for teachers. Economic theory argues that incentives to individuals act as a motivation for efficient work, the underlying assumption being that agents respond to contracts that reward performance. Thus, these strategies reward or sanction teachers based on some form of performance evaluation (Chamberlin, et al, 2002). One of the most salient instruments for such policies is, obviously, salaries. As it has been documented, salaries affect teachers' motivation (OECD, 2009; Figlio and Kenny, 2006; Ortega, 2010; Player, 2009; Heutel, 2009; Loeb and Page, 2000); can cause high performing teachers to leave the profession (Imazeki, 2005; Harris and Adams, 2007; Scafidi et al., 2007); and can prevent the most talented students from choosing an education major in college (Corcoran, 2007). Our paper contributes to this literature by showing that changes in the expected payoffs of becoming a teacher can affect both higher education choices and the composition of the future pool of teachers.

This study also contributes to the literature on information treatments. In the standard framework modeling for investments in human capital, individuals are assumed to have complete and accurate information about the costs and expected benefits of each schooling level. This enables them to make optimal schooling choices. Increasingly, new results from the development and economics of education literatures are challenging this assumption. For example, Jensen (2010) shows that providing children with basic information on average earnings increased education of treated

students by 0.2 years. Other randomized controlled trials have shown that providing information to students or parents about the benefits and/or costs of investing in higher levels of education improves school attendance, grades, application choices and enrollment outcomes at different levels of schooling<sup>1</sup>. Whether providing information affects human capital investments and what choices could be affected by information may depend on context. Several studies analyze how information about higher education affects decisions in the US and find large positive effects on the extensive margin outcomes for enrollment. However, these information treatments tend to be coupled with more expensive subsidies and/or guidance through the application process (e.g. Bettinger et al., 2012; Carrell and Sacerdote, 2013; Hoxby and Turner, 2013). In contrast, our paper contributes to this literature by showing that a simple and easily scalable information treatment can affect the higher education decisions of high school students. Particularly, the fact that information was delivered in a group setting accentuates the benefits of this treatment.

Our paper's relevance, however, goes beyond how the information treatment was delivered. Several studies have been conducted to determine the effect of similar changes to the teaching career through Latin America. Mizala and Romaguera (2004) offer an initial assessment of the impact of the National System of Performance Assessment (SNED), a system mostly focused on monetary incentives based on teacher evaluation. The reform in Colombia, which included a selective entry competition and a variety of quality incentives, has been evaluated by Brutti and Sanchez (2017). McEwan and Santibañez (2005) study the effects of raising economic and morale-boosting incentives in Mexico. All of these found small but positive impacts on student outcomes. In this context, our study contributes to this literature by showing that structural changes to the teaching career can affect not only the efforts of the current stock of teachers, and the

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<sup>1</sup> These experiments have taken different forms. For example, some provide application information to interested students (e.g. Carrell and Sacerdote, 2013; Hoxby and Turner, 2013), others provide information on economic returns (Nguyen, 2008; Jensen, 2010; Hastings et al., 2015) or on financial aid (Dinkelman and Martínez A, 2014; Dunn and Oreopoulos, 2013), while yet others supplement information interventions with targeted assistance in applying for financial aid or college (Bettinger et al., 2012; Brown et al., forthcoming), or with cash incentives or fee waivers for completing applications (Carrell and Sacerdote, 2013; Hoxby and Turner, 2013). Studies have been targeted at all levels of schooling (primary, secondary and tertiary), at different types of students (high achievers, average students, etc.), and in high, middle-income and low-income countries such as the US, Chile, Madagascar, and Dominican Republic. Banerjee et al. (2013) and Lavecchia et al. (2014) present comprehensive reviews of much of this recent experimental evidence from studies in developed and developing country settings.

corresponding student performance, but can also impact the composition of future teachers by affecting career choices of high school graduates.

The paper is structure as follows. Section 2 provides some background on the teaching career in Peru, focusing on the context before the reform and discussing the details of the changes implemented by the reforms. Section 3 describes the details of the experiment and data used. Section 4 presents baseline results describing the characteristics of high school students who report to be interested in becoming a teacher, while Section 5 shows the experimental results. Finally, Section 6 discusses the policy implications of the results and the cost of the intervention.

## **2. Setting**

Our experiment takes place in Lima, Peru. Peru is a country that has experienced an important increase in schooling coverage. This has led to almost universal enrollment at the primary level, and around 85% at the secondary level<sup>2</sup>. As a direct consequence of this expansion, there has been a significant increase in the number of teachers, which in turn led to a proliferation of teacher training institutions. The number of pedagogical institutions that did not require an admissions exam expanded from 17 in 1990 to 177 in 1997, enrolling more than two thirds of prospective teachers by the end of that period. This rapid expansion and lack of barriers to become a teacher might have resulted in a profession that attracted students with lower cognitive abilities who were interested in a career with less working hours but with job and wage stability (Diaz and Saavedra, 2000).

Before the implementation of the recent reforms, the main characteristic of the public teaching career structure was its uniformity in terms of rights and duties, due to the centralized nature of its regulatory framework. In this context, public sector teachers worked in a system where the incentives in place were not aligned to reward effectiveness (Diaz and Saavedra, 2000). The wage structure was not linked to performance, did not recognize merits, nor did it stimulate improvement, creativity, or pedagogical innovation. When entering the public magisterial career, after passing a centralized examination, teachers were granted the right to employment stability in the position, level, and place of work. While in theory there was an evaluation procedure in place

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<sup>2</sup> ESCALE, 2015.

to determine salary raises based on tenure and actual performance (with more weight given to professional background than to performance), the reality was that this process was only active for only one year in 1990.

This is the context in which a series of reforms to the public teaching career were implemented. The foundational shift was the enactment, in November of 2012, of the Teacher Reform Law<sup>3</sup>. This law establishes a new Public Teaching Career, unifying the two public sector teacher labor regimes that co-existed in Peru until that year, and seeks to improve teaching performance.

This law specifies competitive criteria for admission, permanence and promotion within the public sector teaching career, as well as a new scale of remunerations and incentives. It introduced a new structure to the public teaching career to promote sustained improvement in teaching quality, recognize merit in work performance, and generate conditions to provide equal opportunity for promotion. This new structure of the Public Magisterial Career consists of eight levels and four areas of work development, which are accessed, and by which one gets promoted to, based on merits and not only years of experience. The law establishes periodic teacher performance evaluations—at least every three years—that must be successfully passed for retention and promotion purposes. Those teachers who do not pass the regular evaluation must sit for an extraordinary evaluation in the following year and, if this evaluation is not passed, they will be evaluated in a second extraordinary evaluation whose disapproval will lead to contract disengagement.

The law was complemented by a series of other policies implemented between 2013 and 2015 to improve the social and economic standing of the teaching profession. For example, in terms of wages, the base wage for all teachers was raised by increasing the fixed hourly rate, which is the base for the teachers' monthly remuneration. Monthly salary also depends on the weekly hours

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<sup>3</sup> The Teacher Reform Law (*Ley de Reforma Magisterial—LRM*, Law #29944) was enacted in November of 2012. The main goals of this law are to: (a) help ensure the quality of public education institutions, the suitability of teachers and education authorities and their proper performance; (b) promote sustained improvement in the quality of teachers to bolster student learning and development; (c) recognize merit in work performance; (d) generate conditions to provide equal opportunity for promotion to the different levels of the Public Magisterial Career; (e) promote better work conditions to facilitate a better performance from teachers in educational programs and institutions; and (f) establish criteria and evaluation processes that guarantee the entrance and tenure of high quality teachers.

worked, and the teacher's placement in the public teaching career eight-tiers structure (see above). A new teaching wage policy was introduced, linking wage raises not only to tenure but also to performance in evaluations that include an assessment of the teacher's in-class pedagogical practices. Moreover, a teacher's take-home salary now also depends on hardship bonuses (such as assignment to rural and remote schools, or to inter-cultural and bilingual schools).

A relevant aspect of the reforms is their focus on improving the quality of the education system. Thus, the law determined that, in order to enter the public teaching career, candidates must pass a national qualifying exam. As an additional incentive, the Ministry of Education introduced in 2015 a bonus, equivalent to two annual salaries, to those candidates who score in the upper third in this national entry evaluation.

Another important policy was the establishment of an official scholarship system for tertiary students who enrolled in education majors. This program<sup>4</sup> was launched in 2015 to finance tertiary university for those enrolling in education-related majors in 6 universities. These scholarships are assigned to students from public and private high schools based on their high school GPA. The scholarships, which are solely based on the candidates' merit and not on their economic needs, cover all costs associated with university studies in education-related majors.

Even though these changes were heavily discussed in the popular press, only 27% percentage of the high school seniors that are part of our study were aware in 2015 of the reforms that took place. Furthermore, their perception of the teaching career was low. Among the students surveyed, 75% disagreed, before the intervention, with the statement that teaching is an attractive career for young students of their generation. A similar percentage disagreed when asked if they thought that teachers in Peru were paid well.

### **3. Research Design**

#### *3.1. The Intervention*

The premise of this study is that students in their last year of high school are mostly unaware of the details and implications of the changes introduced by the reforms to the public teaching career

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<sup>4</sup> Called "Beca Vocación de Maestro" (Vocation to Teach Scholarship).

that started in late 2012. The intervention took place in November of 2015, and consisted of sessions that delivered information regarding the changes to the teaching career to a group of students in their last year of high school. These sessions were facilitated by a group of trained young promoters, in order to form a bond and elicit empathy with the students. The main component of the sessions was the showcasing of audiovisual materials, to avoid the facilitators' biases and differences in skills. These audiovisual modules were intended to reach students both on a rational (using an informational video) and emotional (using a motivational video) level and were performed by young actors. To avoid contamination to untreated students, no printed material was distributed and no school personnel or students from untreated classrooms could attend the sessions. Lastly, to avoid exhaustion, promoters were restricted to facilitate a maximum of two sessions per day.

The talk and videos included the following content: social/emotional retribution of being a teacher; wages; meritocracy (stability, promotion mechanisms, opportunities for salary increases); benefits (vacations, others), and information on the scholarships for studying education majors. With these contents we aimed to emphasize the changes in the career introduced by the reform, the complementary policies that were being implemented by the Peruvian Education Ministry, and the contrast between teaching and other careers and professions. The scripts for the videos and all other the materials were reviewed by technical staff of the ministry. Appendix A1 discusses in more detail the contents of the intervention.

### *3.2. Randomization Strategy*

The universe of this study consists of all 624 public and private high schools in metropolitan Lima with at least 30 students<sup>5</sup>, except those schools were part of another information experiment that was being ran at the time by the Ministry of Education, elite private schools, and schools that only enroll male students. From this universe, we selected 277 schools for our study. Our sample

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<sup>5</sup> Our study is limited to metropolitan Lima due to logistics and to minimize the costs of data collection. We excluded schools that only operated in night shifts or using distance education, schools that only enrolled male students

consists of all Fe y Alegria schools<sup>6</sup> in the universe, which were complemented by randomly selecting (without stratification) public and non-elite private high schools.

*Table 1* uses data from the school census (ESCALE) to compare the observable characteristics of the universe and our study sample, and shows that our sample is representative. For completeness, we also provide the characteristics of all Peruvian schools (which includes schools located outside of urban Lima).

**Table 1: Sample Representativity**

Variables	Peru (1)	Universe (2)	Sample (3)	P-Value of Diff. (2) - (3)
Students Enrolled in Senior Year	31.11	78.98	81.05	0.90
Female Students Enrolled in Senior Year	15.58	40.67	41.25	0.80
Average Age in Senior Year	16.57	15.95	15.95	0.80
Total Secondary Enrollment	180.00	410.50	419.88	0.93
Percentage of Indigenous Students	0.25	0.11	0.11	0.86
Morning Shift	0.81	0.79	0.77	0.96
Afternoon Shift	0.10	0.07	0.07	0.51
Full School Day	0.09	0.14	0.16	0.57
Public School	0.61	0.20	0.20	0.71
Number of Labs per Student	0.34	0.67	0.74	0.06
Number of Libraries per Student	0.38	0.59	0.60	0.82
Gyms per Student	0.04	0.11	0.13	0.14
Teaches Foreign Language	0.26	0.21	0.19	0.33
Use of Educational Software	0.29	0.41	0.39	0.21
Computers per Student	0.32	0.17	0.17	0.50
Percentage of Female Teachers	0.41	0.47	0.49	0.13
Percentage of Teachers with a Pedagogy Degree	0.94	0.89	0.89	0.75
Average Magisterial Level	1.91	1.94	1.91	0.18
Average Hours of Teaching Work	24.63	24.73	24.73	0.70

*Source: School Census (ESCALE, 2014). Statistics shown for presential education only and excluding night shifts.*

Table 1 shows that, on average, the schools in our sample enrolled 80 students in 5<sup>th</sup> year of high school, of which 41% were females. Our schools enroll, on average, 420 students at the secondary level and 11% of the school population is of indigenous descent. Only 16% of the schools in our sample are full-day schools, and around 20% are public. In terms of resources, 74% of schools in

<sup>6</sup> Fe y Alegria schools are publicly funded, privately ran schools (like charters) that provide educational opportunities to low-income students. This organization manages 81 schools in Peru and is also active in other 18 countries.

our sample have science labs, 60% have a library, 13% has a gym and 19% teach a foreign language. Approximately 50% of the teachers are female, 89% of them have an education-related degree, they work 25 hours per week and are—on average—on the lowest stages of the teaching career ladder (average level of 1.74 out of 8 tiers).

To assign treatment, we grouped the 277 schools into 40 strata, each with approximately 7 schools, based on 5<sup>th</sup> year secondary enrollment according to ESCALE 2014 and on whether the schools were Fe y Alegria. To have strata with similar number of schools, one stratum includes both Fe y Alegria and non-Fe y Alegria schools. From each stratum, we randomly assigned 80 schools to treatment, 120 schools to the control group, and 77 schools for replacement. Strata with 7 schools had 2 schools for replacement, and strata with 6 schools had only 1 replacement (balance between treatment and control is discussed below).

### 3.3. *Data*

This study relies on four sources of information. The first is the 2014 Peruvian school census, ENLACE, that collects detailed information of all public and private educational institutions in Peru. This rich dataset has data on enrollment, repetition, dropout, human resources and other schooling inputs. ENLACE was used in our sample design.

The second is the baseline dataset, collected before the intervention in November 2015 from 7,374 high school seniors in 176 schools.<sup>7</sup> These students were attending mostly to privately administrated institutions (66%)—the rest of the students attended public schools (23%) and Fe y Alegria schools (10%). For the baseline we designed and fielded a questionnaire that collected information on the students' demographic and socioeconomic characteristics; their academic profile, including information on their past academic experience and achievements; their future goals; career choices; and about their knowledge and opinion about teaching and studying

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<sup>7</sup> We visited the 200 schools that were part of our treatment and control groups. However, data collection and the implementation of the intervention were not feasible in 24 schools, mostly because the period of data collection coincided with the first application of the Student Census Evaluation to high school students. In addition, there were extreme weather events related to El Niño that suspended classes in some schools during the baseline data collection timeframe.

education in general, and about the public teaching career in particular. This extensive questionnaire was complemented with a battery of seven cognitive and non-cognitive tests. We measured the students' productive vocabulary, mathematical reasoning and numerical skills, reading comprehension, IQ, empathy, and personality traits<sup>8</sup>.

The third data source is a midline survey collected only among treatment students, immediately after the intervention was implemented. This short survey asked students to recall information provided in the videos, their opinions regarding the teaching career and their likelihood of enrolling in an education major. The goal of this short survey was to assess whether the intervention managed to elicit short-term changes in opinions and interests regarding teaching.

The final source is a questionnaire applied three years after the intervention, in October to December of 2018. We had collected multiple contact information options at baseline, which allowed us to find over 90% of our 2015 treatment and control students. This endline survey collected information on the students' post-secondary educational and occupational paths, including information on whether they were working or studying, their career choice and its determinants. We also included a set of additional questions for those who indicated to be studying an education major, in order to understand more thoroughly their reasons behind this choice and future employment expectations. Further details describing the instruments used for each data collection process can be found in the Data Appendix, and all questionnaires and tests are available from the authors upon request.

### *3.4 Sample Description and Balance*

Table 2 compares the baseline variables for students in the treatment and control groups. In terms of socio-demographic characteristics, the students in our sample are on average 16 years old, half of them are female, 63% have failed a course at least once, and they have an average GPA of 15 out of a maximum of 20.

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<sup>8</sup> We computed standardized scores using a logistic model of only one parameter for all the tests applied. This was to adjust for test characteristics, particularly the difficulty parameter of the skills tests—which for the personality tests corresponds to the intensity of the trait measured—and to obtain scores for students who did not answer all the questions on a given section.

**Table 2. Randomization Balance**

	Control	Treatment	P-value
A. Socio-demographic Characteristics			
Age	16.17	16.14	0.27
Female (%)	0.52	0.51	0.89
Socio-Economic Level	0.85	0.84	0.77
Failed a Class (%)	0.63	0.63	0.94
GPA	15.12	15.06	0.60
B. Standardized Test Scores			
<i>Cognitive</i>			
Mathematics	0.00	0.15	0.02
Reading comprehension	0.00	0.12	0.17
IQ	0.00	0.12	0.21
Productive vocabulary	0.00	-0.20	0.05
<i>Non-Cognitive</i>			
Extraversion	0.00	-0.02	0.44
Agreeableness	0.00	-0.02	0.51
Neuroticism	0.00	-0.02	0.55
Openness	0.00	-0.01	0.66
Conscientiousness	0.00	0.00	0.98
Empathy	0.00	0.01	0.76
Risk Aversion	0.00	-0.02	0.41
Firmness	0.00	0.03	0.44
Patience	0.00	-0.04	0.18
C. Career Choice			
Area: Humanities (%)	0.21	0.20	0.69
Area: Social Sciences (%)	0.15	0.14	0.38
Area: Natural and Formal Sciences (%)	0.03	0.04	0.37
Area: Applied Sciences (%)	0.50	0.52	0.28
Institution: Public University (%)	0.51	0.63	0.00
Institution: Private University (%)	0.64	0.60	0.23
Institution: Public Institute (%)	0.18	0.20	0.36
Institution: Private Institute (%)	0.25	0.25	0.60
D. Teaching Career			
Knows about changes (%)	0.25	0.26	0.80
Considers the changes are positive (%)	0.76	0.76	0.99
Expects government to follow through (%)	0.36	0.37	0.88
Intention to Teach (%)	0.03	0.03	0.53
Observations	3,817	3,498	

Notes: Standard errors clustered at the school level. Table shows results of mean comparisons across students in treatment and control groups, accounting for the stratification design and controlling for administrative dependency of the school and whether the child got held back a year or not. Sample corresponds to 7,370 12th-grade students of 176 high schools in Metropolitan Lima. Test scores are presented after applying Item Response Theory and standardized to have a zero mean for the control group.

Regarding their post-secondary career choices, 20% of our high school seniors would consider studying a humanities major, 14% would consider a social sciences major, 4% a natural and formal sciences major, and 52% of an applied sciences major. In terms of types of post-secondary

institutions where they would enroll, over 50% indicated they would consider studying in a public university, 60% in a private university, 20% in a public tertiary institute, and 25% in a private tertiary institute. Finally, regarding their knowledge of the teaching career, only 26% of the students in our sample knew about the changes being introduced to the teaching career; of these, 76% considered these changes to be positive and 37% believed the government will follow through with the proposed changes.

In terms of balance, there are no statistical differences between treatment and control groups in 16 out of the 19 variables in table 2. The only statistical differences we find are in the math and productive vocabulary test scores, where we find that treated students perform on average better in math and worse in productive vocabulary than students in the control group, and in the share of students that would consider studying at a public university—with 63% of the students in the treatment group expressing this preference in contrast to 51% in the control group.

#### **4. Who intends to become a teacher?**

In this section we use our unique data to provide a rich description of young Peruvians who intend to become teachers. To do this, we use our baseline—that is, before the information intervention—to create an “intention to teach” variable that allows us to identify those high school seniors who expressed an interest in eventually becoming a teacher. To create this variable, we use the questions that asked the students to reveal the first, second and third college career options they would like to pursue. After categorizing this information, we identify all the students who indicate being interested in studying an education related major in any of their three options and flag them as having an “intention to teach”. Once this dichotomous variable is created, we first compare high school seniors with an intention to teach and those with other post-secondary preferences in terms of their socioeconomic characteristics and cognitive and non-cognitive skills. Then we compare their preferences for post-secondary institutions and reasons for their expressed career choice, and their opinions about the teaching career and about the ongoing reforms.

As Table 3 shows, students who reveal an intention to teach are slightly older, more likely to be female, have a slightly higher socioeconomic level, and have a lower GPA. In terms of their cognitive skills, they have lower mathematic reasoning and IQ scores. Finally, regarding their non-cognitive abilities, students with an expressed intention to teach are relatively similar to those who

do not express such intention. The only statistically significant difference is that those who express an intention to teach have a higher empathy score compared to all other students. Although they also show higher levels of patience, the difference is not statistically significant.

**Table 3. Intention to Teach: Student Characteristics**

	Intention to Teach		P-value of Equality
	No	Yes	
A. Socio-demographic Characteristics			
Age	16.15	16.24	0.03
Female (%)	0.51	0.77	0.00
Socio-Economic Level	0.14	0.17	0.00
Failed a Class (%)	0.62	0.65	0.37
GPA	15.11	14.86	0.02
B. Test Scores			
<i>Cognitive</i>			
Mathematics	0.00	-0.23	0.00
Reading	0.00	0.03	0.67
IQ	0.00	-0.11	0.08
Productive vocabulary	0.00	0.04	0.62
<i>Non-Cognitive</i>			
Extraversion	0.00	0.05	0.42
Agreeableness	0.00	0.05	0.43
Neuroticism	0.00	0.09	0.23
Openness	0.00	0.04	0.55
Conscientiousness	0.00	0.01	0.89
Empathy	0.00	0.23	0.00
Risk aversion	0.00	-0.09	0.16
Firmness	0.00	-0.01	0.94
Patience	0.00	0.08	0.20
Observations	6,851	296	

Notes: Standard Errors clustered at the school level. Table shows results of mean comparisons across students who show an intention to teach and those who do not, accounting for the stratification design and controlling for administrative dependency of the school and whether the child got held back a year or not. Sample corresponds to 7,146 12th-grade students of 176 high schools in Metropolitan Lima. Test scores are presented after applying Item Response Theory and standardized to have a zero mean for the control group.

In terms of educational and career preferences, Table 4 shows that high school seniors who express an intention to teach are less likely to state that they would like to study in a private university and more likely to indicate a preference for studying in a public tertiary institute. In terms of the factors considered as important when choosing a post-secondary career, high school seniors with an intention to teach are more likely to single out the importance of lower costs—measured by perceived difficulty of the studies, perceived time requirements, and tuition among others—and

less likely to consider important the quality of the job—which includes the perceive difficulty of obtaining employment, job stability, decent wages and having enough family time.

**Table 4. Intention to Teach: Career Preferences**

	Intention to Teach		P-value
	No	Yes	
<b>A. Career Choice</b>			
Institution: Public University (%)	0.57	0.62	0.15
Institution: Private University (%)	0.62	0.53	0.01
Institution: Public Institute (%)	0.19	0.29	0.00
Institution: Private Institute (%)	0.25	0.23	0.51
Criteria: Lower Costs	0.00	0.16	0.01
Criteria: Job Quality	0.00	-0.15	0.04
Criteria: Interests	0.00	-0.07	0.26
Criteria: Career Contributes to Society (%)	0.91	0.93	0.45
Criteria: Job Contributes to Society (%)	0.96	0.96	0.87
<b>B. Reasons to Study (or not) Education</b>			
Student is Patient (%)	0.46	0.84	0.00
Student has Vocation (%)	0.51	0.72	0.00
Family Reasons (%)	0.57	0.12	0.00
Easy to Study (%)	0.54	0.28	0.00
Scholarship Opportunities (%)	0.58	0.45	0.00
Prestige of Education (%)	0.43	0.59	0.00
Job Quality	0.00	0.08	0.45
Teaching Career: Prestige	0.00	0.35	0.00
Teaching Career: Job Quality	0.00	0.38	0.00
<b>C. Changes in Teaching Career</b>			
Knows about Changes (%)	0.25	0.37	0.00
Thinks Changes are Good (%)	0.76	0.83	0.03
Thinks Government will maintain the Changes (%)	0.37	0.44	0.04
Observations	6851	296	

Notes: Standard Errors clustered at the school level. Table shows results of mean comparisons across students in treatment and control groups, accounting for the stratification design and controlling for administrative dependency of the school and whether the child got held back a year or not. Sample corresponds to 7,370 12th-grade students of 80 high schools in Metropolitan Lima.

Table 5 also shows opinions regarding education and the teaching career if they were to study education. If they were to study education, students who express an intention to teach see themselves as being more patient and as having a higher level of vocation for public service, and less likely to enter this career due to family reasons, perceived easiness of this field of studies, and the availability of scholarships. In terms of the teaching career specifically, students who show an intention to teach think this is a prestigious career and that it can lead to a quality job. Finally, in

terms of knowledge on the changes to the teaching career, high school seniors with an intent to teach are more likely to know about these changes, more likely to think the changes are positive, and more likely to think that the government will follow through with the reforms.

Lastly, we use the endline survey to analyze the actual career choices made by our high school seniors. Table 5 shows that only 1.8% of our students who enrolled in tertiary education are studying an education major. The field of study with the highest enrollment in our sample is law, social and commercial sciences (52%), followed by engineering and related fields (24%) and health sciences (8%).

To analyze the external validity of our endline sample, we further compare the career choices of individuals in our sample with results from the 2014 National Survey for University Graduates and Universities. To make this comparison relevant, we restrict this survey to Metropolitan Lima and exclude graduates from elite private schools,<sup>9</sup> and we restrict our endline data to students enrolled in universities (for completeness, we also show the statistics for all Peru). As can also be seen in table 5, the distribution of college majors is relatively similar between our surveyed students and the national survey: around 2.5% choose an education-related major, slightly more than 50% study social and commercial sciences or law majors, around 30% study engineering, industry and construction, and approximately 8% study health sciences.

**Table 4: Tertiary education major choices**

Category	Sample		University Graduates' Survey	
	All	University	Lima	Peru
Agricultural, Livestock and Veterinarian	0.99	1.28	2.09	2.88
Natural, Exact and Computation Sciences	6.78	3.77	2.47	3.36
Law, Social and Commercial Sciences	51.49	51.97	53.06	46.95
Health Sciences	8.43	7.72	9.37	12.78
Education	1.73	2.35	3.06	5.57
Arts and Humanities	6.41	2.49	2.96	1.80
Engineering, Industry and Construction	24.17	30.42	26.99	26.67

Source: Endline survey and National Survey for University Graduates and Universities (2014) – INEI.

<sup>9</sup> Since the University student survey of 2014 does not include information regarding their secondary education institution, we construct a socio-economic level variable out of the information available and exclude the to 5% of the income distribution.

## 5. Experimental Results

### *5.1 Changes in Perception about the Teaching Career*

In this subsection, we use the midline survey to capture immediate changes in revealed preferences and opinions regarding the teaching career among treated students. Recall that this short questionnaire was applied immediately after the intervention. The first question of this short questionnaire asked treated students about which aspects of the reforms to the teaching career presented in the videos and talk they could remember. Remembrance rates of the highlighted aspects of the reforms were quite high, between 80 and 90%. To make sure we were really capturing the capacity to recall information, we also included some distractors—that is, information that was not part of the new teaching career and, thus, not mentioned in the videos. On average, only around 20% of the students answered positively to remembering these distractors.

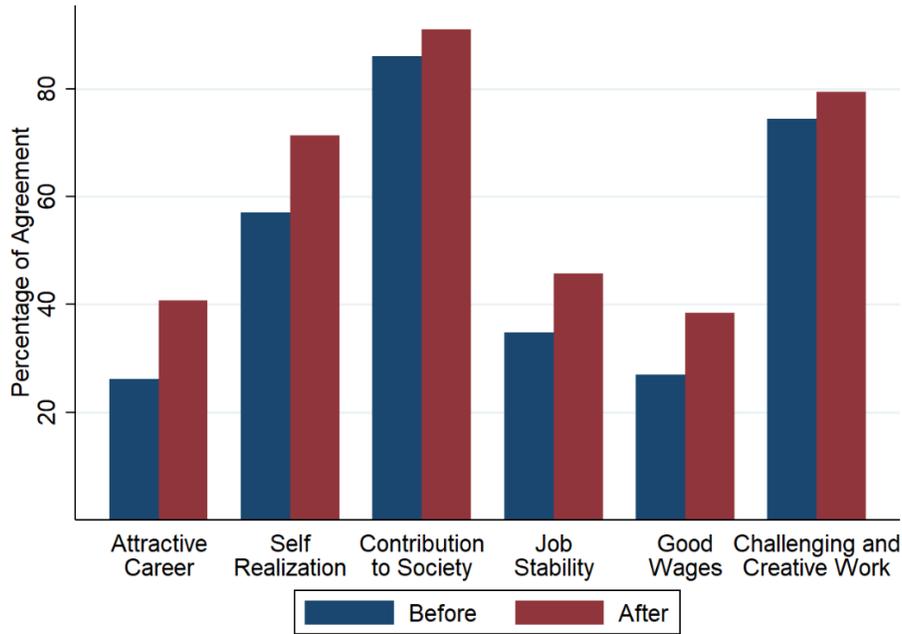
The second question asked about agreement/disagreement with various affirmations regarding the public teaching career in Peru. As this question was also included in the baseline questionnaire, it allows us to measure immediate changes to the perception about the teaching career that are a result of the intervention. Figure 1 shows that the intervention reduced drastically the negative perceptions of the public teaching career while improving many positive views.

The last question of the short midline survey inquired into the probability of studying an education-related major. Even though the perceptions regarding the teaching career improved drastically, the intervention did not modify, in the very short-term, the expressed intention to study education among treated students: before and after the intervention, 77% of our treated high school seniors reported that it is unlikely they would study an education-related major.

We then correlate the opinions about the teaching career to the baseline student characteristics. Columns (1) and (2) of table 6 show that high school seniors with higher math and productive vocabulary test scores and from a higher socio-economic status are more likely to have a worse opinion of the teaching career. In contrast, students with higher levels of patience are more likely to have a better opinion. Lastly, in column (3) we show the correlation between these baseline

characteristics and shifts in opinions among treated students right after the intervention. Results suggest that treated students with higher math test scores were more likely to change their opinion of the teaching career right as a result of the intervention

**Figure 1: Percentage of Agreement regarding Statements about the Public Teaching Career**



Notes: 3,514 observations pre-intervention, 3,384 observations post-intervention.

**Table 6: Opinion Regarding the Teaching Career and Change of Opinion among Treated**

	Positive Opinion at Baseline		Change in Opinion among the Treated (3)
	Control (1)	Treatment (2)	
Math	-0.012*** (0.003)	-0.016*** (0.003)	0.015** (0.006)
Productive vocabulary	-0.001** (0.001)	-0.002*** (0.001)	-0.001 (0.001)
GPA	-0.003 (0.004)	0.000 (0.003)	0.008 (0.008)
Socioeconomic level	-0.089*** (0.032)	-0.056* (0.032)	-0.071 (0.060)
Female	0.012 (0.010)	0.009 (0.009)	0.027 (0.019)
Patience	0.012*** (0.004)	0.009** (0.004)	-0.005 (0.008)
N	2,911	3,367	2,984

Notes: \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ . Standard errors clustered at the school level in parenthesis. All regressions include stratification fixed effects, and controls for school administrative dependence, and whether the student was held back a year.

## 5.2. The Intervention Impact on Career Choices

To determine the impact of the treatment on career choices, we study three outcome variables: (1) whether the student enrolled in tertiary education, (2) whether the student chose an education-related major, and (3) whether the student chose an education-related major conditional on having enrolled in tertiary education.

We estimate the following model:

$$(1) \quad Y_{isr} = \theta T_{isr} + \beta X_{isr}^0 + \mu_r + \varepsilon_{isr}$$

where the dependent variable  $Y_{isr}$  corresponds to whether the student  $i$ , of school  $s$ , on strata  $r$  is enrolled in tertiary education/pursuing an education-related major,  $T_{isr}$  equals 1 for treated students, and  $\theta$  is the parameter of interest. We control for student characteristics at baseline  $X_{isr}^0$ , including sociodemographic characteristics, cognitive and non-cognitive skills, opinion of the teaching career, administrative dependence of the school, and whether the student was held back a year<sup>10</sup>. The model also includes strata fixed effects  $\mu_r$ . We estimate this model adding the control variables sequentially to document the stability of estimates of the treatment coefficient to alternative sets of controls.

Treated high school seniors were 2.7% more likely to enter tertiary education, 0.8% more likely to study an education-related major, and 0.9% more likely to study an education-related major conditional on enrolling in tertiary education than control students (table 7). These results are robust to changes in specification using different sets of control variables<sup>11</sup>. While the point estimates for studying education are small, the fact that the results are significant is extremely relevant considering the small number of students choosing a career in education. Among the 6,607 students for whom we were able to obtain endline information, only 78 chose to study education out of a total of 5,447 who enrolled in higher education. Thus, being 0.8 more likely to study education corresponds to more than a 70% increase. As a robustness check, we perform the same

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<sup>10</sup> The last two are included due to the lack of balance between treatment and control.

<sup>11</sup> We reject the null of zero treatment effect against the alternative hypothesis that the main treatment effect, for the likelihood of studying education, is 0.008 with a statistical power of 0.71.

analysis including those who pursue a technical career as education auxiliary support. These results are consistent with our initial estimations and can be found in Appendix table A.2.

**Table 7: Treatment Effects on Career Choice**

	(1)	(2)	(3)	(4)	(5)	N	Control Group Mean
Probability of enrolling in tertiary education	0.027** (0.011)	0.027** (0.011)	0.026** (0.011)	0.033** (0.013)	0.027** (0.011)	6,607	0.850
Probability of studying an education-related major	0.008* (0.004)	0.008* (0.004)	0.008* (0.004)	0.009* (0.004)	0.008* (0.004)	6,607	0.011
Probability of studying Education/enrolling in tertiary education	0.009* (0.005)	0.010* (0.005)	0.009* (0.005)	0.011** (0.005)	0.009* (0.005)	5,447	0.013
<b>CONTROLS</b>							
Cognitive Skills	NO	YES	YES	YES	YES		
Socio-Demographic Variables	NO	NO	YES	YES	YES		
Non-Cognitive Skills	NO	NO	NO	YES	YES		
Opinion of Teaching Career	NO	NO	NO	NO	YES		

Notes: \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ . Standard errors clustered at the school level in parenthesis. All regressions include stratification fixed effects, and controls for school administrative dependence and whether the student was held back a year. (1) No additional controls (2) Controlling for math and productive vocabulary test scores and GPA (3) Controlling for math and productive vocabulary test scores, GPA, socioeconomic level, school socioeconomic level and gender (4) Controlling for math and productive vocabulary test scores, GPA, socioeconomic level, gender and patience score (5) Controlling for math and productive vocabulary test scores, GPA, family and school socioeconomic level, gender, patience score and opinion of teaching career before the intervention.

The coefficients for the control variables (not shown here) are in the expected direction. Students who are female, have higher math test scores, have better GPA, and come from higher socioeconomic status are more likely to enroll in tertiary education. When focusing on the probability of studying an education-related major, students who were female, have lower socio-economic level, and a better opinion of the teaching career before the intervention were more likely to select this career path.

Since there are several variables that seem to be related to whether the student chose a career in education, we next analyze if the treatment had heterogeneous effects across different groups. For this, we estimate specification (1) from Table 7 for the different sub-samples defined by these

control variables. Thus, we divide the sample into female/male students, high/low socio-economic status students, high/low math performance, high/low patience levels, and high/low initial opinion about the teaching career and we estimate 10 different equations. As table 8 shows, female students of low socio-economic status, with low performance in math, high level of patience, and a better initial opinion of the teaching career appear to be driving the treatment effects seen in table 7. However, the only coefficients for which we can reject the null hypothesis of them being equal is for high and low socio-economic level, for high and low math performers, and for those who had a better initial opinion regarding the teaching career, which seems reasonable.

**Table 8: Long-Run Effects on Studying Education: Heterogeneity in Treatment Effects**

Categories	Group 1	Group 2	T-Test
Sex	0.004 (0.003)	0.010* (0.006)	0.251
Socio Economic Level	0.020*** (0.007)	0.001 (0.004)	0.015
Math	0.015** (0.006)	0.003 (0.004)	0.061
Patience	0.005 (0.005)	0.013** (0.005)	0.273
Opinion of Teaching Career	0.004 (0.003)	0.024*** (0.007)	0.015

Notes: \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ . Group 1 corresponds to male students and Group 2 corresponds to female students. For all other categories, Group 1 corresponds to “Low” level and Group 2 corresponds to “High” level.

### 5.3 The Profile of Tertiary Students in Education Majors

Lastly, we compare the students in our study who chose to enroll in education-related majors with the rest of the post-secondary students. Table 9 shows that education students are more likely to be enrolled in public universities (and less likely to be enrolled in private universities and institutes) than the rest of the students who are in tertiary education. We do not see differences in how they finance tertiary studies, as they are equally likely to finance higher education with private resources. We also do not find statistically significant differences changes in majors nor in working while in college. However, students who enrolled in education-related majors took longer to enter

tertiary education than their counterparts enrolled in other majors and expect to earn significantly lower wages<sup>12</sup> upon completing their tertiary education degrees.

**Table 9: Who Chooses to Study Education?**

	Other Majors	Education	P-value
A. Where Do They Study			
Public University	0.13	0.72	0.00
Private University	0.53	0.28	0.00
Public Institute	0.03	0.00	0.13
Private Institute	0.31	0.00	0.00
B. How Do They Study			
Private Financing	0.96	0.99	0.20
Scholarships	0.04	0.01	0.21
Months Before First Entrance	26.98	35.30	0.00
Months Before Current Entrance	54.56	47.33	0.43
Changed Major	0.05	0.08	0.23
C. Job Market			
Working while studying	0.20	0.21	0.92
Expected Wages	612.6	418.0	0.00
N	5,369	78	

## 6. Conclusion

Many countries around the world have implemented education reforms that introduced multiple incentives for teachers with the objective of improving education quality. The evaluations of these reforms have mostly focused on whether these incentives raise teacher quality as measured by student achievement. However, a substantial part of the argument behind these reforms—particularly those in Latin America—has centered on improving the teaching career itself and how some sub-optimal conditions of the teaching profession act as a deterrent for attracting the best candidates to become teachers. Thus, an important evaluation agenda of these reforms should be around determining whether they can change the profile of those who decide to become teachers

<sup>12</sup> When analyzing their wage expectations in relation to actual market wages (according to the Ministry of Labor and Employment Promotion of Peru), average monthly earnings for teachers in 2016 was \$426 (ranging from \$325 to \$724, using the exchange rate from Peruvian soles to US dollars of December 2018), which is very close to the average expected wage of \$418 of those who are enrolled in education-related majors.

by acting on high school students who are making their career choices.

Our intervention was designed with two things in mind. First, to understand how the changes introduced to the teaching career in Peru were being perceived by high school students on the verge of making post-secondary career decisions, and whether these changes made the teaching career a more attractive option. Second, to determine whether an information treatment that encourages high school seniors to pursue a career in education could achieve this goal. Our results suggest that a simple, low cost and easily scalable intervention had significant positive effects on encouraging high school seniors to enroll in education majors. Three years after the intervention, we find that the treatment elicits a 70% increase in the likelihood of choosing education and that results are robust despite the low number of education students.

While the results indicate that our treatment effectively reached and influenced students making career choices, we can say little about whether these influenced students are better candidates than the current stock of teachers. Even though we find that the treatment only had an impact on students in the lower end of the math test score distribution, this does not necessarily mean that the experiment resulted in attracting students with lower cognitive skills into teaching. The precise interpretation of this result is simply that a career in teaching continues to attract, on average, candidates with lower cognitive skills than other post-secondary majors. Thus, future research including either a sequenced version of this experiment or a larger scale experiment would allow for a more accurate analysis of the changes in the composition of those who want to study education elicited by reforms to the teaching career. Nevertheless, the insights gained from induce changes in expressed career preferences as a result of a simple treatment may be important, particularly for governments looking to introduce reforms to the increase the attractiveness of the teaching career.

## References

- Banerjee, A.; Glewwe, A.; Powers, S.; Wasserman, M. (2013). Expanding access and improving student learning in post-primary education in developing countries: A review of the evidence, Abdul Latif Jameel Poverty Action Lab (J-PAL) Post-Primary Education Initiative Review Paper.
- Bettinger, E. P.; Long, B. T.; Oreopoulos, P.; Sanbonmatsu, L. (2012). The role of simplification and information in college decisions: results from the H& R block FAFSA experiment. *The Quarterly Journal of Economics* 127(3).
- Brown, R.S.; Lavecchia, A.; Oreopoulos, P. (2017). Pathways to education: an integrated approach to helping at-risk high school students, *Journal of Political Economy* 2017 125:4, 947-984.
- Brutti, Z., Sanchez Torres, F. (2017), Does Better Teacher Selection Lead to Better Students? Evidence from a Large Scale Reform in Colombia, Documentos CEDE, Universidad de los Andes - CEDE
- Carrell, S.; Sacerdote, B. (2013). Late interventions matter too: The case of college coaching in New Hampshire, NBER Working Paper No. 19031, May
- Chetty, R.; Friedman, J. N.; & Rockoff, J. E. (2014). Measuring the Impacts of Teachers II: Teacher Value-Added and Student Outcomes in Adulthood. *American Economic Review*, 104, 2633–2679.
- Díaz, H.; Saavedra, J. (2001). "La carrera del maestro en el Perú: factores institucionales, incentivos económicos y desempeño," Documentos de Investigación dt32, Grupo de Análisis para el Desarrollo (GRADE).
- Dinkelman, T.; Martínez A., C. (2014). Investing in schooling in Chile: the role of information about financial aid for higher education. *The Review of Economics and Statistics*, 96 (2), 244–257.
- Dolton, P. & Marcenaro-Gutierrez, O. (2011). If You Pay Peanuts Do You Get Monkeys? A Cross Country Comparison of Teacher Pay and Pupil Performance. *Economic Policy*, 26(65), 5-55.
- Dunn, R.; Oreopoulos, P. (2013). Information and college access: evidence from a randomized field experiment. *The Scandinavian Journal of Economics*. 115 (1), 3–26.
- Elacqua, Gregory; Hincapie, Diana; Vegas, Emiliana; Alfonso, Mariana. (2018). Profesión: Profesor en América Latina ¿Por qué se perdió el prestigio docente y cómo recuperarlo? Inter-American Development Bank
- Hanushek, E. A. & Pace, R. R. (1995). Who Chooses To Teach (and Why)? *Economics of Education Review*, 14, 101-117.
- Hastings, J., Neilson, C., Zimmerman, S., 2015. The effects of earnings disclosure on college enrollment decisions, NBER Working Paper Number 21300, June

Hoxby, C. Turner, S., 2013. Expanding college opportunities for high-achieving, low income students, SIEPR Discussion Paper No. 12-014

Jensen, R. (2010). The (perceived) returns to education and the demand for schooling. *The Quarterly Journal of Economics*, 125(2), 515-548.

Koedel, C., Mihaly, K., Rockoff, J.E., 2015. Value-added modeling: a review. *Economics of Education Review*. 47, 180–195.

Lavecchia, A. M.; Liu, H.; Oreopoulos, P. (2014). Behavioral economics of education: progress and possibilities. NBER Working Papers. *Handbook of Economics of Education*, Volume 5, 2016, Chapter 1, pp 1-74 North Holland Press, Amsterdam.

McEwan, P. J.; Santibáñez, L. (2005). Teacher and principal incentives in Mexico. In E. Vegas (Ed.), *Incentives to improve teaching: lessons from Latin America*. Washington, DC: World Bank Press.

Mizala, A.; Ñopo, H. (2014). Measuring the Relative Pay of Latin American School Teachers at the Turn of the 20th Century. Working papers 2014-2015. Lima, Perú: Asociación Peruana de Economía.

Mizala, A.; Romaguera, P. (2004). "Teachers' Salary Structure and Incentives in Chile," *Documentos de Trabajo* 193, Centro de Economía Aplicada, Universidad de Chile.

Nguyen, T. (2008). Information, Role Models and Perceived returns to Education: experimental Evidence from Madagascar. Abdul Latif Jameel Poverty Action Lab (JPAL).

Podgursky, M., Monroe, R., & Watson, D. (2004). The academic quality of public school teachers: An analysis of entry and exit behavior. *Economics of Education Review*, 23(5), 507-518.

Sanders, W.; Rivers, J. (1996). Cumulative and Residual Effects of Teachers on Future Student Academic Achievement. Value Added Research and Assessment Center, Universidad de Tennessee.

Springer, M.; Podgursky, M. (2007). Teacher Performance Pay: A Review. *Journal of Policy Analysis and Management*. 26. 909-950. 10.1002/pam.20292.

## Appendix

### A.1 Robustness Check

**Table A.1.: Long-Run Treatment Effects including Technical Education Auxiliary Assistance**

	(1)	(2)	(3)	(4)	(5)	N	Control Group Mean
Probability of Studying Education	0.008* (0.004)	0.008* (0.004)	0.007* (0.004)	0.009* (0.004)	0.007* (0.004)	6,607	0.850
Probability of Studying Education/Studying	0.009* (0.005)	0.009* (0.005)	0.009* (0.005)	0.010* (0.005)	0.008* (0.004)	5,447	0.013
CONTROLS							
Cognitive Skills and Results	NO	YES	YES	YES	YES		
Socio-Demographic Variables	NO	NO	YES	YES	YES		
Non-Cognitive Skills	NO	NO	NO	YES	YES		
Opinion of Teaching Career	NO	NO	NO	NO	YES		

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

Notes: Standard errors clustered at the school level in parenthesis. All regressions include stratification fixed-effects, and controls for school administrative dependence, and whether the student was held back a year. (1) No additional controls (2) Controlling for Math Test Score, Writing Test Score and GPA (3) Controlling by Math Test Score, Writing Test Score, GPA, socioeconomic level, school socioeconomic level and gender (4) Controlling by Math Test Score, Writing Test Score, GPA, socioeconomic level, gender and patience score (5) Controlling by Math Test Score, Writing Test Score, GPA, socioeconomic level, school socioeconomic level, gender, patience score and opinion of teaching career before the intervention.

## A.2 Experimental Validity

**Table A.2.1.: Comparison in terms of School Characteristics between Different Groups**

Variables	Pr(T=C) (1)	Pr(R=C) (2)	Pr(T*=C*) (3)	Pr(A) (4)
Students Enrolled in Senior Year	0.06	0.12	0.39	0.50
Female Students Enrolled in Senior Year	0.03	0.13	0.29	0.36
Average Age in Senior Year	0.04	0.29	0.00	0.08
Morning Shift	0.07	0.09	0.02	0.11
Afternoon Shift	0.85	0.64	0.49	0.61
Full School Day	0.03	0.10	0.01	0.13
Public School	0.00	0.21	0.00	0.03
Number of Labs per Student	0.66	0.21	0.08	0.43
Number of Libraries per Student	0.74	0.50	0.28	0.83
Gyms per Student	0.83	0.28	0.17	0.15
Total Secondary Enrollment	0.09	0.19	0.45	0.51
Teaches Foreign Language	0.54	0.38	0.12	0.03
Percentage of Indigenous Students	0.03	0.10	0.07	0.90
Use of Educational Software	0.45	0.57	0.65	0.27
Computers per Student	0.31	0.99	0.55	0.83
Percentage of Female Teachers	0.02	0.02	0.12	0.23
Percentage of Teachers with a Degree	0.03	0.22	0.13	0.20
Average Magisterial Level	0.83	0.12	0.67	0.46
Average Hours of Teaching Work	0.30	0.20	0.99	0.98

Notes: T, C, and R correspond to treatment, control, and replacement schools in the original design. T\* and C\* correspond to effective treatment and control schools. A corresponds to attrited schools, meaning those assigned to either treatment or control but ended up not participating in the experiment.

Source: School Census (ESCALE, 2014). Statistics shown for presential education only and excluding night shifts.

**Table A.2.2.: Long-Run Treatment Effects using only full Strata**

	(1)	(2)	(3)	(4)	(5)	N	Control Group Mean
Probability of Studying Education	0.017 (0.010)	0.018 (0.011)	0.017 (0.010)	0.019 (0.012)	0.017 (0.010)	1,847	0.021
Probability of Studying Education/Studying	0.019 (0.012)	0.020 (0.012)	0.019 (0.012)	0.021 (0.014)	0.018 (0.011)	1,568	0.025
<b>CONTROLS</b>							
Cognitive Skills and Results	NO	YES	YES	YES	YES		
Socio-Demographic Variables	NO	NO	YES	YES	YES		
Non-Cognitive Skills	NO	NO	NO	YES	YES		
Opinion of Teaching Career	NO	NO	NO	NO	YES		

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

Notes: Standard errors clustered at the school level in parenthesis. All regressions include stratification fixed-effects, and controls for school administrative dependence, and whether the student was held back a year. (1) No additional controls (2) Controlling for Math Test Score, Writing Test Score and GPA (3) Controlling by Math Test Score, Writing Test Score, GPA, socioeconomic level, school socioeconomic level and gender (4) Controlling by Math Test Score, Writing Test Score, GPA, socioeconomic level, gender and patience score (5) Controlling by Math Test Score, Writing Test Score, GPA, socioeconomic level, school socioeconomic level, gender, patience score and opinion of teaching career before the intervention.

**Table A.2.2.: Long-Run Treatment Effects using only full Strata**

	(1)	(2)	(3)	(4)	(5)	N	Control Group Mean
Probability of Studying Education	0.018** (0.008)	0.020** (0.008)	0.019** (0.008)	0.020** (0.009)	0.018** (0.008)	2,382	0.008
Probability of Studying Education/Studying	0.021** (0.009)	0.023** (0.009)	0.022** (0.009)	0.022** (0.011)	0.020** (0.009)	2,012	0.009
<b>CONTROLS</b>							
Cognitive Skills and Results	NO	YES	YES	YES	YES		
Socio-Demographic Variables	NO	NO	YES	YES	YES		
Non-Cognitive Skills	NO	NO	NO	YES	YES		
Opinion of Teaching Career	NO	NO	NO	NO	YES		

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

Notes: Standard errors clustered at the school level in parenthesis. All regressions include stratification fixed-effects, and controls for school administrative dependence, and whether the student was held back a year. (1) No additional controls (2) Controlling for Math Test Score, Writing Test Score and GPA (3) Controlling by Math Test Score, Writing Test Score, GPA, socioeconomic level, school socioeconomic level and gender (4) Controlling by Math Test Score, Writing Test Score, GPA, socioeconomic level, gender and patience score (5) Controlling by Math Test Score, Writing Test Score, GPA, socioeconomic level, school socioeconomic level, gender, patience score and opinion of teaching career before the intervention.

## Data Appendix

### *Instruments*

To analyze how well informed young Peruvian students were regarding the changes introduced by the teaching career reform, and whether teaching is attractive as a career path, we used the following battery of instruments for the baseline:

- i) Background Survey: includes modules on general data and contact information, home characteristics, students' educational profile (including study habits and school achievements), post high school goals, and career choice (including type of educational institutions). Two additional modules were applied to all treated schools and a portion of the control schools, with questions regarding their perception and knowledge about the teaching career, as well as their interest in pursuing this path.
- ii) Instrument for measuring skills. This instrument consisted on two parts. The first contained modules on:
  - a. Empathy
  - b. Patience
  - c. Personality: Extraversion
  - d. Personality: Agreeableness
  - e. Personality: Conscientiousness
  - f. Personality: Neuroticism
  - g. Personality: Openness
  - h. Firmness of character
  - i. Math
  - j. Reading Comprehension
  - k. IQ (Intelligence Test)

The second one included only a test on productive vocabulary, as a measure of writing skills. This test was administered at the end because it was the only one that had a pre-defined time (three minutes).

This battery of instruments was piloted on 30 students in their 5<sup>th</sup> year of secondary education in two institutions during the month of July 2015. The pilot was complemented with two focus groups of 12 students to gain a more detailed feedback on the applied instruments.

Right after finishing the intervention, a small midline survey was conducted in order to measure immediate changes in perception and opinion regarding the teaching career. This survey contained questions regarding:

- i) What they remembered about the changes in the Public Magisterial Career (the question lists characteristics of the changes associated with the reform as well as a test to determine the validity of the question by adding an affirmation that is not included in the changes).
- ii) Their opinion regarding the teaching career, in the same format asked at baseline.

Finally, an endline survey was conducted, looking for information regarding actual career choices, in order to see if the treatment had an impact in the choice of becoming a teacher. This survey includes modules on:

- i) Current situation: focuses on their path after high school graduation, including employment status, whether they pursued higher education, and their reasons not to when applicable.
- ii) Higher education: including information regarding their career choice, the type of institution they are attending/attended, how they financed their studies, whether they pursued more than one career, and their wage expectations, among other things.
- iii) Education career: this module, applied only to those who declared having studied education, inquires on their specialization, their reasons for pursuing this career, among other things.