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Working Paper

Calling their bluff: Expressed and revealed preferences of top college graduates entering teaching in Argentina

IDB Working Paper Series, No. IDB-WP-446

Provided in Cooperation with:

Inter-American Development Bank (IDB), Washington, DC

Suggested Citation: Ganimian, Alejandro; Alfonso, Mariana; Santiago, Ana (2013) : Calling their bluff: Expressed and revealed preferences of top college graduates entering teaching in Argentina, IDB Working Paper Series, No. IDB-WP-446, Inter-American Development Bank (IDB), Washington, DC, <https://hdl.handle.net/11319/4633>

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<https://hdl.handle.net/10419/115431>

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September 2013

Inter-American Development Bank
Education Division

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2013

Cataloging-in-Publication data provided by the
Inter-American Development Bank
Felipe Herrera Library

Ganimian, Alejandro.

Calling their bluff: expressed and revealed preferences of top college graduates entering teaching in Argentina / Alejandro Ganimian, Mariana Alfonso, Ana Santiago.

p. cm. (IDB working paper series ; 446)

Includes bibliographical references.

1. Teachers—Argentina. 2. Teachers—Selection and appointment—Argentina. 3. Teachers—Recruiting—Argentina. I. Alfonso, Mariana. II. Santiago, Ana. III. Inter-American Development Bank. Education Division. IV. Title. V. Series.

IDB-WP-446

<http://www.iadb.org>

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Calling Their Bluff: Expressed and Revealed Preferences of Top College Graduates Entering Teaching in Argentina

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Abstract

Many school systems today are trying to attract top college graduates into teaching, but little is known about what dissuades this target group from entering the profession. This study randomly assigned applicants for a highly-selective alternative pathway into teaching in Argentina either to a survey about their motivations for applying to the program or to surveys that revealed information about their future pay or working conditions. The study finds that applicants who received information about pay or working conditions were much more likely to report that they intended to drop out of the selection process, but were no more likely to actually drop out. This can be explained by the temporary salience effects of the informational prompts. Applicants with higher undergraduate grade point averages and/or scores in the selection process, however, were both more likely to report that they will drop out and to actually do so.

JEL Codes: I20, J44, C93

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Introduction

Over the past two decades, rigorous studies have found that teachers who are successful at helping students make large academic gains can offset learning disadvantages associated with students' socioeconomic background, and can also increase students' chances of enrolling in college and earning relatively high wages once they enter the labor market (Chetty, Friedman, and Rockoff 2011; Kane and Staiger 2012; Kane et al. 2013; Kane and Staiger 2008; Rivkin, Hanushek, and Kain 2005; Sanders and Horn 1998).

These studies have prompted school systems around the world to enact reforms to increase the effectiveness of their teachers (Bruns, Filmer, and Patrinos 2011; Vegas et al. 2012). An approach that has recently gained traction in both developed and developing countries is to attract top college graduates into teaching. The impetus for these efforts seems to stem from evidence indicating that teachers typically have lower cognitive skills than their peers in other professions (Bacolod 2007; Bruns, Evans, and Luque 2011; Corcoran, Evans, and Schwab 2004a and b; Hanushek and Pace 1995; Louzano et al. 2010; Navarro 2002) and that teachers with stronger subject matter knowledge are more successful at raising students' test scores (Hill, Kapitula, and Umland 2011; Metzler and Woessmann 2012; Santibañez 2006). In recent years, evidence that countries with the top global testing scores recruit teachers from the top of their high school classes has complemented the earlier findings (Auguste, Kihn, and Miller 2010; Barber and Mourshed 2007; Mourshed, Chijioke, and Barber 2010).

Despite vibrant policy experimentation on this front, very little is known about the factors that dissuade top college graduates from entering teaching. Prior studies on why individuals go into the profession focus on current entrants as opposed to potential or desirable entrants; rely

solely either on what individuals say (i.e., their expressed preferences) or on what they do (i.e., their revealed preferences); and concentrate on the positive aspects of teaching, while ignoring how its negative aspects (if salient) might dissuade otherwise willing candidates.

This study estimates the causal effect of providing information about the pay or working conditions in the teaching profession to top college graduates who applied to a highly-selective alternative pathway into teaching in Argentina in 2012. These applicants are interested in entering teaching but have little prior exposure to the profession. After they had applied to the program, but before they were told whether they would move on to the next stage of the selection process, the applicants were randomly assigned to one of three surveys: (1) a control survey in which they were only asked about their motivations for applying to the program; (2) a treatment survey that revealed to them information about their working conditions if they were admitted to the program; or (3) a treatment survey that revealed information about their pay if they were admitted into the program. The study then looked at whether applicants said that they wanted to withdraw their application to the program and whether they actually did so.

The study finds that applicants who received information about pay or working conditions were much more likely to say they wanted to drop out of the selection process of the program, but were no more likely to actually drop out. There is some evidence that some of this “bluff” results from the information provided to applicants, which makes some factors seem more salient. But this effect fades quickly once applicants go through the selection process. Importantly, the only group of applicants that did not “bluff” was the one with the highest undergraduate grade point averages and scores in the alternative pathway selection process. Those applicants were both more likely to report that they will drop out and to actually do so.

These findings are important for two main reasons. First, they provide the first piece of causal evidence that self-reports of individuals are a poor predictor of the actual intentions of top college graduates to enter teaching. Second, they suggest that school systems will not be able to raise the aptitude of the pool of teacher recruits by more aggressive marketing alone. It will also be necessary to address or compensate for factors such as pay and working conditions that potentially could dissuade applicants from entering the profession.

The study first briefly reviews prior research and discusses the surveys that were conducted. It then introduces the datasets used, presents the empirical strategy, reports the results, and discusses the policy implications.

Prior Research

There is an extensive body of empirical research on the reasons why individuals go into teaching. Yet, existing research to inform policies seeking to attract top college graduates into the profession is limited on three fronts: (1) the research looks at current as opposed to potential entrants; (2) it examines either individuals' expressed or revealed preferences; and (3) it assumes that people decide whether to enter teaching based only on the profession's positive aspects.

Current Teachers versus Potential Entrants

Despite the fact that one of the main motivations of these studies is to understand how to attract high-caliber applicants, the bulk of this literature focuses on the motivations of current entrants, as opposed to desirable entrants, for entering the teaching profession.

Auguste, Kihn, and Miller (2010) broke new ground by surveying 1,600 college graduates and current teachers who are in the top third of their class in the United States about their perceptions of teaching and other professions. The authors also probed respondents' reactions to potential changes to traditional features of teaching (e.g., raising initial pay, introducing merit pay, making teachers' salary trajectory steeper, subsidizing teacher training, increasing entry requirements for principals, and improving the work environment at school). Yet, it is not clear how to interpret the findings of this study because the top-third college graduates who participated never planned to go into teaching and were simply engaging in a hypothetical exercise. Therefore, their responses may not reflect their actual priorities if they ever considered entering the profession.

Expressed versus Revealed Preferences

Studies in this body of research examine individuals' motivations for going into teaching by relying solely either on what they say (i.e., their expressed preferences) or on what they do (i.e., their revealed preferences). However, to our knowledge, no study has been able to *contrast* evidence on expressed and revealed preferences.

Typically, studies relying on expressed preferences survey teachers about why they entered the profession (Farkas et al. 2001; Ganimian 2011; Johnson, Kraft, and Papay 2011; Liu, Johnson, and Peske 2004). The main limitation of these studies is that several factors unrelated to people's motivations influence their responses to surveys. As Bertrand and Mullainathan (2001) have argued, there can be measurement error in such surveys due to the number and order of questions, the wording of each question, the scales presented to respondents, respondents

attempting to avoid looking bad in front of interviewers, and respondents failing to fully consider the issues about which they are being surveyed.

Studies relying on revealed preferences seek to bypass the problems of self-reports by comparing the observable characteristics of individuals who enter teaching with those who do not (Alfonso and Santiago 2010; Boyd et al. 2005; Brewer 1996; Dolton and von der Klaauw 1995, 1999; Greenberg and McCall 1974; Gritz and Theobald 1996; Hanushek, Kain, and Rivkin 2004; Hanushek and Rivkin 2007; Jackson 2010; Lankford, Loeb, and Wyckoff 2002; Murnane 1981; Murnane and Olsen 1989, 1990; Podgursky, Monroe, and Watson 2004; Stinebrickner 1999, 2001a and b). These studies, however, are limited by the characteristics that they observe, and they cannot rule out or even quantify the importance of omitted variables.

Positive versus Negative Aspects of Teaching

Finally, studies often assume that individuals decide whether to enter teaching based on its positive aspects. Little attention has been given to how the negative aspects of the profession dissuade otherwise willing candidates. It is assumed that there is always a compensating wage differential that can make up for potential dissuading factors.

A number of studies have predicted the probability that teachers will transfer from one school to another or leave the system altogether based on the observable characteristics of the schools where they work (Hanushek and Pace 1995; Kershaw and McKean 1962; Murnane 1991; Podgursky, Monroe, and Watson 2004; Rivkin, Hanushek, and Kain 2005; Rumberger 1987). Yet, it is possible that many unobservable characteristics of schools play an important role

in teacher transfers and exits. Further, it is far from obvious that the individuals who do not enter teaching do so for the same reasons as teachers who do not want to work in certain schools.

The Experiment

Based on the assessment of the literature in the previous section, any new study seeking to advance knowledge of the reasons why academically talented individuals decide whether or not to become teachers should (1) focus on potential (rather than regular) entrants to the profession; (2) contrast evidence on expressed and revealed preferences; and (3) shed light on the factors that might dissuade these entrants from becoming teachers (rather than on the factors that motivate them to become teachers).

In order to estimate the extent to which a particular factor dissuades top college graduates from entering teaching, this study used a sample from the population of top graduates considering teaching and randomly assigned them to offers of teaching jobs that vary solely on that factor. For example, if we wanted to know the causal effect of low initial pay on the decision of top graduates to accept a teaching job, a sample of these graduates was assigned to two types of teaching job offers that were identical in all respects except initial pay. The mean acceptance rates of both types of jobs were then compared. Of course, we cannot make actual job offers of teaching posts, and even if we could, positions would differ in more than one aspect.

In this paper, we try to get as close as possible to this ideal experiment. In 2012, *Enseñá por Argentina* (EpA), a program that recruits top college graduates into teaching, had a large pool of applicants who wanted to enter the profession but knew little about what their pay or

working conditions would be if they did so.¹ Applicants were randomly assigned either to a plain survey or to a survey that revealed information about a potential dissuading factor. The study then observed their expressed and revealed preferences for applying to the program. If applicants knew little about these potential dissuading factors when they applied, one can obtain a lower bound estimate of the causal effect of the dissuaders by estimating the causal effect of the information.

The two factors most commonly mentioned in prior research as potentially dissuading talented applicants were pay and working conditions, so that was the focus of this study as well. The survey was administered to all applicants to EpA after they had finished their application but before they were told whether they had been chosen to move on to the first step of the selection process. Applicants were randomly assigned to one of three versions of the survey: (1) a control version in which they were asked only about their motivations for applying to the program; (2) a first-treatment-condition version in which information was revealed to them about their working conditions if they were admitted into the program; and (3) a second-treatment-condition version in which information was revealed to them about their pay if they were admitted into the program.

The Treatment: Informational Prompts

All surveys had three parts. The first was the same across the three versions and included questions about demographic, academic, and professional background. A second part differed by version, which will be explained below. A third part, which was the same across the three

¹ See the next section entitled “Data” for more information about *Enseñá por Argentina*.

versions, asked applicants whether they continued to be interested in applying to EpA and asked them to rank potential changes that could be made to the program to make it more appealing.²

In the control version of the survey, the second part asked applicants their expectations about pay and working conditions if they were to get into EpA and about their motivations for applying to the program. These questions measured how much applicants knew about these two factors and whether applicants viewed them as potential dissuaders for entering the profession.

The first treatment version of the survey included a set of questions with informational prompts about the applicants' working conditions if they were admitted to EpA. Specifically, information was provided about EpA's restrictions on the number of corps members it can assign to public schools and the fact that graduates are often assigned to low-cost private schools and are typically assigned teaching hours at multiple schools. The survey also explained that it can take up to a month after the start of classes for EpA to assign a program graduate to a school and that graduates may have to switch schools from one year to the next. Importantly, most of these issues have more to do with barriers that the applicants face to teach at public schools without a certification than with the traditional working conditions discussed in the literature. Yet, these are the issues these applicants would face if they tried to enter teaching on their own, so they may influence their career decisions.

Finally, the second treatment version of the survey included a set of questions with informational prompts about the pay that applicants would receive if they were admitted to EpA. Specifically, information was provided on the starting salary that the average EpA program graduate receives, the salary that teachers in Argentina receive after 15 years of experience, the maximum salary that teachers in Argentina can receive by the end of their careers, the options

² The three versions of the survey can be found online. See <https://www.surveymonkey.com/s/DF3Q8BX> (control); <https://www.surveymonkey.com/s/DFPFB5D> (working conditions); and <https://www.surveymonkey.com/s/D6LFXN2> (pay).

that corps members have to increase their pay (e.g., accumulate years of experience, participate in professional development activities, and obtain a graduate degree), and the fact that corps members can only access the benefits of public school teachers if they become certified teachers. These prompts touched on the same factors frequently considered by the literature on teacher pay, mostly because teacher certification does not make an important difference in how much novice teachers are paid in Argentina.

The Outcomes: Expressed and Revealed Preferences

The impact of the informational prompts on applicants' interest to continue to pursue their application to EpA was measured through expressed and revealed preferences. Applicants stated expressed preferences at the end of all surveys, when they were asked whether they wanted to continue to pursue their application to the program. Revealed preferences were determined by tracking applicants at every step of the program's selection process and seeing whether they accepted, rejected, or ignored a "callback" (an invitation from the organization to move forward).

The specific question asked of applicants to measure their expressed preferences was: "After completing this survey, are you still interested in pursuing your application to *Enseñá por Argentina?*" Applicants could respond using a Likert scale that ranged from 1 ("Yes, this survey didn't change my intentions at all") to 5 ("No, I'm no longer interested in applying to the program"). To ensure that applicants did not think that their response to this question was binding, the study specified both in its invitation to complete the survey and at the beginning of the survey that the survey data would be used for a Harvard University research project and would not be seen or used by EpA during the selection process.

The study measured applicants' revealed preferences by observing their decisions at every step of EpA's selection process. As Figure 1 indicates, applicants have to go through several steps to be selected for EpA. At each step along the way both the organization and the applicant decide whether the applicant moves forward. Thus, the study could determine whether applicants accepted, ignored, or rejected a "callback" at each step.

Finally, at the end of every survey, applicants were asked to rank a number of potential changes that could be made to EpA to make it more appealing to them. These changes included increasing the amount of classroom resources (e.g., school supplies, textbooks, access to the Internet), assigning corps members to "clusters" with peers, providing teacher training opportunities that cater to the needs of corps members, increasing initial pay, guaranteeing that they will be working with principals who are capable instructional leaders, increasing the maximum pay, providing a full scholarship to corps members who wish to obtain a teacher certificate, and paying corps members on the basis of their students' improvements in achievement. This list of potential changes was included in order to understand whether the potential effects of pay and working conditions as dissuaders could be offset. Yet, these are admittedly only expressed preferences and there is no way of contrasting them with revealed preferences.

Data

The data for this study are from *Enseñá por Argentina*, a program that recruits top college graduates to teach in high-need schools for at least two years. It is an adaptation of Teach for America, a U.S. nonprofit that has implemented the same model and placed over 28,000 college

graduates in teaching since 1990. This model has been replicated in 29 developed and developing countries by the organizations that form part of the global network called Teach for All.

This study combines three datasets: datasets from EpA's application and selection processes, and the dataset from the survey administered as part of the study itself.

Application Data

The data include all of the information entered by the 1,017 applicants to EpA in 2012 who finished their online application form (out of the 1,800 applicants who started it). This includes their responses to demographic and academic and professional background questions. The data also include their responses to the question on their three most important motivations and reservations when they applied to EpA. All applications were completed prior to randomization.

Table 1 includes balancing checks across randomization groups in four families of variables: demographic, academic, professional, and motivational variables. The first column includes the description of each variable; the second through fourth columns include the means and the standard deviations (in parentheses) of that variable across the three randomization groups; the fifth and sixth columns present the results of t-tests of that variable between the control and treatment groups; and the seventh through ninth columns present the F-test of joint significance, its p-value, and the number of nonmissing observations, respectively. As the table shows, the randomization worked as expected and there is balance across groups.³

³ None of the t-tests include adjustments for multiple hypotheses testing, so we expect 1 in 20 significant differences across groups (at the .05 level) by chance (Schochet, 2008).

The demographic variables indicate that 93 percent of applicants are from Argentina and most live in the City of Buenos Aires (51 percent) or the Province of Buenos Aires (45 percent), the two areas where EpA places its teachers. Seventy percent of applicants are female, and on average applicants are nearly 30 years old.

The academic variables show that over half (55 percent) of applicants attended a competitive college,⁴ 13 percent majored in science, technology, engineering, or math, and 5 percent majored in education.⁵ On average, they had a grade point average of 7.39 (out of 10), and 41 percent had a graduate degree.

The professional variables reveal that 58 percent of applicants were employed at the time of applying. Consistent with the hypothesis here that applicants to EpA had little knowledge of the pay and working conditions in the school system, only 14 percent had applied for a teaching post in the past. While 26 percent stated that they were teaching at the time when they were applying, and 53 percent reported they had taught before, it is possible given the wording of the question that applicants included unpaid teaching (e.g., volunteer work, which 46 percent of applicants in the group had done) or other types of instruction (e.g., as a teaching assistant at a university) in their responses.⁶ Neither of these types of work would have provided them with first-hand experience with the pay and working conditions of the school system. Additionally, only 16 percent of applicants had a teaching degree.

Finally, there was little variation in the major reason cited for applying to EpA: 88 percent listed education as a key driver of change. However, there was more variation in the greatest reservation that individuals said they had at the moment of applying: 19 percent reported

⁴ A competitive college is defined here as a university listed in U.S. News' Best Universities in Latin America in 2012: <http://www.usnews.com/education/worlds-best-universities-rankings/best-universities-in-latin-america>.

⁵ We grouped applicants who majored in education and those in a teacher training program.

⁶ The question asks: "Are you currently a teacher?"

to be concerned about pay, 5 percent about the two-year commitment, 13 percent about not knowing the school where they would be placed, 29 percent about the fact that their friends and family advised them to make a different career choice, 17 percent about whether teaching set them “off track” in their career, and about 10 percent about taking on a full-time commitment.

Selection Data

The selection data include the scores applicants received at the three steps of EpA’s selection process: (1) the online application; (2) the group interview; and (3) the individual interview. When EpA reviews online applications, it assesses applicants’ accomplishments, leadership, and perseverance. During the group interview, it evaluates their organizational, critical thinking, and communication skills. Lastly, in the one-on-one interview, it scores applicants on leadership, perseverance, communication, alignment with the organization’s mission, openness to new ideas, and respect for diversity.⁷

The section titled “Heterogeneous Effects” later in this paper uses the scores from the online application review (which were assigned prior to randomization) to explore whether there are heterogeneous effects based on any of the assessed criteria. This is a key question because some of the competencies assessed in EpA’s rubric have been found to predict teachers’ value-added scores in the United States (Dobbie 2011).⁸

⁷ The rubrics used by EpA to assess these skills are confidential and thus cannot be included here.

⁸ We also took advantage of the fact that two of the competencies (leadership and perseverance) were evaluated during both the online application review and the individual interview to assess the effect of the informational prompts on applicants’ effort (i.e., their change in scores). We found that applicants who received prompts on working conditions actually had higher effort on these two criteria the second time they were scored. Yet, given that we only observed 163 applicants in both stages, the results are not very precisely estimated. They are available upon request.

Appendix Table A1 checks for balance across randomization groups in the pre-randomization scores (i.e., the ones from the online application review).⁹

Survey Data

Finally, data are used from the survey sent to applicants to EpA in 2012. The survey was administered after applicants finished the online application but before they knew whether they would move on to the next stage of EpA's selection process (September 26 to October 1, 2012). E-mails were sent to the 1,017 applicants with a complete online application using the address that they provided to EpA. The e-mail told applicants about the survey, included a link to complete it, and explained how the data would be used. Applicants were not required to complete the survey, so we provided an incentive by entering those who finished the survey into a lottery for an iPod Nano. Reminders were sent two days after the survey started and the day before it closed.

The survey response rate was 64 percent (i.e., 651 of the 1,017 applicants finished the survey). Appendix Table A2 shows that, in the pre-randomization variables, applicants who finished the survey are nearly identical to those who did not.¹⁰

Table 2 presents the data from the second part of the survey.¹¹ The applicants' responses to questions in this part of the survey cannot be compared because they differed across randomization groups (i.e., this part was the treatment). One can, however, see what the conclusions about applicants' preferences would have been if we had only administered this survey without conducting the experiment.

⁹ As above, we do not adjust for multiple tests, so we expect a few differences by chance.

¹⁰ Again, we do not adjust for multiple testing here.

¹¹ See the section earlier in the paper entitled "The Treatment: Informational Prompts."

The questions in the control group asked applicants how important a given factor was in their decision to apply to the program. They could respond by choosing options ranging from 1 (“I didn’t consider this factor”) to 5 (“This was a decisive factor”). The questions in the treatment groups asked applicants whether the information provided to them made them reconsider their decision to apply to the program. Their possible responses ranged from 1 (“Not at all - I knew this already and/or this information is inconsequential”) to 5 (“A lot - I no longer want to apply to EpA”). In Table 2, dummies were created for both the control and treatment questions that are equal to 1 if the applicant chose options 3 through 5, and 0 otherwise.

Interestingly, none of the factors included in the control group survey seems to have played a key role in the decision of applicants to apply to EpA. Consistent with the hypothesis that applicants knew little about what their working conditions would be if they were admitted to the program, the most commonly chosen factor was “working at a public school” (18 percent), even though the EpA places the vast majority of its corps members in low-cost private schools. Other factors that control group applicants considered (in order from most to least popular) were working close to home (14 percent), initial pay (12 percent), pay increases and benefits (10 percent each), and being on a school calendar (i.e., having three months off during the summer) (8 percent).

Additionally, none of the informational prompts in the treatment group surveys seem to have played a major role in updating applicants’ decisions to apply to EpA. While prompts in the pay group seem to be more influential in applicants’ decisions, none was chosen as important by more than 3 percent of applicants.

Finally, the control group version of the survey also asked applicants about their expectations regarding how much they would be paid during and after their participation in EpA

if they were selected, as well as how much they would be paid (in some other job) if they were not admitted.¹² Figure 2 shows applicants' responses. Consistent with the hypothesis that applicants knew little about what their pay would be if they were admitted, when asked how much they expected to make per month if they got into the program, only about 18 percent of applicants answered correctly (up to ARS 3,000).¹³ About a third were not far off, guessing that they would be paid between ARS 3,000 and 4,000. Yet, over half expected ARS 4,000 or more and almost a quarter expected more than ARS 5,000.

Interestingly, according to their self-reports, more than 60 percent of control group applicants expected to make over ARS 5,000 per month if they did not get into EpA. That would imply that they would be taking more than a 60 percent pay cut to enter the program. As the last panel in Figure 2 indicates, however, almost 50 percent of applicants expected to make more than ARS 5,000 after their two-year commitment with the organization. Therefore, applicants seem to perceive this cut as a deferment rather than as a loss.

Empirical Strategy

The question of whether the provision of information on pay or working conditions dissuades top college graduates from pursuing their application to EpA fits into the structure of a binary choice model (Cameron and Trivedi 2005; Wooldridge 2010). The binary choice of interest in this case is:

¹² We asked applicants about their expectations for their monthly (as opposed to annual) wages. This is more customary in Argentina.

¹³ At the time of the study in September 2012, the exchange rate was US\$1 = ARS 4.69.
<http://www.xe.com/currencytables/?from=ARS&date=2012-09-26>.

$$y_i = \begin{cases} 1 & \text{if the applicant drops out} \\ 0 & \text{if the applicant does not drop out} \end{cases} . \quad (1)$$

It is important to explain y_i , with $(i = 1, 2, \dots, N)$, given K characteristics in x_i . Since not everyone who sent the survey actually responded to it (see previous section), we can estimate both the effect of being offered information on pay or working conditions (i.e., intent-to-treat – ITT), and the effect of actually receiving the information (i.e., treatment-on-the-treated – TOT). One can see why some might be interested in the ITT results,¹⁴ yet we see the TOT results as most relevant to our research question and focus on them. ITT results are available upon request.

Intent-to-Treat

The ITT effect can be obtained with a simple linear probability model (LPM):

$$y_i = x_i' \beta + \epsilon_i, \quad i = 1, 2, \dots, N, \quad (2)$$

where y_i is binary and defined either in terms of expressed preferences (i.e., a dummy that takes the value 1 if an applicant stated he/she will withdraw his/her application at the end of the survey and 0 otherwise) or revealed preferences (i.e., a dummy that takes the value 1 if an applicant dropped out of the selection process and 0 otherwise), and x_i includes a constant and the two treatment dummies. In some specifications, a vector of control variables is added in x_i to increase the precision of the estimates.

If $E[\epsilon_i | x_i] = 0$ (which, in our case, is warranted by the randomization strategy), then $E[y_i | x_i] = x_i' \beta$. Since y_i is binary, the conditional expectation can be found as:

¹⁴ For example, if a government were to do a survey similar to the one conducted here with all of its applicants into teaching and wanted to know what the average effect of providing information on pay or working conditions would be for this population.

$$x'_i\beta = E[y_i|x_i] = 1 \cdot P(y_i = 1|x_i) + 0 \cdot P(y_i = 0|x_i) = P(y_i = 1|x_i). \quad (3)$$

In other words, $x'_i\beta$ can be interpreted as the probability that $y_i = 1$ and the derivative, β , as the change in the probability $\Delta P(y_i = 1|x_i) = \beta \cdot \Delta x_i$ caused by the offer of information on either pay or working conditions.

Using an LPM to estimate probabilities is problematic for two well-known reasons. First, since $x'_i\beta$ is a probability, it should be bounded between 0 and 1; the LPM does not bound or restrict β in any way. Second, the error term in the LPM, ϵ_i , is highly non-normal and heteroskedastic. In fact, it can only take two values (conditional on x_i): $1 - x'_i\beta$ with probability $x'_i\beta$, and $-x'_i\beta$ with probability $1 - x'_i\beta$. This is why in estimating probabilities in binary choice models, econometricians tend to use models of the class $P(y_i = 1|x_i) = F(x'_i\beta)$ for some link function $F(\cdot)$ between 0 and 1. We used these models to estimate the ITT but encountered the problems of model convergence that are typical when estimating the TOT with limited dependent variables with dummy endogenous regressors. Therefore, following Angrist (2001), we used an LPM to estimate both the ITT and TOT. The ITT results are not model dependent and the probit and logit estimates are available upon request.

Treatment-on-the-Treated

Similarly, as in any other experiment with imperfect compliance:

$$d_i = \begin{cases} 1 & \text{if the applicant was assigned to a treatment group} \\ 0 & \text{if the applicant was assigned to a control group} \end{cases}. \quad (4)$$

For compliers ($d_1 > d_0$, where $d_0 = 0$ and $d_1 = 1$), we have a perfect experiment, but we only observe one of the potential treatment indicators (d_0, d_1), so we cannot identify which group any individual belongs to. Yet, with three key assumptions (independence, first stage, and monotonicity), we can identify $\alpha_{LATE} = E[y_1 - y_0 | d_0 > d]$, the average treatment effect for compliers, or the local average treatment effect (Angrist, Imbens, and Rubin 1996; Imbens and Angrist 1994). Since we have one-sided noncompliance, $E[y_1 - y_0 | d_1 > d_0] = E[y_1 - y_0 | d = 1]$ and $\alpha_{LATE} = \alpha_{ATET}$, which is the average treatment effect on the treated.

Thus, to estimate α , we run the two-stage least squares (2SLS) regression:

$$y_i = d_i' \alpha + x_i' \beta + v_i, \quad (5)$$

where d_i is the vector of treatment dummies, v_i is the error term, and everything else is defined as above. We also test for the existence of heterogeneous effects by interacting the treatment dummies with selected characteristics of the applicants.

Results

This section presents the results of the TOT estimates on applicants' intention to drop out and their actual dropout rates from the EpA selection process.

Treatment-on-the-Treated Effects on Intention/Propensity to Drop Out

Table 3 presents the results of the TOT models estimating the effects of receiving the informational prompts. In columns 1–4, the outcome variable is whether applicants said that they wanted to drop out of the program, first upon receiving the prompts on working conditions and

then upon receiving the prompts on pay without and with controls. In columns 5–8, the outcome variable is whether applicants actually dropped out, first upon receiving the prompts on working conditions and then the ones on pay without and with controls.

The coefficients themselves can be interpreted as the marginal effects. Applicants who received the prompts on working conditions were 25 percent more likely than those in the control group to say that they wanted to drop out of EpA’s selection process, and those who received the prompts on pay were almost 31 percent more likely to say that they intended to drop out. However, neither of these groups was actually more likely to drop out of the selection process, with or without controls. As above, small differential attrition rates for either one of the treatments can be discarded.

Heterogeneous Effects

The TOT models were also used to explore whether there were heterogeneous effects. We examined whether the effects of receiving informational prompts differed for (1) females, (2) applicants with higher undergraduate grade point averages, (3) applicants with higher pre-randomization selection scores,¹⁵ (4) applicants who had previously applied to teach, and (5) applicants who were employed when they applied to EpA.

Table 4 presents the heterogeneous effects on applicants’ expressed preferences. For ease of presentation, controls are left out. Interestingly, female applicants are slightly less likely than male applicants to report that they intend to drop out when they receive prompts on working conditions, but not when they receive prompts on pay. Other than that, not much else is going on.

¹⁵ We calculated a simple average of the three pre-randomization selection scores on accomplishments, leadership, and perseverance and then standardized it at the applicant level. This way, the results can be interpreted in terms of standard deviations on that composite score.

Applicants with higher selection scores who receive prompts on working conditions are more likely to report that they want to drop out, but the effect is small. Similarly, applicants employed when they applied to EpA who receive prompts on pay are more likely to report that they want to drop out. This effect is larger, but absent in the case of prompts on working conditions. It is unclear what to make of these results by themselves.

Table 5 presents the heterogeneous effects on applicants' revealed preferences. As above, only the marginal effects without controls are included. Consistent with Table 4, female applicants who receive prompts on working conditions or pay are more likely than men to drop out of EpA's selection process. Perhaps more importantly, however, more desirable applicants are more likely to drop out. Every one point in a college grade point average makes an applicant 6–8 percentage points more likely to drop out of EpA's selection process if he or she receives information on working conditions. Every one standard deviation in a selection score makes an applicant about 25 percentage points more likely to drop out if he/she receives prompts on working conditions or pay.

Effects on Applicants' Demand for Changes

Using the TOT models, we also explored whether receiving prompts on working conditions or pay influenced the changes that applicants wanted in EpA in the last question of the survey.¹⁶ Dummies were created that were equal to 1 if an applicant ranked a change to the program at the top and 0 otherwise.

Table 6 presents the effects on applicants' top-ranked changes to the program. Once again, only the estimates without controls are included. For ease of presentation, all

¹⁶ See the section earlier in this study entitled "The Outcomes: Expressed and Revealed Preferences."

nonsignificant results are omitted for both types of prompts: higher maximum pay, a teaching degree, a good principal, and professional development. The general pattern that emerges in the remaining variables is that applicants who were prompted to think about working conditions were more likely to rank being assigned with other corps members as their top choice and applicants who were prompted to think about pay were more likely to rank incorporating merit pay as their top choice. Prompts on one issue do not seem to have any bearing on applicants' demands on the other, with the exception of prompts on working conditions, which make applicants less likely to rank higher initial pay as their top choice.

Discussion

To our knowledge, this is the first study that estimates the causal effect of providing top college graduates with information about pay or working conditions on their decisions to enter teaching. The overall picture that emerges is one in which applicants “bluff”—that is, those who receive this information are more likely to report that they will drop out of EpA’s selection process, but they are no more likely to actually drop out. This result should give pause to those relying on expressed preferences to understand the intentions of top college graduates for entering teaching, as self-reports do not appear to be reliable predictors of actual intentions.

Although the experimental setting is ideal to contrast applicants’ expressed and revealed preferences, it is less ideal for understanding why applicants are “bluffing.” This could happen due to one of the reasons discussed earlier in the section of the paper entitled “Expressed versus Revealed Preferences.” For example, applicants may purposefully overestimate the impact of potential dissuading factors on their decision in hopes of influencing changes in the program, or

they may not fully understand the implications of the information revealed to them until they move forward in the selection process (e.g., because they can discuss these dissuading factors with peers and/or representatives from the organization).

The hypothesis here is that neither of these is the main mechanism at work. Rather, it is likely that the informational prompts are making working conditions and pay more salient in applicants' minds at the time when they are responding to the survey, but that this salience fades quickly. We have no way of directly testing this hypothesis, but the effects of the informational prompts on the changes that applicants demanded at the end of the survey are certainly consistent with this interpretation. When prompted to think about working conditions, applicants were more likely to ask for changes related to those conditions and when prompted to think about pay, applicants were more likely to ask for changes related to pay. Our interpretation is also consistent with the results of recent surveys in education that are able to considerably influence respondents' answers to the same question simply by changing the framing of the question (Schueler 2012).

Interestingly, the group of applicants that is not bluffing (i.e., that is both saying that it will drop out after receiving information on pay and working conditions and then actually dropping out at higher rates) is precisely the group that programs such as EpA are most interested in recruiting. In hindsight, this is not entirely surprising. The most desirable applicants are also more likely to face relatively high opportunity costs for entering teaching. So, it is reasonable that they are more sensitive to information about potential dissuading factors. Yet, this finding suggests that EpA will not be able to maximize the number of top candidates that it can select through more aggressive marketing alone; it must also either directly address or otherwise compensate for these factors dissuading applicants from teaching.

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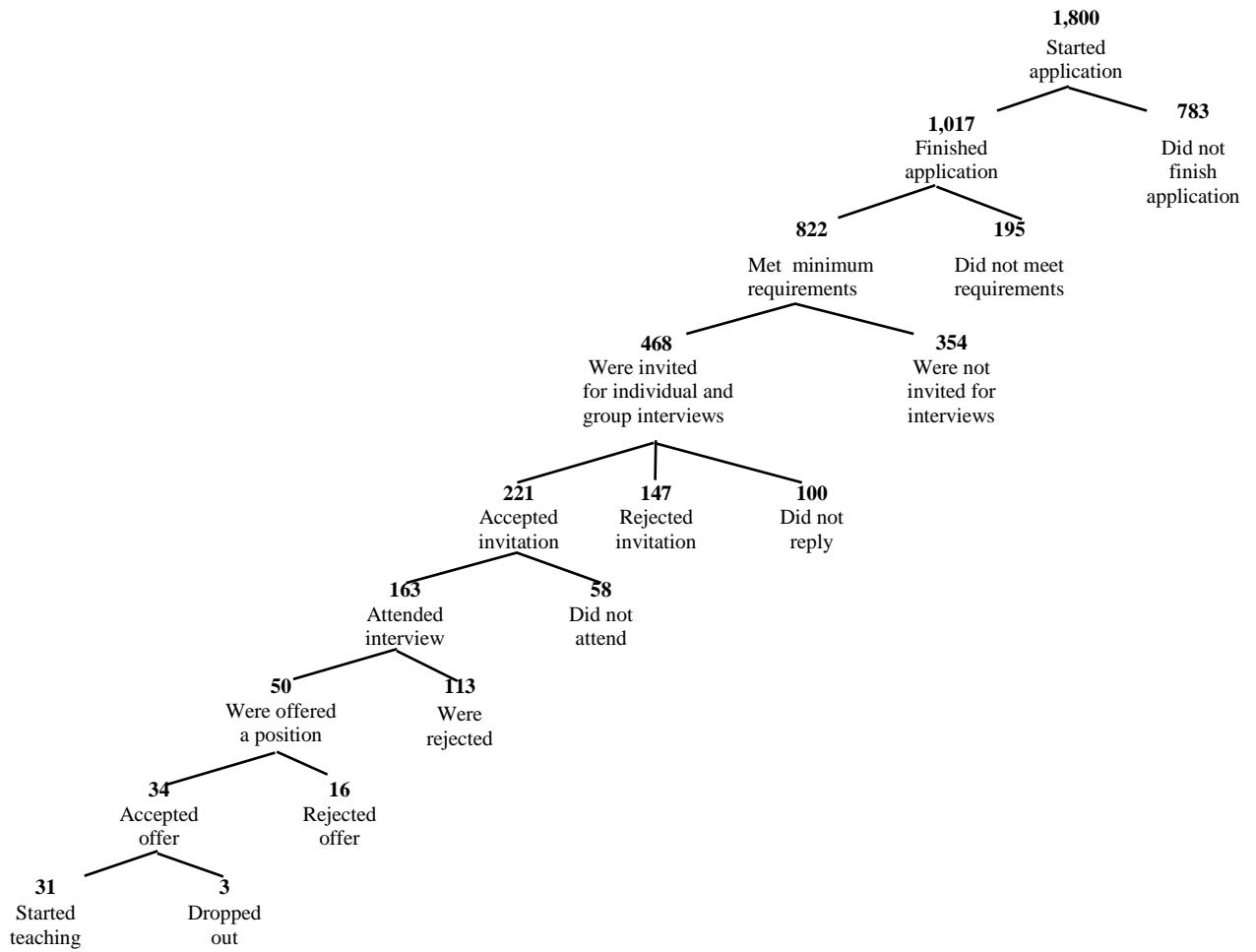
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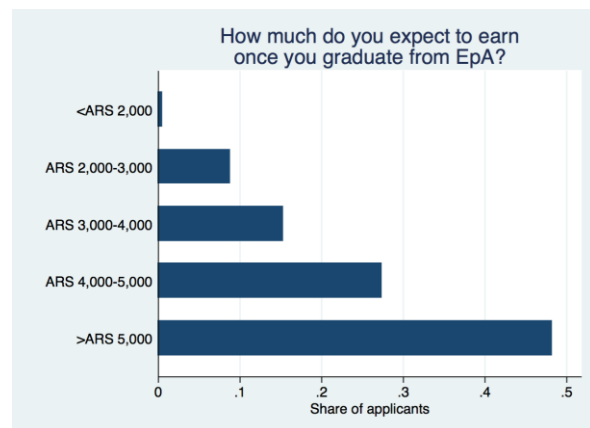
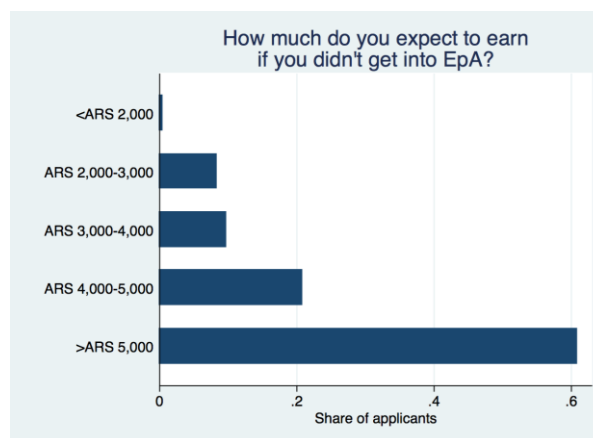
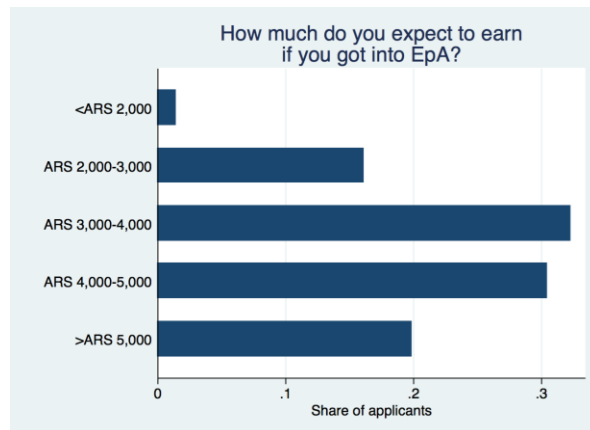
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Figure 1. Selection Process of *Enseñá por Argentina* in 2012



Source: Prepared by the authors based on the *Enseñá por Argentina* database.

Figure 2. Salary Expectations for Applicants to *Enseñá por Argentina* in 2012



Source: Prepared by the authors based on the *Enseñá por Argentina* (EpA) database.

Table 1. Balancing Checks at Baseline

	All	T0	T1	T2	T1-T0	T2-T0	F-Test	P-Value	Number
Percent Argentine	0.93 (.254)	0.93 (.259)	0.92 (.273)	0.94 (.228)	-0.01	0.02	0.95	0.39	1,017
Percent from Province of Buenos Aires	0.45 (.498)	0.44 (.496)	0.46 (.498)	0.47 (.500)	0.02	0.04	0.44	0.65	1,017
Percent from City of Buenos Aires	0.51 (.500)	0.52 (.500)	0.51 (.500)	0.49 (.500)	-0.01	-0.03	0.37	0.69	1,017
Percent females	0.70 (.458)	0.68 (.467)	0.69 (.463)	0.73 (.443)	0.01	0.05	1.33	0.26	1,017
Average age	29.60 (5.85)	29.79 (5.47)	29.26 (6.04)	29.76 (6.05)	-0.52	-0.03	0.84	0.43	1,003
Percent from competitive college	0.55 (.498)	0.54 (.499)	0.52 (.500)	0.58 (.494)	-0.02	0.04	0.96	0.38	1,017
Percent majoring in science, technology, engineering or math	0.13 (.339)	0.13 (.336)	0.14 (.352)	0.12 (.328)	0.01	-0.01	0.37	0.69	1,017
Percent majoring in education	0.05 (.214)	0.04 (.197)	0.05 (.222)	0.05 (.222)	0.01	0.01	0.37	0.69	1,017
Average college grade point average (out of 10)	7.39 (.900)	7.41 (.903)	7.39 (.926)	7.38 (.872)	-0.02	-0.03	0.07	0.93	1,000
Percent with graduate degree	0.41 (.492)	0.40 (.490)	0.45 (.497)	0.39 (.487)	0.05	-0.01	1.39	0.25	1,017
Percent who are working	0.58 (.493)	0.63 (.484)	0.54 (.498)	0.58 (.494)	- 0.09**	-0.05	2.61	0.07	1,017
Percent who applied to teach	0.14 (.348)	0.13 (.336)	0.14 (.352)	0.15 (.357)	0.01	0.02	0.31	0.73	1,017
Percent who are teaching	0.26 (.436)	0.29 (.452)	0.25 (.431)	0.23 (.423)	-0.04	-0.05	1.32	0.27	1,017
Percent who have taught	0.53 (.499)	0.54 (.499)	0.52 (.500)	0.53 (.499)	-0.02	-0.00	0.18	0.83	1,017
Percent with teaching degree	0.16 (.369)	0.16 (.371)	0.14 (.352)	0.18 (.385)	-0.02	0.02	0.81	0.45	1,017
Percent who volunteered	0.46 (.498)	0.47 (.499)	0.49 (.500)	0.44 (.496)	0.02	-0.03	0.91	0.40	1,017
Percent that sees education as driver of change	0.88 (.320)	0.88 (.330)	0.88 (.320)	0.89 (.310)	0.01	0.02	0.23	0.79	1,017
Percent concerned about pay	0.19 (.395)	0.21 (.406)	0.18 (.386)	0.19 (.393)	-0.03	-0.02	0.37	0.69	1,017
Percent concerned about two-year commitment	0.05 (.218)	0.06 (.239)	0.04 (.204)	0.05 (.209)	-0.02	-0.01	0.57	0.56	1,017
Percent concerned about not knowing schools	0.13 (.332)	0.15 (.355)	0.14 (.346)	0.09 (.289)	-0.01	-0.06**	3.05	0.05	1,017
Percent concerned about friends and family	0.29 (.451)	0.27 (.443)	0.33 (.471)	0.25 (.436)	0.06*	-0.01	2.62	0.07	1,017
Percent concerned about fit with career goals	0.17 (.378)	0.16 (.363)	0.16 (.369)	0.20 (.402)	0.01	0.05	1.38	0.25	1,017
Percent concerned about full-time requirement	0.10 (.303)	0.08 (.277)	0.08 (.277)	0.14 (.348)	0.00	0.06**	3.37	0.03	1,017

Source: Prepared by the authors based on the *Enseñá por Argentina* database.

Note: Standard deviations in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. STEM = science, technology, engineering and math.

Table 2. Survey Responses about Motivations

Group 0: Control	Share of Applicants	Number
Working close to home	0.14 (.348)	1,017
Initial pay	0.12 (.321)	1,017
Pay increases	0.10 (.299)	1,017
Benefits	0.10 (.293)	1,017
Working at a public school	0.18 (.380)	1,017
Being on a school calendar	0.08 (.278)	1,017
<hr/>		
Group 1: Working Conditions	Share of Applicants	Number
Being assigned to multiple schools	0.00 (.054)	1,017
Working in City/Province of Buenos Aires	0.01 (.098)	1,017
Being assigned to a private school	0.01 (.076)	1,017
Waiting to be assigned for up to a month	0.00 (.069)	1,017
Switching schools from one year to another	0.00 (.062)	1,017
<hr/>		
Group 2: Pay	Share of Applicants	Number
Making ARS 3,000 per month	0.03 (.169)	1,017
Making ARS 4,788 after 15 years	0.03 (.171)	1,017
Making ARS 5,780 by end of career	0.03 (.177)	1,017
Ways to increase teacher pay	0.01 (.112)	1,017
Getting certified to receive benefits	0.02 (.142)	1,017

Source: Prepared by the authors based on the *Enseñá por Argentina* database.

Note: Standard deviations in parentheses.

Table 3. 2SLS Treatment-on-the-Treated Estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Expressed	Expressed	Expressed	Expressed	Revealed	Revealed	Revealed	Revealed
Treated (working conditions)	0.250*** (0.0378)	0.254*** (0.0375)			0.00623 (0.0578)	0.00878 (0.0565)		
Offered (pay)	0.203*** (0.0236)	0.203*** (0.0239)			-0.0110 (0.0360)	-0.0206 (0.0360)		
Female		-0.0400* (0.0214)		-0.0321 (0.0212)		0.0580* (0.0322)		0.0573* (0.0322)
Age		-0.000916 (0.00173)		-0.00152 (0.00172)		-0.0114*** (0.00261)		-0.0114*** (0.00261)
Attended a competitive college		0.00262 (0.0200)		0.00804 (0.0198)		0.0419 (0.0301)		0.0419 (0.0302)
College grade point average (out of 10)		0.0110 (0.0112)		0.00865 (0.0111)		0.0577*** (0.0169)		0.0582*** (0.0169)
Currently working		0.0356* (0.0202)		0.0400** (0.0201)		0.0171 (0.0305)		0.0178 (0.0306)
Currently teaching		-0.00165 (0.0250)		-0.00916 (0.0247)		0.00464 (0.0376)		0.00645 (0.0376)
Has a teaching degree		-0.0469 (0.0286)		-0.0424 (0.0283)		-0.0305 (0.0431)		-0.0312 (0.0431)
Applied to teach		-0.000889 (0.0316)		-0.00484 (0.0313)		-0.0124 (0.0476)		-0.0149 (0.0476)
Treated (pay)			0.309*** (0.0355)	0.308*** (0.0358)			-0.0167 (0.0549)	-0.0310 (0.0545)
Offered (working conditions)			0.154*** (0.0230)	0.158*** (0.0232)			0.00383 (0.0355)	0.00568 (0.0354)
Constant	0.00289 (0.0164)	-0.0398 (0.106)	0.00289 (0.0162)	-0.0136 (0.105)	0.321*** (0.0251)	0.166 (0.159)	0.321*** (0.0251)	0.161 (0.160)
Observations	1,017	987	1,017	987	1,017	987	1,017	987

Source: Prepared by the authors based on the *Enseña por Argentina* database.

Note: Standard deviations in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. 2SLS = two-stage least squares regressions.

Table 4. 2SLS Treatment-on-the-Treated Estimates: Expressed Preferences

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Expressed	Expressed	Expressed	Expressed	Expressed	Expressed	Expressed	Expressed	Expressed	Expressed
Treated (working conditions)	0.0907*** (0.0343)		0.0885** (0.0345)		0.0863** (0.0383)		0.0921*** (0.0346)		0.0938*** (0.0343)	
× Female	-0.165*** (0.0537)	0.0420 (0.0527)								
Female	0.00858 (0.0244)	-0.0368 (0.0238)								
Treated (pay)		0.194*** (0.0317)		0.191*** (0.0322)		0.191*** (0.0363)		0.192*** (0.0318)		0.190*** (0.0316)
× College grade point average			0.0303 (0.0264)	-0.0140 (0.0268)						
College grade point average (out of 10)			-0.00392 (0.0129)	0.00541 (0.0123)						
× Selection score					0.0556** (0.0283)	-0.0450 (0.0279)				
Selection score					0.0003 (0.0126)	0.0215* (0.0122)				
× Applied to teach							0.0570 (0.0775)	-0.0256 (0.0703)		
Applied to teach							-0.0227 (0.0315)	-0.00978 (0.0312)		
× Currently working									-0.0645 (0.0499)	0.147*** (0.0483)
Currently working									0.0419* (0.0228)	-0.00457 (0.0221)
Constant	0.0951*** (0.0210)	0.105*** (0.0203)	0.130 (0.0959)	0.0397 (0.0915)	0.103*** (0.0140)	0.0843*** (0.0132)	0.104*** (0.0132)	0.0809*** (0.0126)	0.0759*** (0.0182)	0.0823*** (0.0174)
Observations	1,017	1,017	1,000	1,000	827	827	1,017	1,017	1,017	1,017

Source: Prepared by the authors based on the *Enseña por Argentina* database.

Note: Standard deviations in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. 2SLS = two-stage least squares regressions.

Table 5. 2SLS Treatment-on-the-Treated Estimates: Revealed Preferences

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Expressed	Expressed	Expressed	Expressed	Expressed	Expressed	Expressed	Expressed	Expressed	Expressed
Treated (working conditions)	0.0164 (0.0502)		0.0210 (0.0500)		-0.0407 (0.0503)		0.0121 (0.0506)		0.0165 (0.0502)	
× Female	0.0275 (0.0786)	-0.0452 (0.0791)								
Female	0.0606* (0.0358)	0.0760** (0.0358)								
Treated (pay)		-0.0246 (0.0477)		-0.0247 (0.0479)		0.0253 (0.0490)		-0.0195 (0.0478)		-0.0193 (0.0478)
× College grade point average			0.0113 (0.0383)	-0.0808** (0.0399)						
College grade point average(out of 10)			0.0595*** (0.0187)	0.0793*** (0.0183)						
× Selection score					-0.0372 (0.0371)	-0.0259 (0.0376)				
Selection score					0.251*** (0.0165)	0.247*** (0.0164)				
× Applied to teach							-0.0899 (0.113)	-0.0298 (0.106)		
Applied to teach							-0.0156 (0.0460)	-0.0258 (0.0469)		
× Currently working									-0.111 (0.0729)	-0.0269 (0.0731)
Currently working									0.0237 (0.0334)	0.00611 (0.0334)
Constant	0.273*** (0.0308)	0.271*** (0.0305)	-0.125 (0.139)	-0.262* (0.136)	0.400*** (0.0183)	0.385*** (0.0179)	0.318*** (0.0193)	0.326*** (0.0190)	0.301*** (0.0265)	0.319*** (0.0263)
Observations	1,017	1,017	1,000	1,000	827	827	1,017	1,017	1,017	1,017

Source: Prepared by the authors based on the *Enseñá por Argentina* database.

Note: Standard errors in parentheses. *p<0.10, ** p<0.05, *** p<0.01. 2SLS = two-stage least squares regressions.

Table 6. 2SLS Treatment-on-the-Treated Estimates: Effects on Top-Ranked Requested Change

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	highinipay	highinipay	clusterassn	clusterassn	betterresou	betterresou	meritpay	meritpay
Working conditions	-0.0553** (0.0275)		0.0551** (0.0226)		0.00436 (0.0266)		-0.0149 (0.0130)	
Pay		0.0589** (0.0257)		-0.00954 (0.0217)		0.0746*** (0.0249)		0.0426*** (0.0122)
Observations	1,017	1,017	1,017	1,017	1,017	1,017	1,017	1,017

Source: Prepared by the authors based on the *Enseñá por Argentina* database.

Note: Marginal effects; standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. 2SLS = two-stage least squares regressions.

Appendix Table A1. Balancing Checks on Scores at Baseline

	T0	T1	T2	T1-T0	T2-T0	F-Test	P-Value	Number
Average score on accomplishments (Stage 1)	3.24 (.389)	3.24 (.370)	3.26 (.342)	0.00	0.02	0.30	0.74	827
Average score on leadership (Stage 1)	2.77 (1.12)	2.74 (1.02)	2.53 (1.04)	-0.03	-0.24**	3.97	0.02	827
Average score on perseverance (Stage 1)	3.06 (1.00)	3.07 (1.01)	3.02 (1.12)	0.01	-0.05	0.21	0.81	827

Source: Prepared by the authors based on the *Enseñá por Argentina* database.

Note: Standard deviations in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The score for accomplishments ranges from 1 to 5 points. The other two scores range from 1 to 4 points.

Appendix Table A2. Balancing Checks Due to Attrition

	Non-Dropouts	Dropouts	Difference	Number
Percent Argentine	0.93 (.259)	0.92 (.273)	-0.01	1,017
Percent from Province of Buenos Aires	0.44 (.496)	0.46 (.498)	0.02	1,017
Percent from City of Buenos Aires	0.52 (.500)	0.51 (.500)	-0.01	1,017
Percent females	0.68 (.467)	0.69 (.463)	0.01	1,017
Average age	29.79 (5.47)	29.26 (6.04)	-0.52	1,012
Percent from competitive college	0.54 (.499)	0.52 (.500)	-0.02	1,017
Percent majoring in science, technology, engineering, or math	0.13 (.336)	0.14 (.352)	0.01	1,017
Percent majoring in education	0.04 (.197)	0.05 (.222)	0.01	1,017
Average college grade point average (out of 10)	7.41 (.903)	7.39 (.926)	-0.02	1,003
Percent with graduate degree	0.40 (.490)	0.45 (.497)	0.05	1,017
Percent who are working	0.63 (.484)	0.54 (.498)	-0.09**	1,017
Percent who applied to teach	0.13 (.336)	0.14 (.352)	0.01	1,017
Percent who are teaching	0.29 (.452)	0.25 (.431)	-0.04	1,017
Percent who have taught	0.54 (.499)	0.52 (.500)	-0.02	1,017
Percent with teaching degree	0.16 (.371)	0.14 (.352)	-0.02	1,017
Percent who volunteered	0.47 (.499)	0.49 (.500)	0.02	1,017
Percent that sees education as driver of change	0.88 (.330)	0.88 (.320)	0.01	1,017
Percent concerned about pay	0.21 (.406)	0.18 (.386)	-0.03	1,017
Percent concerned about two-year commitment	0.06 (.239)	0.04 (.204)	-0.02	1,017
Percent concerned about not knowing schools	0.15 (.355)	0.14 (.346)	-0.01	1,017
Percent concerned about friends and family	0.27 (.443)	0.33 (.471)	0.06*	1,017
Percent concerned about fit with career goals	0.16 (.363)	0.16 (.369)	0.01	1,017
Percent worried about full-time requirement	0.08 (.277)	0.08 (.277)	0.00	1,017

Source: Prepared by the authors based on the *Enseñá por Argentina* database.
 Note: Standard deviations in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.