

Transportation and Access to Higher Education

Fabiola Alba Vivar^{*}

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Abstract

Typically, less advantaged students are more likely to enroll in low-quality universities: Using a rich administrative dataset on difference-in-differences approach, we estimate the cost of this policy for recent graduates using, taking advantage of the staggered nature of licensing decisions. We find that, within one year from the licensing decision, graduates from colleges that obtained a license have higher wages and lower working hours; graduates from universities whose license was denied had no significant effects on their labor market outcomes. This suggests that employers were aware of quality differences between colleges before the licensing process, and that regulation might have come at low cost to recent graduates.

I have benefited from data provided by the Peruvian Ministry of Education.

^{*} Teachers College at Columbia University, *fma2139@tc.columbia.edu*, New York, NY.

1 Introduction

In this paper, I study the effects of public transportation in access to college. Previous work has documented the positive returns to college reputation (Macleod et al. (2017), Anelli (2020), Sekhri (2020)); in this setting, firms are likely to update their beliefs regarding college graduates based on the outcomes of the regulation process. This can make recent graduates winners on losers, depending on the direction and size of the update. In this paper, we study the case of a major higher education reform in Peru, where compliance with a set of basic quality standards was enforced: colleges that failed to meet certain criteria were denied an operational license and had to cease their activities. The licensing decisions were announced over the period 2016-2021 and resulted in the closure of a total of 50 universities out of 144.

In partnership with the Ministry of Education and the Ministry of Labor, we combine administrative data from college records and match it with monthly firm tax-records. This data allows us to show that less advantaged students are the more likely to attend bad colleges, and that licensing decisions closed the colleges with the lowest returns. We then take advantage of the staggered nature of licensing decisions to estimate a difference-in-differences model, exploiting within-college variation in the labor market outcomes of recent graduates. Separate models are estimated for graduates of colleges who received or were denied a license. This approach addresses the systematic differences in earnings of graduates from different colleges and provides us with suitable comparison groups.

Our preliminary analysis of short-term effects shows positive effects for recent graduates of colleges which were granted a license. We find that, conditional on being employed, monthly wages increase by about *USD*20 (or 6 percent of the monthly minimum wage) while total monthly hours decreased approximately 8 hours. Interestingly, we find small and negative effects on employment, which could be due to increased

entrepreneurship or to graduates deciding to pursue masters or PhD degrees. On the other hand, graduates from universities that were denied a license experience small, non-significant effects for all outcomes. This suggests that employers did not update their beliefs about quality at these institutions following the licensing process: if this was the case, the regulation might have come at low cost to their graduates.

This paper is linked to various branches of the economics literature. First, it relates to papers studying the use of private or public signals for hiring decisions. We expect that the licensing process affected the labor market outcomes of university graduates, as it generated better information about the quality of education provided by different universities.¹ The inadequate education of the workforce is considered a central problem by 28% of Peruvian companies (MINEDU (2020a)). Certifying graduates' knowledge and skills could affect hiring decisions by reducing employers' uncertainty over their productivity. For example, Rockoff et al. (2012) shows that when school principals use teacher performance measures to update their beliefs as predicted by standard learning models. Eble and Hu (2021) finds that employers were not swayed by Chinese colleges trying to attract students through misleading changes in their names. Bates (2020) shows that availability of objective benchmarks on the quality of potential hires increases mobility of the most productive workers. In our setting, employers receive signals about college quality: Rivera (2011) finds that educational credentials are the most common criteria used to evaluate resumes. Our paper contributes to this literature by assessing the effects of an improvement or worsening in the reputation of the institution attended, rather than about of a signal of past performance.

Several studies have estimated labor market returns of college attendance in different contexts (see recent examples in Grosz (2020); Montoya et al. (2018); Zimmerman (2014)). Nevertheless, less is known about the role of colleges' reputation. Macleod

¹This could potentially affect the match between employers and employees. Improving the allocation of talent can have important consequences for economic growth, as shown in Hsieh et al. (2019).

et al. (2017) shows that college reputation partially substitutes for individual signals, when the latter are unavailable; additionally, reputation appears to be related to earnings growth even when controlling for measures of individual ability. Recent work has focused on reputation in elite institutions, finding that attending more reputable colleges can increase individuals' income even when they don't appear to improve their graduates' skills (Anelli (2020); Sekhri (2020)).² In contrast to papers that take reputation as fixed, our paper contributes the analysis of the effects of a policy that directly affected colleges' reputation.

Lastly, this paper relates to the literature studying the effects of labor demand shocks at the time of graduation, with most of the work focused on macroeconomic shocks. Kahn (2010) documents the effects of graduating in an economic recession in the early 1980s, finding large and persistent negative labor market effects for white American college graduates. Oreopoulos et al. (2012) finds consistent results using administrative data in Canada. Importantly, this paper is also able to document disparate effects for more or less advantage students, with the former being better able to switch jobs and cushion the impact. Additionally, Altonji et al. (2016) shows that the effects of a bad economy differ by fields, since higher-skilled majors are less sensitive to negative shocks to the economy. In our paper, we show how market regulation can have short-term effects on recent graduates, even when the policy itself did not targeted them. This can lead to changes in career trajectories and persistent effects.

The next section discusses the relevant institutional context and shows that less advantaged students are more likely to attend lower-quality institutions. Section 3 describes the data used in our analysis. Section 4 presents the empirical strategy, while Section 5 presents preliminary results. Section 6 concludes with a discussion of our

²In a recent study, Arteaga (2018) documents that demand for college graduates in an elite college in Colombia decreased following cuts to the university curriculum (i.e. a reduction in courses required for Economics majors), which is consistent with the human capital hypothesis.

next steps.

2 Background

2.1 The Metropolitano

2.2 Higher Education in Peru

Peru, as many other countries in Latin America, went from a closed economy to an open one at the beginning of the 90s. Many of the reforms that came during that decade included market deregulation policies and promotion of the private sector, and some of these reforms were focused on the education sector. With the approval of Law No. 882 in 1996, the Peruvian Congress allowed for-profit universities to enter the market. This increasing number of universities also revealed a pattern: private universities rarely expanding access in unattended regions and predominantly entering markets with already established public universities, as Flor-Toro and Magnaricotte (2021) describe.

In a context where the average income per-capita has grown substantially, access to higher education increased as well over the last two decades. But even when expanding access is a desirable outcome, there has been concern among policymakers and the public opinion regarding the quality of services that universities have provided (British Council; MINEDU, 2020b; SUNEDU, 2020b). One reason to be concerned about this comes from the low quality of university graduates. For example, Yamada et al. (2013) finds that a reason for this deterioration in the quality of professionals is the lower level of skills of the last generations of students, coming from low-quality universities. This is part of a larger literature documenting the quality differences among higher education options in Peru (Díaz, 2008; Yamada et al., 2015).

As a consequence, in 2012 the Peruvian Congress passed a moratorium on the creation of new universities. This law aimed to limit the entry of universities, especially those of low quality. The moratorium prohibited the creation of both public and private universities and the opening of new branches. Subsequently, already established universities had to pass a licensing process.

3 Data

In partnership with the Ministry of Education, we matched educational records of recent graduates from multiple sources with their labor market outcomes. Mainly, we use a combination of two large administrative datasets. First, a panel spanning 2014-2019 with monthly formal labor market outcomes for each individual, obtained from the Ministry of Labor. This data comes from the tax records and includes income, number of hours worked, employer identification (anonymized), occupation level and sector. We highlight that this data is from the formal sector, given that Peru has a highly informal labor market, where 5 out of 10 college graduates work in the informal sector.

Second, we have information on educational achievement collected by the Ministry of Education. This data set includes university attended, major, graduation year, level of degree. In our case, we restrict our attention to bachelor level graduates who born after 1979. In our empirical analysis, we focus on those who graduated withing 1 to 5 years after the licensing decision was made.

[INSERT DESCRIPTIVE STATISTICS TABLE]

For our treatment, we use data obtained directly through the regulator’s website about the outcome of the licensing process and its timing. As previously discussed and shown in Figure ??, this provides us with 50 colleges that were closed and 94 that received a license.

3.1 Sample

Our default sample:

- **for descriptives** uses the old data up to november 2019 and then the sample/new data from december 2019 to the most recent month; always show data from different samples in different colors whenever possible (i.e. when x-axis is in calendar time)
- **for analysis** use the same sample as above but only up to march 2020 included
- **weights** (ideally with weights to account for the sample nature of the new data, aweights: for each university take as population the number of people in november 2019 of the old data, and compare it to the number of people in november 2019 of the new data; weights should be =1 until nov 2019, a fraction $\frac{1}{2}$ afterwards; weights should vary by university and be fixed after nov 2019)
- **additionally** if sample data adds much noise, remove it for analysis

Complementary data used in this paper: CENAUN ENAHO (?)

4 Descriptive Analysis

4.1 Licensing Determinants

What characteristics predict later licensing? Use CENAUN and labor market wages+employment (planilla)

Can we also predict the timing of licensing?

What majors were more common in licensed and non-licensed colleges?

4.2 College Sorting

Do poorer students go more often to license-denied college? What are the shares of poor students in higher education prior to licensing, and how do they change after licensing (what was the share of poor students in bad colleges)? Do more or less poor students go to college after licensing?

SRI+SIRIES postulantes (2014-2019) - by parental education, see if share of low-educated is higher/lower in license-denied colleges, and document share before and after licensing in licensed colleges. Link to SIAGIE for GPA (top of the class) and HS value added.

4.3 Labor Market Dynamics of Recent Graduates

Graph with career earnings or employment by university for the earliest graduates available (keep in mind using ENEU 2014 for comparison: do we get comparable results?)

What sectors are involved in general, are licensed and non-licensed graduates going into different ones? (needs individual-level data)

5 Empirical Strategy

Our empirical strategy is based on a difference-in-differences (DiD) with multiple time periods and staggered treatment. In our setting, we have two treatments: *Granted* for those universities which obtained a license and *Denied* for those that were denied it.

We assume a model of the type:

$$y_{t,c} = \sum_{\tau} \sum_{c'} \beta_{\tau,c'} D\{c' = c\} D\{\tau = t - g(c)\} + \psi_t + \mu_c + e_{t,c}$$

where $g(c)$ is the period in which the licensing decision was announced for college c , and t indexes different months. $\beta_{\tau,c}$ is the parameter of interest: the effect of exposure to the reputation shock on outcome $y_{t,c}$ (e.g. earnings). The term $\beta_{\tau,c}$ highlights the possibility of effects being heterogeneous for different colleges (c) and depending on exposure length $(t - g(c))$.³ Allowing for heterogeneity and dynamics requires us to avoid standard “two-way fixed effects” (TWFE) regressions, as they have been shown to be problematic in such setups (Goodman-Bacon (2021), Baker et al. (2021)).

The frailties of TWFE come from the inclusion of already-treated groups within the comparison group: if treatment effects are heterogeneous, the TWFE estimator will be biased.⁴ Several recent papers have introduced solutions to address these problems, by making sure that only never-treated or not-yet-treated units are included in the comparison group. Similar to the basic difference in differences, these papers rely on parallel trends assumptions to build consistent estimators that do not suffer from the same problems.⁵

We use the estimator proposed in Callaway and Sant’Anna (2020) and provide estimates using only not-yet-treated units.⁶ This estimator is robust to dynamic effects (e.g. increasing with length of exposure to treatment) and effects being heterogeneous across colleges.

Because we have two different treatments, we estimate two separate models. Additionally, only colleges that will eventually receive a license are used as comparison group for the *Granted* treatment; we build the comparison group for the *Denied* treatment correspondingly. $y_{t,c}$ will be earnings, employment, and other labor market outcomes

³In our setting, heterogeneous treatment effects are likely to arise from heterogeneity in the employers’ beliefs update induced by the licensing decision.

⁴Dynamic effects, e.g. when treatment effect is growing as time from the event passes, also lead to misspecification and inconsistency when a constant effect is assumed. This can be addressed by estimating treatment effects relative to event time (Borusyak et al. (2021)).

⁵See as examples of such new estimators Callaway and Sant’Anna (2020), Borusyak et al. (2021), and Sun and Abraham (2020).

⁶By the end of the period studied, all colleges had received or were denied a license.

depending on the specification.

6 Preliminary Results

7 Discussion and Further Steps

The results presented on this draft will be completed in the upcoming months as we gather and include recent data that has already been obtained: this will allow us to extend the analysis to include the period of December 2019 to December 2020. The lack of this period implies that our current analysis might be under powered: since most of the events happened after 2018, we only have limited data post-treatment for many colleges. Other data sources that we are currently collecting to improve our analysis include informal sector data and credit data.

We also plan to look at treatment effect heterogeneity depending on their prior reputation. We also plan to look at employers (by size), tenure in the job, effects by majors and occupations. Finally, we want to complement this paper by looking at the effects on the informal sector and formal-informal transitions.

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