HARD AND SOFT SKILLS IN VOCATIONAL TRAINING:
EXPERIMENTAL EVIDENCE FROM COLOMBIA

Felipe Barrera-Osorio
Adriana D. Kugler
Mikko I. Silliman

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Felipe Barrera-Osorio, Adriana D. Kugler, and Mikko I. Silliman
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ABSTRACT

We randomly assign applicants to over-subscribed programs to study the effects of teaching hard and soft skills in vocational training and examine their impacts on skills acquisition and labor market outcomes using both survey and administrative data. We find that providing vocational training that either emphasizes social or technical skills increases formal employment for both men and women. We also find that admission to a vocational program that emphasizes technical relative to social skills increases overall employment and also days and hours worked in the short term. Yet, emphasis on soft-skills training helps applicants increase employment and monthly wages over the longer term and allows them to catch up with those learning hard skills. Further, through a second round of randomization, we find that offering financial support for transportation and food increases the effectiveness of the program, indicating that resource constraints may be an obstacle for individuals considering vocational training.

Felipe Barrera-Osorio
Department of Leadership,
Policy and Organizations
Vanderbilt University
106 C Payne hall
230 Appleton Place
Nashville, MA 37203
felipe.barrera.-.osorio@vanderbilt.edu

Adriana D. Kugler
Georgetown University
McCourt School of Public Policy
37th and O Streets NW, Suite 311
Washington, DC 20057
and NBER
ak659@georgetown.edu

Mikko I. Silliman
Harvard University
Graduate School of Education
13 Appian Way
Cambridge, MA 02138
silliman@g.harvard.edu

1 Introduction

Vocational training programs are often seen as a means to improve the transition between formal schooling and employment. However, the extent to which vocational training programs succeed in improving the labor market outcomes of their participants is highly debated – and empirical evaluations of vocational programs report mixed results. While some programs suggest positive and sustained impacts (Kugler et al, 2020; Silliman and Virtanen, 2019; Brunner et al., 2019; Attanasio et al., 2017; Attanasio, Kugler and Meghir, 2011), others report no effects (Hicks et al., 2014). Moreover, even the positive effects of some vocational programs that succeed in improving labor market outcomes in the short term can dissipate in only a few years (Acevedo et al., 2017; Alzua et al., 2016; Hirshleifer et al., 2016). A common explanation for this fadeout is that the later outcomes of vocational trainees may suffer if the narrow training they receive does not provide them the skills to adapt to changes in the nature of work (Hanushek et al., 2017; Krueger and Kumar, 2004).

In this paper, we use a randomized experiment to study whether vocational training programs can be designed to provide their participants with sustained benefits by exogenously varying the technical and social skills provided in the program. Building off recent work highlighting the importance of social skills in adapting to labor-market change (Deming, 2017), we randomize applicants to over-subscribed vocational training programs in Cali, Colombia to various treatment arms as follows. First, we randomly assign applicants to either receive vocational training or not. Then, within particular vocational programs, we randomly assign applicants to programs with varying degrees of training in technical and social skills. We assess the effects of providing social and technical training in vocational programs by tracking applicants through both an extensive array of survey data and data on labor market outcomes from social security administrative records.

By randomly assigning curricular content within otherwise comparable vocational training programs, our study is among the first —to the best of our knowledge— to explicitly address how curricular content in vocational training affects labor market performance. While a number of studies focus on policy-changes to offer some insight into the potential effects of changes in vocational curricula (e.g., Bertrand et al., 2019; Hall, 2016; and Malamud and Pop-Eleches, 2010), any effects identified by these non-experimental studies might be partly driven by changes in the composition of students entering vocational training.[1] Further, comparisons between cohorts are challenging, because, as Field et al. (2019) observe, vocational graduates are particularly sensitive to changes in initial local labor market conditions

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[1]Meer (2007) notes that selection into vocational programs or tracks make it challenging to interpet descriptive differences in outcomes between graduates of different programs as causal.

due to business cycle fluctuations. There are few randomized trials that examine the impacts of soft skills. Groh et al. (2016) randomly assigned community college women graduates in Jordan to soft skills training and find no impact of the program. Acevedo et al. (2017) and Ibarran et al. (2014) both examine the impact of combining soft skills with internships in the Dominican Republic and find positive short-term effects but only for women.[2]

In the aggregate, our results show that admission to vocational training through random assignment increases formal employment for both men and women. Both the social and technical vocational programs produce positive effects on labor market outcomes. These effects are robust to a number of specifications and they are present regardless of whether we use our own survey or administrative measures of employment. Our cost effectiveness estimates suggest that the program pays for itself after about seven months. Our results also suggest that both programs improve organizational skills.

Next, we test for differences between the effects of the social and technical vocational training programs. Our analysis highlights three findings. First, the initial benefits of vocational training are smaller for those randomly assigned to social skills training than for those assigned to the technical training program. Second, we find that despite the smaller initial premium to the training program emphasizing social skills, those exposed to the social skills training eventually catch up to their technical program counterparts between six to 12 months after finishing the program. Third, we find no significant differences in social skills between participants exposed to the two types of vocational programs.[3]

Through a further treatment arm that randomizes stipend receipt, we study the potential role of resource constraints as barriers to participation in vocational training. We find that applicants randomized to receive stipends experience a bigger effect of vocational training on employment than those without stipends. We also examine the heterogeneity of our results and find that the benefits of vocational training accrue largely to men in terms of the probability of getting a job but that women also benefit similarly to men in terms of increased formality and hours and days worked. This suggests that skills alone may be insufficient for helping women to overcome other barriers to employment such as lack of access to childcare.

The aggregate results from our study are in line with previous studies from Colombia, the Dominican Republic, and Mongolia, which suggest that vocational programs can improve

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[2]This study offers two treatment arms, one that combines soft skills training and the internship, and one that also adds vocational skills training to the soft skills training and internship. Unfortunately, this study does not allow disentangling the effect of soft skills from that of the internships. While both papers listed study the same program, Acevedo et al. (2017) extend the analysis to include labor market outcomes.

[3]One potential reason for why there are no observed differences in the social skills between participants in the two types of vocational training is that both programs include teaching in hard and soft skills. Likewise, since the jump in social skills training is not from zero to one-hundred, it is possible that effects on labor market outcomes are explained by complementarities between hard and soft skills.

labor market outcomes in the short term (Field et al., 2019; Acevedo et al., 2017; Attanasio, Kugler and Meghir, 2011; and Card et al., 2011). Kugler et al. (2020) and Attanasio et al. (2017), who are able to follow their sample for up to 10 years through administrative data, find that the initial benefits of vocational training in Colombia may persist in terms of labor market outcomes into the longer-term and Kugler et al. (2020) also find that there are also benefits 13 years after participation in the program in terms of further formal educational attainment. Moreover, Kugler et al. (2020) also document spillover benefits from vocational education to relatives of the treated individual, suggesting that studies of vocational education in developing or middle-income contexts may understate the benefits of such programs by focusing only on the individual.

Furthermore, our study advances the knowledge on the ongoing debate in the literature on vocational training by building on insights from economic theory. A common view suggests that general (vs. specific) skills are important in providing individuals with the flexibility to adapt to changes in the demands of the labor market (Deming and Noray, 2018; Deming, 2017; Goos et al., 2014; Acemoglu and Autor, 2011; and Goldin and Katz, 2009). Applying this view to the context of vocational education, some scholars have argued that any initial benefits of vocational education, which tends to emphasize technical education specific to a trade, are likely to disappear with time (Hampf and Woessmann, 2017; Hanushek et al., 2017; and Heckman and Krueger, 2005; and Krueger and Kumar, 2004).

By randomly assigning applicants to intensive vocational training programs emphasizing either technical or soft skills, we directly investigate how labor market dynamics are affected by the extent to which vocational curricula include social skills, which are likely to be a particularly important form of general skills (Deming, 2017). By comparing vocational programs that differ only in the degree to which they include social skills, our study builds on the few studies that evaluate vocational programs with components related to social skills (Acevedo et al., 2017; Groh et al., 2016).[4] We find that vocational training improves organizational skills – but, perhaps surprisingly, we find little difference in the acquisition of social skills between individuals exposed to different types of programs. Nonetheless, we do see that while those exposed to the program emphasizing technical skills are quicker to

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[4]Acevedo et al., (2017) compare two vocational programs both of which have the same degree of soft skills training, stipends, and internships, but vary in the extent to which they have technical training. Groh et al., (2016) study an intervention which compares the labor market outcomes of public female community college graduates in Jordan who are exposed to either an employment voucher, soft skills through an employability training program, or a combination of the two. Our results contrast with the Acevedo et al.'s (2017) results, which show positive short-term impacts of social skills programs on women, but not in the medium term, and negative impacts on men even in the short term. We instead find positive impacts of vocational and soft skills training on both women and men in the short and medium terms. Our results are also in sharp contrast to Groh et al.'s (2016) results, which show no effects at all of a much shorter soft skills training program in Jordan.

find employment, those exposed to the program emphasizing social skills soon catch up, and are slightly more successful in maintaining their jobs. These findings add nuance to the debate of general and specific skills in vocational training, suggesting that technical skills can be helpful in helping people find employment, but social skills may be important in allowing them to maintain their jobs into the longer term.[5] These findings may also help to explain why vocational programs that include some training in general skills may succeed in providing long-term benefits (Kugler et al., 2020; Bertrand et al., 2019; and Silliman and Virtanen, 2019).

Finally, our results highlight obstacles that may continue to prevent people from benefiting from vocational training. Existing studies document that resource constraints can prevent individuals and families from investing in training and education. Further, studies suggest that vocational training programs can affect men and women in different ways. For Colombia, Kugler et al. (2020) find that credit constraints were likely behind women's increase in educational attainment when they gained access to vocational training, while knowledge of specific skills was likely behind the increase in college education after training for men.

The rest of the paper proceeds as follows. In Section 2, we describe the program and the experimental design. In Section 3, we describe both the survey as well as the administrative data we use for our analysis. We present the results in Section 4. We present cost-benefit analysis in Section 5 and conclude in Section 6.

2   Program Description and Experimental Design

We randomly assigned applicants who enrolled in oversubscribed vocational training classes which were part of the Inclusive Employment Program (IEP) offered by the Carvajal Foundation[6] based in Cali, Colombia.[7] First, within specific vocational programs (for example, cooking or sales), applicants were randomly assigned to receive vocational training versus no training at all (i.e., treatment versus control groups). Second, those randomly assigned to

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[5]While consistent with theory suggesting sustained returns to general skills, our experimental design does not allow us to directly tease-apart whether these results are due to general skills better allowing individuals to adapt to technical change, or if social skills - either by improving employee-employer relationships or the increased importance of face-to-face encounters - are driving these results.

[6]We partnered with the Carvajal Foundation to run and implement the program. The Carvajal Foundation is a non-profit foundation devoted to help with social programs in Cali including programs to support entrepreneurship, education initiatives, training, and employment programs.

[7]Cali is the third largest city in Colombia with 2.2 million people, after the capital, Bogota, with 7.4 million people and Medellin with 2.4 million people.

vocational training were assigned to receive different degrees of training in social (Treatment 1) and technical (Treatment 2) skills. Third, half of those assigned to vocational training were also provided a stipend for transportation and meals.

Between the end of June 2018 and the beginning of December 2018, the Carvajal Foundation offered 18 classes in total with 8 different types of courses. While one course ended in July and one in August of 2018, the vast majority ended in the Fall of 2018 (4 in September, 2 in October, 8 in November and 2 in December). The courses were all in the service sector in each of the following areas: sales and client services, general services, surveillance and security services, cashiers, quality control assistant, cooking assistant, delivery assistant and storage assistant.[8] The courses lasted for a period of between 4 and 10 weeks with courses offering classes between 5 and 8 hours a day.

Participants registered voluntarily into classes in response to a call for registrations by the Carvajal Foundation. The Foundation established this program to help the poorest in the community access jobs. Thus, the foundation reaches broadly to enroll participants through radio, social media, loud-speakers in cars that go through poor neighborhoods, flyers, and through the public employment office and offices that provide other public services to the poor. As reported in the next section, most individuals who registered for these courses were in the lowest socio-economic strata according to the Census of the Poor in Colombia.

Individuals who were interested in registering for the classes attended an informational meeting and registered for the specific classes they wanted to take. Each class had between 23 and 31 spots and registration in each class ranged from 28 to 47 registrations per class. Given over-subscription in the classes, the foundation randomly selected individuals to either receive a spot or not receive a spot in the course. The lotteries for each course were recorded by video to ensure everyone knew people were allocated into the courses by luck. Those who did not win a spot in the training courses through the lottery were in the control group and were not provided other services by the Carvajal Foundation for an entire year following registration. As shown in the next section, the randomization divided people into groups that were very similar on average in terms of their characteristics, thus giving credibility that the lottery worked well in terms of randomly assigning individuals into and out of the classes. There were initially 710 people who registered in the courses and of these, 483 were randomly assigned to the training and 227 were assigned to the control group.

The next step of the random assignment consisted of randomly assigning classes to place greater emphasis in teaching social skills or technical skills. In particular, Treatment 1, which offered greater emphasis on social skills offered 100 hours of social skills and 60 hours of technical skills, while Treatment 2, which offered greater emphasis on teaching technical

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[8]The program offered two of each of these types of courses, except for 4 courses in General Services.

skills, offered 60 hours of social skills and 100 hours of technical skills. The weekly hours in each course ranged between 30 and 60 hours, which meant that courses lasted between about 3 and 5 weeks. Since there were two classes in each area, a coin toss decided which of the two classes, for example in security services, gave more emphasis to soft skills and which one to technical skills. This was done for each type of course and the courses were offered with the same content in each, just with more time devoted to teaching social skills or with more time devoted to teaching technical skills. In total, there were 483 individuals assigned to training with greater emphasis on social skills and 227 assigned to training with greater emphasis on technical skills. Social workers provided the social skills content of the courses, which included self-esteem, work ethic, organizational skills, inter-personal skills and communication skills. The content of the technical skills varied depending on the course (e.g., security and surveillance services, cashiers, or cooking assistant skills). In all cases, the content was specific to a job and the skills were taught both in the classroom as well as through practical hands-on experience in the training center of the Carvajal Foundation.

The last step of the randomization involved either offering or not offering a stipend to participants. The monetary stipend consisted of US$1.50 per day. This monetary transfer was meant to help participants cover the costs of transportation and meals while taking the courses. The offer of a stipend was randomized at the class level to avoid envious comparisons among participants in the same course. The stipend was paid at the end of the week for the entire week to ensure that participants attended the classes each day of that week before receiving the payment. As with the class-level randomization for the skill emphasis, the toss of a coin determined which classes received (or did not receive) the stipends.

3   Data Description

3.1   Survey Data

We track our sample through survey and administrative data. We collected data on both treatment and control individuals and their families by conducting our own pre-treatment surveys. Further, we collected information on labor market characteristics and social skills in the pre-treatment surveys. Importantly, these pre-treatment surveys were conducted in November 2017, before people found out if they were randomly assigned into or out of the program. We, then, collected information between March and April of 2019 using a reference period of February 2019 for all labor market questions and a reference period of March and April 2019 for social skills questions for both treatment and control individuals after the

courses had concluded.

We were able to re-interview 653 individuals in the post-treatment period or 91.97% of the initial registered individuals. Of these, 444 individuals were in the treatment group (91.9% of this group) and 209 in the control group (92.1% of this group), which means that the attrition was the same among those in the treatment and control groups. Of the 8% who attrited, 37 people were not interviewed in the follow up survey, 10 people did not conduct the initial survey, and 10 were excluded because they indicated having a socio-economic level above that intended for participants of the program.

Table 1 shows the covariate balance check between applicants assigned to treatment and control groups. The first column shows descriptive statistics for the control group, while the second column shows the difference in characteristics between the treatment and control groups. Sixty six percent of control group individuals are women. They are on average 26 years old and have 11 years of education. Ninety nine percent have an elementary school and 94% secondary school education and 29% have technical higher education. Most individuals, 55%, are Afro-Colombians and 17% report being Mestizo. Control group households are relatively poor with an average household income of US$19.23/day and an average household size of 4.45 individuals. Importantly, Column 2 shows that treatment individuals are very similar to control group individuals in terms of all their characteristics. None of the treatment-control differences are individually or jointly significant (the F-test is 0.59).

We, also, check that the characteristics between the control and treatment groups are similar for each treatment arm. Columns 3 and 4 report the treatment-control differences for Treatment 1 (with emphasis on social skills training) and for Treatment 2 (with emphasis on technical skills training), respectively. Column 3 shows that the only difference between Treatment 1 and the control group is the household size, which is slightly bigger for those in the treatment. However, the test of joint significance of all characteristics yields an F-test of 0.95 and a p-value of 0.52, showing that these are not jointly significantly different between the social skills treatment and the control group. Similarly, Column 4 shows that Treatment 2 and the control are only different along one dimension. The technical treatment has slightly less access to electricity but this difference is only significant at the 10% level. Moreover, the joint significance test shows that the differences of all the characteristics are not jointly significant (F-test is 0.71 and p-value 0.79).

Panel A of Table 2 reports pre-treatment differences between the treatment and control groups in terms of labor market outcomes in May of 2018, which is before any of the courses started. As with other pre-treatment characteristics, we conduct a balancing test for indicators of employment, whether the worker has a contract, whether the worker is a causal worker. We also include balancing tests of days worked per month and hours worked per

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week as well as wages per hour. The control group means in Column 1 show that 55% were employed, but only 28% had a written contract. Control group individuals worked only 13.5 days per month and 24.5 hours a week. Not only did they not work full time, but also their wages were very low, only US $1.20/hour. Column 2 shows that the treatment group was very similar. In fact, none of these variables are significantly different between treatment and control group individuals. Likewise, the differences between the control and each of the treatment arms are also insignificant for all labor market outcomes.

Panel A of Table 3 reports measures of self-reported soft skills. We ask individuals to report—using a 7-point Likert scale—whether they agree if they possess a list of specific soft or socio-emotional skills.[9] The 1 to 7 scale includes the following options: strongly agree, agree, somewhat agree, neither agree nor disagree, somewhat disagree, disagree, and strongly disagree. We ask several questions related to work ethic and responsibility, inter-personal skills and ability to get along with others, leadership skills, teamwork and communication skills. Column 1 in Panel A of Table 3 shows the average scores for the control group. The scores generally show that for the most part, individuals self-report as being neither good nor bad in terms of their work ethic. The average score for work ethic is 3.78 or close to 4, which means they neither agree nor disagree. Individuals in the control group report somewhat agreeing that they possess organizational, interpersonal, leadership and communication skills (the average Likert scores are 3.6, 3.37, 3.35 and 3.43 and 3 represents somewhat agreeing). However, on average, they self-report as having less ability to work in teams. The average score is 5.22, which means they somewhat disagree with possessing teamwork skills. Column 2 shows that treatment group individuals report similar soft skills to the control group, as none of the differences in average Likert scales between the two groups are significant. The same is true for the differences between those receiving greater emphasis on technical treatment and the control group. In addition, the difference between those receiving more social training and the control group are mostly insignificant and only the communication skill differences are marginally smaller for those in the treatment group.

3.2 Administrative Data

We conducted our follow up surveys between 3 and 7 months after the participants finished the program. To be able to examine the long-term impacts of the program, we use Social Security records up until December of 2019. This allows us to examine the labor market

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[9]Since these skills are distinct from one another, we choose to keep them separate rather than combine them into an index.

outcomes for individuals between 11 months and 17 months after finishing the program. Since the Social Security records only provide information about formal sector jobs that provide social security benefits, we are not able examine informal sector jobs as we do with our survey data. In addition, due to confidentiality, for the process of merging our experimental sample with Social Security records—a process undertaken by the Ministry of Health and Social Protection—we have to delete all personal information and only identify who was in different treatment arms and who was in the control group. Therefore, all the analysis with administrative data does not control for observable characteristics. Nevertheless, given the baseline balance in characteristics across treatment arms, it is highly likely that controls for baseline characteristics would not make a difference in the point estimators.

Figure 1 shows data on employment characteristics from monthly administrative records for the control and treatment groups. Panel (a) shows the trajectory of days of formal employment, Panel (b) shows formal employment probabilities, and Panel (c) shows monthly wages. The solid lines in the figures represent the control group, the dashed lines represent the social treatment and the discontinuous lines represent the technical treatment. Figure 1(a) shows that prior to treatment (most courses ended by November 2018 except for 2 which ended on December 3rd), all groups had on average about 5 days of formal employment per month. Days of employment jumped for all groups starting in December of 2018, but the jump was greater for the two treatment groups than for the control group and this persisted until December of 2019. Similarly, Figure 1(b) shows that the probability of formal employment was only around 0.2 for the treatment and control groups prior to conclusion of the courses, the probability of formal employment jumps disproportionately for the two treatment arms relative to the control group after December of 2018 and remains relatively higher until December 2019. Finally, Figure 1(c) shows also similar wages prior to the courses, and relatively higher wages for the treatment individuals compared to the control individuals after the conclusion of the courses. These figures preview similar findings in the next section using our survey data, which allows us to control for other characteristics, as well as a more detailed event-study analysis of the administrative data.

4 Results

4.1 Aggregate Effects of Vocational Training

In this section we estimate intention to treat (ITT) effects of the training program.[10] First we use survey data and simply estimate differences in average outcomes (Y_{ict}) of those individuals i assigned to course c at time t to treatment (T) and those assigned to the control group. Then, we estimate regressions controlling for baseline characteristics (X_i), course fixed effects (γ_c) effects and time since finishing training. To perform these estimates, we use variations of a model of the following form:

$$Y_{ict} = \beta_0 + \beta_1 T_{it} + \beta_2 X_i + \gamma_c + \eta_{ict} \tag{1}$$

Before running any formal estimates of the effects of vocational training on labor market or social skill outcomes, we report raw differences between those assigned to the treatment and control groups across all measured outcomes. Panel B of Table 2 shows average differences in post-treatment labor market outcomes for treatment and control groups. Column 2 of Panel B shows increases in employment in the extensive and intensive margin. After completing their courses, treatment group individuals experience an increase in average overall employment and employment with contracts as well as increased days and hours worked compared to control group individuals. By contrast, the likelihood of casual work declines for treated relative to control individuals. These results, thus, suggest a shift towards formal and better employment. Column 3 of Panel B in Table 2 shows results from a difference-in-difference specification, comparing treatment and control individuals post-treatment relative to treatment and control individuals pre-treatment. The results similarly show increased formal employment and days and hours worked and decreased casual work. The next four columns in Panel B show similar simple difference and double difference results for those with greater emphasis on social training and those with greater emphasis on technical training. The results for the social treatment arm show a shift from informal towards formal employment, while the results for the technical treatment arm show the same increases on overall employment, days and hours worked and the shift towards formal employment found when combining both treatments. These preliminary results suggest that treatment improved labor market outcomes and that the effect was greater for those with more emphasis on technical training.

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[10]We focus on ITT rather than average treatment on the treated (ATT) effects, because there were some of those initially assigned to the control group who were allowed to eventually enter the training courses. This mainly happened at the beginning of the implementation of the program in the first few courses offered.

Panel B of Table 3 shows simple and double difference results on the outcome measures of social skills. Columns 2 and 3 show that both organizational and communications skills seem to improve after training. In particular, organizational skills appear to improve for both those in the social and technical treatment arms, while communication skills are also improved for those receiving greater emphasis on social skills. These results suggest improved social skills of applicants assigned into treatment.

We assess the robustness of the differences between the outcomes of control and treatment groups in our survey data through a series of statistical tests in Table 4. First, we estimate ITT effects with course-specific fixed effects and demographic background variables (specification 1, Columns 1,4 and 7, Table 4). The baseline demographic characteristics are gender, age, years of education, race/ethnicity indicators, and the household size. Next, we re-run these estimates using a differences-in-differences strategy, taking advantage of the pre-period measures of the outcomes (specification 2, Columns 2, 5, and 8). Third, we add a variable measuring days after graduation to the estimation equation since the post-treatment survey asked labor market questions about February 2019 as the reference period and about March/April 2019 for the soft skills questions, but the courses all concluded at different times (specification 3, Column 3). When we adjust these estimates for multiple-hypothesis testing (Appendix Table 1), our results for increased participation in formal work remain statistically significant at the 99% level without controls, but we lack power to detect statistical significance when we add our full set of controls (Benjamin et al., 2006).

The results from survey data are largely robust across specifications and show that random assignment of individuals into vocational training improves their labor market outcomes. Columns (1) to (3) in Table 4 show that access to training increased the likelihood of being employed with a formal contract and decreased the likelihood of being a casual worker. The results are largely robust to the different specifications and controls. The results in Column (3) which includes all the controls shows that assignment to training increased the likelihood of being in formal employment by 12 percentage points (70 percent) and decreased the likelihood of being a casual worker by 13 p.p. (28 percent). Additionally, while imprecise, we also find positive effects of training on days and hours of work in the survey data. Adding credence to these estimates, when we translate this increase in hours of work to monthly wages, our estimate of an increase in US$21 is very close to the estimated US$23.6 that we estimate precisely with administrative data (Table 5, Panel A – discussed later in the paper). By contrast, we find no evidence of increased productivity as measured by hourly wages.[11]

We also examine the impacts of training on the acquisition of soft skills in Panel B of Table 4. Similar to the labor market outcomes, we increasingly add more controls in different

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[11]Note that we impute zero earnings for those who are not employed to avoid selection biases.

specifications. Like in the simple and double difference specifications, the specifications with course fixed effect and baseline demographics and outcomes as well as days since graduation show a positive impact on organizational skills for both the groups that receive more emphasis on social and technical skills training. This means that part of the reason why the training worked was by providing soft skills that are helpful in getting a new job.

We then estimate the effects of vocational training on labor market outcomes using administrative data. Since we are unable to link the administrative and survey data, these estimates are run without any control variables, but have the advantage of allowing for measurement over several months for a much longer period of time (from between 11 months and 17 months after the courses finish). The results from administrative data also suggest that assignment to vocational training increased the employment probabilities, days of employment and wages (as proxied for by social security contributions).

We first run our administrative-data estimates using an event-study framework where we estimate differences between treatment and control groups month-by-month, and include month fixed-effects (π_m). Standard errors are clustered at the individual level.

$$Y_{it} = \beta_0 + \sum_{t=1}^{31} \beta_t T_{it} + \pi_m + \eta_{it} \tag{2}$$

Figure 2 shows an event study analysis of the training program on these three outcomes. While the first course finished on July 20, 2018 and the last ended on December 3, 2018, most courses ended by November of 2018. Figure 2(a) shows that days worked were very similar between treatment and control individuals up to November 2018, but that they increased sharply for those assigned to treatment relative to control individuals starting in December 2018 and were much higher for this group during the year 2019. Figure 2(b) shows a similar increase in employment probabilities for treatment relative to the control group individuals starting in December. Also, monthly wages show similarly a jump in December 2018 that remains for the rest of the 2019.[12] Figures 3 and 4 show separate effects for the two treatment arms.

To provide a single estimate of the effects of the training programs we pool the monthly administrative records (Table 5, Panel A). We run these estimates using a differences-in-differences model where we compare the outcomes of individuals before taking part in the experiment (β_1) to those after all coursework ended (β_3) (Equation 3). Our model allows for changes in employment outcomes while treated individuals are exposed to the training (β_2),

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[12]Note that we examine monthly wages instead of wages per hour because we do not have hours in the administrative data. When we examine monthly wage in the survey data we also find the same effect as in the administrative data, indicating that this increase in wages is due to increased days and hours worked.

but these are not significant for any of our outcomes and are not reported in Table 5.[13]

$$Y_{it} = \beta_0 + \beta_1 T_i + \beta_2(T_i * During_t) + \beta_3(T_i * Post_t) + \pi_m + \eta_{it} \qquad (3)$$

These results suggest that the vocational training program increased employment by 2.16 days per month, the likelihood of being employed each month by nearly 8 percentage points, and social security contributions (a proxy for wages) by US\$21 per month.

Next, we take advantage of the dynamic nature of the monthly administrative data to test whether or not the benefits of vocational training fade-out over time (Table 5, Panel B). To estimate the dynamic effects of training on employment, we add an additional term to our equation by interacting the treatment in the post-period with the number of months following treatment (Equation 4).

$$Y_{it} = \beta_0 + \beta_1 T_i + \beta_2(T_i * During_t) + \beta_3(T_i * Post_t) + \beta_4(T_i * MonthsPost_t) + \pi_m + \eta_{it} \quad (4)$$

The third row in Panel B measures any dynamic effects of training on employment. These coefficients are small and statistically insignificant, suggesting that we are unable to detect any evidence of fadeout the post-training labor market outcomes between those assigned to treatment and control groups.

4.2   Hard and Soft Skills in Vocational Training

We then examine the differences in the dynamics between the labor market outcomes of people admitted to the social and technical tracks using administrative data. Figure 5 shows the ITT employment dynamics between social and technical treatment groups using the administrative data. Figures 5(a)-(c) show clear negative effects of social training (vs. technical training) in the initial post-treatment period on days, employment probabilities and monthly wages. As time passes, however, the differences in labor market outcomes between the social and technical treatment groups disappear. That is, the differences between the two groups go from being negative in December 2018 and the first few months of 2019 to being zero in the second half of 2019.

Panels C and D of Table 5 examine impacts separately for those that receive more emphasis of social and technical training, respectively. As with the survey data, these results

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[13]Including the "During" period to our analysis avoids any mechanical relation between post-period results and dips in employment due to participation in the training program.

show a larger impact for those who received more emphasis on technical training. For those with more social skills training, there is an increase in the probability of employment of 10 pp and an increase in wages of US$20. Those who receive technical skills training experience an increase of 3.3 days worked, an increased probability of employment of 0.13 pp and an increase in monthly wages of US$34, all significant at the 1 percent level.

We formally test if the post-training dynamics are affected by assignment to the social vs. technical training programs in Table 5 (Panel E). We include a social treatment dummy, social treatment dummy interacted with a post-treatment dummy and a social treatment dummy interacted with both the post-treatment dummy and the months since November. The negative sign in the double interaction term suggests that there may be an initial cost to social skills training, but the positive sign in the triple interaction term suggests that social skills help improve workers' performance in the labor market over time. This is in line with the positive impact of soft skills found in Deming (2017). While we find corresponding differences between social and technical training using survey data in Tables 6 and 7, these results are much less precise. Also, since we are unable to follow participants for a period of time using the survey data, we cannot capture the dynamics we are able to see in the administrative data.

4.3 Does Receiving a Stipend Make Vocational Training More Effective?

In Table 8 we test for whether stipend receipt magnifies or reduces the effects of admission to vocational training. On the one hand, receiving a stipend may make it more likely that individuals attend the training sessions and magnify the potential impacts of the program. On the other hand, receiving the stipend may make people less likely to attend the courses. As explained below, however, the money was disbursed at the end of the week after people had attended all weekly classes, so this is unlikely to be the case. Table 8 includes an interaction of the treatment with the stipend to see if the training has a bigger or smaller effect when a stipend is provided to the students. The results show that providing training together with the stipend receipt had large positive and significant effects on employment in the extensive and intensive margins. The effects on employment, days and hours worked are larger when training and the stipend are provided together. Without stipend receipt, the effects of vocational training are zero, suggesting that resource constraints exhibit a serious obstacle for people, preventing them from vocational training programs. This is in line with the findings in Kugler et al. (2020) who also find evidence of credit constraints in another

training program in Colombia.

4.4 Differential Impacts by Gender

Tables 9 and 10 report results of models that interact a female dummy with the treatment dummy to identify if there are differential effects of the program by gender. In order to run these pooled models, we completely saturate the regression with interactions of all demographics with the gender indicator. Table 9 shows no differential effect for women and men (the interaction term is insignificant) for most of the outcomes, except for employment. While assignment to treatment has a positive impact on the employment of men, there is no impact of assignment to treatment on employment for women. However, assignment to treatment does benefit women equally to men in terms of offering them access to formal employment and increasing the number of days worked. Table 10 also shows a smaller effect of training on women in terms of gaining organizational skills compared to men. Thus, Tables 9 and 10 suggest that men were more likely to benefit from vocational training than their female counterparts.[14] Note that these results contrast with previous evaluations of training programs for young people, which find bigger effects of training on young women (Attanasio et al., 2011; Card et al., 2011). These results also contrast to the study by Acevedo et al. (2017), which find that soft skills training combined with internships and vocational training has effects on women in the short term but not in the medium term. By contrast to our finding, they also find no effects on young men, although the baseline imbalance for men may be driving those results.

4.5 Cost-Benefit Analysis

Although the program may affect areas outside the labor market, wage returns represent a lower-bound of a program's cost benefits. The ITT estimates from the administrative data suggest that, in aggregate, program participants experience a monthly US$21 wage gain by participating in the program for the first year following program participation. While lacking statistical power, the estimates from the survey data are of a similar magnitude, suggesting that participants are not merely shifted into the formal sector of the labor market. Given the average age of program participants of 26, we assume that they will work another 35

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[14]We also test for heterogeneity by education and social strata, but we are unable to detect any differences by prior education or social strata probably partly due to the degree of homogeneity in our sample across these measures.

years. Since we can only follow participants for one year after the program, the overall cost-benefit analysis will hinge on assumptions regarding whether or not the benefits individuals experience are permanent, or whether they fade-out over time. In Panel D of Table 11, we present two scenarios: one in which the benefits of the program persist, and another where we assume 10 percent annual depreciation. Under the first scenario, participants experience a benefit of US$4,262 over their lifetimes, whereas under the second scenario participants experience a US$1,186 benefit over their lifetimes.[15]

Including the stipend, the direct marginal costs of operating the program are US$176. As such, the two scenarios represent lifetime wage gains of US$4,086 and a US$1,010 respectively. The cost-effectiveness of the vocational programs emphasizing social versus technical skills are similar. Put another way, our results suggest that the vocational training program pays for itself in about eight months.

5   Discussion and Conclusion

We use a randomized experiment in Cali, Colombia to study the effects of vocational training on labor market outcomes. In aggregate, we find that vocational training shifts people to the formal sector of the labor market and increases their monthly earnings and employment. Importantly, our results show positive impacts both in the short and medium term, with effects persisting up to 12 and 17 months after the program.

The key novelty of this study is that we examine how providing different intensities of soft or technical skills as part of vocational training affects labor market dynamics. We randomize vocational admits to receive varying degrees of social skills training. Our results show that both programs with an emphasis in social and technical skills have a positive impact on labor market outcomes, the program with emphasis on technical skills has a bigger short term effect. However, we find that those with an emphasis on soft skills catch up to those who receive more technical training about 6 to 12 months later in terms of employment, earnings and hours worked. The catch up of those receiving more soft skills could be due to the ability of those with soft skills to learn on the job due to the acquisition of organizational and other soft skills. Alternatively, organizational and communication skills gained through training may help these individuals retain their jobs and negotiate better salaries.

Our paper, thus, provides the first experimental evidence showing that while technical skills may improve immediate labor market outcomes, social skills help to sustain employment benefits over time. Our paper contributes to the literature on soft skills in the work-

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[15]We find no evidence of a fadeout in monthly returns a year after the program ended (Table 5).

place. First, we provide some evidence that soft skills can be taught even to older people. Second, there are only a handful of randomized trials on soft skills training. Ours is the first one to show that soft skills training can have long-lasting effects for both men and women. Groh et al. (2016) find no effect, but their training takes place in a 9-day period and only lasts a total of 45 hours. Acevedo et al. (2017) find effects only short term impacts on young women but not on young men in the Dominican Republic. However, not only was soft training offered after hours and it is possible that young men did not attend, but it is not possible to disentangle whether the effect of this program was due to an internship offered in conjunction with the soft skills training. Thus, our paper is the most convincing evidence to date on the effectiveness of a well-designed soft skills intervention.

Further, we randomize stipend receipt to study how resource constraints affect participation in vocational training programs in developing country contexts. Our results suggest that resource constraints may be an important reason why individuals are unable to follow through with their investments in vocational training.

Taken together, our results suggest that the extent to which vocational programs include general skills such as social skills, can help sustain their benefits into the longer term.

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Table 1: Covariate balance check

	Control mean	Treatment-control difference	Treatment arm 1: Social-control difference	Treatment arm 2: Technical-control difference
Male	0.34	0.03	0.02	0.04
	(0.03)	(0.04)	(0.05)	(0.05)
Age	26.21	-0.25	-0.43	-0.08
	(0.44)	(0.51)	(0.58)	(0.61)
Years of education	11.31	-0.01	-0.14	0.12
	(0.11)	(0.14)	(0.16)	(0.15)
Black	0.55	0.01	0.00	0.02
	(0.03)	(0.04)	(0.05)	(0.05)
Mestizo	0.17	-0.01	0.01	-0.03
	(0.03)	(0.03)	(0.04)	(0.03)
Indigenous	0.03	-0.00	-0.01	-0.00
	(0.01)	(0.01)	(0.02)	(0.02)
Disability	0.02	-0.01	0.00	-0.01
	(0.01)	(0.01)	(0.02)	(0.01)
Primary education	0.99	-0.01	-0.01	0.00
	(0.01)	(0.01)	(0.01)	(0.01)
Secondary education	0.94	-0.02	-0.03	-0.02
	(0.02)	(0.02)	(0.03)	(0.02)
Technical higher education	0.29	0.02	-0.02	0.05
	(0.03)	(0.04)	(0.04)	(0.04)
Professional higher education	0.02	0.01	0.00	0.01
	(0.01)	(0.01)	(0.02)	(0.02)
Enrolled in school	0.07	-0.01	-0.02	-0.00
	(0.02)	(0.02)	(0.02)	(0.02)
Using Public Employment Service	0.37	-0.04	-0.06	-0.01
	(0.03)	(0.04)	(0.05)	(0.05)
Household size	4.45	0.10	0.36 **	-0.15
	(0.13)	(0.15)	(0.17)	(0.17)
HH income per day (USD)	19.23	2.84	7.48	-1.23
	(4.25)	(5.65)	(7.65)	(4.99)
HH with electricity	1.00	-0.01	-0.01	-0.01 *
	(0.00)	(0.01)	(0.01)	(0.01)
HH with water	0.99	0.00	-0.00	0.01
	(0.01)	(0.01)	(0.01)	(0.01)
HH with sanitation	0.98	-0.00	-0.01	0.00
	(0.01)	(0.01)	(0.02)	(0.01)
Joint significance		F-test = 0.59	F-test = 0.95	F-test = 0.71
		p-val = 0.9104	p-val = 0.5183	p-val = 0.7941
Observations	212	663	434	441

Notes: Significance levels (* = 0.10, **= 0.05, *** = 0.01).

Table 2: Pre- and post- : Labor market outcomes

	Control mean	Treatment -control difference	DD	Treatment 1: Soc.-control difference	DD	Treatment 2: Tech.-control difference	DD
				Panel A: Pre-treatment			
Employed	0.55	0.01		0.01		0.01	
	(0.03)	(0.04)		(0.05)		(0.05)	
With contract	0.28	0.01		0.04		-0.01	
	(0.03)	(0.04)		(0.04)		(0.04)	
Casual worker	0.44	-0.01		-0.01		-0.01	
	(0.03)	(0.04)		(0.05)		(0.05)	
Days worked per month	13.48	0.06		1.16		-1.04	
	(0.93)	(1.10)		(1.27)		(1.26)	
Hours worked per week	24.43	0.17		0.46		-0.11	
	(1.78)	(2.17)		(2.47)		(2.51)	
Wage per hour (USD)	1.19	0.14		0.63		-0.35	
	(0.48)	(0.59)		(0.81)		(0.49)	
				Panel B: Post-treatment			
Employed	0.40	0.09 **	0.08	0.08	0.07	0.10 **	0.10
	(0.03)	(0.04)	(0.05)	(0.05)	(0.06)	(0.05)	(0.06)
With contract	0.17	0.14 ***	0.13 ***	0.11 ***	0.07	0.17 ***	0.17 ***
	(0.03)	(0.04)	(0.05)	(0.04)	(0.05)	(0.04)	(0.05)
Casual worker	0.47	-0.16 ***	-0.15 **	-0.16 ***	-0.15 **	-0.16 ***	-0.16 **
	(0.03)	(0.04)	(0.06)	(0.05)	(0.07)	(0.05)	(0.07)
Days worked per month	9.54	2.73 **	2.63 *	2.28 *	1.02	3.17 ***	3.17 ***
	(0.85)	(1.06)	(1.41)	(1.21)	(1.55)	(1.21)	(1.62)
Hours worked per week	18.67	4.98 **	4.81 *	3.76	3.25	6.17 **	6.17 *
	(1.68)	(2.11)	(2.83)	(2.38)	(3.10)	(2.43)	(3.27)
Wage per hour (USD)	0.44	0.01	-0.11	0.01	-0.60	0.01	0.01
	(0.05)	(0.05)	(0.59)	(0.06)	(0.82)	(0.06)	(0.50)
Observations	212	663	663	434	434	441	441

Notes: Significance levels (* = 0.10, **= 0.05, *** = 0.01).

Table 3: Pre- and post- : Social skill outcomes

	Control mean	Treatment-control difference	DD	Treatment 1: Soc.-control difference	DD	Treatment 2: Tech.-control difference	DD
				Panel A: Pre-treatment			
Work ethic	3.78	-0.00		-0.03		0.03	
	(0.03)	(0.03)		(0.04)		(0.03)	
Organizational	3.60	-0.10		-0.11		-0.09	
	(0.05)	(0.07)		(0.08)		(0.08)	
Interpersonal	3.37	0.02		0.02		0.03	
	(0.03)	(0.03)		(0.04)		(0.04)	
Leadership	3.35	0.02		-0.01		0.04	
	(0.04)	(0.04)		(0.05)		(0.05)	
Teamwork	5.22	0.16		0.12		0.20	
	(0.10)	(0.11)		(0.13)		(0.13)	
Communication	3.43	-0.03		-0.09 *		0.04	
	(0.03)	(0.04)		(0.05)		(0.04)	
				Panel B: Post-treatment			
Work ethic	3.80	0.02	0.02	-0.00	0.03	0.04	0.04
	(0.02)	(0.02)	(0.04)	(0.03)	(0.04)	(0.03)	(0.04)
Organizational	3.54	0.11 *	0.21 **	0.08	0.19 *	0.13 **	0.13 **
	(0.05)	(0.06)	(0.08)	(0.07)	(0.10)	(0.07)	(0.09)
Interpersonal	3.46	0.04	0.02	0.02	-0.00	0.07 **	0.07
	(0.02)	(0.03)	(0.04)	(0.03)	(0.04)	(0.03)	(0.04)
Leadership	3.42	0.06 *	0.04	0.06	0.07	0.06	0.06
	(0.03)	(0.03)	(0.05)	(0.04)	(0.06)	(0.04)	(0.05)
Teamwork	5.15	0.03	-0.13	0.04	-0.09	0.03	0.03
	(0.08)	(0.09)	(0.13)	(0.11)	(0.16)	(0.11)	(0.14)
Communication	3.43	0.07 *	0.10 **	0.06	0.15 ***	0.08 *	0.08
	(0.03)	(0.04)	(0.05)	(0.04)	(0.06)	(0.04)	(0.05)
Observations	212	663	663	434	434	441	441

Notes: Significance levels (* = 0.10, **= 0.05, *** = 0.01).

Table 4: ITT estimates (Survey data)

	Any treatment-control			Social treatment-control			Technical treatment-control		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Labor market outcomes									
Employed	0.07	0.08	0.08	0.05	0.05	0.05	0.09	0.11	0.09
	(0.04)	(0.06)	(0.06)	(0.05)	(0.06)	(0.06)	(0.06)	(0.07)	(0.07)
	543	543	543	393	393	393	322	322	322
With contract	0.13***	0.12**	0.12**	0.10**	0.09	0.09	0.17***	0.17***	0.16**
	(0.04)	(0.05)	(0.05)	(0.04)	(0.06)	(0.06)	(0.05)	(0.06)	(0.06)
	543	543	543	393	393	393	322	322	322
Casual worker	-0.16***	-0.13**	-0.13**	-0.16***	-0.13*	-0.14*	-0.16***	-0.13*	-0.13
	(0.04)	(0.06)	(0.06)	(0.05)	(0.07)	(0.07)	(0.06)	(0.08)	(0.08)
	543	543	543	393	393	393	322	322	322
Days worked per month	1.95*	2.25	2.23	1.59	1.06	0.97	2.53*	5.15***	4.74**
	(1.14)	(1.54)	(1.53)	(1.26)	(1.61)	(1.61)	(1.47)	(1.97)	(1.95)
	542	523	523	393	384	384	321	305	305
Hours worked per week	3.44	4.66	4.61	2.56	3.91	3.78	4.99*	7.13*	6.32*
	(2.26)	(3.01)	(2.99)	(2.48)	(3.22)	(3.22)	(2.94)	(3.79)	(3.76)
	541	522	522	392	383	383	321	305	305
Wage per hour (USD)	-0.04	-0.40	-0.39	-0.03	-0.88	-0.89	-0.05	-0.24	-0.28
	(0.06)	(0.73)	(0.73)	(0.07)	(0.93)	(0.93)	(0.08)	(0.72)	(0.72)
	541	498	498	392	366	366	321	288	288
Panel B: Social skill outcomes									
Work ethic	-0.01	0.00	0.00	-0.02	-0.00	-0.00	0.00	0.01	0.01
	(0.02)	(0.04)	(0.04)	(0.03)	(0.05)	(0.05)	(0.03)	(0.05)	(0.05)
	546	542	542	396	392	392	325	322	322
Organizational	0.08	0.24**	0.23**	0.07	0.20*	0.20*	0.12	0.31***	0.28**
	(0.07)	(0.10)	(0.10)	(0.08)	(0.11)	(0.11)	(0.09)	(0.11)	(0.11)
	547	543	543	397	393	393	325	322	322
Interpersonal	0.02	-0.01	-0.01	0.01	-0.03	-0.03	0.03	-0.02	-0.02
	(0.03)	(0.04)	(0.04)	(0.03)	(0.05)	(0.05)	(0.04)	(0.05)	(0.05)
	547	543	543	397	393	393	325	322	322
Leadership	0.05	0.03	0.03	0.06	0.04	0.04	0.03	0.01	0.01
	(0.04)	(0.05)	(0.05)	(0.04)	(0.06)	(0.06)	(0.05)	(0.06)	(0.06)
	547	543	543	397	393	393	325	322	322
Teamwork	-0.03	-0.24*	-0.22	0.04	-0.17	-0.13	-0.16	-0.38**	-0.36**
	(0.10)	(0.14)	(0.14)	(0.11)	(0.17)	(0.17)	(0.13)	(0.17)	(0.17)
	547	512	512	397	362	362	325	312	312
Communication	0.05	0.06	0.06	0.04	0.09	0.09	0.03	-0.02	-0.03
	(0.04)	(0.05)	(0.05)	(0.05)	(0.06)	(0.06)	(0.05)	(0.07)	(0.07)
	547	543	543	397	393	393	325	322	322
Controls									
Baseline demographics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Course FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pre-treatment outcome	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Days from graduation	No	No	Yes	No	No	Yes	No	No	Yes

Notes: Significance levels (* = 0.10, ** = 0.05, *** = 0.01).

Table 5: Vocational training and employment dynamics (Administrative data)

	Days formally employed	Months formally employed	Monthly SS contributions
	Panel A: Treatment-control		
Treatment	-0.33	-0.01	-5.00
	(0.83)	(0.03)	(7.28)
Treatment X Post	2.16 **	0.08 **	20.66 **
	(1.09)	(0.04)	(10.17)
Observations	663	663	663
	Panel B: Treatment-control		
Treatment	-0.33	-0.01	-5.00
	(0.83)	(0.03)	(7.28)
Treatment X Post	2.79 **	0.13 ***	29.70 **
	(1.25)	(0.04)	(11.78)
Treatment X Months-post	-0.09	-0.01 *	-1.29
	(0.12)	(0.00)	(1.21)
Observations	663	663	663
	Panel C: Social treatment-control		
Social treatment	-0.58	-0.02	-7.43
	(0.96)	(0.03)	(8.24)
Soc. treat. X Post	1.72	0.11 **	20.67
	(1.39)	(0.05)	(12.92)
Soc. treat. X Months-post	0.05	-0.00	-0.13
	(0.14)	(0.00)	(1.38)
Observations	441	441	441
	Panel D: Technical treatment-control		
Technical treatment	-0.08	0.01	-2.49
	(0.95)	(0.03)	(8.27)
Tech. treat. X Post	3.88 ***	0.15 ***	39.02 ***
	(1.44)	(0.05)	(13.59)
Tech. treat. X Months-post	-0.23 *	-0.01 **	-2.48 *
	(0.13)	(0.00)	(1.30)
Observations	434	434	434
	Panel E: Social-technical		
Social treatment	-0.82	-0.04	-7.04
	(0.68)	(0.03)	(5.77)
Soc. treat. X Post	-1.83	-0.03	-16.26
	(1.13)	(0.04)	(10.82)
Soc. treat. X Months-post	0.28 **	0.01 *	2.35 **
	(0.12)	(0.00)	(1.18)
Observations	451	451	451
Month FE	Yes	Yes	Yes

Notes: Significance levels (* = 0.10, ** = 0.05, *** = 0.01).

Table 6: Social vs. technical treatment: Labor market outcomes

	Technical treatment mean	Social-technical difference	Specification			
			DD	(1)	(2)	(3)
Employed	0.50	-0.02	-0.03	-0.03	-0.06	-0.10
	(0.03)	(0.05)	(0.06)	(0.06)	(0.08)	(0.08)
With contract	0.34	-0.06	-0.11 *	-0.03	-0.04	-0.08
	(0.03)	(0.04)	(0.06)	(0.05)	(0.07)	(0.07)
Casual worker	0.31	0.00	0.00	-0.00	-0.01	-0.01
	(0.03)	(0.04)	(0.06)	(0.05)	(0.08)	(0.08)
Days worked per month	12.71	-0.89	-3.23 *	-0.73	-2.38	-3.98 *
	(0.86)	(1.22)	(1.67)	(1.44)	(2.04)	(2.05)
Hours worked per week	24.83	-2.40	-3.14	-1.86	-1.73	-5.07
	(1.74)	(2.42)	(3.34)	(2.84)	(3.99)	(4.00)
Wage per hour (USD)	0.45	-0.00	-0.97	-0.01	-1.58 *	-1.75 *
	(0.04)	(0.06)	(0.67)	(0.07)	(0.91)	(0.93)
Controls						
Baseline demographics	No	No	No	Yes	Yes	Yes
Course FE	No	No	No	Yes	Yes	Yes
Pre-treatment outcome	No	No	Yes	No	Yes	Yes
Days from graduation	No	No	No	No	No	Yes
Observations	229	451	451	451	451	451

Notes: Significance levels (* = 0.10, **= 0.05, *** = 0.01).

Table 7: Social vs. technical treatment: Social skills outcomes

	Technical treatment mean	Social-technical difference	Specification			
			DD	(1)	(2)	(3)
Work ethic	3.84	-0.04 *	0.02	-0.01	0.00	0.01
	(0.02)	(0.02)	(0.04)	(0.03)	(0.05)	(0.05)
Organizational	3.67	-0.06	-0.04	-0.01	-0.09	-0.15
	(0.04)	(0.06)	(0.10)	(0.08)	(0.13)	(0.13)
Interpersonal	3.53	-0.05	-0.04	-0.03	-0.06	-0.07
	(0.02)	(0.03)	(0.04)	(0.04)	(0.05)	(0.05)
Leadership	3.47	-0.00	0.06	0.01	0.02	0.01
	(0.03)	(0.04)	(0.05)	(0.05)	(0.07)	(0.07)
Teamwork	5.18	0.01	0.07	0.13	0.05	0.00
	(0.07)	(0.10)	(0.14)	(0.13)	(0.16)	(0.17)
Communication	3.51	-0.02	0.12 **	-0.04	0.04	0.01
	(0.03)	(0.04)	(0.05)	(0.05)	(0.07)	(0.07)
Controls						
Baseline demographics	No	No	No	Yes	Yes	Yes
Course FE	No	No	No	Yes	Yes	Yes
Pre-treatment outcome	No	No	Yes	No	Yes	Yes
Days from graduation	No	No	No	No	No	Yes
Observations	229	451	451	451	451	451

Notes: Significance levels (* = 0.10, **= 0.05, *** = 0.01).

Table 8: Heterogeneity by stipend receipt: Labor market outcomes

	Employment	Formal contract	Casual worker	Days worked	Hours	Wages
Treatment	-0.04	0.08	-0.10	-0.50	-1.47	-1.04
	(0.07)	(0.06)	(0.08)	(1.90)	(3.71)	(0.93)
StipendXTreatment	0.28***	0.08	-0.05	6.12**	13.65***	1.39
	(0.10)	(0.09)	(0.11)	(2.56)	(4.99)	(1.22)
Observations	543	543	543	523	522	498
Controls						
Baseline demographics	Yes	Yes	Yes	Yes	Yes	Yes
Course FE	Yes	Yes	Yes	Yes	Yes	Yes
Pre-treatment outcome	Yes	Yes	Yes	Yes	Yes	Yes
Days from graduation	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Significance levels (* = 0.10, **= 0.05, *** = 0.01).

Table 9: Heterogeneity by gender: Labor market outcomes

	Employment	Formal contract	Casual worker	Days worked	Hours	Wages
Panel A: Main effects by gender						
Treatment	0.26**	0.20*	-0.21*	5.21*	8.85	-0.36
	(0.11)	(0.10)	(0.12)	(2.90)	(5.68)	(1.37)
Female	1.20**	0.09	-1.07**	19.04	44.10*	-11.16*
	(0.49)	(0.44)	(0.54)	(12.64)	(24.75)	(5.95)
FemaleXTreatment	-0.26*	-0.11	0.11	-4.23	-6.02	-0.05
	(0.14)	(0.12)	(0.15)	(3.50)	(6.85)	(1.67)
Observations	543	543	543	523	522	498
Panel B: Social treatment by gender						
Treatment	0.26**	0.19*	-0.16	4.57	8.81	-1.26
	(0.12)	(0.11)	(0.14)	(2.98)	(5.95)	(1.71)
Female	1.06*	0.08	-0.87	18.07	39.52	-13.35*
	(0.55)	(0.50)	(0.64)	(13.97)	(27.96)	(7.99)
FemaleXTreatment	-0.29**	-0.15	0.03	-5.29	-7.39	0.54
	(0.15)	(0.13)	(0.17)	(3.67)	(7.35)	(2.12)
Observations	393	393	393	384	383	366
Panel C: Technical treatment by gender						
Treatment	0.19	0.16	-0.28*	6.83*	6.66	0.18
	(0.15)	(0.13)	(0.17)	(3.96)	(7.62)	(1.45)
Female	1.53**	-0.37	-1.41*	24.39	45.49	5.86
	(0.67)	(0.58)	(0.74)	(17.20)	(33.16)	(6.23)
FemaleXTreatment	-0.14	-0.00	0.20	-2.76	-0.44	-0.61
	(0.18)	(0.15)	(0.19)	(4.54)	(8.75)	(1.67)
Observations	322	322	322	305	305	288
Controls						
Baseline demographics	Yes	Yes	Yes	Yes	Yes	Yes
Course FE	Yes	Yes	Yes	Yes	Yes	Yes
Pre-treatment outcome	Yes	Yes	Yes	Yes	Yes	Yes
Days from graduation	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Significance levels (* = 0.10, **= 0.05, *** = 0.01).

Table 10: Heterogeneity by gender: Social skill outcomes

	Work ethic	Organizational	Interpersonal	Leadership	Teamwork	Communication
			Panel A: Main effects by gender			
Treatment	-0.08	0.52***	0.06	0.02	0.04	0.11
	(0.08)	(0.19)	(0.08)	(0.10)	(0.28)	(0.10)
Female	0.10	-1.16	0.11	-0.13	-1.12	-0.47
	(0.33)	(0.81)	(0.35)	(0.45)	(1.24)	(0.45)
FemaleXTreatment	0.11	-0.40*	-0.11	0.02	-0.35	-0.07
	(0.09)	(0.22)	(0.10)	(0.12)	(0.33)	(0.12)
Observations	542	543	543	543	512	543
			Panel B: Social treatment by gender			
Treatment	-0.09	0.41**	0.04	-0.00	0.14	0.13
	(0.09)	(0.20)	(0.09)	(0.12)	(0.32)	(0.11)
Female	0.05	-1.30	-0.21	-0.25	-1.44	-0.52
	(0.41)	(0.94)	(0.41)	(0.55)	(1.52)	(0.52)
FemaleXTreatment	0.13	-0.30	-0.10	0.06	-0.37	-0.05
	(0.11)	(0.25)	(0.11)	(0.14)	(0.39)	(0.14)
Observations	392	393	393	393	362	393
			Panel C: Technical treatment by gender			
Treatment	-0.06	0.59**	0.03	0.05	-0.33	-0.08
	(0.10)	(0.24)	(0.11)	(0.14)	(0.36)	(0.14)
Female	-0.29	-1.97*	-0.07	-0.19	-0.29	-0.63
	(0.42)	(1.03)	(0.46)	(0.59)	(1.56)	(0.60)
FemaleXTreatment	0.09	-0.41	-0.06	-0.05	-0.04	0.07
	(0.11)	(0.27)	(0.12)	(0.15)	(0.41)	(0.16)
Observations	322	322	322	322	312	322
Controls						
Baseline demographics	Yes	Yes	Yes	Yes	Yes	Yes
Course FE	Yes	Yes	Yes	Yes	Yes	Yes
Pre-treatment outcome	Yes	Yes	Yes	Yes	Yes	Yes
Days from graduation	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Significance levels (* = 0.10, **= 0.05, *** = 0.01).

Table 11: Cost-effectiveness

	Aggregate			Social treatment			Technical treatment		
	Total	Per 100 USD	Percent per 100 USD	Total	Per 100 USD	Percent per 100 USD	Total	Per 100 USD	Percent per 100 USD
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Costs									
Program cost	164.44			161.22			168.00		
Marginal cost	157.65			154.43			160.86		
Stipend (x0.5)	15.00			15.00			15.00		
Marginal cost w/ stipend	172.65	100		169.43	100		175.86	100	
Panel A: ITTs Estimates from Survey Data									
Employed	0.08	-	-	0.05	-	-	0.09	-	-
With contract	0.12**	0.07	41	0.09	-	-	0.16**	0.09	53
Casual worker	-0.13**	-0.08	-16	-0.14*	-0.08	-18	-0.13	-	-
Days worked per month	2.23	-	-	0.97	-	-	4.74**	2.70	28
Hours worked per week	4.61	-	-	3.78	-	-	6.32*	3.59	19
Wage per hour (USD)	-0.39	-	-	-0.89	-	-	-0.28	-	-
Wage per month (USD)	21.94	-	-	18.00	-	-	30.08*	17.11	19
Panel C: ITTs Estimates from Administrative Data									
Employed	0.08***	0.05	14	0.09**	0.05	16	0.08***	0.04	13
Days of contributions	2.16***	1.25	14	2.05*	1.21	13	2.27***	1.29	14
Contributions	20.66***	11.97	13	19.73**	11.64	13	21.63***	12.30	14
Panel D: Present Discount Value for 35 Years									
Discount rate of 5%	4,262	2,468		4,070	2,402		4,462	2,537	
Discount rate of 5% with 10% depreciation	1,186	687		1,132	669		1,242	706	

Notes: Significance levels (* = 0.10, ** = 0.05, *** = 0.01). Columns 1 for all three groups come from the main specifications in Tables 4 and 5.
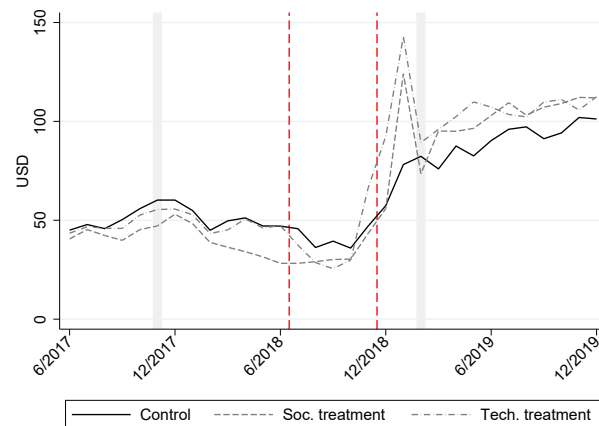
Figure 1: Descriptive graphs from administrative registers
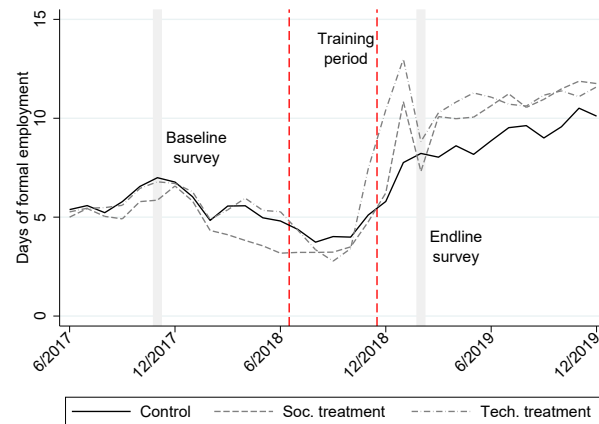
(a) Days of employment
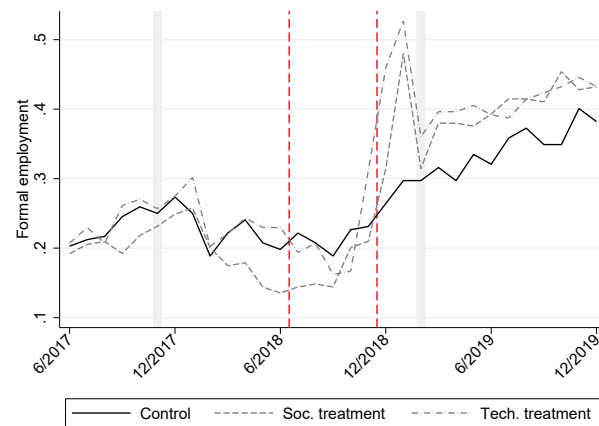
(b) Employment

(c) Contributions

*Note*s: Figure 1 displays mean outcomes by treatment group. As shown in Figure 1(a), the gray vertical regions mark the baseline and endline data collection, and the red vertical lines indicate the beginning and end of the treatment periods.

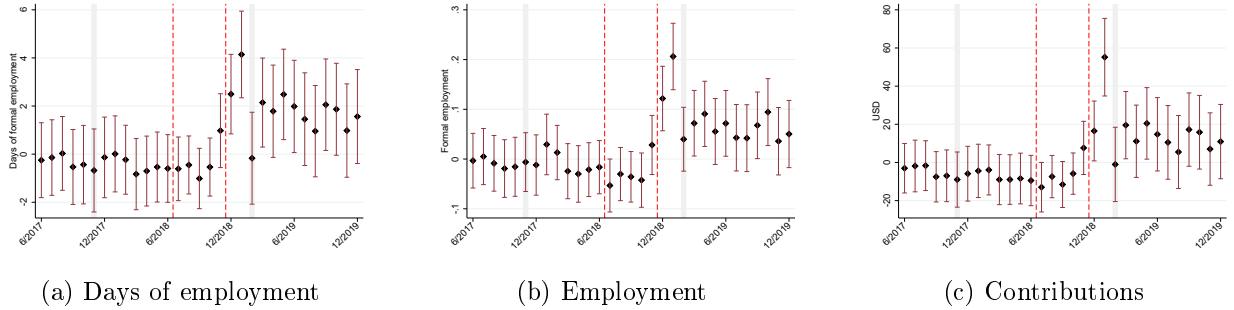Figure 2: ITT graphs from administrative registers: Treatment-control

(a) Days of employment (b) Employment (c) Contributions

Figure 3: ITT graphs from administrative registers: Social treatment-control

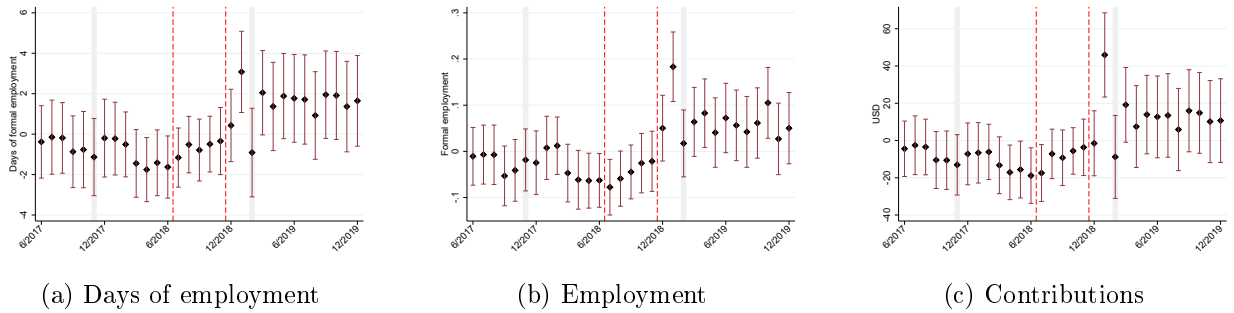(a) Days of employment (b) Employment (c) Contributions

Figure 4: ITT graphs from administrative registers: Technical treatment-control
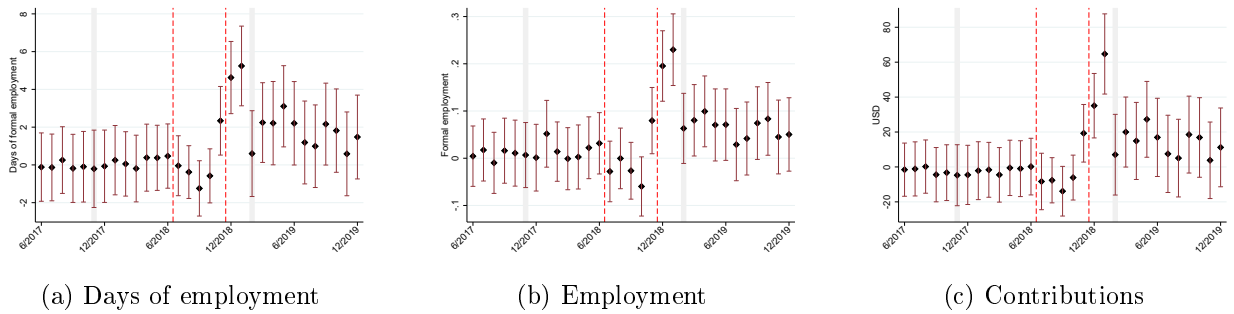

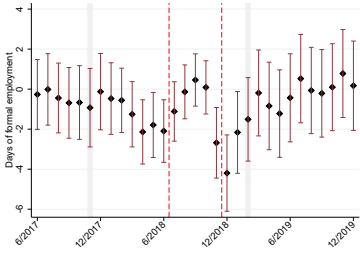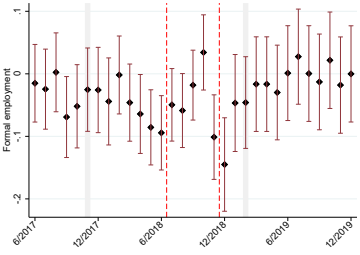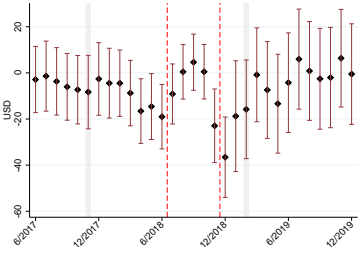(a) Days of employment (b) Employment (c) Contributions

Figure 5: ITT graphs from administrative registers: Social treatment - technical treatment

(a) Days of employment

(b) Employment

(c) Contributions

Appendix

Table 1: ITT estimates (Survey data): FDR q-values

	Any treatment-control			Social treatment-control			Technical treatment-control		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Labor market outcomes									
Employed	0.07	0.08	0.08	0.05	0.05	0.05	0.09	0.11	0.09
	(0.04)	(0.06)	(0.06)	(0.05)	(0.06)	(0.06)	(0.06)	(0.07)	(0.07)
	543	543	543	393	393	393	322	322	322
With contract	0.13***	0.12	0.12	0.10**	0.09	0.09	0.17***	0.17**	0.16*
	(0.04)	(0.05)	(0.05)	(0.04)	(0.06)	(0.06)	(0.05)	(0.06)	(0.06)
	543	543	543	393	393	393	322	322	322
Casual worker	-0.16***	-0.13	-0.13	-0.16***	-0.13	-0.14	-0.16**	-0.13	-0.13
	(0.04)	(0.06)	(0.06)	(0.05)	(0.07)	(0.07)	(0.06)	(0.08)	(0.08)
	543	543	543	393	393	393	322	322	322
Days worked per month	1.95	2.25	2.23	1.59	1.06	0.97	2.53	5.15**	4.74*
	(1.14)	(1.54)	(1.53)	(1.26)	(1.61)	(1.61)	(1.47)	(1.97)	(1.95)
	542	523	523	393	384	384	321	305	305
Hours worked per week	3.44	4.66	4.61	2.56	3.91	3.78	4.99	7.13*	6.32
	(2.26)	(3.01)	(2.99)	(2.48)	(3.22)	(3.22)	(2.94)	(3.79)	(3.76)
	541	522	522	392	383	383	321	305	305
Wage per hour (USD)	-0.04	-0.40	-0.39	-0.03	-0.88	-0.89	-0.05	-0.24	-0.28
	(0.06)	(0.73)	(0.73)	(0.07)	(0.93)	(0.93)	(0.08)	(0.72)	(0.72)
	541	498	498	392	366	366	321	288	288
Panel B: Social outcomes									
Work ethic	-0.01	0.00	0.00	-0.02	-0.00	-0.00	0.01	0.01	0.01
	(0.02)	(0.04)	(0.04)	(0.03)	(0.05)	(0.05)	(0.03)	(0.05)	(0.05)
	542	542	542	392	392	392	322	322	322
Organizational	0.10	0.24	0.23	0.09	0.20	0.20	0.12	0.31*	0.28
	(0.07)	(0.10)	(0.10)	(0.08)	(0.11)	(0.11)	(0.09)	(0.11)	(0.11)
	543	543	543	393	393	393	322	322	322
Interpersonal	0.02	-0.01	-0.01	0.01	-0.03	-0.03	0.03	-0.02	-0.02
	(0.03)	(0.04)	(0.04)	(0.03)	(0.05)	(0.05)	(0.04)	(0.05)	(0.05)
	543	543	543	393	393	393	322	322	322
Leadership	0.06	0.03	0.03	0.06	0.04	0.04	0.05	0.01	0.01
	(0.04)	(0.05)	(0.05)	(0.04)	(0.06)	(0.06)	(0.05)	(0.06)	(0.06)
	543	543	543	393	393	393	322	322	322
Teamwork	-0.03	-0.24	-0.22	0.04	-0.17	-0.13	-0.17	-0.38*	-0.36
	(0.10)	(0.14)	(0.14)	(0.12)	(0.17)	(0.17)	(0.14)	(0.17)	(0.17)
	543	512	512	393	362	362	322	312	312
Communication	0.03	0.06	0.06	0.02	0.09	0.09	0.00	-0.02	-0.03
	(0.04)	(0.05)	(0.05)	(0.05)	(0.06)	(0.06)	(0.05)	(0.07)	(0.07)
	543	543	543	393	393	393	322	322	322
Controls									
Course FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Baseline measures	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Days from graduation	No	No	Yes	No	No	Yes	No	No	Yes

Notes: Significance levels (* = 0.10, ** = 0.05, *** = 0.01).