

Experimental evidence on the long term impacts of a youth training program¹

Pablo Ibararán

Jochen Kluge

Laura Ripani

David Rosas Shady

19 October 2017

¹ This project is a collaborative effort involving many people. First, we want to recognize the support of Gavino Severino, director of the programs and projects executing unit at the Ministry of Labor in the Dominican Republic. We are especially thankful for the collaboration of Brígida García, advisor on the evaluation of the program, as well as to Douglas Hasbun from the Ministry of Labor. We acknowledge excellent comments and suggestions from Juan Miguel Villa Lora and Oscar Mitnik, as well as from participants of the 10th IZA/World Bank conference on employment and development, the 1st Impact Evaluation Workshop of the IDB's Labor Markets and Social Security Unit (LMK), the ILO/INSEAD RCT-Lab Evidence Symposium, ESPE Glasgow, and the RWI/GIZ conference on "The effectiveness of youth employment interventions". Special thanks to Barbara Buchbinder, Minoru Higa, Juan Mejalenko and Camila Mejia Giraldo for excellent research assistance. The views expressed in this paper are those of the authors and should not be attributed to the Inter-American Development Bank or any other institution that the authors are affiliated with. This research has been supported by the Technical Cooperation ATN/OC-13955-DR "Long Term Impacts of the Youth and Employment Program" financed by the Social Fund of the Inter-American Development Bank. Jochen Kluge gratefully acknowledges financial support from the Leibniz Association within the Leibniz Competition project "The effectiveness of youth employment programs".

Abstract

Identifying the right human capital investments for disadvantaged young adults is a key policy concern worldwide. While many studies on the (very) short-term impacts of youth skills training programs exist, there is almost no rigorous evidence on the long-run effects of these policies outside the US. This paper presents the results of a large-scale randomized controlled trial of a youth training program, estimating treatment effects six years after random assignment, including long-term labor market trajectories of young people. We are able to track a representative sample of more than 3,200 youths at the six-year follow-up. The intervention is prototypical of many skills training programs worldwide, and has been implemented at scale in the Dominican Republic for more than a decade. Our empirical findings indicate mixed results: on the one hand, we document statistically significant and positive impacts on the formality of employment, particularly for men, and impacts for both men and women in Santo Domingo, the capital. The long-term analysis shows that these impacts are sustained and growing over time. The estimated earnings impacts are positive in sign, though again statistically significant only in Santo Domingo. On the other hand, there are no significant impacts on average employment; which appears consistent with the low unemployment in countries with high informality and no unemployment insurance. Our analysis suggests that skills training programs work better in more dynamic local labor market contexts, where there is actual demand for the skills provided.

Keywords: Long-term, impact evaluation, Randomized Controlled Trial, Dominican Republic, youth training, labor market outcomes.

JEL Classification: J24, J64, O15, O17.

Pablo Ibararán

Laura Ripani

David Rosas Shady

Inter-American Development Bank, Washington, DC

pibarraran@iadb.org

laurari@iadb.org

davidro@iadb.org

Jochen Kluge

Humboldt-Universität zu Berlin and RWI, Berlin, Germany

jochen.kluve@hu-berlin.de

1. Introduction

Investments in human capital are decisive for the economic success of individuals in the labor market. In developed and developing countries alike, however, there are disadvantaged groups in need of support to upgrade, modernize or simply build their skills. The fact of being disadvantaged can arise for several reasons, such as lack of access to education, or dropping-out of education; a history or background of poverty; and/or being unemployed and looking for a job. Job training programs of various types have been implemented in many countries to address issues of skills shortages, to help jobseekers find jobs, and to increase individual productivity and labor earnings.

A large number of program evaluation studies over the last decades have addressed the effectiveness of these training programs in terms of increasing participant earnings and employment probability (for systematic overviews of the evidence see Heckman et al. 1999, Greenberg et al. 2003, Betcherman et al. 2004, Kluve 2010, Card et al. 2010, 2017). A key result emerging from the overall evidence is that the timing of measuring program impacts matters: short-term effects during the first year post-program are often small or even negative, reflecting the “lock-in” nature of a skills-enhancing treatment. With increasing time between the end of the program and measurement of the effects, the size of the effects and their likelihood of being positive and statistically significant generally tends to increase. Card et al. (2010, 2017) e.g. show that medium- and long-run estimates of training impacts are more likely to be positive and significant than the shorter-term estimates. One caveat of this finding is, however, that the number of available long-run estimates is small, and that the “long-run” is typically defined only as impacts measured more than 24 months after the program. Thus, the importance of the pattern notwithstanding, this type of evidence also implies that our knowledge on long-term impacts remains quite limited.

In fact, only very few studies of long-term impacts of training programs exist, such that there is little knowledge regarding the question whether the human capital investment contained in these – typically post-secondary – training programs has any significant impacts over an extended time horizon. Our paper contributes to filling this knowledge gap by investigating the long-term effects of a youth training program using a Randomized Controlled Trial (RCT). The empirical analysis is based on experimental

data tracing 3,279 young people six years after random assignment. Our study is implemented in the Dominican Republic and covers a cohort of the training program *Juventud y Empleo* (i.e. “youth and employment”). A previous cohort of the previous version of the program served to evaluate the short-term impacts also using a (partly botched) RCT (Card et al. 2011), and short-term results for the training cohort serving for our long-term experiment are presented in Ibararán et al. (2014). Along with parallel studies by Kugler et al. (2015) and Attanasio et al. (2017) for Colombia, our paper is one of the very few experimental long-term impact evaluations of a youth training program outside the US, where a series of large-scale experimental evaluations investigated the impacts of the National Supported Work Demonstration in the 1970s, JOBSTART and the Job Training Partnership Act (JTPA) in the 1980s, and Job Corps in the 1990s. The *Juventud y Empleo* program is interesting and relevant to study, because it is prototypical of many youth training programs worldwide, and it has been implemented at scale for more than a decade.

As our review of the literature shows (section 2), the evidence on long-term impacts of job training programs is quite limited and inconclusive, despite the policy relevance of these programs. On the one hand, a series of studies for Germany uses non-experimental identification strategies on specific cohorts of registered unemployed and generally finds that training programs – at least the more intensive ones – have positive long-term labor market impacts. These programs are not targeting specific age groups among the unemployed. On the other hand, the large-scale experimental studies in the US look specifically at youths and generally find that these programs at best have very small long-term earnings impacts. This led some authors at the time to conclude that despite the efforts that went into the experimental evaluations there is no known way to make training programs for disadvantaged youths work (Bloom et al. 1997).

Our paper contributes to this debate by producing new evidence on the long-run impacts of a job training program. The intervention itself is less intensive than many training programs in developed countries, but constitutes a sizeable human capital input combining classroom training and on-the-job training for disadvantaged youths. Our study has several key advantages: (i) we can rely on experimental data, (ii) we succeed in tracing a representative and comparatively large sample at the 6-year follow-up, (iii) together with two studies for Colombia (Kugler et al. 2015 and Attanasio et al. 2017) it constitutes the

first experimental long-term evidence outside the US, and since the 1990s, (iv) and we study a prototypical job training implemented at scale.

The empirical analysis shows and discusses the representativeness of our sample at the long-term follow-up and presents intention-to-treat, average treatment, and local average treatment effect estimates of program impacts. We find persistent effects on the formality of employment, in particular for men, but not on overall employment. Young individuals in Santo Domingo, the capital, also benefit substantively in terms of labor earnings. The empirical results therefore suggest that the skills investment of the program may not bring about large overall impacts, but that it does have a statistically significant and positive impact on the probability of being formally employed, and on labor earnings in an urban labor market. Moreover, the (small) positive impacts found for subgroups are generally sustained and growing over time.

The paper is organized as follows. Section 2 reviews the literature on long-term impacts of training programs. Section 3 describes the *Juventud y Empleo* program, gives a summary of the previous findings on short-term impacts, and explains the experimental design and the long-term data collection. The empirical results are presented in section 4. Section 5 concludes.

2. Related literature

The evidence to date on the long-run effects of job training programs is quite limited and can be grouped into three types of studies.² The first type of studies looks at job training programs in the US; these studies

² Note that our review of the related literature focuses specifically on long-run impact studies. There is a large number of impact evaluations of (youth) training programs in developing and developed countries that estimate short-run effects, typically for periods of one to two years after the start of the program (or random assignment); these studies are contained and discussed e.g. in the reviews and meta-analyses provided by Heckman et al. (1999), Greenberg et al. (2003), Ibararán and Rosas (2009), Card et al. (2010, 2017), and Kluve (2010). Note also that our particular interest lies in *youth* training programs, such that in this literature review we predominantly highlight the long-term impact results for youth training interventions, or the youth results of general training programs. Finally, note that there is no unique definition of "youth" in these interventions and program evaluations: whereas the "Juventud y Empleo" program we study covers the age bracket 16-29, e.g. the JTPA results cover 16-21 only, and some European studies may consider youths up to the mid-thirties.

investigate impacts for the set of well-known US employment training programs that were evaluated using large-scale experimental designs. A second type of studies looks at the long-run effects of training for the unemployed (youth and adult) in Germany; these studies are based on administrative data and use non-experimental identification strategies. Third, there are parallel studies by Kugler et al. (2015) and Attanasio et al. (2017) looking at long-run impacts of youth training in Colombia. We will review the three types of studies in turn.

Couch (1992) uses Social Security data to track annual earnings for the treatment and control groups in the National Supported Work (NSW) demonstration for 8 years following the end of the program. The NSW provided subsidized employment opportunities – essentially work experience and on-the-job training – to individuals “severely handicapped in the labor market” and operated experimentally at 10 sites across the US from 1975 to 1979. The study finds statistically significant earnings impacts (in the range of USD 400 – 500 p.a.) for Aid to Families with Dependent Children (AFDC) recipients during the period 4 to 8 years after treatment, but does not find any statistically significant earnings effects for the youth target group (sample sizes are not reported for both target groups). That is, for the entire 8-year post-program period 1979-1986 the annual earnings impact estimates for young individuals are close to zero in size and always insignificant, indicating that the program did not help this group into a better position in the labor market.

The JOBSTART demonstration was implemented between 1985 and 1988 in 13 sites and specifically aimed at providing evidence on what works for low-skilled, economically disadvantaged young people (Cave et al. 1993). The evaluation used an experimental design on the eligible population of 17- to 21-year old, economically disadvantaged school dropouts with poor reading skills. The treatment group participated in education and vocational training, and received job placement assistance; the total average duration of program activities amounted to 400 hours (with wide variation, cf. Cave et al. 1993). The evaluation uses a sample of 1,941 youths who were surveyed in the short- and medium-term (12, 24, and 48 months after random assignment). Whereas educational outcomes – i.e. passing the General Educational Development (GED) examination or completing high school – were measurably improved, labor market outcomes were not enhanced: after the expected “lock-in” effect in the first year, at the end of the survey period treatment group average earnings “appeared to overtake those of controls [...], but]

the magnitude of these impacts was disappointing and they were not statistically significant according to the usual tests” (Cave et al. 1993).

The National Job Training Partnership Act (JTPA) Study was commissioned by the US Department of Labor in 1986 to measure the impacts of selected employment and training programs for economically disadvantaged adults and out-of-school youths funded under Title II-A of the JTPA, enacted in 1982. The study is based on random assignment at 16 local JTPA programs (called SDAs, Service Delivery Areas) during the period November 1987 until September 1989, and the main results for the out-of-school-youths during a 30-month follow-up period indicate no earnings gains for program participants relative to the control group (Bloom et al. 1997). The long-term results (United States General Accounting Office 1996) show that annual earnings of male youths in the treatment group increased from approximately USD 2,900 at random assignment to approximately USD 7,600 five years later, but there is no statistically significant difference compared with the control group, and the 5-year earnings trajectories of treatment and controls are virtually the same. The same findings hold for female youths, on a lower level (increase from approximately USD 2,000 at random assignment to USD 5,400 in the fifth year). Also, the employment rate outcomes for male and female youths show virtually identical patterns for JTPA treatment and control groups, with no statistically significant patterns: a slight increase and peak in the year after random assignment, with a slight decline in the four years after.

The Job Corps program is similar to JOBSTART but more intensive: disadvantaged youths between the ages of 16 to 24 receive academic education, vocational training, and other services (e.g. counseling and life skills training) during an average period of 8 months (again varying widely) in a residential setting (Schochet et al. 2008). Placement services are also provided. The large-scale experimental study uses a sample of 11,131 eligible youths that applied to the program in the mid-1990s. Survey data were collected at baseline and at 12-, 30-, and 48-month follow-up interviews. The results indicate negative earnings impacts during the first 5 quarters after random assignment (the “lock-in” phase), before treatment group youths catch up with the control group and display higher earnings that are statistically significant during the 3rd and 4th year after random assignment: in year 4, average weekly earnings for treatments were USD

211, compared to USD 195 for controls.³ This statistically significant medium-term impact found in the survey data disappears, however, when looking at the long-term impacts (years 5 to 8 after random assignment) on earnings and employment using annual Social Security records (Schochet et al. 2008): in year 8, for instance, average annual earnings are USD 7,822 for the treatment group, and USD 7,796 for the control group; and the respective average employment rates are 73.8 per cent and 73.1 per cent, respectively. Hence, despite the intensity of the Job Corps intervention, the long-term impacts appear to be small. This finding, however, has to be interpreted against the counterfactual of the evaluation, which is given by a randomized-out control group of youths who to a large extent were offered and took part in (less intensive) alternative training programs (ibid.).

Hotz et al. (2006) analyze the impacts of California's Greater Avenues to Independence program (GAIN) for up to 9 years after random assignment. A key part of the study is an assessment of the relative effectiveness of alternative strategies for designing welfare-to-work programs: one approach uses human capital development through education and vocational training, and a second approach focuses on labor force attachment through job search assistance. Different from the above studies that assess long-term impacts for disadvantaged youths, GAIN targeted adults on welfare, and contained a mandatory component (see Hotz et al. 2006 for details). The analysis finds that in the long run the human capital development approach yields higher employment rates for participants than the labor force attachment approach. Overall, however, the long-run experimental impact estimates (7-9 years) on employment rates are statistically different from zero only for one of the four counties analyzed.

This evidence on long-run impacts of training programs in the US is complemented by three studies for Germany using administrative data based on specific cohorts each: inflows into unemployment during 1993 and 1994 (Fitzenberger and Völter 2007), inflows into training for the unemployed from January 1992 to June 1993 (Lechner et al. 2011), and inflows into unemployment within the period July 1999 to December 2001 (Osikominu 2012). Given the non-experimental nature of the data, identification of treatment effects in these studies is based on the conditional independence assumption, or

³ This is not the case for all youths. Flores-Lagunes et al. (2010) find that Hispanic youth did not experience earnings gains like whites and blacks – despite similar increases in human capital – and show that this relates to the different (higher) local labor market unemployment rates they face.

unconfoundedness. The results are generally encouraging: Fitzenberger and Völter (2007) find statistically significant positive long-run impacts – up to 7.5 years after start of the program – on participants' employment probability for a comprehensive classroom training program, ranging from 2.5 to 5 percentage points. Lechner et al. (2011) find statistically significant positive employment impacts of up to 8.8 percentage points during the period until 8 years after the end of the program, for the more comprehensive training programs. Osikominu (2012) considers impacts for up to 5 years after registering as unemployed, and finds the longer programs to be effective in creating stable employment spells and higher earnings.

Finally, the parallel studies by Kugler et al (2015) and Attanasio et al. (2017) look at the *Jovenes en Accion* ("youth in action") program in Colombia⁴. Both studies link the data from the initial experimental evaluation (Attanasio et al. 2011) to administrative long-term follow-up data (8 years) and find that the program had a positive and statistically significant impact on the probability of working in the formal sector. Kugler et al (2015) find an impact of 5.8 and 5.1 percentage points, respectively, on the probability of having a formal job for females and males⁵, while Attanasio et al. (2017) find positive and statistically significant impacts on formal employment (of about 4 to 5 percentage points) and on earnings (a 12 percent increase) for men and for women.

3. The *Juventud y Empleo* Program: random assignment and data collection

Youth labor market insertion represents a challenge for the majority of Latin American and Caribbean (LAC) countries. According to ILO (2014), one out of five young individuals are neither working nor studying, and among those who are employed more than half are in the informal sector. To address this situation, LAC governments have a long tradition of implementing programs that offer short-term job

⁴ Diaz and Rosas (2016) develop a randomized controlled trial and combine data from a follow-up survey, three years after participants finished the training, with administrative data to evaluate the impact of a similar youth training program in Peru. The authors find a positive impact of the program on formal employment. For example, the probability of having a job with health insurance and the probability of having a pension increase by 3.8 and 3.3 percentage points, respectively, for the treatment group when compared to the control group.

⁵ Kugler et al. (2015) also find that the program increased the probability of the participants to complete secondary education and to enroll in formal tertiary education.

training services to youths living in urban areas. These programs are supposed to offer training that responds to the skills needs of the productive sector (Ibarraran and Rosas 2009, Gonzalez et al. 2012). The interventions combine technical skills training (of approximately three months) in lower-skilled professions with a subsequent internship period to provide on-the-job work experience (of around three months). The majority of the programs also comprise a short component of soft skills training.

There is some evidence about the short-term impacts of these training interventions. In general, the existing impact evaluations find zero or modest impacts on overall employment, but positive impacts on job quality (formal employment) and earnings. Also, the evidence suggests large heterogeneity in results by gender (Ibarrarán and Rosas 2009, Urzúa and Puentes 2010, Gonzalez et al. 2012). These results differ somewhat from those for similar programs in developed countries, where youth training programs rarely show any positive impacts at all (Card et al. 2010, 2017). A more general pattern that training for the disadvantaged may have larger impacts for females has also been identified in a recent systematic review by Card et al. (2017), though the precise reason for this heterogeneity remains unclear.

Since 2001, the Dominican Republic has been implementing one of the previously described programs, which is named *Juventud y Empleo* (“youth and employment”). The *Juventud y Empleo* program has been rigorously evaluated in the past, because it considered an experimental design since its inception (Card et al. 2011). This emphasis on rigorous impact evaluation is striking in LAC, since few randomized controlled trials to evaluate social policies or labor programs exist. Also, the program has been characterized by using the findings from earlier evaluations to introduce improvements in its conceptual and operative design.

Juventud y Empleo targets youths between 16 to 29 years of age that are living in poor neighborhoods and that are not attending school. Other targeting criteria are that they should have, at most, incomplete high school education; and they should be unemployed, under-employed or occupationally inactive at the moment of the registration in the program; and hold a Dominican identity card. The program offers skills training courses that last 225 hours: 150 hours devoted to teaching a wide range of low-skill qualifications, such as administrative assistant, hair stylist, or mechanic; and 75 hours devoted to improving the soft skills of participants (mainly, work habits and self-esteem). Courses are followed by

a three-month internship in a private firm. Both the registration of beneficiaries and the identification of firms are the responsibility of private training institutions (*Centros Operativos del Sistema*, COS) that have been previously approved by the national training institution (INFOTEP for its acronym in Spanish). Participants receive a monetary stipend of around US\$3 per day from the government during both phases of the program. They also receive insurance against workplace accidents.

3.1 Previous evaluations

Juventud y Empleo is the first labor training program with an experimental impact evaluation in LAC. Card et al. (2011) estimate program effects using a sample of youth that applied to the program in 2004. Follow-up data were collected in 2005, approximately 10-14 months after trainees had finished the program. No impacts on employment but a modest positive impact on wages and formality for men were found. The evaluation had a relatively small sample and a few other limitations. In particular, compliance was imperfect: 17.4 per cent of youths randomly assigned to training did not show up for the course. Moreover, the no-show behavior was selective and the study did not collect follow-up data for the no-show group. In addition, 36.7 per cent of youths originally assigned to the control group were re-assigned to the treatment group to replace the no-shows. Whereas, clearly, such a replacement procedure can be implemented rigorously by randomly assigning control group units as replacements – as we do in the current study (see section 3.2) – in that first evaluation the training institutions were allowed to choose the replacements, and they did so in a selective manner (Card et al. 2011).

A second evaluation of the program was performed by Ibararán et al. (2014), again focusing on short-term effects of the program, but using a later cohort of participants. Specifically, the cohort under study in the second evaluation comprises youths who registered in the COS training centers in 2008, and follow-up data were collected between November 2010 and February 2011, some 18-24 months after participants had finished their course. In light of the experiences made in the first evaluation, the study is based on an improved procedure of random assignment and data collection that also forms the basis of our analysis (section 3.2).

The results of the evaluation are mixed; as in the first study, program impacts on overall employment are negligible but there is an impact on job quality for men. Specifically, the impact on the probability of formal employment for males is a 17 per cent increase (4 percentage points relative to a control group probability of formal employment of 0.235). Moreover, the study finds a positive impact of 7 per cent on monthly earnings, conditional on being employed (control group mean RD\$4,713). Both of these impacts are stronger in Santo Domingo, the capital. Looking at secondary outcomes, the study finds positive impacts on participants' perceptions and expectations about the future, particularly for women. The program also has an impact on the development of soft skills, mainly in the following dimensions: leadership skills, persistency of effort, and conflict resolution (Ibarrarán et al. 2014).

Despite the fact that the second evaluation managed to solve the methodological problems of the first impact study, estimates of the short-term effects only provide limited information on the program's effectiveness. First, it is imperative to investigate whether the overall relatively modest effects as well as the stronger effects for some subgroups are sustained in the long run. Second, this is particularly interesting against the background of the generally disappointing results on long-term impacts for youth training programs in developed countries (recall section 2). And third, it is important to assess long-term impacts specifically in LAC, since the series of youth training programs in the region has been generally perceived as a success, even though this conclusion is derived from short-term impact estimates only.

3.2 Random assignment and survey implementation

The evaluation design of the Juventud y Empleo program is strongly linked to its targeting method. In the first stage, for each training course they offer, the COS training centers identify 35 young people that meet the eligibility criteria described above. In the second stage, the Juventud y Empleo Program Coordination Unit (PCU; *Unidad Coordinadora de Programas*) receives the information about the youths that registered for the course from the COS training centers and proceeds to verify that none of the applicants has registered before. In the third step, the program runs a lottery in which each of the 35 youths is randomly assigned to one of two groups. The first one is formed by 20 youths who are invited to attend the training course and the second one by 15 youths who are assigned to the control group; their

identification numbers are locked in order to guarantee that they will not be registered again in the case of any other attempt.

If any of the 20 youths assigned to the treatment group gives no response when called to attend the course or if they drop out before the tenth day of classes, the COS may replace up to 5 slots with youths from the control group. This group of five people is again randomly selected out of the 15 in the control group by the PCU, who provides the names of the up to five replacements directly to the COS. Hence, given this procedure and the initial configuration of random assignment to treatment and control groups, we can define four groups in the data: (A) the *beneficiaries*: those who were randomly assigned to the treatment group and actually attend and complete the course, (B) the *no-shows*: those who were randomly assigned to the treatment group but fail to show up or fail to complete at least two weeks of the course, (C) the *replacements*: those who were randomly assigned to the control group and then randomly chosen to replace no-shows in the training course, thus also becoming beneficiaries, and (D) the *controls*: those who were randomly assigned to the control group and did not become replacements.

The data for the long-term impact evaluation were collected in three waves, one baseline survey at random assignment in 2008 and two follow-up surveys: the short-term follow-up survey between November 2010 and February 2011 (18 to 24 months after graduating from the program), and the long-term follow-up survey between September and December 2014 (six years after the treatment). Both follow-up surveys were administered using comprehensive face-to-face interviews (the full questionnaires are available upon request). It has to be emphasized that substantial effort went into tracking youths at the long-term follow-up, using all resources available (family, friends, neighbors) to establish contact and make possible the interview.⁶

⁶ Data collection proceeded using several incentives and instruments for quality assurance. For instance, external advisors were hired to supervise the field experiment, and the data processing system was implemented using the Computer Assisted Field Editing (CAFÉ) methodology. A system of double entry was used in 20 per cent of the cases to ensure that the CAFÉ methodology was working as expected. Finally, monetary incentives of RD\$600 (around 15 dollars) per respondent were offered in order to minimize attrition.

At baseline in the year 2008, 10,309 eligible applicants were randomly assigned to 5,914 treated and 4,395 control units. The short-term follow-up targeted a random sample of 5,000 out of the 10,309 young people who had initially registered.⁷ This target sample had 3,250 individuals from the treatment group and 1,750 from the control group. From this sample, 4,033 individuals were found and interviewed, 2,626 of the treatment group and 1,407 of the control group (Ibarrarán et al. 2014 show that respondents do not systematically differ from those who could not be interviewed, i.e. attrition from the survey can be assumed to be random). This population formed the target sample for our long-term follow-up in 2014: From the 4,033 individuals interviewed in 2010, 3,279 were found and have complete surveys: 2,163 individuals in the treatment group and 1,116 in the control group (as initially assigned, i.e. prior to the replacement mechanism). In sum, in both follow-up surveys about 80 percent of the sample were located at their households, and this percentage was balanced between treatment and control groups.

This procedure generates the following data structure: if Z_i represents the random assignment of each youth i ($Z_i = 1$ assigned to the treatment group and $Z_i = 0$ assigned to the control group) and D_i the final treatment status ($D_i = 1$ attended the course and $D_i = 0$ do not), Table 1 shows the distribution of the long-term follow-up (3279 individuals found) between the four groups in 2014.

⁷ The sample size was set at 5,000 to detect an 8 percent increase in income with a power of 0.8 and an attrition of 30 percent of the sample.

Table 1. Participants by lottery assignment and treatment status, long-term follow-up sample

	Selected in the Lottery, $Z_i=1$	Not selected in the Lottery, $Z_i=0$
Participated in the program, $D_i=1$	Group A: Beneficiaries, N=1,901 Group C: Replacement-beneficiaries, N=438	
Did not participate in the program, $D_i=0$	Group B: No-shows, N=262	Group D: Controls, N=678

Source: 2014 long-term follow-up survey.

3.3 Identification strategy and data

Given the randomized experiment described above, the main step in our analysis is to estimate the causal effect of Z_i on labor market outcomes using an Intention to Treat (ITT) analysis, i.e. a linear regression of the outcome on Z_i . The ITT approach in the set-up delineated in Table 1 compares groups A + C + B, all of which were invited to participate in the program, against group D. In addition, we also estimate an Average Treatment Effect on the Treated (ATT) parameter that compares A+C – both of which effectively received the treatment – against group D as control group (i.e. the “pure” randomized-out control units). In both cases, the regressions include fixed effects for training institutions COS, and robust standard errors are computed using clusters defined by the course within which randomization took place. Finally, we also estimate the Local Average Treatment Effects (LATE), in which participation is instrumented by randomization status.

Ibarrarán et al. (2014) show that the complete cohort ($N=10,305$)⁸ as well as both the target sample ($N=5,000$) and the realized sample ($N=4,033$) at short-term follow-up are balanced in baseline

⁸ The complete cohort of 10,305 individuals comes from the original randomization group of 10,309, taking out four individuals that did not have identification numbers.

characteristics of the treatment and control groups. Table 2 validates the long-term follow-up and shows that, at baseline, there are no statistically significant differences between the long-term follow-up sample (N=3,279) and the rest of the sample (N=7,026). As shown, the characteristics of the sample that we track in 2014 are statistically equivalent to the rest of the 2008 training cohort. The same holds if we focus on differences at baseline between the 2014 sample and the rest of the sample within the treatment and control groups.⁹

After having shown that the long-term follow-up sample is representative of the complete cohort, we proceed to show that, within the 2014 sample, there is balance in the characteristics of treated and control youths (as defined by the lottery) as well as between participants and non-participants. That is, using the definition of the four groups presented above, Table 3 shows the mean characteristics at baseline for each of the groups defined by the assignment/participation matrix (Table 1), as well as for the groups defined by initial invitation to participate into the program (AB vs CD) and by intention-to-treat (ABC vs D). The results show that balance is maintained in the 2014 sample. In both comparisons, there are only two unbalanced variables out of 39 each, even at the 10% significance level. In sum, these tables show that the long-term follow-up data are representative of the whole cohort, and that the data are balanced between the four subgroups defined by lottery assignment and participation, essentially also validating the replacement procedure.

⁹ The tables showing the descriptive statistics within treatment and control groups at baseline for the 2014 sample and the rest are available upon request. They find the same results in terms of balancing as the overall sample shown in table 2. As a robustness check, and additional validation of the long-term follow-up sample, we re-estimated the regressions for the short-term analysis in Ibarraán et al. (2014) restricting the sample to the 3,279 observations with complete long-term data in 2014, and the results remain essentially unchanged.

Table 2. Representativeness of the long-term follow-up sample, characteristics at baseline

	Mean		P-value
	Sample 2014=0	Sample 2014=1	
Age	21.54	21.51	0.61
Age 16-19	0.35	0.35	1.00
Age 20-24	0.43	0.44	0.49
Age >24	0.22	0.21	0.41
% Women	63.09	62.24	0.41
% Married	24.15	24.03	0.89
Number of people in HH	4.36	4.53	0.00
Number of children	0.70	0.70	0.88
% Currently attending school	22.47	24.46	0.03
Incomplete elementary	0.21	0.19	0.01
Complete elementary	0.05	0.05	0.54
Incomplete high school	0.54	0.57	0.00
Complete high school	0.03	0.03	0.96
More than high school	0.00	0.00	0.35
Missing education	0.16	0.15	0.20
Fraction with prior work experience	0.16	0.17	0.46
Worked during last 2 years	0.21	0.21	0.79
Currently employed	0.04	0.04	0.65
Currently salaried worker	0.02	0.02	0.96
Currently unemployed	0.53	0.52	0.51
ICV Score (0 to 100) ^a	62.95	62.67	0.18
Rosenberg (0 to 30) ^b	23.85	23.95	0.25
Urban areas	0.90	0.88	0.04
Lives in Santo Domingo	0.34	0.31	0.01
Receives remittances	1.89	1.90	0.43
Owns home	0.06	0.06	0.20
Concrete, brick or wood walls	0.97	0.97	0.54
Concrete or zinc ceilings	1.00	1.00	0.22
Cement, ceramic or wood floors	0.98	0.98	0.94
% connected to aqueduct	50.00	49.10	0.39
% Proper sanitation	98.83	99.05	0.31
% Garbage collection	83.43	84.84	0.07
% Refrigerator	70.82	71.61	0.41
% TV	87.65	87.86	0.76
% Wash Machine	71.71	72.19	0.61
% Car	14.29	15.07	0.30
% AC	1.89	1.89	0.99

% Computer	8.80	8.48	0.59
% Electricity Generator	8.38	8.57	0.75
Observations	7,026	3,279	10,305

Sources: Long-term follow-up survey, baseline survey.

Notes: The “Sample 2014=1” group denotes the long-term follow-up sample available for analysis. The “Sample2014=0” group comprises the remaining observations from the full cohort of 10,305 youths that formed part of the random assignment in 2008.

^a The ICV is the acronym of the Quality-of-Life Index (“Indice de Condiciones de Vida” in Spanish). It is a proxy means test used by the Unified Beneficiaries System (SIUBEN) to target the beneficiaries of social programs in the country. The ICV combines 17 variables related to household characteristics (e.g. basic services, dwelling, etc.) which best predict household welfare. It yields a score from 0 to 100, where a higher score indicates higher quality-of-life/ better living conditions.

^b The Rosenberg Scale is a tool used in clinical-psychometric practice to measure self-esteem levels. It was first introduced in 1965 and revised in 1989 (see Rosenberg 1989). Higher scores on the scale indicate greater self-esteem. The balancing test for the scale is based on the 9,692 observations with available data -3,096 of them in the follow-up sample. Additional balancing tests for subsamples yield the same conclusions and are available in the online appendix.

% connected to aqueduct	49.29	45.42	47.26	51.18	48.82	49.64	48.56	0.656	0.224
% Proper sanitation	98.68	99.62	99.77	99.41	98.80	99.55	98.96	0.035	0.283
% Garbage collection	84.85	84.73	83.33	85.84	84.84	84.86	84.58	0.987	0.416
% Refrigerator	72.07	64.89	72.60	72.27	71.20	72.40	71.43	0.469	0.667
% TV	88.69	84.73	88.13	86.58	88.21	87.19	88.20	0.395	0.250
% Wash Machine	72.49	73.66	71.46	71.24	72.63	71.33	72.43	0.430	0.536
% Car	14.94	17.56	15.53	14.16	15.26	14.70	15.30	0.670	0.459
% AC	1.89	1.53	1.83	2.06	1.85	1.97	1.85	0.808	0.709
% Computer	8.52	8.40	9.82	7.52	8.51	8.42	8.73	0.935	0.316
% Electricity Generator	8.73	6.11	9.13	8.70	8.41	8.87	8.54	0.658	0.890
Observations	1901	262	438	678	2163	1116	2601		

Sources: Long-term follow-up survey.

Notes: Groups as defined by lottery assignment and participation: A = beneficiaries, B = no-shows, C = replacements, D = controls. See also section 3.2 and Table 1. ABC = treatment group according to random assignment, D = control group according to random assignment; these groups are used to identify ITT program effects. AC = all youths that actually received the treatment, AC vs. D used to identify ATT program effects.

^a Tests for current job status were run for the available observations: 1,708 from group A, 230 group B, 375 group C, 606 group D, 1,938 AB, 981 CD, 2,313 ABC.

^b The test for ICV scores was run for the available observations: 1,592 from group A, 221 group B, 364 group C, 574 group D, 1,813 AB, 938 CD, 2,177 ABC.

^c The test for Rosenberg scores was run for available observations: 1,795 from group A, 251 group B, 409 group C, 641 group D, 2,046 AB, 1,050 CD, 2,455 ABC.

Additional balancing tests for subsamples yield the same conclusions and are available in the online appendix.

Table 4 displays sample characteristics and raw outcomes at the time of the long-term follow-up in 2014. Again, we group the data based on the subgroups defined above. Table 4 shows that the age at the time of the long-term follow-up is 28 years on average, so the group is at the upper end of the youth age range (if we consider youths as individuals between 15 and 29 years of age), entirely in line with the timing of the survey six years after random assignment.

Half of the sample is married (in contrast with 20 per cent at baseline), and about 32 per cent are heads of household. Looking at gender separately, the respective probabilities for men and women to be married at the long-term follow-up are 0.41 and 0.56, and to be head of household the respective probabilities are 0.42 and 0.25. The statistically significant difference in marital status is due to a higher share of males being married in the treatment group: those males assigned to participate in the program (ABC) are more likely to be married in 2014 than the control group (D). A plausible mechanism for this result lies in the positive impacts on quality of employment (explored below) that may in turn impact positively the probability of getting married.

Looking at raw outcomes, overall there is little indication of statistically significant differences in the comparison of the groups assigned to treatment vs. control, and actual participation vs. control. The average employment rate is 73 per cent, with no statistically significant differences across those randomly assigned to training (ABC vs D) or across treatment participants and controls (AC vs D). The employment rate is higher for men than for women, and it is overall substantially higher than at the short-term follow-up in 2010 (when it was around 62 per cent). In part this can be explained already by an upward sloping employment-age profile that would be expected in general; and specifically, against the background of high levels of informality in the Dominican labor market, generating pressure on youths to look for work. We will explore these employment patterns further when we look at the long-term labor market trajectories of the treatment and control groups in section 4.2.

Regarding employment characteristics, almost 90 per cent of young individuals work in services, and the average tenure on the job is about 20 months (with a slightly longer tenure for those selected in the lottery). About 56 per cent have a permanent job (but only 21 per cent have a written contract), 44 per cent are salaried workers and 22 per cent work at large firms. About half of the workers express their

desire to change their current job, but only 19 per cent were seeking for another job at the time of the survey. Average monthly labor income (calculated with zero earnings for those not working) is RD\$5,300, the equivalent of USD\$120.

Table 4. Sample characteristics and raw outcomes at long-term follow-up

	Mean				P-value	
	AB	CD	ABC	D	AB/CD	ABC/D
<i>Panel A: Demographic Characteristics</i>						
Age	27.94	27.93	27.92	28.00	0.94	0.61
% Women	62.64	61.47	62.09	62.83	0.51	0.72
% Head of Household (all)	30.37	33.87	30.60	35.25	0.04	0.02
% Head of Household (women)	24.80	26.09	24.83	26.76	0.52	0.41
% Head of Household (men)	39.73	46.28	40.06	49.60	0.03	0.01
% Married (all)	50.30	50.36	50.75	48.67	0.97	0.34
% Married (women)	64.65	66.47	65.57	64.08	0.41	0.57
% Married (men)	39.48	44.42	40.57	43.65	0.09	0.38
% Currently attending school	21.91	20.16	21.65	20.06	0.25	0.37
Years of education	14.03	13.97	14.06	13.82	0.51	0.03
<i>Panel B: Employment Characteristics</i>						
Agriculture and mining	0.02	0.02	0.02	0.01	0.57	0.50
Industry	0.08	0.10	0.08	0.11	0.05	0.01
Services	0.90	0.88	0.90	0.87	0.04	0.03
Duration of current job (months)	18.67	21.03	19.20	20.52	0.03	0.30
Permanent job	0.56	0.57	0.57	0.55	0.65	0.33
Employed at large firms	0.22	0.21	0.22	0.22	0.39	0.98
Salaried workers	0.44	0.44	0.44	0.42	0.75	0.33
Unpaid workers	0.01	0.01	0.01	0.01	0.40	0.89
Self-employed	0.22	0.22	0.22	0.22	0.77	0.92
Workers w/labor risk insurance	0.13	0.11	0.13	0.11	0.11	0.08
Workers w/ health insurance	0.28	0.25	0.28	0.24	0.12	0.03
Workers w/written contract	0.21	0.20	0.21	0.19	0.34	0.14
Weekly worked days	5.75	5.72	5.72	5.79	0.59	0.33
Weekly worked hours	28.42	29.31	28.69	28.85	0.35	0.89
Wants to work more hours	0.47	0.47	0.47	0.47	0.70	0.81
Workers seeking another job	0.19	0.21	0.19	0.20	0.21	0.70
Monthly wage (Dominican peso)	5285.06	5357.84	5390.65	4999.80	0.75	0.14
Hourly wage (Dominican peso)	39.78	37.44	40.13	34.57	0.46	0.14
<i>Panel C: Labor market outcomes</i>						

Employed (all)	0.72	0.74	0.73	0.72	0.34	0.71
Employed (women)	0.57	0.54	0.57	0.52	0.25	0.05
Employed (men)	0.86	0.86	0.85	0.87	0.80	0.68
Observations	2,163	1,116	2,601	678	3,279	3,279

Source: 2014 long-term follow-up survey.

Notes: Outcomes are not conditional on employment status. Groups as defined by lottery assignment and participation: A = beneficiaries, B = no-shows, C = replacements, D = controls. See also section 3.2 and Table 1. ABC = treatment group according to random assignment, D = control group according to random assignment; these groups are used to identify ITT program effects. AC = all youths that actually received the treatment, AC vs. D used to identify ATT program effects.

a: Large firms are those that employ 51 or more employees -- b: One Dominican Peso = 0.0228 USD (November 2014)

4 Empirical results

4.1 Long-term impacts

Tables 5 through 7 present the long-term impact estimates of the Juventud y Empleo training program on labor market outcomes, using the experimental design described in the previous section. It is important to recall that the sample is representative for the young people that this program serves, and that the large sample size at the six-year long-term follow-up and the virtue of random assignment allows us to provide precise estimates of the intervention impacts. It is also worth noting that Juventud y Empleo is not a pilot program, but has been running for more than a decade as a publicly funded active labor market program in the Dominican Republic. In addition to overall program impacts, we investigate impact heterogeneity for the main subgroups: for male and female participants, in order to analyze whether youths benefit in differential ways by gender; for Santo Domingo, since it forms the largest subsample in our data, and constitutes the most important local labor market in the country; and for the older (>21 years) and the younger (16-21 years) age bracket of youths, to investigate whether program participation at a different stage of life (adolescence) may have differential impacts.

The results in tables 5 and 6, displaying the Intention-to-Treat (ITT) and the Average Treatment Effect on the Treated (ATT) estimates, respectively, show several important patterns. First, the overall average impacts on employment in the long-run remain close to zero in size and insignificant (top panel). Second, as the fourth panel indicates, the estimated long-run earnings impacts for the full sample and subsamples

are all positive in sign (and of relevant magnitude compared to the control group mean), but statistically significant only for the Santo Domingo subsample (column 4), and in particular for women in Santo Domingo (column 5). Third, there is an overall impact on formal employment as measured by "employment with health insurance" (panel two), amounting to 4 percentage points, or a 17 per cent increase over the control group mean of 0.24 (ITT in Table 5, column 1). The latter finding implies a sustained positive impact on formality that is consistent with what was found in the short-run evaluation: in the first follow-up, the impact also was statistically significant and of the same magnitude (17 per cent).

Fourth, there is further heterogeneity in the impact estimates, indicating statistically significant treatment-control differences for several stratifications of the sample population by socio-demographic characteristics: one key result is that the positive long-term impact on formal employment in the entire country is mostly driven by men (ITT in Table 5, column 3: 7.7 percentage points, i.e. an impact of 26 per cent).¹⁰ Moreover, the long-term impact on formality is largest in Santo Domingo (column 4), where there is also an important impact for women (column 5): the overall point estimate of 8.1 percentage points in Santo Domingo, representing an impact of 37 per cent, is higher in the case of women (9 percentage points) than for men (6.2 percentage points), and in relation to the mean outcomes of controls the differential increase is even more pronounced (55 per cent for females, 18 per cent for males).

¹⁰ Having a job with health insurance or a written contract are used as proxies of formality. Given the high informality rates in the Dominican Republic, having a formal job makes a sizeable difference in the career path of young people (Alaimo et al. 2015).

Table 5. Long-term impacts of the “Juventud y Empleo” training program on labor market outcomes: ITT

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Outcomes	All	Women	Men	Santo Domingo	Santo Domingo Women	Santo Domingo Men	Age 16-21	Age >21
<i>Employed</i>	0.0048 (0.0180)	0.0165 (0.0254)	-0.0059 (0.0225)	0.0393 (0.0362)	0.0614 (0.0476)	-0.0089 (0.0491)	-0.0029 (0.0264)	0.0208 (0.0271)
Mean control group	0.724	0.641	0.865	0.705	0.635	0.855	0.737	0.711
<i>Employed with health insurance</i>	0.0395** (0.0191)	0.0228 (0.0235)	0.0776** (0.0311)	0.0810** (0.0339)	0.0896** (0.0388)	0.0618 (0.0680)	0.0295 (0.0291)	0.0474* (0.0243)
Mean control group	0.237	0.202	0.298	0.221	0.162	0.348	0.286	0.187
<i>Employed with written contract</i>	0.0248 (0.0169)	0.0180 (0.0207)	0.0403 (0.0284)	0.0405 (0.0299)	0.0334 (0.0366)	0.0373 (0.0562)	0.0231 (0.0269)	0.0175 (0.0224)
Mean control group	0.189	0.155	0.246	0.189	0.155	0.261	0.225	0.151
<i>Monthly earnings</i>	341 (265)	268 (273)	575 (521)	1,007** (462)	1,032** (438)	1,031 (1084)	470 (348)	144 (382)
Mean control group	5000	3599	7368	4879	3443	7961	5213	4778
<i>Ln Monthly earnings</i>	0.0411 (0.0508)	0.0020 (0.0774)	0.1060* (0.0635)	0.0482 (0.1014)	0.1134 (0.1570)	0.0322 (0.1047)	0.0719 (0.0672)	-0.0202 (0.0764)
Mean control group	8.677	8.492	8.889	8.725	8.479	9.050	8.728	8.621
<i>Labor force participation</i>	0.0106 (0.0137)	0.0143 (0.0207)	0.0045 (0.0130)	0.0374 (0.0242)	0.0460 (0.0317)	0.0107 (0.0239)	0.0165 (0.0204)	0.0094 (0.0190)
Mean control group	0.872	0.819	0.960	0.866	0.824	0.957	0.867	0.877
Observations	3,279	2,041	1,238	1,020	677	343	1,729	1,550

Notes: Regressions use the full sample of groups A, B, and C (treated) and D (controls). All specifications control for training institutions (COS) and 10 administrative regions. Standard errors (clustered at the course level) in parentheses. Significance levels are indicated by *10%, **5%, and ***1%.

Table 6. Long-term impacts of the “Juventud y Empleo” training program on labor market outcomes: ATT

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Outcome	All	Women	Men	Santo Domingo	Santo Domingo women	Santo Domingo Men	Age 16-21	Age >21
<i>Employed</i>	0.0033 (0.0182)	0.0148 (0.0255)	-0.0103 (0.0231)	0.0313 (0.0364)	0.0575 (0.0476)	-0.0261 (0.0509)	-0.0030 (0.0266)	0.0183 (0.0279)
Mean control group	0.724	0.641	0.865	0.705	0.635	0.855	0.737	0.711
<i>Employed with health insurance</i>	0.0437** (0.0194)	0.0273 (0.0240)	0.0816*** (0.0314)	0.0861** (0.0342)	0.0969** (0.0398)	0.0639 (0.0683)	0.0360 (0.0290)	0.0488* (0.0249)
Mean control group	0.237	0.202	0.298	0.221	0.162	0.348	0.286	0.187
<i>Employed with written contract</i>	0.0260 (0.0169)	0.0178 (0.0207)	0.0449 (0.0284)	0.0447 (0.0292)	0.0407 (0.0360)	0.0315 (0.0566)	0.0224 (0.0266)	0.0172 (0.0226)
Mean control group	0.189	0.155	0.246	0.189	0.155	0.261	0.225	0.151
<i>Monthly earnings</i>	388 (269)	304 (277)	622 (536)	1,030** (478)	1,059** (457)	1,125 (1,166)	557 (352)	143 (390)
Mean control group	5000	3599	7368	4879	3443	7961	5213	4778
<i>Ln Monthly earnings</i>	0.0451 (0.0516)	0.0056 (0.0786)	0.1120* (0.0647)	0.0466 (0.1031)	0.1082 (0.1612)	0.0426 (0.1072)	0.0829 (0.0660)	-0.0240 (0.0788)
Mean control group	8.677	8.492	8.889	8.725	8.479	9.050	8.728	8.621
<i>Labor force participation</i>	0.0127 (0.0137)	0.0162 (0.0206)	0.0030 (0.0131)	0.0384 (0.0244)	0.0485 (0.0312)	0.0070 (0.0255)	0.0195 (0.0206)	0.0115 (0.0190)
Mean control group	0.872	0.819	0.960	0.866	0.824	0.957	0.867	0.877
Observations	3,017	1,872	1,145	938	625	313	1,601	1,415

Notes: Regressions use the sample of groups A and C (treated) and D (controls). All specifications control for training institutions (COS) and 10 administrative regions. Standard errors (clustered at the course level) in parentheses. Significance levels are indicated by *10%, **5%, and ***1%.

Overall, the long-term impacts on formality are substantial and show that the program has an important effect in helping youth get and keep good jobs. As indicated above, Table 5 also shows that, in Santo Domingo, there is a statistically significant impact on earnings overall, and especially for women: the overall estimated impact of RD\$1,007 (column 4) represents an increase of 21 per cent in the treatment over the control group mean of RD\$4,879; for females, the coefficient of RD\$1,032 (column 5) represents an increase of 30 per cent over the control group mean of RD\$3,443.

The results of estimating the ATT impacts (Groups A and C vs. D) shown in Table 6 are consistent with the findings from the ITT analysis: there is an important impact on formality (measured by having employer provided health insurance, in the order of 18 per cent), which is particularly strong for men (27 per cent) and in Santo Domingo (39 per cent over control mean). In this specification, women in Santo Domingo again have a very large impact (9.7 percentage points or 60 per cent over the control mean). Also, the impact on earnings in Santo Domingo, in particular for women, is statistically and economically meaningful, of about 30 per cent. For men, the point estimate is similar, but the sample is much smaller and the percentage difference relative to the control group is also smaller (14 per cent, insignificant). In both tables 5 and 6 there is no strong indication that program impacts are different by age bracket within youths (columns 7 and 8).

Finally, we report the results from a Local Average Treatment Effects (LATE) analysis in Table 7, using the random assignment as instrument for participation. The coefficients are slightly larger in size than the ITT analysis shown in Table 5, by a factor of approximately 1.1 (as LATE coefficients are the result of dividing ITT coefficients by the difference between participation of lottery winners – here approximately 90 per cent – and the participation rate of those who did not win the lottery – 0 per cent), and statistical significance is largely unchanged. The interpretation is that for those that participated in the program due to the lottery, the impact on formality is substantial, and the impact on earnings is always positive in sign, but statistically significant for Santo Domingo overall and Santo Domingo women only.

Table 7. Long-term impacts of the “Juventud y Empleo” training program on labor market outcomes: LATE estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Outcome	All	Women	Men	Santo Domingo	Santo Domingo Women	Santo Domingo Men	Age 16-21	Age >21
<i>Employed</i>	0.0053 (0.0196)	0.0183 (0.0275)	-0.0064 (0.0239)	0.0435 (0.0392)	0.0678 (0.0509)	-0.0099 (0.0524)	-0.0032 (0.0283)	0.0232 (0.0293)
Mean control group	0.733	0.649	0.878	0.736	0.655	0.899	0.741	0.725
<i>Employed with health insurance</i>	0.0436** (0.0207)	0.0253 (0.0255)	0.0851*** (0.0329)	0.0898** (0.0366)	0.0990** (0.0413)	0.0690 (0.0723)	0.0325 (0.0312)	0.0528** (0.0263)
Mean control group	0.243	0.198	0.319	0.234	0.170	0.364	0.293	0.191
<i>Employed with written contract</i>	0.0274 (0.0184)	0.0199 (0.0224)	0.0442 (0.0301)	0.0448 (0.0324)	0.0369 (0.0393)	0.0416 (0.0597)	0.0254 (0.0288)	0.0195 (0.0242)
Mean control group	0.193	0.158	0.252	0.191	0.145	0.283	0.238	0.146
<i>Monthly earnings</i>	377 (269)	297 (277)	631 (536)	1,116** (478)	1,141** (457)	1,150 (1166)	517 (372)	160 (413)
Mean control group	5041	3617	7496	5208	3673	8309	5261	4817
<i>Ln Monthly earnings</i>	0.0453 (0.0548)	0.0022 (0.0818)	0.1169* (0.0670)	0.0536 (0.1100)	0.1243 (0.1657)	0.0365 (0.1122)	0.0790 (0.0711)	-0.0225 (0.0812)
Mean control group	8.681	8.488	8.906	8.738	8.504	9.032	8.738	8.619
<i>Labor force participation</i>	0.0117 (0.0149)	0.0158 (0.0224)	0.0049 (0.0138)	0.0414 (0.0262)	0.0509 (0.0340)	0.0120 (0.0254)	0.0182 (0.0218)	0.0105 (0.0205)
Mean control group	0.870	0.815	0.965	0.873	0.825	0.970	0.869	0.871
Observations	3,279	2,041	1,238	1,020	677	343	1,729	1,550

Notes: Regressions use the full sample. All specifications control for training institutions (COS) and 10 administrative region. Standard errors (clustered at the course level) in parentheses. Significance levels are indicated by *10%, **5%, and ***1%.

In a next step, we apply the test for selection on unobserved variables for LATE as suggested in Black et al. (2017). The approach implies estimating an equation that has on the left-hand-side the outcome (e.g. employed, monthly earnings) of those not actually receiving the treatment, and on the right-hand-side a constant, an indicator for whether the participant was randomly offered the treatment, and other covariates such as training institutions and region as in the previous specifications. The coefficient of the indicator for whether the participant was randomly offered the treatment then informs regarding the presence or absence of selection on unobserved variables. Results are presented in appendix Table A1.

Table A1 follows the structure of the other results tables and reports the coefficient explained in the previous paragraph as well as the size of the effect following Black et al. (2017). The table shows that most of the estimated coefficients are not statistically different from zero, indicating the absence of selection into treatment based on unobserved variables. Only for those living in Santo Domingo (in general, but also for the male subsample) we find some evidence for the presence of selection on unobserved variables for the employment outcome. Hence, our LATE estimates are particularly relevant for these groups.¹¹

In a final step of the analysis, we investigate more closely the impact on formal employment. Table A2 in the Appendix constructs two versions of a formality index as an outcome: "strong" formality defined as employment with both health insurance and a written contract, and "weak" formality as employment with either health insurance or a written contract. The table shows a measurable impact on "strong formality" for male participants and for youths from Santo Domingo (columns 3 and 4, marginally significant at the 10% level). At the same time, "weak" formality is statistically significantly and positively influenced by the program on average and for almost all subgroups.

¹¹ It is important to note that we could have also undertaken the same exercise for those that actually received the treatment. However, given our definition of treatment (A+B+C) and control (D) groups, we do not have enough variation in the indicator for whether the participant was offered the treatment randomly for this group. This can be observed in Table 1, where the number of participants with $D_i=1$ and $Z_i=0$ is zero.

4.2 Labor market trajectories

The persistent long-term impact of the Juventud y Empleo training program on formality for men is the most significant and consistent result in all the specifications. The coefficients in Tables 5 through 7 are estimated for the point in time six years after the treatment. In addition to assessing the impacts at the long-term follow-up, it is of interest to look at the evolution of labor market outcomes over time: specifically, we can use a set of retrospective questions on labor market status in the short-term and long-term surveys to construct labor market trajectories on a monthly basis over the full time horizon (with a very small gap of four months from September to December 2010 not covered by the data due to the timing of the surveys). For this purpose, we merge the short-term and long-term data to combine individual trajectories.

We construct these labor market trajectories for the formal employment rate, as this has been identified as the most relevant outcome in the previous section. Figure 1 depicts the long-term trajectory of formal employment for men, separately for the treatment and control groups. The figure shows several patterns. First, the percentage of men that hold formal sector jobs increases over time for both treatment and controls. It starts at around 5 per cent for both groups before the start of the program, and increases over the six years to approximately 32 per cent for the control group and 40 per cent for the treatment group. Second, the trajectories indicate a slight lock-in effect: the treatment group employment rate is lower than the control group employment rate initially, but the curves soon intersect once the program is over. Third, from that point in time onward the average monthly employment rate for men in the treatment group always lies above the average for the control group. Fourth, this difference is not statistically significant for a substantial time period, but the gap widens and becomes statistically significant during the last 1 to 1.5 years. This indicates that the initially small gains are consistent and increase over time.

Figure 1. Labor market trajectory: Formal employment rate – ITT men



Notes: The figure depicts monthly averages for treatment and control groups from the time of random assignment until long-term follow-up. Dashed lines correspond to 95% confidence intervals. The labor market trajectories are constructed from merging retrospective information collected in the 2010 and 2014 surveys. Due to the timing of the two surveys, the 4-month-period from September to December 2010 is not covered by the data.

Figures A1 to A6 in the appendix depict corresponding labor market trajectories for several other (sub-) samples: for the full sample as ITT and ATT; for women; for youths in Santo Domingo; and separately for the younger age group (≤ 21 years of age) and the older age group (>21 years of age). Overall, the figures strengthen several of the patterns seen in Figure 1: First, a continuously increasing trend in employment rates over time for all (sub-) samples, in both treatment and control groups. Second, a lock-in effect during the year 2008, such that the treatment group trajectory typically crosses the control group

trajectory during the year 2009. Third, for the years three to six after treatment in all (sub-) samples the treatment group has a consistently higher employment rate than the control group – a rather pronounced pattern, despite the fact that the confidence intervals indicate that the difference is often not statistically significant. However, fourth, in several of the graphs the treatment-control difference does become significantly positive in statistical terms during the last 1 to 1.5 years prior to the long-term follow-up. Overall, this suggests that program gains do develop over time and do persist.

4.3 Local labor market context

Local labor market conditions may play a role in determining labor market outcomes and also the effectiveness of labor market interventions, as is the case e.g. for Job Corps in the US (Flores-Lagunes et al. 2010). In the Dominican Republic, the Metropolitan Region or Santo Domingo is the most dynamic labor market in the country. It is formed by two provinces: Santo Domingo and the National District (ND). The former has the largest number of inhabitants of all provinces, followed by the ND, which is the capital and the only fully urban region of the country. The overall participation rate in the region is 60.2% and its employment rate is 52.4%, both above the national average (Dominican Republic Central Bank, 2016). Although its territory represents only 3% of the national surface, the Metropolitan Region makes up 34% of the economically active population and 33% of the country's employed population (EP). Only 5% of the total EP in the informal sector resides in its territory (ONE, 2015). In addition, its unemployment rate is 12.9%, lower than the national average (Dominican Republic Central Bank, 2016). Its average labor income is higher than the national average and its average educational attainment is higher than for the rest of the country (ENFT, October 2015).

The labor markets of the regions North, South, and East are less dynamic than Santo Domingo's. Their overall participation rates are around 56.3%, 57.8%, and 59.6%, respectively (Dominican Republic Central Bank, 2016). In the South and East reside only 18% and 12% of the country's employed population (EP). In the North, the number rises to 37%. However, the latter concentrates 61% of the total EP in the informal sector of the country (ONE, 2015). The average labor income of each region is below the national average and many of their workers are low skilled. The percentage of employed individuals without secondary education is around 48%, 55%, and 49%, for the North, South, and East, respectively.

In addition, like Santo Domingo, most of the EP in the East are employees or workers of private companies (41%), whereas, in the North and South predominate non-professional self-employed workers (42% and 52%, respectively) (ENFT, October 2015). This is associated with the fact that the predominant economic activities in the North and South are agriculture, cattle farming, and commerce, while in the East, apart from the previous ones, the main activities are hotels and restaurants.

The regional differences that characterize the Dominican Republic suggest that further analysis is warranted. In the main specifications (Tables 5 to 7, also Figure A4) we find that there is regional heterogeneity in the impacts, particularly for youths in Santo Domingo, the capital, that benefit from their participation in *Juventud y Empleo*. We investigate the role of local labor market further by looking at results by the three Dominican macro-regions, “Cibao” (North), “Sur” (South), and “Este” (East), where the latter excludes Santo Domingo. The corresponding regression results are reported in Tables A3 to A5 in the Appendix.

In general, the results are not very pronounced, but do show some coarse patterns by macro-region. First, the North is the region for which we find statistically significant and negative impacts on overall employment and labor force participation, driven by the results for the young women in the sample. At the same time, the North is the one region with a significantly higher rate of youths being in education: the overall average probability to report “currently being studying” is 6.2 percentage points or 11.1 per cent higher in the North (base probability 54.8 per cent, numbers not reported in the table). This pattern would be in line with the lower level of the labor market outcomes, in particular for the labor force participation rate. Since marriage rates or number of children are not significantly different between regions, these are unlikely to be key explaining factors.

Looking at the South, the estimated coefficients are not significantly different from zero in statistical terms. The coefficient for the impact on formality for males is relatively large in size, but not statistically significant. Different from the results for the North and South, the regressions for the East do show the sizeable and statistically significant impacts on formality that we saw for the overall sample (Table A2), driven mainly by the male population. One might argue that these results for the East are in line with the positive findings for the Santo Domingo subpopulation, in a way that also the region surrounding the

capital benefits more strongly than other parts of the country. This may have to do mostly with the fact that the capital is characterized by the most dynamic labor market of the country, such that a skills training program may be more beneficial in a context where these skills are actually in demand.

5 Conclusions

Experimental evidence on long-term impacts of (youth) training programs had not been produced outside the US until now, and many of the large-scale experiments in the US date back two decades. This lack of rigorous evidence on such an important policy question – the longer-term effectiveness of human capital interventions for disadvantaged youths – is surprising. Together with parallel studies for Colombia (Kugler et al. 2015 and Attanasio et al. 2017), this paper contributes to closing this knowledge gap.

The evidence from the experimental US studies points to long-run impacts that are small and positive at best, but generally tend to be close to zero. In the case of Job Corps, a comprehensive intervention for the most disadvantaged youths, positive medium-run impacts on earnings are not sustained in the longer run. Against the background that some of these programs are comparatively intensive (and costly), these are certainly not encouraging results for the conception and design of youth training programs.

In the case of this new experimental long-term impact evaluation, we find a series of interesting results: because of the program, young men seem to have a better start of their careers, in the formal sector, and urban women improve their earnings. Specifically, our results show that there is a statistically significant long-run impact on the formality of employment for men (as measured by jobs with health insurance benefits, and a "weak formality index") participating in the Juventud y Empleo program. This effect of the Juventud y Empleo program was previously reported in the short-run evaluations, and it is important to see that this impact is sustained over a long-time horizon. Moreover, the long-term labor market trajectories we construct suggest that the effect is growing over time. Such lasting impacts in the quality of employment can make an important difference in the employment experience of young people and their lifetime labor market trajectories.

Second, the ITT and ATT estimates also provide evidence of sustained earnings impacts for most subgroups, and in particular female youths in the country's most important urban labor market, Santo Domingo. This, together with the impacts on formality for males, suggests that the returns to skills investments may be particularly relevant in the context of a more dynamic labor market where the demand for these skills is higher. The East region surrounding the capital also seems to benefit from this local labor market context (although to a lesser extent), whereas for the other two macro-regions North and South this does not seem to be the case.

Finally, for the full sample, the long-term impacts on labor earnings are positive in sign but not particularly large and not statistically different from zero. Impacts on the overall employment probability are frequently close to zero in size and not statistically significant, which is compatible with the US studies. This result should also be seen against the background that the total skills investment implied by the program is not very large compared to training programs in developed countries. A recurring issue in job-training evaluations is whether general equilibrium effects occur. In this case, given the modest direct effects on beneficiaries and the relatively small human capital investment it is unlikely that the program has any relevant general equilibrium effects. From anecdotal accounts of program operatives and interviews with employers that provide the internships to participants, there is no indication that the program could have any substitution or displacement effects, or even deadweight – quite the contrary: it is likely that this program is pure added value in terms of human capital acquisition of a very low-skilled target population, and through the positive impacts on formality and earnings adds productivity to the labor market in the Dominican Republic.

Overall, we interpret our results as indicating that training programs for disadvantaged youth can have positive long-term impacts: the Juventud y Empleo training improves formality in a context of high informality; and it increases earnings in that part of the labor market in the Dominican Republic that is comparatively dynamic and where actual demand for skills exists. It is important to highlight the fact that a program of this kind has impacts on formality: given the high rate of informality of young people in LAC, impacts on the probability of being formally employed may change the path on which young people start their careers and can have lifelong impacts.

Was spending scarce public resources in this training program a worthwhile investment? Net of the transfers to participants, the average cost of the program was about US\$400. Assuming no opportunity costs of participants during the training and if the impacts on income are maintained at RD\$341 as reported in Table 5, the cost –without transfers- would be recovered in about six years, which is the time elapsed between training and this evaluation. Furthermore, one could recommend offering this program only in Santo Domingo, where a similar analysis implies that the costs are fully recovered in two years.

These findings are relevant for a much broader set of countries, since a multitude of economies worldwide face similar types of labor markets, and challenges for youths. Moreover, the training offered here, while not as comprehensive as the very intensive – and costly – interventions analyzed in previous research on long-term impacts (e.g. Job Corps in the US) does combine a sizeable investment in both classroom and on-the-job training, and is thus comparable and similar to many youth interventions that are used across countries. Moreover, additional external validity comes from the fact that this is not a pilot intervention or pilot evaluation, but a rigorous long-term study on an active labor market program that is part of the set of public policies offered in a developing country to improve labor market opportunities for youth.

References

Alaimo, V., M. Bosch, D. Kaplan, C. Pagés and L. Ripani (2015), *Jobs for Growth*, Inter-American Development Bank: Washington, DC.

Attanasio, O., A. Kugler and C. Meghir (2011), "Subsidizing Vocational Training for Disadvantaged Youth in Colombia: Evidence from a Randomized Trial", *American Economic Journal: Applied Economics* 3, 188-220.

Attanasio, O., A. Guarin, C. Medina and C. Meghir (2017), "Vocational training for Disadvantaged Youth in Colombia: A Long-Term Follow-Up", *American Economic Journal: Applied Economics* 9, 131-143.

Betcherman, G., K. Olivas and A. Dar (2004), *Impacts of Active Labor Market Programs: New Evidence from Evaluations with Particular Attention to Developing and Transition Countries*, Social Protection Discussion Paper Series 0402, Washington, D.C.: World Bank.

Black, D., J. Joo, R. LaLonde, J.A. Smith and E. Taylor (2017), "Simple Tests for Selection Bias: Learning More from Instrumental Variables", CESifo Working Paper No. 6392.

Bloom, H.S., L.L. Orr, S.H. Bell, G. Cave, F. Doolittle, W. Lin and J.M. Bos (1997), "The Benefits and Costs of JTPA Title II-A Programs – Key findings from the National Job Training Partnership Act Study", *Journal of Human Resources* 32, 549-576.

Card, D., P. Ibarrran, F. Regalia, D. Rosas-Shady and Y. Soares (2011), "The labor market impacts of youth training in the Dominican Republic", *Journal of Labor Economics* 29, 267-300.

Card, D., J. Kluve and A. Weber (2010), "Active Labour Market Policy Evaluations: A Meta-analysis", *The Economic Journal* 120, F452-F477.

Card, D., J. Kluve and A. Weber (2017), "What Works? A Meta Analysis of Recent Active Labor Market

Program Evaluations, *Journal of the European Economic Association*, forthcoming.

Cave, G., H. Bos, F. Doolittle and C. Toussaint (1993), *JOBSTART: Final Report on a Program for School Dropouts*, Manpower Demonstration Research Corporation MDRC.

Couch, K.A. (1992), New Evidence on the Long-Term Effects of Employment Training Programs, *Journal of Labor Economics* 10, 380-388.

Diaz J.J. and Rosas D. (2016), Impact evaluation of the Job Youth Training Program Projovent, IDB Working Paper Series N. IDB-WP-693.

Dominican Republic Central Bank (2016), Labor Market Statistics. Retrieved from https://www.bancentral.gov.do/estadisticas_economicas/mercado_trabajo/

Encuesta Nacional de Fuerza de Trabajo (ENFT) (October 2015). Banco Central de la República Dominicana. Santo Domingo: Dominican Republic.

Fitzenberger, B. and R. Völter (2007), Long-run effects of training programs for the unemployed in East Germany, *Labour Economics* 14, 730-755.

Flores-Lagunes, A., A. Gonzalez and T. Neumann (2010), Learning but not earning? The impact of Job Corps training on Hispanic youth, *Economic Inquiry* 48, 651-667.

Gonzalez, C., L. Ripani and D. Rosas (2012), *Mejorando las Oportunidades de Inserción Laboral de Jóvenes en América Latina*, BID Nota Técnica, Washington, DC.

Greenberg, D.H., C. Michalopoulos and P.K. Robins (2003), A Meta-Analysis of Government-Sponsored Training Programs, *Industrial and Labor Relations Review* 57, 31-53.

Heckman, J.J., R.J. LaLonde and J.A. Smith (1999), The economics and econometrics of active labour

market programs, in Ashenfelter, O. and D. Card (eds.), *Handbook of Labor Economics* 3, Elsevier, Amsterdam.

Hotz, V.J., G.W. Imbens and J.A. Klerman (2006), Evaluating the Differential Effects of Alternative Welfare-to-Work Training Components: A Reanalysis of the California GAIN program, *Journal of Labor Economics* 24, 521-566.

Ibarrarán, P., L. Ripani, B. Taboada, J.M. Villa and B. Garcia (2014), Life skills, employability and training for disadvantaged youth: Evidence from a randomized evaluation design, *IZA Journal of Labor and Development* 3, 1-24.

Ibarrarán, P. and D. Rosas (2009), Evaluating the impact of Job Training Programs in Latin America: evidence from IDB funded operations, *Journal of Development Effectiveness* 2, 195-216.

ILO (2014), *Global Employment Trends: Risk of a jobless recovery?* International Labour Office. Geneva.

Kluve, J. (2010), The effectiveness of European active labor market programs, *Labour Economics* 17, 904-918.

Kugler, A., M. Kugler, J. Saavedra and L.O.H. Prada (2015), Long-term direct and spillover effects of job training: experimental evidence from Colombia, National Bureau of Economic Research Working Paper No. 21607.

Lechner, M., R. Miquel and C. Wunsch (2011), Long-run effects of public sector sponsored training in West Germany, *Journal of the European Economic Association* 9, 742-784.

Oficina Nacional de Estadística (ONE) (2008), *Madres Adolescentes en República Dominicana*, Santo Domingo: Dominican Republic.

Oficina Nacional de Estadística (ONE) (2015), Estadísticas sobre empleo y seguridad social. Retrieved from <https://www.one.gob.do/Estadisticas/169/empleo-y-seguridad-social>

Osikominu, A. (2012), Quick Job Entry or Long-Term Human Capital Development? The Dynamic Effects of Alternative Training Schemes, *The Review of Economic Studies* 80, 313-342.

Rosenberg, M. (1989), *Society and the Adolescent Self-Image*. Revised Edition, Middletown, C.T. Wesleyan University Press.

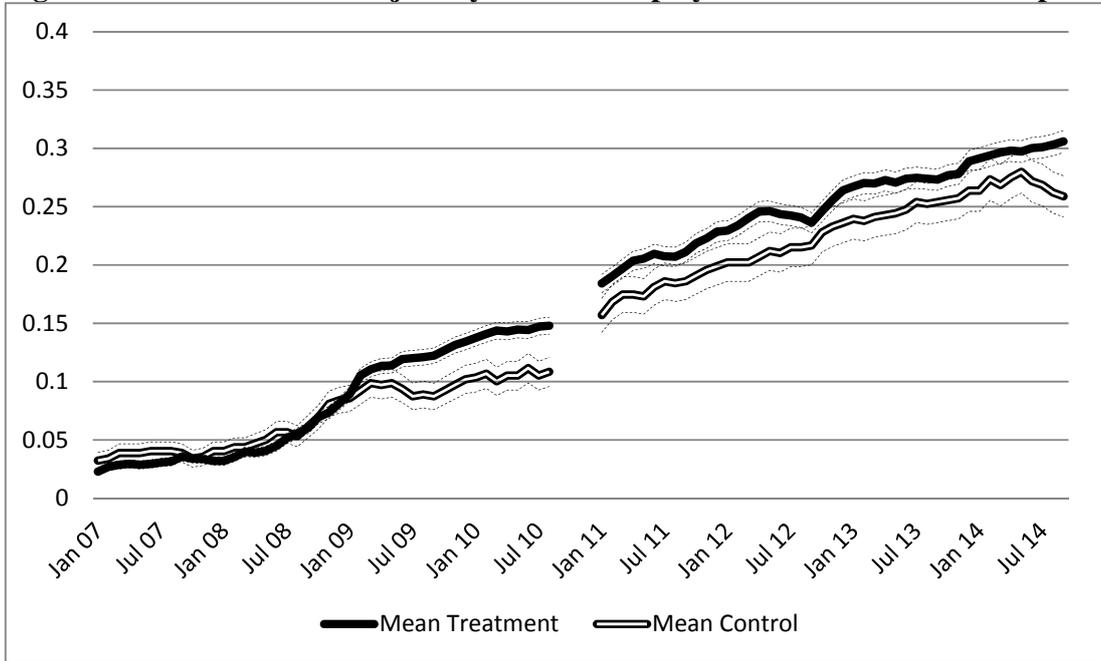
Schochet, P.Z., J. Burghardt and S. McConnell (2008), Does Job Corps Work? Impact Findings from the National Job Corps Study, *American Economic Review* 98, 1864-1886.

Urzúa, S. and E. Puentes (2010), La evidencia del impacto de los programas de capacitación en el desempeño en el mercado laboral, Banco Interamericano de Desarrollo – Unidad de Mercados Laborales del Sector Social, Notas Técnicas #268, BID: Washington, DC.

United States General Accounting Office (1996), *Job Training Partnership Act: Long-Term Earnings and Employment Outcomes*, Report GAO/HEHS-96-40, Washington, DC: U.S. Government Printing Office.

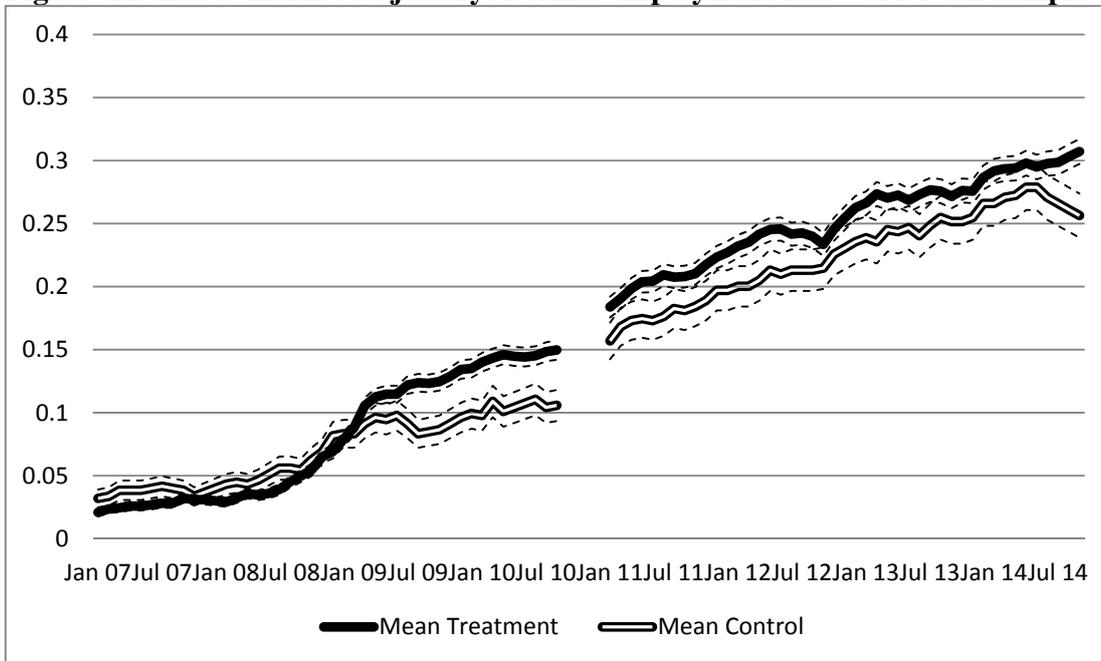
Appendix

Figure A1. Labor market trajectory: Formal employment rate – ITT full sample



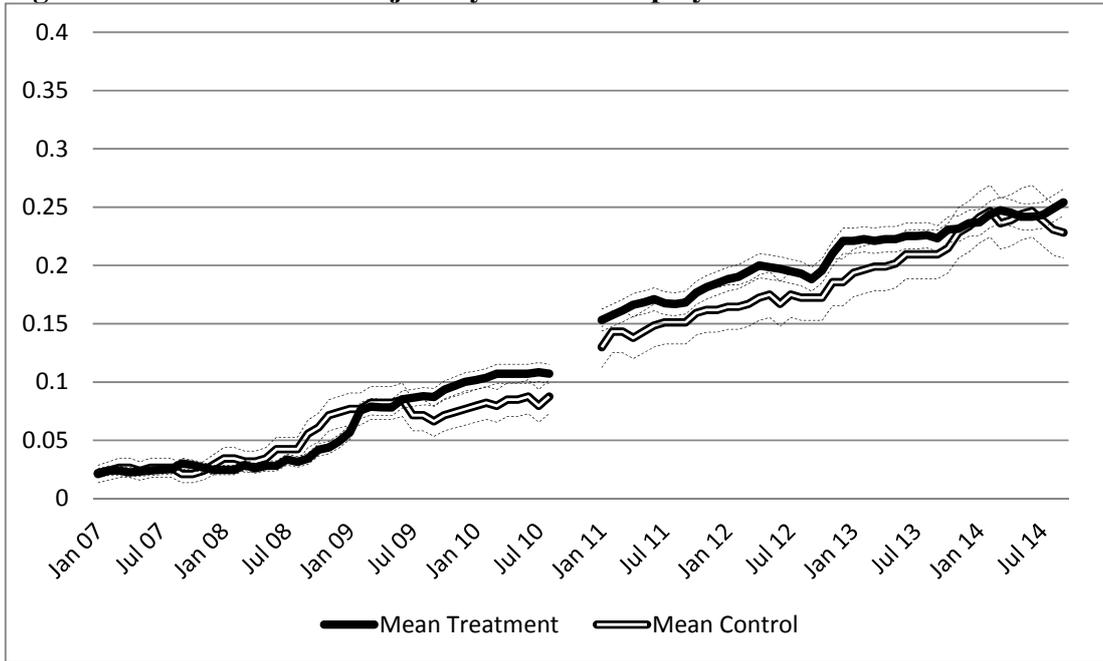
Notes: See notes to Figure 1.

Figure A2. Labor market trajectory: Formal employment rate – ATT full sample



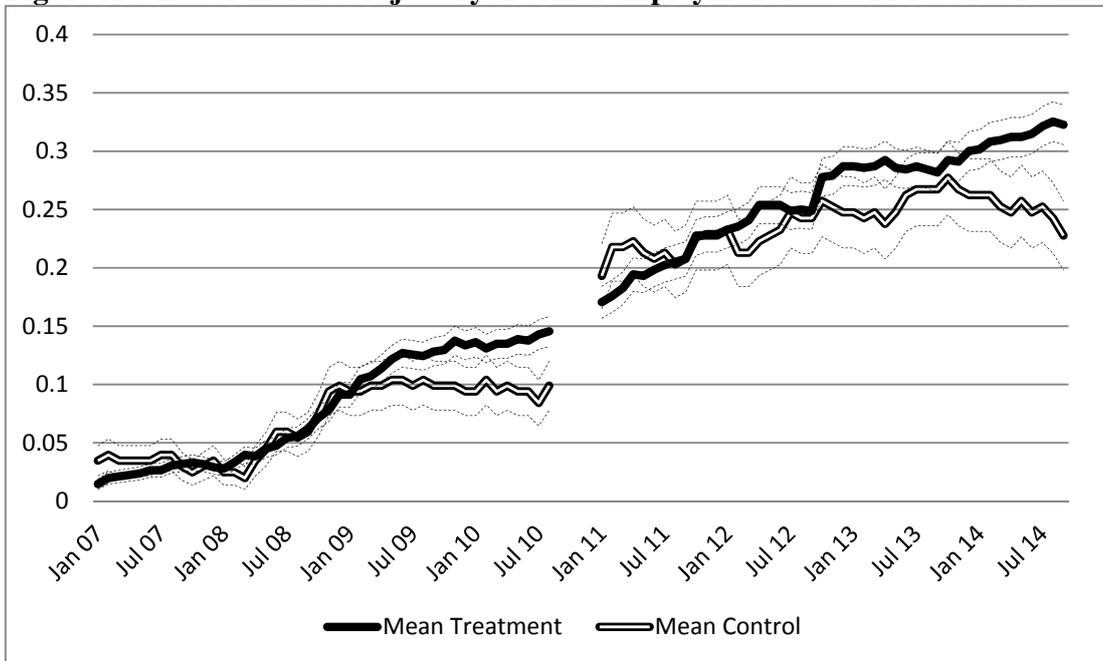
Notes: See notes to Figure 1.

Figure A3. Labor market trajectory: Formal employment rate – ITT women



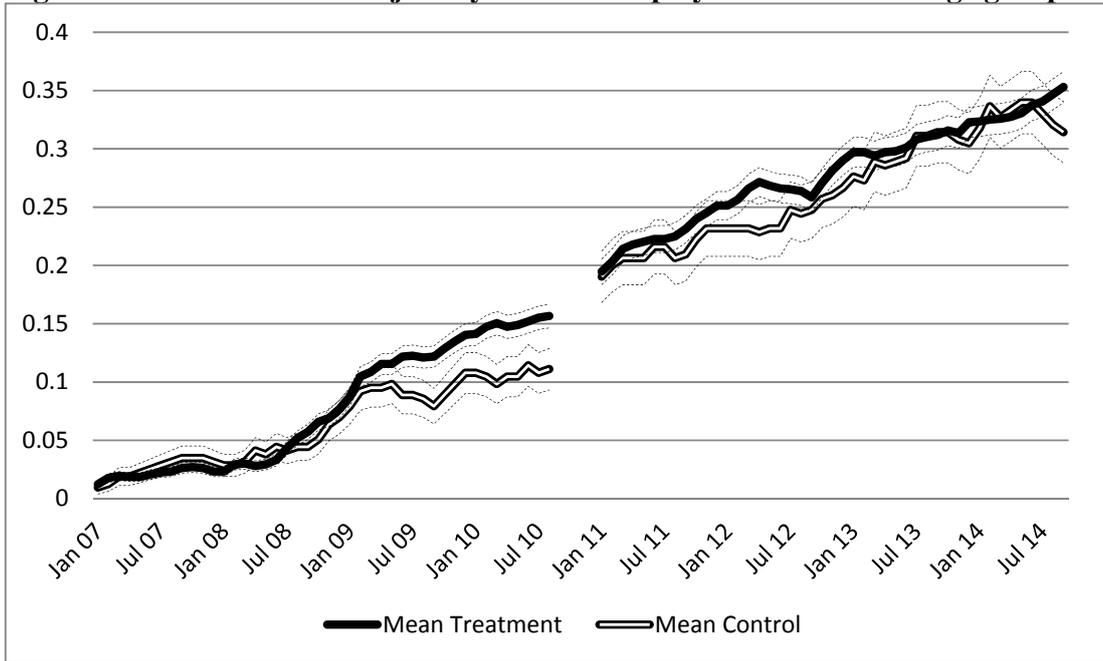
Notes: See notes to Figure 1.

Figure A4. Labor market trajectory: Formal employment rate – ITT Santo Domingo



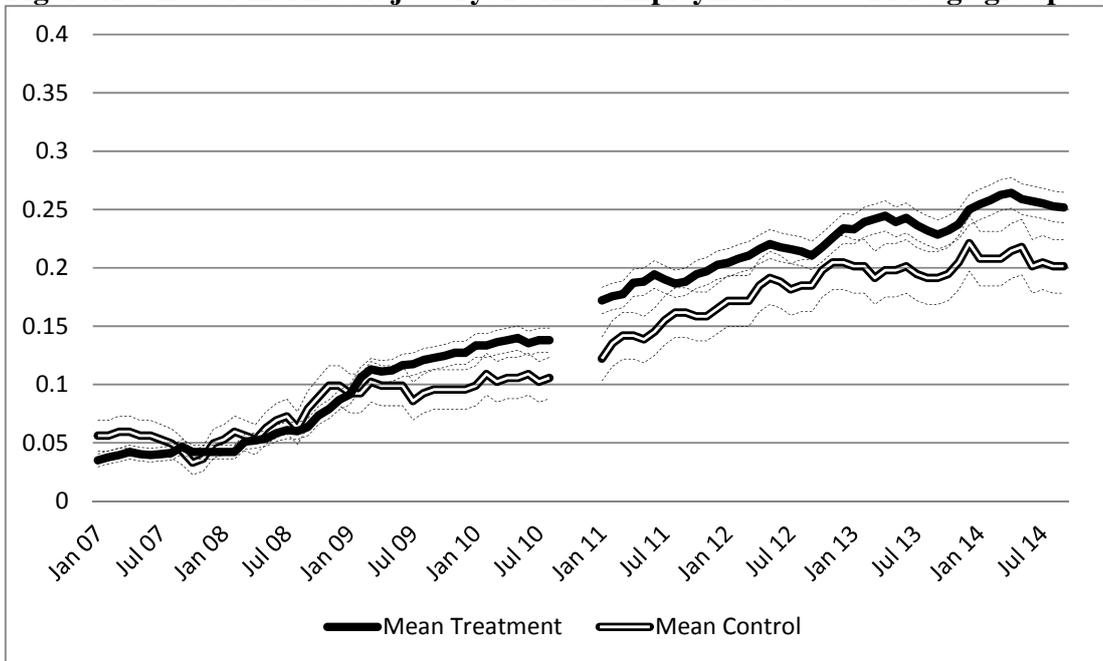
Notes: See notes to Figure 1.

Figure A5. Labor market trajectory: Formal employment rate – ITT age group ≤ 21 years



Notes: See notes to Figure 1.

Figure A6. Labor market trajectory: Formal employment rate – ITT age group > 21 years



Notes: See notes to Figure 1

Table A1. Testing selection on unobservables for LATE

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Outcomes	All	Women	Men	Santo Domingo	Santo Domingo Women	Santo Domingo Men	Age 16-21	Age >21
<i>Employed</i>	0.0209 (0.0333)	0.0289 (0.0503)	0.0195 (0.0407)	0.1265** (0.0556)	0.1107 (0.0819)	0.1319** (0.0601)	-0.0031 (0.0518)	0.0413 (0.0509)
Selection Effect	0.0232	0.0321	0.0217	0.1407	0.1231	0.1467	-0.0034	0.0459
<i>Employed with health insurance</i>	0.0030 (0.0334)	-0.0196 (0.0378)	0.0550 (0.0671)	0.0019 (0.0613)	-0.0162 (0.0616)	0.0166 (0.1398)	0.0099 (0.0552)	-0.0111 (0.0447)
Selection Effect	0.0033	-0.0218	0.0612	0.0021	-0.0180	0.0185	0.0110	-0.0123
<i>Employed with written contract</i>	0.0158 (0.0323)	0.0253 (0.0382)	-0.0089 (0.0682)	-0.0077 (0.0623)	-0.0234 (0.0677)	0.0227 (0.1284)	0.0373 (0.0571)	-0.0160 (0.0419)
Selection Effect	0.0176	0.0281	-0.0099	-0.0086	-0.0260	0.0252	0.0415	-0.0178
<i>Monthly earnings</i>	-136 (463)	-63 (452)	158 (1017)	868 (795)	900 (765)	933 (1776)	-15 (664)	-316 (745)
Selection Effect	-151	-70	175	966	1001	1037	-17	-351
<i>Ln Monthly earnings</i>	-0.0055 (0.0864)	-0.0239 (0.1430)	0.0605 (0.1094)	-0.0003 (0.1598)	0.1373 (0.2455)	-0.1115 (0.2011)	-0.0168 (0.1459)	-0.0420 (0.1327)
Selection Effect	-0.0061	-0.0266	0.0673	-0.0003	0.1527	-0.1240	-0.0187	-0.0467
<i>Labor force participation</i>	-0.0107 (0.0261)	-0.0144 (0.0417)	0.0045 (0.0213)	0.0271 (0.0430)	0.0115 (0.0687)	0.0288 (0.0213)	-0.0017 (0.0393)	-0.0244 (0.0415)
Selection Effect	-0.0119	-0.0160	0.0050	0.0301	0.0128	0.0320	-0.0019	-0.0271
Observations	940	595	345	299	200	99	474	466

Notes: All specifications control for training institutions (COS) and region (10 regions responding to political administrative division). Clustered standard errors at course level in parentheses. Significance levels are indicated by *10%, **5%, and ***1%.

Table A2. Long-term impacts of “Juventud y Empleo”: ITT for "strong" and "weak" formality index

Outcome	(1) All	(2) Women	(3) Men	(4) Santo Domingo	(5) Santo Domingo Women	(6) Santo Domingo Men	(7) Age 16- 21	(8) Age >21
<i>Strong Formality index</i> (Having both Health insurance & Written Contract)	0.0183 (0.0158)	0.0051 (0.0191)	0.0456* (0.0272)	0.0481* (0.0279)	0.0433 (0.0338)	0.0502 (0.0553)	0.0067 (0.0252)	0.0225 (0.0210)
Mean control group	0.164	0.134	0.214	0.152	0.115	0.232	0.202	0.123
<i>Weak Formality index</i> (Either Health insurance or Written Contract)	0.0459** (0.0196)	0.0356 (0.0244)	0.0723** (0.0320)	0.0734** (0.0351)	0.0797* (0.0404)	0.0489 (0.0663)	0.0459 (0.0300)	0.0425* (0.0250)
Mean control group	0.263	0.223	0.329	0.258	0.203	0.377	0.309	0.214

Notes: Regressions use the full sample of groups A, B, and C (treated) vs. D (controls). All specifications control for training institutions (COS) and region (10 regions responding to political administrative division). Standard errors (clustered at the course level) in parentheses. Significance levels are indicated by *10%, **5%, and ***1%.

Table A3. Long-term impacts of “Juventud y Empleo” on labor market outcomes by macro-region: ITT

Outcome	(1) North	(2) North women	(3) North men	(4) South	(5) South women	(6) South men	(7) East	(8) East women	(9) East men
<i>Employed</i>	- 0.0766** (0.0349)	- 0.1135** (0.0528)	-0.0039 (0.0406)	0.0212 (0.0309)	0.0412 (0.0456)	-0.0172 (0.0432)	0.0427 (0.0415)	0.0573 (0.0596)	0.0032 (0.0492)
Mean control group	0.806	0.761	0.857	0.67	0.567	0.862	0.73	0.629	0.902
<i>Employed w/ health insurance</i>	-0.0275 (0.0384)	-0.0724 (0.0538)	0.0395 (0.0524)	0.0169 (0.0371)	-0.0039 (0.0462)	0.0752 (0.0558)	0.1001** (0.0423)	0.0559 (0.0520)	0.1716** (0.0695)
Mean control group	0.291	0.284	0.299	0.195	0.167	0.246	0.261	0.243	0.293
<i>Employed w/ written contract</i>	-0.0454 (0.0320)	-0.0561 (0.0481)	-0.0190 (0.0412)	0.0274 (0.0321)	0.0259 (0.0333)	0.0386 (0.0655)	0.0979** (0.0413)	0.0676 (0.0481)	0.1517** (0.0659)
Mean control group	0.242	0.216	0.273	0.135	0.1	0.2	0.198	0.171	0.244
<i>Monthly earnings</i>	-592 (552)	-730 (527)	-33 (1011)	101 (481)	-151 (554)	594 (768)	909 (673)	723 (693)	705 (1407)
Mean control group	5925	4289	7795	4315	3234	6311	5001	3688	7244
<i>Ln Monthly earnings</i>	0.0197 (0.1076)	-0.0654 (0.1776)	0.1187 (0.1274)	0.0370 (0.0917)	-0.0795 (0.1284)	0.1405 (0.1283)	0.0443 (0.1026)	-0.0360 (0.1347)	0.1287 (0.1626)
Mean control group	8.723	8.526	8.901	8.58	8.44	8.745	8.666	8.543	8.818
<i>Labor force participation</i>	-0.0437* (0.0259)	-0.0545 (0.0452)	-0.0051 (0.0286)	0.0117 (0.0286)	-0.0028 (0.0455)	0.0282 (0.0273)	0.0448 (0.0330)	0.0717 (0.0506)	-0.0202* (0.0110)
Mean control group	0.909	0.875	0.948	0.843	0.783	0.954	0.874	0.800	1.000
Observations	834	481	353	769	491	278	656	392	264

Notes: Regressions use the corresponding full samples for the Dominican Republic’s three macro-regions “Cibao” (North), “Sur” (South), and “Este” (East), where the latter excludes Santo Domingo. All specifications control for training institutions (COS) and administrative sub-region (10 total). Standard errors (clustered at the course level) in parentheses. Significance levels are indicated by *10%, **5%, and ***1%.

Table A4. Long-term impacts of “Juventud y Empleo” on labor market outcomes by macro-region: ATT

Outcome	(1) North	(2) North women	(3) North men	(4) South	(5) South women	(6) South men	(7) East	(8) East women	(9) East men
<i>Employed</i>	-0.0768** (0.0354)	-0.1194** (0.0507)	-0.0025 (0.0416)	0.0203 (0.0309)	0.0378 (0.0455)	-0.0226 (0.0435)	0.0478 (0.0435)	0.0644 (0.0619)	0.0092 (0.0516)
Mean control group	0.806	0.761	0.857	0.670	0.567	0.862	0.730	0.629	0.902
<i>Employed w/ health insurance</i>	-0.0222 (0.0392)	-0.0706 (0.0548)	0.0453 (0.0539)	0.0176 (0.0375)	-0.0023 (0.0456)	0.0725 (0.0573)	0.1037** (0.0435)	0.0586 (0.0554)	0.1827** (0.0704)
Mean control group	0.291	0.284	0.299	0.195	0.167	0.246	0.261	0.243	0.293
<i>Employed w/ written contract</i>	-0.0474 (0.0328)	-0.0633 (0.0490)	-0.0123 (0.0420)	0.0227 (0.0315)	0.0182 (0.0319)	0.0395 (0.0659)	0.1034** (0.0427)	0.0681 (0.0522)	0.1712*** (0.0641)
Mean control group	0.242	0.216	0.273	0.135	0.100	0.200	0.198	0.171	0.244
<i>Monthly earnings</i>	-545.6250 (544.3540)	-744.9065 (511.5383)	46.2285 (995.1156)	112.4076 (489.2831)	-135.0655 (551.8664)	475.4241 (787.7755)	1,006.2458 (696.3942)	814.0878 (714.5601)	843.0617 (1,455.9153)
Mean control group	5925	4289	7795	4315	3234	6311	5001	3688	7244
<i>Ln Monthly earnings</i>	0.0315 (0.1076)	-0.0674 (0.1775)	0.1230 (0.1278)	0.0412 (0.0954)	-0.0552 (0.1331)	0.1326 (0.1331)	0.0435 (0.1050)	-0.0405 (0.1387)	0.1474 (0.1662)
Mean control group	8.723	8.526	8.901	8.580	8.440	8.745	8.666	8.543	8.818
<i>Labor force participation</i>	-0.0409 (0.0248)	-0.0524 (0.0426)	-0.0050 (0.0285)	0.0129 (0.0292)	-0.0072 (0.0457)	0.0266 (0.0269)	0.0499 (0.0335)	0.0826 (0.0519)	-0.0214* (0.0116)
Mean control group	0.909	0.875	0.948	0.843	0.783	0.954	0.874	0.800	1
Observations	755	427	328	719	458	261	605	362	243

Notes: Regressions use the corresponding samples of groups A and C (treated) and D (controls) separately for the Dominican Republic’s three macro-regions “Cibao” (North), “Sur” (South), and “Este” (East), where the latter excludes Santo Domingo. All specifications control for training institutions (COS) and administrative sub-region (10 total). Standard errors in parentheses. Significance levels are indicated by *10%, **5%, and ***1%.

Table A5. Long-term impacts of “Juventud y Empleo” on labor market outcomes by macro-region: LATE estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Outcome	North	North women	North men	South	South women	South men	East	East women	East men
<i>Employed</i>	-0.0862** (0.0383)	-0.1303** (0.0578)	-0.0043 (0.0431)	0.0230 (0.0000)	0.0448 (0.0000)	-0.0186 (0.0444)	0.0468 (0.0444)	0.0627 (0.0630)	0.0035 (0.0517)
Mean control group	0.787	0.739	0.853	0.681	0.575	0.878	0.722	0.620	0.887
<i>Employed w/ health insurance</i>	-0.0310 (0.0424)	-0.0831 (0.0596)	0.0432 (0.0557)	0.0184 (0.0000)	-0.0043 (0.0000)	0.0812 (0.0574)	0.1097** (0.0453)	0.0612 (0.0550)	0.1889*** (0.0728)
Mean control group	0.270	0.246	0.304	0.196	0.157	0.268	0.284	0.250	0.339
<i>Employed w/ written contract</i>	-0.0511 (0.0353)	-0.0644 (0.0532)	-0.0207 (0.0438)	0.0298 (0.0000)	0.0281 (0.0000)	0.0416 (0.0674)	0.1073** (0.0445)	0.0740 (0.0512)	0.1670** (0.0690)
Mean control group	0.225	0.204	0.255	0.149	0.118	0.207	0.210	0.180	0.258
<i>Monthly earnings</i>	-666.0001 (608.7803)	-837.7759 (585.0603)	-36.3032 (1,073.6514)	110.0366 (0.0000)	164.3541 (0.0000)	641.7722 (787.6268)	996.4941 (719.7140)	790.8251 (732.6279)	775.9566 (1,477.3440)
Mean control group	5592	4066	7717	4348	3129	6622	4906	3615	6989
<i>Ln Monthly earnings</i>	0.0220 (0.1175)	-0.0741 (0.0000)	0.1288 (0.1337)	0.0403 (0.0000)	-0.0867 (0.0000)	0.1545 (0.1323)	0.0480 (0.1078)	-0.0384 (0.1364)	0.1410 (0.1681)
Mean control group	8.708	8.501	8.937	8.576	8.409	8.769	8.676	8.546	8.828
<i>Labor force participation</i>	-0.0492* (0.0284)	-0.0625 (0.0499)	-0.0056 (0.0303)	0.0128 (0.0000)	-0.0030 (0.0000)	0.0305 (0.0281)	0.0491 (0.0353)	0.0784 (0.0534)	-0.0222 (0.0000)
Mean control group	0.889	0.852	0.941	0.847	0.784	0.963	0.870	0.790	1.000
Observations	834	481	353	769	491	278	656	392	264

Notes: Regressions use the corresponding full samples for the Dominican Republic’s three macro-regions “Cibao” (North), “Sur” (South), and “Este” (East), where the latter excludes Santo Domingo. All specifications control for training institutions (COS) and administrative sub-region (10 total). Standard errors (clustered at the course level) in parentheses. Significance levels are indicated by *10%, **5%, and ***1%.