

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

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– preliminary –

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Abstract

This paper presents the results of a randomized experiment on the long term impacts of a youth training program. The paper analyzes labor impacts six years after the training, including labor market histories of young people, and is the first rigorous long-term evaluation of a training program in developing countries. On a group of youngsters that were around 22 years old at the time of training and 28 years old in the follow-up, we document significant impacts on the quality of employment, particularly for men, and impacts for both men and women in the largest city (Santo Domingo, the capital of the Dominican Republic). There are no impacts on average employment, which is consistent with the low unemployment in countries with high informality and no unemployment insurance. However, we document large impacts on the percentage of participants that receive health insurance through their employer, a good proxy of formality in the Dominican Republic. The results of this paper are consistent with the short-term findings, and shows that for the youngsters that benefit from these programs in the short run, the impacts are long-lasting.

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

JEL Classification: J24, J64, O15, O17.

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1. Introduction

Investments in human capital are determinant 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 builds 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). 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 end of the program and measurement of the effects, the size of the effects and their positive significance generally tends to increase. Card et al. (2010) 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 limited, and that the “long-run” is only defined as impacts measured more than 24 months after the program. 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 – programs has any significant returns 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 up to 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 an RCT, see Card et al. 2011). We show and discuss the representativeness of our sample at the long-term follow-up and present 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 significantly 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 does effectuate significant long-term improvements in the probability of being formal and in labor earnings in an urban labor market.

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 two types of studies. The first type of studies looks at job training programs in the US; these studies investigate impacts for the set of well-known US employment trainings that were evaluated using large-scale experimental designs. Evidence on long-term impacts has been produced for the National Supported Work experiment (Couch 1992), the JOBSTART demonstration (Cave et al. 1993), and Job Corps (Schochet et al. 2008, Flores-Lagunes et al. 2010). A second type of studies looks at the long-run effects of training for the unemployed in Germany; these studies are based on administrative data, use non-experimental identification strategies and specifically focus either on East Germany (Fitzenberger and Völter 2007) or West Germany (Lechner et al. 2011, Osikominu 2012).

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 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 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 was based on an experimental design and the eligible population comprised 17- to 21-year old, economically disadvantaged school dropouts with poor reading skills. Individuals in the treatment group participated in education and vocational training, and also received job placement assistance; the total average duration of program activities amounted to 400 hours (with wide variation, however, cf. Cave et al. 1993). The impact 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. the rates of passing the General Educational Development (GED) examination or completing high school – were significantly improved through the program, labor market outcomes were not enhanced: after the expected “lock-in” effect in the first year, during which youths in the experimental group earned less on average than those in the control group, towards 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 Job Corps program established in 1964 is similar to JOBSTART but more intensive: disadvantaged youths between the ages of 16 to 24 received academic education, vocational training, and a wide range of other services (including counseling, life skills training, and health education)

during an average period of 8 months (again varying widely) in a residential setting (Schochet et al. 2008). In a final step, placement services are also provided. Similar to the studies discussed above, the National Job Corps study used a large-scale experimental design to rigorously assess the impacts of Job Corps. For a total sample of eligible youths of 11,313 – 6,828 and 4,485 of which were randomly assigned to the treatment and control group, respectively – survey data were collected at baseline and at 12-, 30-, and 48-month follow-up interviews. The empirical 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 significantly higher earnings during the 3rd and 4th year after random assignment.² This significant medium-term impact found in the survey data up until month 48 disappears, however, when looking at the long-term impacts (years 5 to 8 after random assignment) on earnings and employment probability using annual Social Security records (Schochet et al. 2008). 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 alternative training programs (ibid.).

This evidence on long-run impacts of training programs in the US is complemented by three studies for Germany (Fitzenberger and Völter 2007, Lechner et al. 2011, Osikominu 2012). The studies use 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, all three studies use econometrically involved variants of identifying treatment effects under unconfoundedness, i.e. selection-on-observables strategies. The results are generally encouraging: Fitzenberger and Völter (2007) find significantly positive long-run impacts – up to 7.5 years after start of the program – on participants’ employment probability for a comprehensive classroom training program. Lechner et al. (2011) estimate treatment effects for up to 8 years after the end of the program and find significantly positive employment impacts for the more comprehensive training programs; in particular, the authors

² 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) levels of local labor market unemployment rates they face.

argue that these programs are relatively intense by international standards. Osikominu (2012) considers impacts for up to 5 years after registering as unemployed, and also finds the longer programs to be effective in creating stable employment spells and higher earnings.

In sum, the evidence on long-term impacts of job training programs is therefore quite limited and inconclusive. On the one hand, there is a series of studies for Germany using (elaborate) non-experimental identification strategies on specific cohorts of registered unemployed and generally finding that training programs – at least the more intensive ones – have positive long-term labor market outcomes. These programs are not targeting specific age groups among the unemployed. On the other hand, a series of large-scale experimental studies in the US looks at the long-run impacts of youth training programs, and generally finds that these programs at best have very small long-term earnings impacts. This has led some authors 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 (see below). The key advantages of our study are that we can rely on experimental data, that we succeed in tracing a representative and comparatively large sample at the 6-year follow-up, that it is the first such study in a developing country (and, effectively, the first such study outside the US), and that we add new insights to a research question on which – as this section has shown – very little knowledge exists.

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

Youth labor market insertion represents a challenge for the vast majority of Latin American and Caribbean (LAC) countries. According to ILO (2014), currently 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, governments in LAC have a long tradition of implementing programs that offer short-term job training services to youth living in urban areas. These programs are supposed to offer a training that responds to the skill needs of the productive sector (Ibarraran and Rosas 2009, Gonzalez et al. 2012). They combine technical skills training courses (of approximately three months) in lower-skilled professions with a subsequent internship period to provide on-the-job work experience (of around three months)³. Most of these programs also consider some training hours of remedial soft skills.

There is some evidence about the short-term impacts of these programs. In general, the existing impact evaluations find zero or modest impacts on overall employment, but positive impact on job quality (formal employment) and earnings. Also, the evidence finds a large heterogeneity in results by gender (Ibarraran and Rosas 2009, Puentes and Urzua 2010, Gonzalez et al. 2012). These results differ from those of similar programs in more developed countries where, in general, no impacts are found (Card et al. 2010).

Since 2001, the Dominican Republic has been implementing one of the previously described programs, which is named “Juventud y Empleo” (J&E). The J&E program has been rigorously evaluated in the past, because it considered an experimental design since its conception (Card et al., 2011). This emphasis on solid impact evaluations is striking in LAC, since few randomized controlled trials to evaluate social and/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 youngsters 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 card⁴. The program offers skills training courses that last 225 hours: 150 hours devoted to teach a wide

³ These programs were based on the experiences of programs implemented in developed countries, mainly the Job Training Partnership Act (JTPA) in the United States and the Youth Training Scheme in Britain.

⁴ The membership to the poorest household of the country was strictly related to the location of the youngsters across the country and a normative priority established by the national government. In a targeting report, it was revealed that 72% of

range of low-skill qualifications, such as administrative assistant, hair stylist, or mechanic; and 75 hours devoted to improve the soft skills of participants (mainly, work habits and self-esteem). Courses are followed by a three-month period 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 an 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) undertook the first evaluation using a sample of youth that applied to the program in 2004. The follow up data were collected in 2005; approximately 10-14 months after most 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 some other limitations. Particularly, it did not follow participants that were originally assigned to receive training and that did not participate in the program (dropouts), and compliance was not perfect: some of the lottery winners did not participate in the training either because they did not show up or they dropped out at some point. Also, some of the young people who were selected for the control group ended up taking the training as replacements of drop-outs and no-shows or for some other reason.

A second evaluation of the program was performed by Ibarra et al. (2014). The cohort of young people under study in the second evaluation comes from those who registered in the COS training centers in 2008. The authors apply an improved identification strategy in order to tackle the limitations that affected the previous evaluation. Mainly, random assignment was performed on a larger sample of each course (20 treatments and 15 controls, and 5 slots for replacements) and the sample size of the follow up survey was increased: 5,000 people were taken as a random sample to be interviewed, out of a total sample of 10,309 registered youth that were randomized into treatment and control groups by a

the postulants met the location criteria but only 40% were poor (Morillo, 2010).

lottery. Also, survey instruments and quality controls of the field work were improved, and the follow-up sample was selected from all of the youngsters who participated in the lottery. The follow-up survey was carried out between November 2010 and February 2011, some 18-24 months after participants have finished their course. Around 80% of the sample was located and no significant differences between the control and treatment groups were observed. As is usual in many experimental impact evaluation designs of social programs, there was imperfect compliance, with many youngsters that won the lottery that did not take the course, and many from the control group that took the course.

The results of the evaluation are mixed: as in the previous evaluation of the program, the impacts on overall employment are negligible but there is an impact on job quality for men. The impact on formal employment for males is 17%. Also, there is a 7% positive impact on monthly earnings conditional on being employed. Both of these impacts are stronger in Santo Domingo, the capital. 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 formal may change the path into which young people start their careers and can have lifelong impacts. The evaluation found other interesting results. The program has a negative impact on teenage pregnancy. There are positive impacts on perceptions and expectations about the future, particularly for women. Also, the program has impact on the development of soft skills: mainly in leadership skills, persistency of effort, and conflict resolution.

3.2 Random assignment

The evaluation design of the JyE program is strongly linked to its targeting method. In a first stage, the training centers that offer a training course identify 35 young people that meet the criteria described above (basically, at-risk youth). In a second stage, the program receives the information about the youngsters that registered for the course from the COS training centers and proceeds to verify that none of the applicants have registered before. After that, the program runs a lottery in which each of the 35 youngsters is randomly assigned to one of two groups. The first one is formed by 20 youngsters who are invited to attend the training course and the second one by 15 youngsters 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. However, if either some out of the 20 treated youngsters gives no response when they are called to attend the course or if they drop out before the tenth day of the classes, the COS may replace up to 5 slots with young people belonging to the control group. This group of five people is again randomly selected out of the 15 in the control group by the Program's Coordination Unit (PCU) who provides the names of the five possible "replacements" directly to the COS. Hence, despite the initial configuration of the treatment and control groups, we end up with four different groups: from the treatment group, those who actually attend and complete the course are so-called *complier beneficiaries* while those that do not show-up or fail to complete at least two weeks of the course are the *dropouts*. Similarly, from the lottery control group those who were supposed to stay away from the program but end up attending the courses are *replacements* (in the literature sometimes called *always-takers*) while those who were non-treated are *complier controls*.⁵

From the original 10,309 applicants that met the selection criteria, previous to starting the courses, the random assignment established 5,914 treated and 4,395 controls.⁶ After the completion of the courses, two follow-up household surveys were carried out. As it was mentioned before, the first follow-up of the 2008 cohort was done between November 2010 and February 2011 (18 to 24 months after graduation) on a random sample of 5,000 out of the 10,309 young people who had initially registered.⁷ This 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). This group was used by Ibararan et al. (2014) to analyze the short term impacts of the program. Based on this group, a second follow-up was done between September and December 2014 (six years after the treatment). From the 4,033 individuals interviewed in 2010, 3,279 were found and have complete information about the characteristics of interest for this paper (2,162 treatments and 1,116 controls).⁸ In sum, in both follow-up surveys (2010 and 2014) about 80 percent of the sample

⁵ We appeal to the typical assumptions of the *LATE Theorem* shown by Angrist and Pischke (2009) regarding the independence, exclusion, first stage and monotonicity. Especially, we exclude from the analysis the existence of *defiers* which is derived from the monotonicity assumption according to Imbens and Rubin (1993). The latter means that there are no participants of the JyE program that adopted an opposite treatment to the one that they were assigned.

⁶ According to the previous classification, there were 4,937 *complier beneficiaries*, 977 *never-takers*, 3,418 *complier controls* and, hence, 977 were classified as *replacements*.

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 with the *sampsi* Stata command.

⁸ The implementation of the survey was carefully done, implementing several quality-control instruments and incentives. In

were located at their households, and this percentage was balanced between treatment and control groups.

Introducing a general notation, if Z_i represents the random assignment of each youngster 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 ($D_i = 1$ attend the course and $D_i = 0$ do not), Table 1 shows the distribution of the second follow-up between these groups in 2014. These groups were defined by the 2010 follow-up survey, where the same questionnaire was applied to all youngsters and their participation status was based on their responses (and not on the administrative data).

Table 1: Participants by Lottery Assignment and Treatment Status, sample followed in 2014.

	Selected in the Lottery, $Z_i=1$	Not selected in the Lottery, $Z_i=0$
Participated in the program, $D_i=1$	GROUP A: “Complier” beneficiaries: 1,901	GROUP C: “Replacements”: 438
Did not participate in the program, $D_i=0$	GROUP B: “Dropout”: 262	GROUP D: “Complier” controls: 678

3.3 Identification strategy and data

Given the randomized experiment described above, the first natural step is to estimate the causal effect of Z_i on labor market outcomes, using an Intention to Treat (ITT) analysis, basically a standard linear regression of the outcome on Z_i . Since some of the youngsters that were randomly selected to be in the “replacements” group did take part in the course, we will also estimate Average Treatment on the Treated (ATT) effects that compare the combination of the groups A and C – both of which effectively received the treatment – with the group D as control group (complier controls, 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

terms of quality controls, 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% 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.

which randomization took place. Finally, we also estimate the Local Average Treatment Effect estimators, in which participation is instrumented by the random assignment.

Ibarraran et al. (2014) show that at baseline the characteristics of the treatment and control groups were balanced both for the complete cohort ($n=10,305$)⁹ as well as for the original ($n=5,000$) and realized ($n=4,033$) follow-up samples. In this paper, we show in Table 2 that, at baseline, there are no significant differences between the 2014 sample ($n=3,279$) and the rest of the sample ($n=7,026$). As shown, the characteristics of the group that was followed 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 comparison groups.¹⁰

After having shown that the 2014 sample is representative of the complete cohort, we move to show that, within the 2014 sample, there is balance in the characteristics of treatment and control youngsters (as defined by the lottery) as well as between participants and non-participants. Using the notation presented above, Table 3 shows the mean characteristics for each of the four groups defined by the assignment/participation matrix (Table 1), as well as for the groups defined by the lottery (AB vs CD) and by participation (AC vs D). The results show that balance is maintained in the 2014 sample. In the first comparison (based on the results of the lottery) there is only one unbalanced variable out of 25, and in the second comparison (based on participation) there are only two unbalanced variables (but only at the 10% significance level). Hence, having shown both that the data are representative of the whole cohort and that the data are balanced, we are able to proceed with the analysis taking advantage of the experimental design.

⁹ The complete cohort of 10,305 individuals comes from the original randomization group of 10,309, but taking out four individuals that did not have identification numbers.

¹⁰ 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 show the same results in terms of balance as the overall sample shown in table 2. For robustness, we also estimate the regressions for the short-term analysis restricting the sample to 3,279 observations with complete data in 2014, and the results remain essentially unchanged.

Table 2. Representativeness of the 2014 sample, characteristics at baseline.

	Mean		P-value
	dat2014=0	dat2014=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	0.63	0.62	0.41
% Married	0.03	0.03	0.70
Number of people in HH	4.36	4.53	0.00
Number of children	0.70	0.70	0.88
% Currently attending school	0.22	0.24	0.03
Fraction with prior work experience	0.16	0.17	0.46
Worked during last 2 years	1.79	1.79	0.79
Rosenberg	0.00	-0.01	0.62
Urban areas	0.90	0.88	0.04
Lives in Santo Domingo	0.25	0.23	0.02
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	0.50	0.49	0.39
% Proper sanitation	0.99	0.99	0.31
% Garbage collection	0.83	0.85	0.07
% Refrigerator	0.71	0.72	0.41
% TV	0.88	0.88	0.76
% Wash Machine	0.72	0.72	0.61
% Car	0.14	0.15	0.30
% AC	0.02	0.02	0.99
% Computer	0.09	0.08	0.59
% Investor	0.08	0.09	0.75
Observations	7,026	3,279	10,305

Table 3: Balance at baseline: sample 2014

Characteristic	Mean							P-value	
	A	B	C	D	AB	CD	AC	AB/CD	AC/D
Age	21.99	22.27	21.79	22.03	22.03	21.94	21.96	0.470	0.604
Age 16-19	0.38	0.36	0.41	0.37	0.38	0.39	0.38	0.511	0.645
Age 20-24	0.24	0.24	0.25	0.23	0.24	0.23	0.24	0.603	0.360
Age >24	4.50	4.49	4.45	4.64	4.50	4.56	4.49	0.341	0.071
% Female	0.69	0.80	0.63	0.73	0.70	0.69	0.68	0.783	0.230
% Married	0.19	0.19	0.22	0.22	0.19	0.22	0.20	0.050	0.170
Number of people in HH	0.53	0.54	0.54	0.50	0.53	0.52	0.53	0.292	0.116
Number of children	0.27	0.27	0.24	0.28	0.27	0.26	0.27	0.555	0.601
Attend school (currently)	0.25	0.21	0.24	0.24	0.24	0.24	0.25	0.898	0.823
Incomplete elementary	0.19	0.21	0.18	0.20	0.19	0.19	0.19	0.938	0.493
Complete elementary	0.05	0.04	0.04	0.06	0.05	0.05	0.05	0.874	0.573
Incomplete high school	0.58	0.56	0.55	0.58	0.58	0.57	0.57	0.612	0.892
Complete high school	0.04	0.03	0.04	0.03	0.03	0.03	0.04	0.966	0.295
More than high school	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.401	0.235
Missing education	0.04	0.04	0.04	0.03	0.04	0.04	0.04	0.991	0.750
No data on education	0.10	0.12	0.14	0.10	0.10	0.12	0.11	0.202	0.651
Fraction with prior work experience	0.17	0.19	0.16	0.16	0.17	0.16	0.17	0.365	0.603
Currently employed	0.04	0.04	0.06	0.04	0.04	0.05	0.04	0.224	0.912
Currently salaried worker	0.01	0.01	0.02	0.02	0.01	0.02	0.01	0.225	0.241
Currently unemployed	0.52	0.55	0.50	0.51	0.53	0.51	0.52	0.417	0.810
ICV Score (0 to 100)	62.66	62.70	63.25	62.29	62.66	62.66	62.77	0.993	0.288
Rosenberg	24.00	23.89	24.09	23.73	23.99	23.87	24.02	0.385	0.075
Urban areas	0.89	0.87	0.86	0.90	0.88	0.88	0.88	0.944	0.117
Lives in Santo Domingo	0.31	0.30	0.28	0.32	0.31	0.31	0.31	0.662	0.603
Receives remittances	0.11	0.08	0.10	0.11	0.10	0.11	0.10	0.806	0.551

Table 4 shows the sample characteristics and outcomes based on the 2014 data for the two alternative identification strategies described above, the first based on the results from the lottery (AB vs CD, the ITT), and the second considering participation in the program (AC vs D, the ATT). As seen in the tables the age at the time of the survey is 28 years on average, so the group is in the higher end of the youth age range (if we consider youth as individuals that are between 15 and 29 years of age), in line with the timing of the follow-up (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 head of household (the shares for men and women are 41.2 per cent and 55.9 per cent for married, and 42 per cent and 25.2 per cent for head of household, respectively). In terms of demographics, the only statistically significant difference is in

marital status, and this is due to a higher share of males being married in the treatment group: those males selected to participate in the program (AB) and those that completed the program (AC) were more likely to be married in 2014 than those in the control group. A plausible mechanism for this result is the positive impacts in terms of quality of employment, which will be explored below.

In terms of raw outcomes, overall there is little indication of statistically significant differences in the comparison of selected/not-selected and participants/non-participants. The average employment rate is 73 per cent, with no significant differences across those randomly selected for training (AB vs CD) or across participants and non-participants (AC vs D). Employment is higher for men than for women, and it is overall substantially higher than in 2010 (when it was around 62 per cent), which may be partially explained by the well documented employment-age profile.

Regarding the characteristics of employment, almost 90 per cent of young individuals work in services, and the average tenure 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 (assignment)

Characteristic/Outcome	Mean				P-value	
	AB	CD	AC	D	AB/CD	AC/D
Age	27.93	27.94	28.00	27.89	0.94	0.48
% Women	0.62	0.63	0.63	0.62	0.48	0.37
% Head of Household (all)	0.34	0.30	0.35	0.31	0.04	0.03
% Head of Household (women)	0.26	0.25	0.28	0.25	0.52	0.53
% Head of Household (men)	0.46	0.40	0.50	0.40	0.03	0.01
% Married	0.50	0.50	0.49	0.50	0.97	0.40
% Currently attending school	0.20	0.22	0.20	0.22	0.25	0.34
Years of education	11.48	11.53	11.29	11.60	0.66	0.01
Employed (women)	0.66	0.65	0.64	0.65	0.41	0.61
Employed (men)	0.86	0.86	0.87	0.85	0.80	0.52
Employed (all)	0.74	0.72	0.72	0.73	0.34	0.82
Agriculture and mining	0.02	0.02	0.01	0.02	0.57	0.45
Industry	0.10	0.08	0.11	0.08	0.05	0.01
Services	0.88	0.90	0.87	0.90	0.04	0.03
Duration of current job (months)	21.03	18.67	20.52	19.26	0.03	0.34
Permanent job	0.57	0.56	0.55	0.57	0.65	0.28
Employed at large firms	0.21	0.22	0.22	0.22	0.39	0.87
Salaried workers	0.44	0.44	0.42	0.45	0.75	0.25
Unpaid workers	0.01	0.01	0.01	0.01	0.40	0.88
Self-employed	0.22	0.22	0.22	0.22	0.77	0.87
Workers w/labor risk insurance	0.11	0.13	0.11	0.13	0.11	0.07
Workers w/ health insurance	0.25	0.28	0.24	0.28	0.12	0.02
Workers w/written contract	0.20	0.21	0.19	0.22	0.34	0.13
Weekly worked days	5.72	5.75	5.79	5.72	0.59	0.34
Weekly worked hours	29.31	28.42	28.85	28.85	0.35	1.00
Wants to work more hours	0.47	0.47	0.47	0.47	0.70	0.83
Wants to change current job	0.55	0.52	0.53	0.54	0.08	0.78
Workers seeking another job	0.21	0.19	0.20	0.19	0.21	0.79
Monthly wage (Dominican peso)	5357.84	5285.06	4999.80	5417.94	0.75	0.12
Hourly wage (Dominican peso)	37.44	39.78	34.57	40.16	0.46	0.14
Observations	1116	2163	678	2339	3279	3017

Source: Follow-up survey.

Note: Outcomes are not conditional on employment status.

a: Large firms are those that employ 51 or more employees.

b: One Dominican Peso = 0.0228 US Dollar (November 2014)

4. Empirical results: long-term impacts

Tables 5-7 present the long-term impact estimates of the Juventud y Empleo job training program, using the experimental design described in the previous section. It is important to note that the sample is representative for the young people that this program serves, and that the large sample size at the six-year follow-up and the virtue of random assignment allows to provide precise estimates of the intervention effects. Additionally, as in the previous table for the six-year follow up, in previous evaluations of this program (a previous cohort in the short-term, and the same cohort at an earlier point in time) the unconditional comparisons of outcomes show virtually no impacts of the program.

The results tables 5 and 6 (ITT and ATT, respectively) show several patterns. First, the overall average impacts on employment and earnings in the long-run remain close to zero in size and insignificant. Second, there is heterogeneity in the impact estimates, indicating, in particular, significant treatment-control differences for several stratifications of the sample population by socio-demographic characteristics.¹¹ One key result is that there is a positive long-term impact of the program on the quality of employment for men, as measured by the job characteristic “employed with health insurance”.¹² This finding implies a sustained positive impact on formality that is consistent with what was reported in the short-run evaluation. The impact is largest in Santo Domingo, where there is also an important impact for women. Overall, the point estimate of 7.3 percentage points in Santo Domingo represents an impact of 30 per cent, and in the case of men the impact is of 35 percent in Santo Domingo and 25 per cent for the whole sample. These long-term impacts are substantial and show that the program has an important effect in helping youngster get and keep good jobs. Table 5 also shows that, in Santo Domingo, there is a statistically significant impact in the earnings for women, representing a substantial increase of 25 per cent in treatment group over the control group.

¹¹ We present the most relevant outcomes in the paper. The complete set of regressions is available from the authors upon request. The estimation for the different subpopulations compares individuals from the treatment and control groups within each specific subpopulation. That is, for example, the ITT coefficients of Santo Domingo compare individuals from the treatment group in Santo Domingo with individuals from the control group in Santo Domingo. This applies even to the type of course subpopulations, as there are individuals both in the treatment and the control groups for each type of course.

¹² Having a job with health insurance or written contract are considered here as proxies of formality. Given the high informality rates in the Dominican Republic, having a formal job makes a very big difference in the career path of young people.

Table 5: IIT estimation on selected labor market outcomes

IIT effect	(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>	-0.0138 (0.0152)	-0.0164 (0.0222)	0.0028 (0.0194)	0.0250 (0.0315)	0.0345 (0.0423)	0.0203 (0.0453)	-0.0038 (0.0224)	-0.0249 (0.0238)
Mean control group	0.740	0.665	0.860	0.719	0.658	0.838	0.739	0.741
<i>Employed with health insurance</i>	0.0255 (0.0157)	0.0002 (0.0200)	0.0783*** (0.0277)	0.0732*** (0.0276)	0.0625* (0.0326)	0.1176* (0.0632)	0.0229 (0.0249)	0.0160 (0.0224)
Mean control group	0.254	0.220	0.309	0.240	0.191	0.333	0.295	0.210
<i>Employed with written contract</i>	0.0176 (0.0140)	0.0114 (0.0175)	0.0357 (0.0258)	0.0441* (0.0246)	0.0318 (0.0296)	0.0744 (0.0523)	0.0217 (0.0220)	0.0016 (0.0195)
Mean control group	0.200	0.163	0.258	0.196	0.164	0.256	0.232	0.164
<i>Monthly earnings</i>	-97.2301 (222.2594)	79.4256 (222.0192)	-106.4207 (476.4994)	299.6451 (391.4541)	913.9499** (371.6096)	-292.7177 (935.1086)	69.6726 (308.6289)	-331.2156 (335.4762)
Mean control group	5358	3772	7888	5519	3692	9031	5549	5145
<i>Ln Monthly earnings</i>	0.0136 (0.0397)	-0.0123 (0.0597)	0.0645 (0.0546)	-0.0333 (0.0817)	0.0234 (0.1259)	-0.0633 (0.1064)	0.0671 (0.0562)	-0.0397 (0.0610)
Mean control group	8.701	8.498	8.930	8.784	8.531	9.111	8.743	8.654
<i>Labor force participation</i>	-0.0044 (0.0134)	-0.0101 (0.0203)	0.0122 (0.0165)	0.0232 (0.0244)	0.0195 (0.0342)	0.0338 (0.0335)	0.0040 (0.0194)	-0.0137 (0.0216)
Mean control group	0.814	0.765	0.891	0.810	0.773	0.880	0.814	0.813
Observations	3,279	2,041	1,238	1,020	677	343	1,729	1,549

Table 6: ATT estimation on selected labor market outcomes

ATT effect	(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>	0.0034 (0.0181)	0.0136 (0.0254)	-0.0107 (0.0234)	0.0313 (0.0364)	0.0575 (0.0476)	-0.0261 (0.0509)	-0.0053 (0.0265)	0.0183 (0.0277)
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** (0.0192)	0.0280 (0.0239)	0.0790** (0.0314)	0.0861** (0.0342)	0.0969** (0.0398)	0.0639 (0.0683)	0.0345 (0.0292)	0.0463* (0.0246)
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>	0.0259 (0.0168)	0.0187 (0.0207)	0.0410 (0.0283)	0.0447 (0.0292)	0.0407 (0.0360)	0.0315 (0.0566)	0.0208 (0.0266)	0.0146 (0.0223)
Mean control group	0.189	0.155	0.246	0.189	0.155	0.261	0.225	0.151
<i>Monthly earnings</i>	400.1165 (267.5821)	302.1002 (276.0975)	609.2733 (534.2763)	1,029.5949** (477.5475)	1,059.2345** (456.7620)	1,124.5911 (1,166.3988)	550.9781 (348.9602)	132.0213 (384.8261)
Mean control group	5000	3599	7368	4879	3443	7961	5213	4778
<i>Ln Monthly earnings</i>	0.0470 (0.0518)	0.0045 (0.0781)	0.1168* (0.0666)	0.0466 (0.1031)	0.1082 (0.1612)	0.0426 (0.1072)	0.0887 (0.0673)	-0.0310 (0.0782)
Mean control group	8.677	8.492	8.889	8.725	8.479	9.050	8.728	8.621
<i>Labor force participation</i>	0.0085 (0.0164)	0.0140 (0.0231)	-0.0021 (0.0204)	0.0334 (0.0274)	0.0451 (0.0355)	0.0010 (0.0385)	0.0032 (0.0240)	0.0199 (0.0240)
Mean control group	0.804	0.751	0.893	0.797	0.757	0.884	0.812	0.795
Observations	3,017	1,872	1,145	938	625	313	1,601	1,415

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), which is particularly strong for men and in Santo Domingo. In this specification, the impact for men is not concentrated in Santo Domingo, where women do have a very large impact (9.7 percentage points or 60 per cent over the mean of the control group). The impact on wages in Santo Domingo, in particular for women, is also statistically and economically meaningful, of about 30 per cent. In the case of 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, not statistically significant).

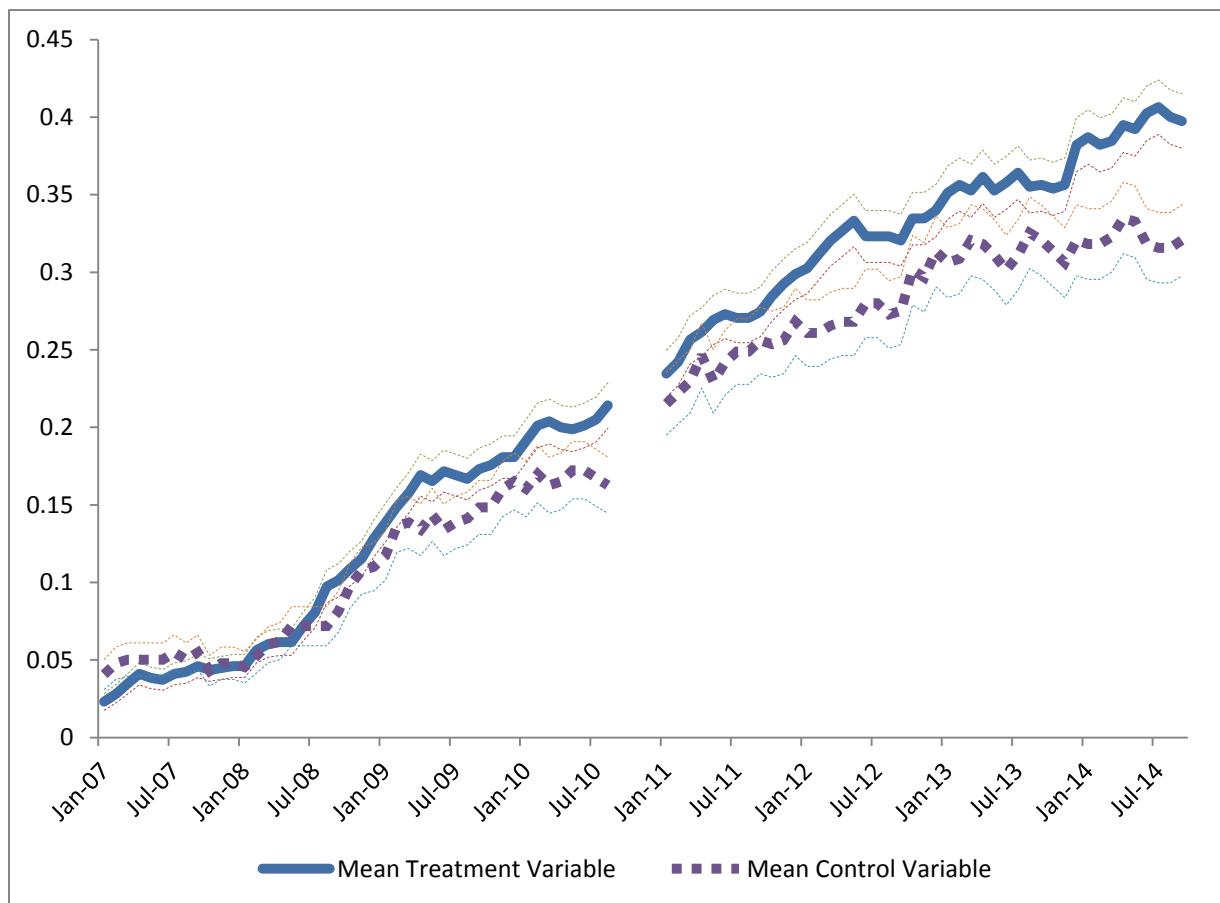
Finally, we report the results from a LATE analysis in Table 7, using the random assignment as instrument for participation. As expected, the coefficients are larger than in the ITT analysis shown in Table 5, by a factor of close to two (LATE coefficients are the result of dividing the ITT coefficients by the difference between participation of lottery winners – approximately 87 per cent – and the participation rate of lottery losers – about 40 per cent). Statistical significance is largely unchanged, and the interpretation is that for those that participated in the program due to the lottery, the impact on formality is substantial. In the case of men, the impact is of 17 percentage points, which represents an increase of about 52 per cent over the mean outcome of the control group. This difference is even stronger in Santo Domingo, representing a 26 percentage point or 70 per cent increase in formality.

Table 7: LATE estimation on selected labor market outcomes

IIT effect	(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>	-0.0286 (0.0310)	-0.0330 (0.0439)	0.0060 (0.0402)	0.0485 (0.0599)	0.0627 (0.0747)	0.0449 (0.0967)	-0.0082 (0.0467)	-0.0502 (0.0469)
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>	0.0529* (0.0321)	0.0004 (0.0395)	0.1678*** (0.0585)	0.1424*** (0.0516)	0.1137** (0.0573)	0.2603** (0.1327)	0.0489 (0.0520)	0.0324 (0.0441)
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>	0.0364 (0.0288)	0.0230 (0.0348)	0.0764 (0.0538)	0.0857* (0.0467)	0.0580 (0.0525)	0.1648 (0.1117)	0.0465 (0.0462)	0.0031 (0.0382)
Mean control group	0.193	0.158	0.252	0.191	0.145	0.283	0.238	0.146
<i>Monthly earnings</i>	-201.4647 (454.6003)	160.3315 (438.7525)	-227.9350 (988.3700)	582.4215 (740.9820)	1,663.0461** (660.6672)	-648.1405 (1,988.6684)	148.9451 (643.7197)	-668.1948 (662.0720)
Mean control group	5041	3617	7496	5208	3673	8309	5261	4817
<i>Ln Monthly earnings</i>	0.0294 (0.0842)	-0.0262 (0.1224)	0.1420 (0.1158)	-0.0694 (0.1657)	0.0449 (0.2317)	-0.1454 (0.2375)	0.1433 (0.1162)	-0.0876 (0.1295)
Mean control group	8.681	8.488	8.906	8.738	8.504	9.032	8.738	8.619
<i>Labor force participation</i>	-0.0073 (0.0235)	-0.0112 (0.0361)	0.0119 (0.0211)	0.0558 (0.0386)	0.0724 (0.0533)	0.0263 (0.0368)	0.0058 (0.0335)	-0.0192 (0.0341)
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	1,549

The persistent impact of formality for men is the most significant and consistent result in all the specifications. In terms of labor market trajectories, we are able to reconstruct the percentage of men working in the formal sector in the last six years, looking at the differences between treatment and control. As shown in Figure 1 below, while the percentage of men that hold formal sector jobs increases over time for both treatment and controls, there is always a difference that shows a positive impact of training.

Figure 1: % of men working in the formal sector by month



Notes: the period from September-December 2010 corresponds to the period when the first survey was applied, so the information is incomplete, and the reference period for the second follow-up survey starts in January 2011. The dotted lines correspond to the 95% confidence intervals around the mean.

5. Conclusions

To the best of our knowledge, this paper is the first experimental analysis of the long-term impacts of a job training program outside the US. The evidence from these earlier experimental US studies – also focusing almost exclusively on training programs for disadvantaged youths (The National Supported Work Demonstration in the 1970s, JOBSTART in the 1980s, Job Corps in the 1990s) – indicates long-run impacts that are small positive at best, but generally tend to be close to zero. In the case of Job Corps, positive medium-run impacts on earnings do not seem to be 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 long-term impact evaluation, we find 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. More 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) participating in the *Juventud y Empleo* program. This effect of the JyE 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. In particular, since the impact is large, and since lasting impacts in the quality of employment can make an important difference in the employment experience of young people and their longer-term (potentially lifetime) labor market trajectories. Second, we find some evidence of sustained earnings impacts for youths in the country's most important urban labor market, Santo Domingo, indicating 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. Finally, we find that young women, in particular, seem to benefit in terms of higher earnings if they live in the capital of the country, where there usually are more labor opportunities. For the overall sample, the long-term impacts on labor earnings and employment probability are close to zero in size and not statistically significant for the whole sample, which is somehow compatible with US studies.

Overall we interpret our results as indicating that training programs for disadvantaged youth can have positive outcomes: the JyE training improves formality in a context of high informality; and it seems to

increase earnings in that part of the labor market in the Dominican Republic that is comparatively dynamic and where actual demand for skills exists. Given that not all groups benefit equally, it is important to understand the causes of this heterogeneity and to propose alternatives for the groups that do not benefit from this type of programs.

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 interventions analyzed in previous research on long-term impacts (e.g. Job Corps in the US, training for the unemployed in Germany) does combine a sizeable investment in both classroom and on-the-job training, and is thus comparable to many youth interventions that are used across countries.

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