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Are vocational training programmes worth their cost? Evidence from a cost-benefit analysis

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Abstract: This paper complements the empirical literature on the impact evaluation of training courses, by comparing the benefits of training courses with the costs borne by the public administration to implement them. We focus on long-duration vocational training courses for unemployed people implemented in the autonomous province of Trento (Italy) in 2010 and 2011, and we find a positive impact on the probability of being employed three years after the programme. Training programmes also have positive effects on earnings, but the overall benefits in the two or three years after the programme do not cover the costs incurred in their delivery.

Keywords: labour policy; training programmes; policy evaluation; cost-benefit; local study

J.E.L. Classification: D61, D04, J68

1. Introduction

Vocational training programmes for the unemployed have for long been important components of active labour market policies. However, their importance has increased during the recent economic crisis because policy makers have resorted to them in order to reduce the high unemployment rates that have affected several advanced countries.

To the best of our knowledge, official Italian data regarding public expenditures on training courses for the unemployed and other active labour policies are not available. OECD (2017) reports that from 2010 to 2015 Italy invested, on average, 460 million euros per year to fund: i) institutional training; ii) workplace training; and iii) apprenticeships. It is reasonable to assume that training courses addressed to the unemployed represent an important component of both institutional and workplace training. Therefore, evaluating the effectiveness of these initiatives and measuring their possible economic returns is a crucial scientific as well as political issue.

Numerous studies measure the employment impact of vocational training programmes for the unemployed (Kluve 2010; Card *et al.* 2015). By contrast, relatively few papers deal with their costs and benefits (Barnow and Smith 2015; Attanasio *et al.* 2011; Card *et al.* 2010, Smith *et al.* 2009)¹. This is even more so in Europe (Osikominu 2013, Jespersen *et al.* 2008, Raaum *et al.* 2002) and, above all, in Italy. As stressed by Perotti and Teoldi (2014), the latter still lacks any rigorous cost-benefit analyses of vocational training programmes. The purpose of this paper is to contribute to filling this gap in, by using more reliable data than those previously presented by Mo Costabella (2017)².

In Italy, Regions and Autonomous Provinces are responsible for organizing training programmes for unemployed people. Among these Regions and Provinces, we decided to focus on the autonomous Province of Trento (PaT) for two main reasons. First, it has displayed an impressive commitment to these policies. Drawing on both its own funds and the European Social Fund, in the past seven years (i.e. from 2010 to 2017), the PaT has organized courses to train an average of 9 thousand people per year, who represent about three fifths of the overall average number of unemployed persons yearly recorded in that period. Second, the PaT has made available detailed data on two sets of long-duration (i.e. lasting more than 300 hours) vocational training courses for the unemployed implemented in 2010 and 2011.

¹ The scarcity of cost-benefit analyses on vocational training courses seems to be mainly due to the difficulty of collecting reliable and accurate information on both their costs and the earnings of participants, has stressed by the paper by Smith mentioned in the main text. However, this situation appears less pronounced in the USA than elsewhere.

² Mo Costabella has not direct information on earnings in his main sample. Instead, he uses an auxiliary source of information on earnings to estimate an equation relating earnings to socio-demographic characteristics. Then, using that equation he inputs earnings to the units included in his main sample.

We first assess the impact of these courses on the probability of finding a job during the three years after their beginning. Second, we estimate: i) the effect of those courses on earnings up to the end of 2013; ii) the amount of additional fiscal returns deriving from these effects on earnings; and iii) savings of public money generated by the reduction of the number of recipients of unemployment benefits. Finally, we compare these effects to the direct costs of the courses.

We found an overall positive impact of the programmes on the probability of having a job as well as on gross earnings along with an appreciable degree of heterogeneity across both courses and socio-demographic groups. Unfortunately, the average gains from these programmes did not cover the relevant costs borne by the administration, at least over the time window we consider.

The rest of the article is organised as follows. Section 2 describes some crucial features of the two groups of vocational training programmes considered in this study. Section 3 illustrates the data made available by the PaT, the sampling selection procedure performed, and the method adopted in the analyses. Section 4 presents (i) the results of the impact evaluation of the courses on the probability of being employed, and (ii) the results of the cost-benefit analysis. Section 5 draws some conclusions.

2. The main features of the vocational training programmes evaluated

As said, our study is concerned with two sets of long-duration training programmes directed to the unemployed living in the Autonomous Province of Trento (PaT). Each set was arranged by a different branch of the PaT – the *Agenzia del Lavoro* (AL) and the *Servizio Europa* (SE)³. Moreover, in the case of AL we considered only the programmes carried out in 2010, while in the case of SE in order to gain a reasonable sample size we took into account those arranged both in 2010 and 2011.⁴

The first group of training courses, i.e. those arranged by AL (hereafter: ALCs), were entirely funded by the PaT and comprised 64 different programmes. They can be roughly classified into three categories: i) courses intended to prepare incumbents of higher-grade routine non-manual occupations (accountants, office clerks, and the like); ii) courses designed to train lower-grade routine non-manual employees (shop assistants, bartenders, telephone switchboard operators, etc.); and iii) courses for the training of workers in skilled manual occupations (electricians,

³ The *Agenzia del Lavoro* (AL) is the branch of the Autonomous Province of Trento in charge of implementing active and passive labour policies, while the *Servizio Europa* (SE) is responsible for designing and organising the policies funded by the structural funds of the European Commission.

⁴ We carried out some equivalence analyses on the two sets of SECs finding that i) the contents of the programmes were very similar; ii) their duration was the same; iii) their average costs largely overlapped; iv) the age and gender compositions of participants were very close.

carpenters, bricklayers, butchers, and so on)⁵. The number of programmes pertaining to each of these three groups, the amount of participants, their average duration in hours and their cost per capita are set out below (Table 1, upper panel). For the sake of clarity, we would stress that, throughout the article, we use the term ‘participants’ to denote only those who attended their course to its end. Moreover, we computed the per capita cost summing up all the direct costs regarding planning and organizing, renting classrooms, participants’ insurance and allowances⁶ and then dividing the resulting amount by the number of participants in the programme.

[TABLE #[1]]

The second set of vocational courses that we analysed, i.e. those arranged by SE (hereafter: SECs), was quite different from the previous one. First, it was fully funded by the European Social Fund. Second, attendance on its 15 courses was conditional on being unemployed and holding (at least) a high-school qualification. Third, all these 15 programmes were intended to train their participants to perform higher-level routine non-manual occupations (bank-teller, accountant, personnel clerk, social welfare worker) or intermediate technical jobs (construction supervisor, computer network technician, web technician). Moreover, the average duration of this second set of courses was considerably longer (Table 1, lower panel) than that of the programmes delivered by AL. Finally, the average per capita costs of the SE courses were much higher (Table 1, lower panel) than those of the AL initiatives.

We will not perform any real comparative analysis of these two sets of vocational training courses. However, their heterogeneity could allow some considerations regarding the possible reasons and mechanisms underlying their possible different impacts on both employment chances and economic benefits.

3. Data and methods

Our empirical strategy to detect the effects of the two sets of courses on employment probability and earnings was based on a counterfactual logic. Since it was unfeasible to carry out a randomised trial, we resort to controlling for

⁵ Eligibility for the large majority of ALCs was not conditional on holding any specific educational credential. Only the access to the two courses addressed to white-collar positions required participants to be high-school graduated. However, these courses involved only thirty-five persons and we do not have any information regarding the level of schooling of the participants in all the remaining ALCs. Therefore, we did not carry out a separate analysis on them.

⁶ The amount of the allowances in ALCs and SECs was, respectively, 30% and 9% of the total cost.

individual's observable characteristics (Imbens 2015; Gerfin and Lechner 2002; Caliendo and Kopeining 2008; Larsson 2003; Sianesi 2004)

The treated group consisted of participants in the training courses who were resident in the province of Trento. The control group was composed of unemployed individuals resident in the same province who did not participate in any course, but were as similar as possible to the treated group with respect to characteristics relevant to the outcome. Given data constraints, further restrictions were applied to our samples. They are described in detail in what follows.

3.1 Data

Our analyses relied mainly on data from administrative archives. First, we collected from AL and SE archives information on individual training courses, the occupational roles they addressed, their duration (overall number of hours and days), socio-demographic characteristics of their participants, and whether they completed the programme or dropped out before its conclusion. The pool of individuals from which we selected the control group consisted of those recorded as unemployed at the starting date of individual training courses in the registers of the local *Centri per l'Impiego* (CPI, the Italian public employment agencies delivering placement services to the unemployed). We obtained information on the work histories of these individuals from three years before the beginning of the relevant courses to three years after their conclusion from the *Comunicazioni Obbligatorie* (COB) archive, i.e. the archive of firms' mandatory communications to the CPI⁷.

Because SECs required a high-school qualification for enrolment, to identify the relevant control group we considered the level of education of its potential members. To do so, we linked the information from the CPIs archive to that from the archive of the Education Department of the PaT⁸.

To implement the cost-benefit analysis, besides information on the direct costs incurred by AL and SE to organize their courses, we considered the earnings (EI) and unemployment benefits (UB) of the individuals included in our study. Data on EI were obtained from yearly tax returns (*Dichiarazioni dei Redditi, Modello Unico, Modello 730 and Modello 770*) filed by individuals residing in the province of Trento in the period 2007-2013. Data on UB

⁷ The COB archive collects detailed information on all hiring and firing episodes of individual employees, their skill level, the type of contract that they signed when hired, and the economic sector to which the hiring (or firing) firm belongs.

⁸ The provincial education archive has been implemented quite recently. Therefore, it collects information on the level of schooling only for young people. Because several participants in ALCs were quite old, we could not check their qualifications and those of the controls.

were retrieved from INPS (Italian Social Security Institute) for its national standard component, and from AL for its local additional component⁹.

As well known, accurate coverage of the relevant population and high reliability of the information gathered from administrative archives (Caliendo *et al.* 2011) are not always sufficient conditions to carry out a sound scientific inquiry. In our case, we had to deal with three main issues deriving from the limitations of the information delivered by tax returns and COB registers.

The first problem was the incomplete linkage between the COB archive and the tax returns archive. The latter one contains information only on people with non-zero incomes and residing in the province of Trento. Therefore, any person not included in the tax return archive may either have no income or not be resident in the province of Trento. To fix this problem at least partially, we excluded from our analysis individuals who were working according to COB but did not appear in the tax returns dataset, assuming that they were not resident in the province of Trento. Moreover, we assigned a zero income to people not appearing in the tax returns register, but recorded as unemployed in the COB archive, on the assumption that they had no earnings.

The second problem was that income data from the tax returns archive refer to calendar years. As a consequence, it is not possible to measure earnings accruing to an individual in any intermediate month of the year: that is, one cannot exactly measure earnings from the beginning of the course to the end of the year. Consequently, our analysis considered earnings during the whole year of the course including also the fraction of earnings that the individual earned from January 1st to the starting month of the programme. The bias resulting from this choice should be minor, however, since most training courses started in February or March and most of the participants were unemployed during the previous month(s). But the key argument to support our choice is that if the control group properly represents the counterfactual for the treatment group, then it should also approximate the earnings of the treated individuals in the months immediately prior to the start of the course. Resting on this assumption, in the rest of the paper reference to the effect on earnings “in the two/three years after the programme” should be understood as the effect “in the year of the programme and in the two/three subsequent years”.

The third problem was again due to use of the COB register, which provides full coverage of the work histories of employees but no information on self-employment spells. However, the income tax returns archive

⁹ According to law no. 191, issued by the PaT in 2009, since that year the unemployed living in the province of Trento are eligible for a set of local additional benefits. They increase the amount of the national subsidies and extend their duration. In a few cases (e.g. apprenticeships), they are addressed to individuals not eligible for any type of UBs.

records whether or not a person is self-employed; we used this information (see section 4.3 below) to integrate some of our analyses.

The control group for participants in a course starting in month t consisted of unemployed persons resident in the Province of Trento who had not participated in any training course in the years previous to that month (Sianesi, 2004).

[TABLE #[2]]

As said, the ALCs and SECs contents and goals differed widely, and so did the targeted recipients. Therefore, it is not surprising that the socio-demographic composition of their participants was quite different (Table 2). More precisely, the proportion of women, young people and Italian citizens was distinctly higher among SECs participants (Table 2). This was so because Italian high school-qualified young women usually tend to perform white-collar occupations (like those addressed by SECs), while relatively old migrant men are quite often incumbents of manual semi-skilled occupations (like most of those involved by ALCs).

3.2 Methods

Our analysis was based on the *blocking with regression adjustment* estimator (BRA) proposed by Imbens (2015). This estimator relies on the use of the propensity score (Rosenbaum and Rubin 1983) and computes the average treatment effect on treated (ATT) by performing linear regressions within blocks (i.e. intervals) of the propensity scores, controlling for the observable characteristics.

The starting point is the usual linear regression of the outcome Y on the binary treatment status D , controlling for the observable confounders X :

$$(1) \quad Y_i = \alpha_0 + \alpha_1 D_i + \alpha_2 X_i + \varepsilon_i$$

i indexing individuals included in the sample. The point made by Imbens (2015) is that if the distribution of X is highly imbalanced across the two treatment arms indexed by D the estimate of the average causal effect resulting from this regression could be badly biased. A simple way out is to reduce first the degree of imbalance of the

distribution of X by stratifying the sample, then run the very same regression separately on each of the resulting strata.

The stratification of the sample is implemented resorting to the so called propensity score, i.e. the regression of the treatment status D on the confounders X. The key mathematical property of the propensity score is that if the two groups of individuals – those participating into the courses and those not – are on average comparable with respect to the propensity score, then they are also on average comparable with respect to the whole set of confounders X. Hence, by grouping together individuals with similar value of the propensity score, then running the regression separately on each of the resulting strata one gets rid of the problem raised by the difference in the composition of the two groups with respect to X.

The main confounders that we controlled for were the following: i) employment status in each of the 36 months before the start of the courses (Heckman *et al.* 1999)¹⁰; ii) the occupation of highest social standing as measured by ESEC scheme (Rose and Harrison 2010) among those performed during the 36 months prior to the start of the course; iii) the economic sector of occupation corresponding to the longest spell of employment; iv) the social standing of that occupation; and v) the labour income earned in each of the three years before the intervention. Moreover, we controlled for some socio-demographic characteristics of the individuals, namely: citizenship, gender, age and, though only for the SECs, level of education¹¹. Figure 1 shows the distribution of the propensity score separately for participants and controls¹².

[FIGURE #[1]]

The average propensity score for participants in ALCs was .011, while it was .003 for controls (Table 3). An even larger difference emerges for SECs, because the average propensity score for participants was .056 whereas that for controls was .009 (Table 3). To account for these differences, we resorted to BRA. That is, we split the ALCs sample into 7 blocks and the SECs sample into 3 blocks based on the value of the propensity score and the number of

¹⁰ Pre-intervention labour market history is a reliable proxy for the unobservables responsible for selection bias, i.e. the unobservables relevant for the post-programme outcome and correlated with self-selection into the programme.

¹¹ We did not control for the educational credentials of ALCs participants due to the lack of such information for the large majority of them. See footnote (5) above.

¹² Diagnostics on the balancing property of the estimated p-score are in appendix, Table A3.

observations¹³. As documented in Table 3, the degree of comparability between treated and controls *within* each block was much higher than in the overall sample. Then, as an additional round of bias reduction, we ran a regression of the outcome on the treatment status separately on each block, controlling for the very same set of confounders included in the propensity score.

This way, we made use of the observable confounders twice: first, to define blocks of individuals similar with respect to the propensity score, i.e. comparable with respect to all the confounders included in the propensity score; second, by controlling for the very same set of confounders in each block specific regression of the outcome on the treatment status.

[TABLE #[3]]

Finally, we got the overall estimate of the ATT by taking the weighted average of the block specific estimates:

$$(2) \text{ ATT} = \sum_j w_j \text{ ATT}_j$$

the index j running over blocks; ATT_j the OLS estimate for the j -th block; w_j the ratio of the number of treated units in the j -th block to the total number of treated units. The sampling variance of ATT is:

$$(3) \text{ Var}\{\text{ATT}\} = \sum_j w_j^2 \text{ var}\{\text{ATT}_j\}$$

$\text{var}\{\text{ATT}_j\}$ the standard OLS sampling variance for the j -th block.

4. Results

In this section, we present the results of our analyses. First, we report the impact of ALCs and SECs on the participants' probability of being employed in the period running from three to thirty-six months after the starting date of the course. Second, we deal with the cost benefit analysis by comparing the costs borne by AL and SE to

¹³ Blocks with few observations were excluded from the analysis because of the high variability of the estimates. Therefore, the numbers of individuals actually studied (see Tables 4 and 5 below) were lower than those appearing in Table 1.

arrange their respective programmes, on the one hand, and the private (labour incomes earned by the participants) and public (income tax returns and saved unemployment transfers) returns to these programmes, on the other.

4.1 Effects on employment

The overall pattern of the impact is presented in Fig. 2 (the comparison group is selected by kernel matching). Three months after their beginning, the overall impact of ALCs on participants' employment probability (i.e. ATT) is negative (Table 4). This is the standard lock-in effect resulting from attendance of the training programmes. On average, participants can spend far less time looking for a job – as well as working if they are able to find a job – than persons not attending a training course. Therefore, also their employment probability is lower (Van Ours 2004). However, from twelve to thirty-six months after their beginning, ALCs significantly increase – though to a slightly declining extent – the participants' chances of being employed (Table 4).

[FIGURE #[2]]

This average impact and its evolution over time vary substantially according to age, gender and citizenship. Older participants suffer a weaker lock-in effect, and gain more and for a longer period than do their younger counterparts (Table 4). The same holds for women in comparison to men, while there are no remarkable differences between Italians and migrants. In light of these results, one should not be surprised to see that older women derive greater advantage from participation in AL training programmes than both younger women and, above all, younger men (Table 4). Regarding the latter, one should say that ALCs do not exert any positive impact on their employment chances. By contrast, older men – at least in the long run, i.e. 36 months after the beginning of the ALCs – record a remarkable positive effect on their chances of being at work (Table 4). Taking participants' gender and citizenship together, the size of the sample for each subgroup shrinks down so that results must be taken with a grain of salt. Nonetheless, some results worth consideration emerge. It turns out that ALCs impacts are more pronounced among Italian women, followed, though only after one year and not later, by migrant women and, at the end of our observation window (i.e. thirty-six months after the beginning of the programmes) by migrant men.

Overall, it seems that ALCs have a positive and rather persistent impact on the weakest components of the local labour force: that is, first, older (and, likely, poorly qualified) Italian women and, second, older migrant men, quite often performing manual jobs.

[TABLE #[4]]

Turning to the impact of SECs, we limit our remarks to the overall effects of the programme at specific points in time both because of the small sample size and because the higher degree of homogeneity of this group of participants.

As the SECs are quite long, their lock-in effect is definitely more pronounced, extending over six months since the beginning of the programme (Table 5). One year after that date, the participants in SECs display a probability of having a job 17.2 percentage points higher than the corresponding probability of the members of the control group. This effect is even stronger after two years and remains very high also at the end of our three-year observation window (Table 5).

[TABLE #[5]]

In light of the above remarks, it can be maintained that both the lock-in effect and the subsequent positive impact of SECs are larger and more persistent than those of ALCs (Table 4, first line). Unfortunately, we are not able to ascertain whether the more pronounced and longer positive effects of SECs depend on their longer duration, the higher level of schooling of their participants, or the kinds of occupations for which they provide training. However, it seems reasonable to assume that these three variables are reciprocally integrated. The higher the level of schooling of participants and the longer the duration of a training programme, the larger the amount of human capital that can be transmitted and the greater the chances of finding a job.

4.2 Cost-benefits analysis

The largely positive effect of ALCs and SECs on the probability of finding a job does not necessarily imply that the economic benefits deriving from the increased employment chances of treated individuals compensate for the costs of the programme. Therefore, one can wonder whether the two sets of training programmes represent a fruitful investment of public money.

To answer this question we estimated the economic returns to ALCs and SECs for both participants and the Public Administration.

The main (even if not the only one; see the discussion below) economic gain for participants was represented by the income they earned after finding a job. We consider gross rather than net earnings, because the former reflect all the economic aspects included in the contracts signed by treated (and controls) when they are hired. Moreover, the taxes paid on earned income – that is to say, the main possible public economic benefit produced by the programme – are computed on its gross amount. To be borne in mind is that our estimates of the impacts on the individuals' earned gross incomes and the tax returns to Public Administration are limited to the treated individuals obtaining jobs as employees, consistently with the estimation of the effects of ALCs and SECs on employment probability.¹⁴

[FIGURE #[3]]

The pattern over time of the impact is represented in Fig. 3 (here the comparison group is selected by kernel matching). Our impact evaluation shows that both ALCs and SECs exert an overall positive impact on earnings¹⁵.

[TABLE #[6]]

Both in 2010 and in 2011 (i.e. during the year in which the course took place and the subsequent one)¹⁶ ALCs participants earned on average around 700 euros more than the members of the control group. This positive effect slightly decreased two years after the beginning of the course (+554 euros) and disappeared in the third year (Table 6). The average overall impact in these four years (2010-2013) was around 2,250 euros. This aggregate impact was concentrated on older individuals (+3,303 euros over the four-year observation window) and on women (+4,299 euros). By contrast, younger persons and men did not record any significant economic advantage in comparison with their counterparts in the control group. It is also worth noting that migrants derived a slightly larger economic benefit from the programme compared to Italians (Table 6). It is even more interesting that older women (+4,339 euros) and migrant women (+5,696 euros) gained much more from participation in ALCs than, respectively,

¹⁴ As said in section 3.1, the reason why the main analyses were restricted to employees was the lack of information on the self-employed in the COB archive. However, we carried out some robustness checks on the economic benefits of the courses including also self-employed persons. See section 4.3 below.

¹⁵ Employment income reported by the tax returns data set also includes unemployment benefits. This does not affect the ATT on employment income, because, as we shall see later, the amount of unemployment benefit is almost the same for treated and controls (Table 9).

¹⁶ As said in section 3.1, income data are recorded on a yearly basis. This means that they may report incomes earned in the year of the course, but in periods subsequent to its conclusion. For this reason, we also took into account the income possibly earned during the year in which the individual training courses started. Hence, the column heading “first year” in Tables 6 and 7 refers to the period between January and December of the year following the start of the programme. Quite obviously, “second year” and “third year” refer, respectively, to two years and three years after the start of the courses.

younger women (+3,336 euros) and Italian women (+ 3,704 euros), while – as implicitly stated above – no economic advantage at all was recorded among men of whatever age and citizenship (Table 6).

These results are consistent with those emerging from the impact evaluation of the ALCs on occupational chances. In both cases, the largest effects of the programme are observed among the weakest components of the labour force, that is to say, older women and migrant women. Migrant men represent the only apparent exception to this regularity. The positive impact on their probability of finding a job is not matched by a corresponding impact on their earnings. This finding may be due to the fact that many migrant men usually perform low paid and rather precarious jobs, quite often performed in the informal sector. Obviously, these jobs do not yield much more money than that earned by the corresponding component of the controls.

[TABLE #[7]]

Turning to the SECs, to be noted is that they display a rather large negative impact in the year in which the course started (Table 7). This is a straightforward implication of the large lock-in effect of the programmes, which, in turn depends on their long duration. However, in the two following years, the effect of SECs on gross earnings is distinctly larger than that of ALCs. Participants in SECs earn around 3,800 euros more than the control group in the year after the course, and this gain remains rather stable in the next year (Table 7). The larger impact of SECs on earnings evidently derives from the higher social standing enjoyed and the higher level of skills required by the occupations entered. These occupations usually guarantee more stability and higher earnings than those on average obtained by ALCs participants.

The impact on gross earnings of participants in the ALCs and SECs should entail an economic benefit also for the Public Administration. At least in principle, higher gross earnings imply higher tax returns. This is what actually happened in our case.

[TABLE #[8]]

We estimated the average impact of ALCs and SECs on income tax revenues per year, over the entire observation window, that is to say, over four years (2010-2013) for ALCS and three years (2010-2012 and 2011-

2013) for SECs. In both cases, the impact was positive (Table 8). On average, each ALCs participant paid 126 euros per year of taxes on earned income more than his/her control counterparts, while each of those treated by SECs paid 318 euros more per year. Relying on these values, one can estimate that thanks to ALCs and SECs the overall impact on tax revenues over the whole time window we consider has been 521,028 euros¹⁷.

As mentioned earlier, a second possible benefit for the Public Administration produced by the impact of the ALCs and SECs on the employment chances of participants may derive from a reduction of the expenditure on unemployment benefits (UBs). This impact was estimated over the whole periods during which we observed the two sets of courses, as done in the case of tax revenues. We obviously took into account all the specific UBs in force during the above periods and the number of treated and controls who received one of them. Regarding the UBs, it should be recalled that – as said in Section 2 – the unemployed persons resident in the province of Trento, besides the national benefits (Ferrera 2012, Mazzarella *et al.* 2014)¹⁸, are eligible for further local transfers¹⁹. Unfortunately, the section of the archive of the Italian Social Security Institute (INPS) that we were able to access contains information only on the number of days during which individuals received the national measures. By contrast, the administrative archive containing the local additional UBs records only the amount of money transferred to the beneficiaries. Therefore, we used the duration (in number of days) of the benefit as the outcome for the estimation of the impact on national UBs, and the amount of money for the estimation of the impact on local UBs. In both cases the estimated impact was negligible (see Table 9).

[TABLE #[9]]

This result can be explained by recalling that in Italy the eligibility for UBs depends both on the unemployment status and on other requisites such as the duration of the employment spell before the onset of unemployment and the amount of payments made to INPS by individual workers and their employers. Therefore, it

¹⁷ This is simply the result of the following sum ((126 euros * 818 participants * 4 years) + (318 euros * 114 participants * 3 years)).

¹⁸ Between 2010 and 2013, Italian UBs underwent several changes. From 2010 to 2012 the *Indennità di disoccupazione Ordinaria* (Ordinary Unemployment Benefit) and the *Indennità di disoccupazione a requisiti ridotti* (Reduced Unemployment Benefit), issued in 1988 by law 160, represented the two basic national subsidies provided for the unemployed. In 2013, *ASpI* (Employment Social Security) and *Mini-ASpI* (Reduced Employment Social Security), issued by law 92/2012, replaced them. During the entire period, a further measure, called *Liste di Mobilità* (Mobility Lists), issued by law 223/1991, was in force for workers with permanent jobs and collectively dismissed by firms with at least 16 employees.

¹⁹ See footnote 9 above.

could happen that several persons in the control groups, though experiencing frequent and long-lasting unemployment spells, are not eligible for the UB.

Putting all the previous results together, calculations for the cost benefits analysis are straightforwardly performed by comparing the average impact on individual gross earning with the per capita amount of the costs borne by the two branches of the PaT to arrange their respective programme.

[TABLE #[10]]

During the year of the ALCs course and over the three subsequent ones, the cumulated average impact for each treated (2.2 thousand euros) turns out be lower than the per capita costs borne (4.8 thousand euros) by AL. Therefore, three years after the start of the programme ALCs record a per capita deficit of 2.6 thousand euros (Table 10). SECs yielded higher benefits (4.1 thousand euros) for their participants. However, SECs are also much more expensive (14.5 thousand euros per capita). Therefore, at the end of the observation period they register a sizeable deficit amounting to 10.4 thousand euros for each participant (Table 10).

4.3 Robustness checks

To strengthen the reliability of our analyses, we conducted some sensitivity checks. They were intended to prove that our results were not affected by either excluding individuals with missing data on labour income from the sample or by dropping the self-employed.

As specified in sec. 3.2, we performed the analyses of the impacts of ALCs and SECs on employment probability and on earnings excluding from the sample individuals recorded as employed in the COB archive, but not recorded in the tax revenues archive. This peculiar situation may be due to a mismatch between the two administrative archives or, alternatively, to a residence move to other Italian regions. Whatever the reason, it might be that excluding these individuals from the analysis affected our results. To exclude this possibility we replicated the analyses taking also these individuals into account.

[TABLE #[11]]

The new sets of results confirm those obtained previously. The sign and the size of ALCs and SECs impacts on the employment probability of treated and their pattern over time (Table 11) largely correspond to those estimated on the basis of our preferred sample (Tables 4 and 5).

[TABLE #[12]]

The same holds for the estimates of the impact of ALCs and SECs on earnings. The analysis carried out including in the sample individuals lacking the relevant information, after imputing them a null income, quite obviously produced results (Table 12) not greatly different from those obtained in our previous estimations (Tables 6 and 7). More precisely, the overall size of the two sets of effects and their trends over time largely overlap.

We turn now to our second robustness check. In section 4.2, we paid attention only to earnings from employment. As already stressed, we did so to be consistent with the analysis regarding the probability of being employed, which was limited to employees because of the lack of any information on self-employment. However, it might be that the chances of becoming self-employed differed between treated and controls, which would result in a bias of our estimate of the impact on earnings. Fortunately, the tax revenues archive provides information also on earnings from self-employment. Consequently, we can check whether the impact of ALCs and SECs on earnings changes when also the latter are taken into account.

[TABLE #[13]]

This issue does not affect our results. The effects of ALCs and SECs on the gross income of both employees and self-employed (Table 13) are very close to those obtained using only data regarding the former (Tables 6 and 7).

5. Discussion and concluding remarks

This paper has presented the results of an evaluation of the impact on employment probability and on gross earnings of long vocational training programmes, organised by two branches of the *Provincia Autonoma di Trento* in 2010 and 2011. This study has been complemented by a cost-benefit analysis. To put our results in perspective, one must take into account that the PaT is by no means representative of the whole country. There are several features of this

province making it peculiar in the Italian scenario, starting from the special statute of administrative autonomy it has been awarded since the early Seventies of the XX century. Anecdotal evidence suggests that organizational efficiency of the local administration, degree of civicness, overall economic performance concur to place this province among the top performers of the country. The qualitative implication we draw is that this is a place in which an active labour market program finds the best conditions to work. In this sense, our results should be taken as a best case for the cost-benefit analysis of training programmes.

We first paid attention to the private (i. e. gross labour earnings) and public gains (i.e. tax revenues and savings on UB) caused by these courses. We then compared these benefits to the costs borne by the Public Administration to arrange those programmes.

The analyses show an overall positive impact of the programmes on the probability of having a job as well as on gross earnings. The effect on employment of both ALCs and SECs lasted over the entire observation windows that we considered. The same holds for earnings of participants in SECs, while the impact of ALCs on this outcome turns statistically not significant - albeit still positive - in the third year after the start of the programme. However, these average impacts are decidedly heterogeneous across both courses and socio-demographic groups. SECs displayed effects on both employment and earnings larger than those recorded by ALCs. The reason for this disparity is the longer duration of SECs, the higher level of schooling required to participate in them, and the type of occupations – higher-grade routine non-manual jobs and intermediate technical roles – for which they provide training. On their side, ALCs had a distinctly stronger impact on older women, foreign women, and – at least for the employment probability – non-Italian men. Overall, it can be maintained that participation in ALCs has been most fruitful for the weakest components of the local labour force, as has been shown by Card et al. 2015.

Unfortunately, these positive effects on employment and earnings do not match the results of the cost-benefit analysis. The latter shows that the average gains obtained from ALCs and SECs in a period, respectively, of four and three years, did not cover the relevant costs. The aggregate monetary returns to both participants and Public Administration were far from negligible. Those of ALCs amounted to about 2.0 million euros and those of SECs to almost .5 million euros. Nonetheless, the aggregate costs of the former were close to 4 million euros and those of the latter amounted to about 1.7 million euros.²⁰ In both cases, the size of the economic deficit is striking.

²⁰ Table A2 of the statistical appendix sets out the exact amounts of benefits and costs mentioned in the main text above.

One could obviously object that our cost-benefit analysis is incomplete for at least three main reasons. First, one cannot exclude that the effects on gross earnings and tax revenues of SECs continued for further years after those we considered. While we cannot disregard this criticism, it seems quite difficult to fully accept it. To cover all costs, the effects of SECs on earnings and tax revenues should have remained stable, at the same level observed in the third year after their beginning, for four additional years. A performance that appears rather unlikely.

Second, our analyses have not paid attention to other possible economic returns to ALCs and SECs, such as a reduction of Public Administration expenditure on the local anti-poverty measure (Schizzerotto *et al.* 2014),²¹ stemming from an increase in the family income of formerly unemployed individuals. This is sensible in principle but likely to be empirically negligible. Recently collected data show that only 5% of the individuals participating in the 2013 edition of ALCs were beneficiaries of the local anti-poverty measure. Moreover, it should be taken into account that, according to the regulations on this measure, the unemployed granted a monetary subsidy continue to receive it for four months after finding a job. Therefore, the possible savings for the local Public Administration deriving from the reduction of the beneficiaries of the anti-poverty measure among ALCs attendants should have been close to zero. The same should hold for the young, highly-educated Italians participant in SECs. In 2011, only 1.3% of the beneficiaries of the local anti-poverty measure displayed the socio-demographic features that characterised young people trained in SECs.

Third, we have completely ignored the value of other indirect benefits of ALCs and SECs. Indeed, it could be argued that training programmes may generate a reduction in the risks of couples' dissolution and an increase in the level of social cohesion by strengthening the interpersonal networks of persons formerly unable to reciprocate friends' invitations to home lunches, coffee bars, pubs, restaurants, and so on. Moreover, there is a literature arguing that unemployment may cause an array of health problems (see for instance Clark and Oswald, 1994) which in turn result in a cost to the national health system. Along this line of reasoning, any policy reducing the risk of unemployment in the end is also a policy reducing the public expenditure in health care.

Summing up, the imbalance we found between economic returns to these training programs and their costs might be too large. Nonetheless, since the public budget constraints cannot be ignored finding a way to reduce the imbalance between economic returns and costs of future editions of ALCs and SECs would be most valuable. On the

²¹ Since 2009, the PaT has guaranteed sizeable monetary transfers to individuals and families with yearly disposable equivalent incomes lower than 6,500 euros.

costs side this could be achieved by reducing/dropping the bonus participants receive to attend the course.²² On the economic returns side improving the targeting would be most effective, focusing the training program on the subpopulations gaining the most from participation, namely women and foreign people. Of course, also a revision of the content of the courses and the occupations addressed could be useful and have positive impacts on young people and Italians.

In light of the above remarks, we can answer in the affirmative the question asked in the title of this paper, conditionally on a reduction of the costs of the training courses as well as on accurate targeting of their beneficiaries and the types of occupation addressed.

Appendix

[TABLE #[A1]]

[TABLE #[A2]]

[TABLE #[A3]]

²² They are worth 1,3 million euros for ALCs and 274K euros for SECs.

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Figure 1. Distribution of the propensity score for treated and controls in ALCs (left graph) and SECs (right graph).

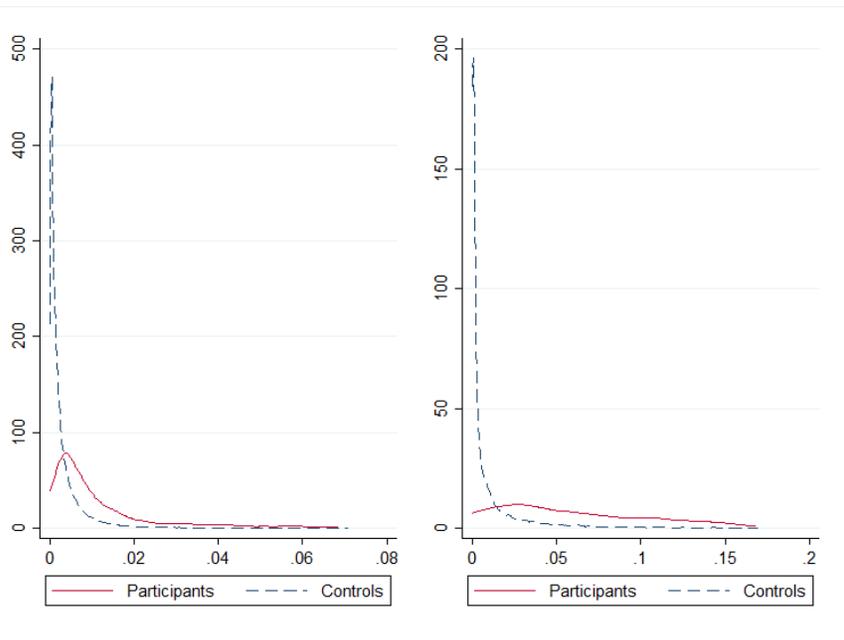


Figure 2. Impact of the training programmes ALCs (left) and SECs (right) on the probability to be at work over the 36 months since the beginning of the course (kernel matching).

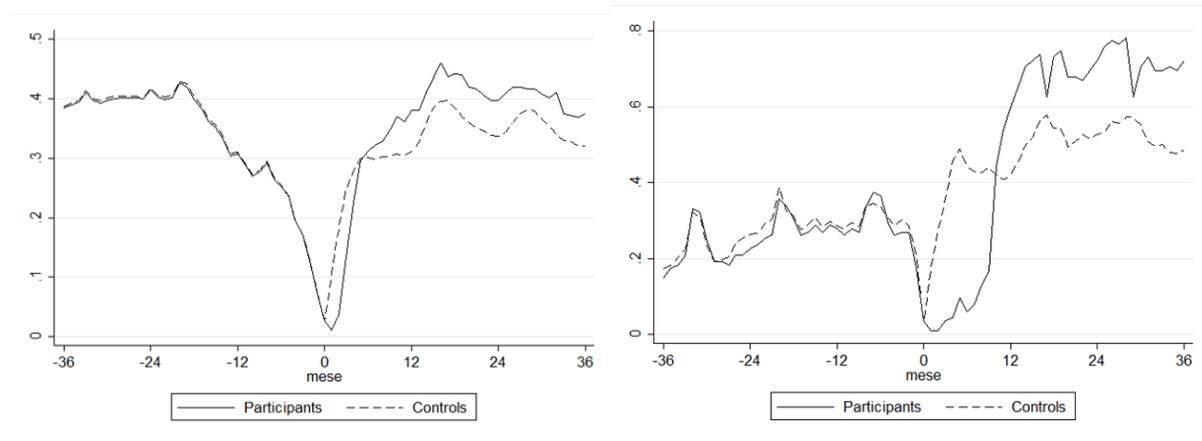


Figure 3. Impact of the training programmes ALCs (left) and SECs (right) on gross yearly earnings over four (ALCs) and three (SECs) years since the beginning of the course (kernel matching).

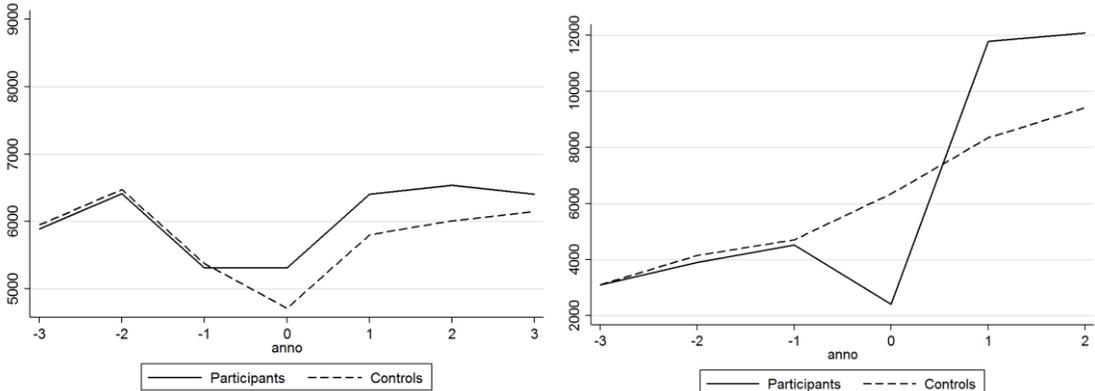


Table 1. Number of courses, number of participants, average duration and average per capita cost (in thousands euros) by administrative branch of PaT and occupational category addressed by COURSES.

Administrative branch and occupational category	Number of courses	Number of participants	Average duration (days)	Average duration (hours)	Average per capita cost
<i>AL</i>					
Higher-grade routine non-manual occupations	15	270	93	384	3.2
Lower-grade routine non-manual occupations	20	322	97	366	3.9
Skilled manual occupations	29	362	109	448	6.8
<i>Total</i>	64	954	100	410	4.8
<i>SE</i>					
Higher-grade routine non-manual occupations	10	150	236	989	13.3
Intermediate technical occupations	5	55	276	950	17.9
<i>Total</i>	15	205	246	979	14.5

Table 2. Socio-demographic composition of our final sample of participants by group of training programmes. Percentages.

Participants	ALCs	SECs
Women	39.4	72.3
Italian citizens	52.1	99.2
People aged 34 or less	55.2	98.5
Number of observations	823	130

Table 3. Average propensity score in each block by treatment status.

Number of blocks	ALCs		SECs	
	Treated	Controls	Treated	Controls
1	0.003	0.001	0.026	0.006
2	0.006	0.006	0.083	0.078
3	0.010	0.010	0.136	0.138
4	0.019	0.019		
5	0.035	0.034		
6	0.049	0.048		
7	0.062	0.062		
<i>Total</i>	0.011	0.003	0.056	0.009

Table 4. ALCs overall and specific impacts on participants' probability of being employed. ATT at selected months from the beginning of the course. Standard error in brackets.

Socio-demographic characteristics of participants.	Months since beginning of the course					Number of obs.	
	3	6	12	24	36	Treated	Controls
All	-0.109*** (0.014)	0.015 (0.015)	0.068*** (0.016)	0.059*** (0.016)	0.051*** (0.016)	818	17,236
Age							
17-34	-0.123*** (0.020)	0.029 (0.021)	0.050** (0.022)	0.031 (0.022)	0.033 (0.022)	447	7,367
35-60	-0.096*** (0.021)	-0.012 (0.022)	0.090*** (0.022)	0.095*** (0.023)	0.082*** (0.023)	362	9,866
Gender							
Women	-0.080*** (0.023)	0.051** (0.024)	0.119*** (0.025)	0.096*** (0.026)	0.069*** (0.026)	321	6,870
Men	-0.134*** (0.018)	-0.013 (0.020)	0.038* (0.020)	0.040** (0.021)	0.043** (0.020)	487	8,025
Citizenship							
Italian	-0.117*** (0.020)	0.024 (0.021)	0.083*** (0.022)	0.064*** (0.023)	0.041* (0.023)	423	11,438
Non-Italian	-0.096*** (0.020)	0.012 (0.022)	0.058*** (0.023)	0.066*** (0.023)	0.077*** (0.023)	389	5,012
Age and gender							
Women aged 17-34	-0.086*** (0.031)	0.068** (0.033)	0.106*** (0.035)	0.070* (0.036)	0.048 (0.036)	179	2,937
Men aged 17-34	-0.167*** (0.026)	0.003 (0.028)	0.005 (0.029)	-0.002 (0.030)	0.005 (0.030)	260	3,433
Women aged 35-60	-0.081** (0.036)	-0.008 (0.038)	0.126*** (0.039)	0.122*** (0.040)	0.092** (0.040)	131	3,492
Men aged 35-60	-0.113*** (0.028)	-0.034 (0.032)	0.060* (0.031)	0.056* (0.031)	0.080*** (0.030)	220	4,286
Citizenship and gender							
Italian women	-0.090*** (0.028)	0.049* (0.030)	0.118*** (0.031)	0.091*** (0.032)	0.048 (0.032)	217	4,155
Non-Italian women	-0.039 (0.044)	0.071 (0.046)	0.106** (0.048)	0.062 (0.050)	0.051 (0.049)	83	1,820
Italian men	-0.137*** (0.030)	-0.002 (0.032)	0.035 (0.032)	0.039 (0.033)	0.015 (0.033)	192	5,091
Non-Italian men	-0.114*** (0.024)	0.000 (0.026)	0.040 (0.027)	0.043 (0.027)	0.055** (0.026)	294	2,589

*** p<0.01, ** p<0.05, * p<0.1

Table 5. SECs overall impact on participants' probability of being employed. ATT at selected months from the beginning of the course. Standard error in brackets.

Training programme	Months since beginning of the course					Number of obs.	
	3	6	12	24	36	Treated	Controls
SEC	-0.325*** (0.046)	-0.359 *** (0.047)	0.172 *** (0.049)	0.272 *** (0.050)	0.282 *** (0.050)	114	1,452

*** p<0.01, ** p<0.05, * p<0.1

Table 6. ALCs overall and specific impacts on participants' earnings (euros). ATT at selected years from the beginning of the course. Standard error in brackets.

Socio-demographic characteristics of participants.	Year of the course	First year after	Second year after	Third year after	Total	Number of obs.	
						Treated	Controls
All	675 *** (136)	698*** (213)	554** (240)	320 (260)	2,247 ** (726)	818	17,236
Age							
17-34	495 *** (182)	290 (293)	252 (332)	-221 (366)	815 (998)	447	7,367
35-60	707 *** (217)	962*** (320)	838** (356)	797** (380)	3,303 *** (1,093)	362	9,866
Gender							
Women	1,022 *** (201)	1,388 *** (312)	1,150*** (359)	739* (390)	4,299 *** (1,074)	321	6,870
Men	466 ** (195)	291 (303)	290 (334)	147 (362)	1,193 (1,025)	487	8,025
Citizenship							
Italian	696 *** (200)	968*** (313)	581* (354)	186 (386)	2,432 ** (1,076)	423	11,438
Non-Italian	689 *** (183)	494* (281)	747** (312)	819** (340)	2,750 *** (942)	389	5,012
Age and gender							
Women aged 17-34	861 *** (262)	1,001** (431)	1,156** (496)	348 (546)	3,366 ** (1,472)	179	2,937
Men aged 17-34	198 (253)	-316 (409)	-480 (461)	-769 (509)	-1,367 (1,391)	260	3,433
Women aged 35-60	960 *** (325)	1,551*** (464)	844 (560)	983* (598)	4,339 *** (1,672)	131	3,492
Men aged 35-60	718 ** (310)	355 (477)	626 (501)	725 (533)	2,424 (1,555)	220	4,286
Citizenship and gender							
Italian women	977 *** (251)	1,313*** (393)	869* (453)	545 (491)	3,704 *** (1,219)	217	4,155
Non-Italian women	1194 *** (354)	1,654*** (528)	1,846*** (600)	1,002 (661)	5,696 *** (1,788)	83	1,820
Italian men	512 (324)	767 (505)	385 (564)	-245 (617)	1419 (1,728)	192	5,091
Non-Italian men	632 *** (218)	48 (348)	101 (385)	309 (418)	1,090 (1,162)	294	2,589

*** p<0.01, ** p<0.05, * p<0.1

Table 7. SECs overall impact on participants' employment income. ATT at selected years from the beginning of the course. Standard error in brackets.

Training programme	Year of the course	First year after	Second year after	Total	Number of obs.	
					Treated	Controls
SEC	-3,267 *** (436)	3,838 *** (681)	3,536 *** (771)	4,106 *** (1,658)	114	1,452

*** p<0.01, ** p<0.05, * p<0.1

Table 8. ALCs and SECs overall impact on Public Administration: average annual per capita tax returns from labour earnings. ATT by type of programme. Standard errors in brackets.

Type of programme	ATT
ALCs ^a	126*** (45)
SECs ^a	318** (135)

*** p<0.01, ** p<0.05, * p<0.1

(a)The numbers of observations for treated and control are identical to those reported in the previous tables for both ALCs and SECs

Table 9. ALCs and SECs(a) impact on Public Administration benefits deriving from savings on national UBs (number of subsidized days) and local UBs (amount in euros). Standard error in brackets.

Training programme	National UBs (days)	Local UBs (euro)	Number of observations.	
	ATT	ATT	Treated	Controls
ALC	-2 (6)	49* (26)	818	17,236
SEC	-4 (11)	-28 (64)	114	1,452

(a)ATT values refer to UB cumulated over four years (2010-2013) for ALCs and three years (2010-2012 or 2011-2013, depending on the start date) for SECs

Table 10. Cost-benefit analysis for each participant in the ALCs and SECs(a).

Training programme	Average per capita costs (thousands of euros)	Average per capita impact on gross earnings (thousands of euros; standard errors in parentheses)
ALC	4.8	2.2 (0.7)
SEC	14.5	4.1 (1.7)

(a) Benefits are cumulated over four years (2010-2013) for ALCs and three years (2010-2012 or 2011-2013, depending on the start date) for SECs

Table 11. SECs and ALCs overall impact on participants' probability of being employed, including those missing from the tax returns archive. ATT at selected months. Standard error in brackets.

Training programme	Months since beginning of the course				Number of obs.	
	6	12	24	36	Treated	Controls
ALC	0.009 (0.015)	0.068*** (0.016)	0.061*** (0.016)	0.050 *** (0.016)	833	17,652
SEC	-0.318*** (0.045)	0.182 *** (0.047)	0.263*** (0.050)	0.284 *** (0.050)	113	1,484

*** p<0.01, ** p<0.05, * p<0.1

Table 12. SECs and ALCs overall impact on participants' earnings, including individuals missing from the tax returns archive. ATT at selected years. Standard error in brackets.

Training programme	Year of the course	First year after	Second year after	Third year after	Total	Number of obs.	
						Treated	Controls
ALCs	690*** (135)	728*** (211)	613*** (237)	379 (258)	2,411 *** (720)	833	17,652
SECs	-3,183*** (444)	3,904*** (689)	3,605*** (778)		4,326 *** (1,678)	113	1,484

*** p<0.01, ** p<0.05, * p<0.1

Table 13. ALCs and SECs impact on earnings from both employment and self-employment. ATT at selected years from the beginning of the course. Standard error in brackets.

Programme	Year of the Course	First year after	Second year after	Third year after	Total	Num. of observations	
						Treated	Controls
ALCs	586 *** (142)	647 *** (215)	468 * (242)	197 (262)	1,898 ** (735)	818	17,236
SECs	-3,265 *** (436)	4,007 *** (701)	3,767 *** (783)		4,508 *** (1,701)	114	1,452

*** p<0.01, ** p<0.05, * p<0.1

Table A1. Socio-demographic composition of the original dataset and of our final sample of participants by group of training programmes. Percentages.

Participants	ALCs		SECs	
	Original dataset	Our sample	Original dataset	Our sample
Women	40.0	39.4	73.8	72.3
Italian citizens	47.9	52.1	96.0	99.2
People aged 34 or less	55.3	55.2	98.0	98.5
Number of observations	954	823	205	130

Table A2. Cost-benefit analysis of ALCs and SECs programmes. Benefits are computed in the year of the course and in the three years after the ALCs and in the two years after the SECs.

Training programme	Number of treated	Total cost (thousands of euros)	Total benefit (thousands of euros)
ALCs	818	3,953	1,838
SECs	114	1,657	468

Table A3. Standardized bias and pseudo R² of the p-score before and after matching for ALCs and SECs programmes.

Training programme	Average bias		Pseudo R ²	
	Before matching	After matching	Before matching	After matching
ALCs	21.8	0.6	0.113	0.000
SECs	30.0	3.9	0.245	0.024