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

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Abstract

In recent years, there has been growing demand for interventions in support of employment – such as, for example, training courses targeted on the unemployed. However, given the economic crisis and the deterioration of public expenditure, it is imperative for the public authorities to focus on the support measures most effective in ensuring tangible benefits and the efficient use of taxpayers' money. In regard to active labour policies, not only is it necessary to furnish training courses of real value in terms of enhancing the probability of finding a job; it is also important to focus on the cost-effectiveness of such interventions.

This paper complements the empirical literature on the impact evaluation of training courses, and it aids understanding of their cost-effectiveness by comparing the benefits of training courses with the costs of implementing 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: Training programmes; Policy evaluation; Blocking with regression adjustment; Cost-benefit

JEL classification: D61, D04, J68

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

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 can be considered a crucial scientific and 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).[1] This is even more so in Europe[2] and, above all, in Italy. As stressed by Perotti and Teoldi (2014), the latter still lacks any rigorous cost-benefit analysis of vocational training programmes.

The purpose of this paper is to contribute to filling this gap. 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. Obviously, these courses represent the subject of this study. We first assess their impact 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 possible additional fiscal returns deriving from these effects on earnings; and iii) the possible savings of public money

[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 individuals who have attended them (Smith *et al*. 2009). However, this situation appears less pronounced in the USA than elsewhere. Actually, several papers evaluating active labour programmes and vocational training courses implemented in the USA contain also cost-benefits analyses (see, for instance, Barnow and Smith 2015; Andersson *et al.* 2013; Schochet *et al.* 2008; McConnell and Glazerman 2001; Couch 1992; Bloom *et al* 1997). Further cost-benefits analyses of vocational training courses have been carried out outside the USA, namely in Turkey (Hirshleifer *et al.* 2015), India (Maitra and Maini, 2013), Colombia (Attanasio *et al.* 2011), and Argentina (Elias *et al*. 2004).

[2] To the best of our knowledge, Europe records only three important papers containing cost-benefits analyses of vocational training courses implemented, respectively in Germany (Osikominu 2012), Denmark (Jespersen *et al.* 2008) and Norway (Raaum *et al* 2002).

generated by the reduction of the number of recipients of unemployment benefits. Finally, we compare these effects with the direct costs of the courses.

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 – the *Agenzia del Lavoro* (AL) and the *Servizio Europa* (SE)[3] – of the Province. 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 Province of Trento and comprised 64 different programmes. They can be roughly classified into three categories[5]: 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, carpenters, bricklayers, butchers, and so on).[6] 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 the course until its end. Moreover, we specify that the per capita cost of each type of programme was computed first by summing up all the direct costs regarding planning and organizing, renting classrooms, participants' insurance and allowances[7] and then dividing the resulting amount by the number of participants in the programme.

[3] The AL is the branch of the Autonomous Province of Trento in charge of implementing active and passive labour policies, while the SE is responsible for designing and organising the policies financed by the structural funds of the European Commission.

[4] We carried out some equivalence analyses on the two sets (that of 2010 and that of 2011) of SECs. The controls showed that: i) the contents of the programmes were very similar (i.e. intended to transmit skills related to the performance of white-collar occupations or intermediate technical roles); ii) their duration was the same; iii) their average costs largely overlapped; iv) the age and gender compositions of participants were very close.

[5] The three occupational categories listed in the main text correspond to ISCO.08 main groups 3, 5, and 7.

[6] To be stressed is that eligibility for the large majority of ALCs was not conditional on the possession of specific educational credentials. Only the access to the two courses addressed to white-collar positions required participants to possess high-school diplomas. 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.

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

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 (hours)	Average per capita cost
AL				
Higher-grade routine non-manual occupations	15	270	384	3.2
Lower-grade routine non-manual occupations	20	322	366	3.9
Skilled manual occupations	29	362	448	6.8
Total	64	954	410	4.8
SE				
Higher-grade routine non-manual occupations	10	150	989	13.3
Intermediate technical occupations	5	55	950	17.9
Total	15	205	979	14.5

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 funded by the European Social Fund. Second, attendance on its 15 courses was reserved to unemployed persons possessing 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).[8] 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. Because it was impossible to carry out a randomised trial, we controlled for 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.

[8] Clearly, all the occupations addressed by the SECs belong to ISCO.08 main group 3.

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 attendees, and whether the latter 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 CPI.[9]

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 Province of Trento[10].

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 were retrieved at INPS (Italian Social Security Institute) for its national standard component, and at AL for its local additional component.[11]

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 conditions sufficient 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 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 up to December: that is, one cannot exactly measure the effect of participation in a training course on earnings from the beginning of the course to the

[9] 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.

[10] 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.

[11] 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.

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 have been minor, however, since most training courses started in February or March and most of the participants were unemployed during the previous month(s). Moreover, and more importantly, if the control group properly represented the counterfactual for the treatment group, it should be able to approximate also the earnings of the treated individuals in the months immediately prior to the start of the course. In light of this conventional 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 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 – Socio-demographic composition of our final sample of participants by group of training programmes. Percentages.

Participants	ALC	SEC
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

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 attendants (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.

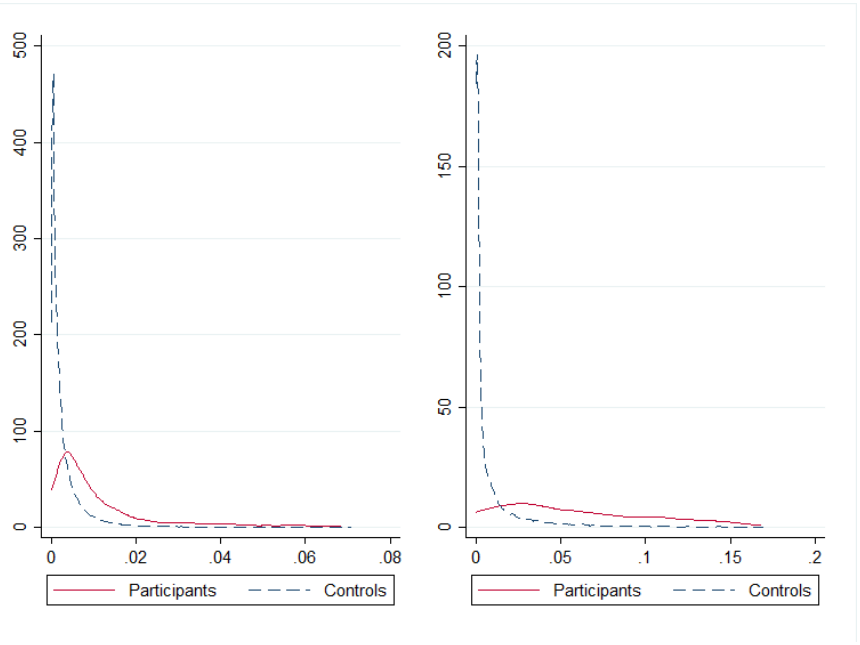
The main confounders that we controlled for were the following: i) employment status in each of the 36 months before the start of the courses[12]; ii) the occupation of highest social standing[13] among those performed during the 36 months prior to the start of the course; iii)

[12] According to Heckman et al. (1999), pre-intervention labour market history is a reliable proxy for the unobservables responsible for selection bias, i.e. it is relevant for the post-programme outcome and correlated with self selection into the programme.

[13] The social levels of occupations were defined according to the ESEC classification scheme (Rose and Harrison 2010).

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 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 education[14]. Figure 1 shows the distribution of the propensity score separately for participants and controls.

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



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 observations[15]. The degree of comparability between treated and controls within each block was much higher than in the overall sample. Then 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.

Finally, the overall estimate of the ATT was performed by taking the weighted average of the block specific estimates using the number of treated units in each block as a fraction of total treated units as weights.

[14] We did not control for the educational credentials of ALCs attendees due to the lack of such information for the large majority of them. See footnote (8) above.

[15]. 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 2.

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		
Total	0.011	0.003	0.056	0.009

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 start date of the course. Second, we deal with the cost benefit analysis by comparing the costs borne by AL and SE to 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

Three months after their beginning, the overall impact of ALCs on participants' employment probability (i.e. ATT) is negative (Table 4). Obviously, this result quite simply reflects the lock-in effect of attendance itself on 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).

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 from ALCs attendance (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 in work (Table 4). Taking participants' gender and citizenship together, 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 long 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. The lack of any systematic effect among foreign women may be tentatively attributed to the fact that several of them are hired intermittently and for rather short periods.

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***	0.015	0.068***	0.059***	0.051***	818	258,533
	0.014)	*(0.015)*	*(0.016)*	*(0.016)*	*(0.016)*		
Age							
17-34	-0.123***	0.029	0.050**	0.031	0.033	447	110,505
	0.020)	*(0.021)*	*(0.022)*	*(0.022)*	*(0.022)*		
35-60	-0.096***	-0.012	0.090***	0.095***	0.082***	362	147,985
	0.021)	*(0.022)*	*(0.022)*	*(0.023)*	*(0.023)*		
Gender							
Women	-0.080***	0.051**	0.119***	0.096***	0.069***	321	103,056
	0.023)	*(0.024)*	*(0.025)*	*(0.026)*	*(0.026)*		
Men	-0.134***	-0.013	0.038*	0.040**	0.043**	487	120,370
	0.018)	*(0.020)*	*(0.020)*	*(0.021)*	*(0.020)*		
Citizenship							
Italian	-0.117***	0.024	0.083***	0.064***	0.041*	423	171,565
	0.020)	*(0.021)*	*(0.022)*	*(0.023)*	*(0.023)*		
Non-Italian	-0.096***	0.012	0.058***	0.066***	0.077***	389	75,187
	0.020)	*(0.022)*	*(0.023)*	*(0.023)*	*(0.023)*		
Age and gender							
Women aged 17-34	-0.086***	0.068**	0.106***	0.070*	0.048	179	44,061
	0.031)	*(0.033)*	*(0.035)*	*(0.036)*	*(0.036)*		
Men aged 17-34	-0.167***	0.003	0.005	-0.002	0.005	260	51,495
	0.026)	*(0.028)*	*(0.029)*	*(0.030)*	*(0.030)*		
Women aged 35-60	-0.081**	-0.008	0.126***	0.122***	0.092**	131	52,381
	0.036)	*(0.038)*	*(0.039)*	*(0.040)*	*(0.040)*		
Men aged 35-60	-0.113***	-0.034	0.060*	0.056*	0.080***	220	64,283
	0.028)	*(0.032)*	*(0.031)*	*(0.031)*	*(0.030)*		
Citizenship and gender							
Italian women	-0.090***	0.049*	0.118***	0.091***	0.048	217	62,324
	0.028)	*(0.030)*	*(0.031)*	*(0.032)*	*(0.032)*		
Non-Italian women	-0.039	0.071	0.106**	0.062	0.051	83	27,297
	0.044)	*(0.046)*	*(0.048)*	*(0.050)*	*(0.049)*		
Italian men	-0.137***	-0.002	0.035	0.039	0.015	192	76,372
	0.030)	*(0.032)*	*(0.032)*	*(0.033)*	*(0.033)*		
Non-Italian men	-0.114***	0.000	0.040	0.043	0.055**	294	38,833
	0.024)	(0.026)	(0.027)	(0.027)	(0.026)		

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

Turning to the impact of SECs, it has to be stressed that the very strong socio-economic homogeneity of the treated makes it very difficult to carry out analyses on specific sub-groups of treated. Therefore, we limit our remarks to the overall effects of the programme at specific points in time.

As the SECs are quite long, their lock-in effect is definitely wide and extends 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 - 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***	-0.359 ***	0.172 ***	0.272 ***	0.282 ***	114	11,616
	(0.046)	*(0.047)*	*(0.049)*	*(0.050)*	*(0.050)*		

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

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 that we studied represent a fruitful investment of public money.

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

Quite obviously, the most important possible economic gain for the participants was represented by the income that they earned after finding a job. We paid attention to 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 the 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.[16]

[16] 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.

Table 6 – ALCs overall and specific impacts on participants' earnings. 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 ***	698***	554**	320	2,247 **	818	258,533
	(136)	*(213)*	*(240)*	*(260)*	*(726)*		
Age							
17-34	495 ***	290	252	-221	815	447	110,505
	(182)	*(293)*	*(332)*	*(366)*	*(998)*		
35-60	707 ***	962***	838**	797**	3,303 ***	362	147,985
	(217)	*(320)*	*(356)*	*(380)*	*(1,093)*		
Gender							
Women	1,022 ***	1,388 ***	1,150***	739*	4,299 ***	321	103,056
	(201)	*(312)*	*(359)*	*(390*	*(1,074)*		
Men	466 **	291	290	147	1,193	487	120,370
	(195)	*(303)*	*(334)*	*(362)*	*(1,025)*		
Citizenship							
Italian	696 ***	968***	581*	186	2,432 **	423	171,565
	(200)	*(313)*	*(354)*	*(386)*	*(1,076)*		
Non-Italian	689 ***	494*	747**	819**	2,750 ***	389	75,187
	(183)	*(281)*	*(312)*	*(340)*	*(942)*		
Age and gender							
Women aged 17-34	861 ***	1,001**	1,156**	348	3,366 **	179	44,061
	(262)	*(431)*	*(496)*	*(546)*	*(1,472)*		
Men aged 17-34	198	-316	-480	-769	-1,367	260	51,495
	(253)	*(409)*	*(461)*	*(509)*	*(1,391)*		
Women aged 35-60	960 ***	1,551***	844	983*	4,339 ***	131	52,381
	(325)	*(464)*	*(560)*	*(598)*	*(1,672)*		
Men aged 35-60	718 **	355	626	725	2,424	220	64,283
	(310)	*(477)*	*(501)*	*(533)*	*(1,555)*		
Citizenship and gender							
Italian women	977 ***	1,313***	869*	545	3,704 ***	217	62,324
	(251)	*(393)*	*(453)*	*(491)*	*(1,219)*		
Non-Italian women	1194 ***	1,654***	1,846***	1,002	5,696 ***	83	27,297
	(354)	*(528)*	*(600)*	*(661)*	*(1,788)*		
Italian men	512	767	385	-245	1419	192	76,372
	(324)	*(505)*	*(564)*	*(617)*	*(1,728)*		
Non-Italian men	632 ***	48	101	309	1,090	294	38,833
	(218)	*(348)*	*(385)*	*(418)*	*(1,162)*		

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

Our impact evaluation shows that both ALCs and SECs exert an overall positive impact on earnings.[17] Both in 2010 and in 2011 (i.e. during the year in which the course took place and the subsequent one)[18] ALCs participants earned 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

[17] 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).

[18] 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.

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 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 greater 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, 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. Obviously, these jobs do not yield much more money than that earned by the corresponding component of the controls.

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 ***	3,838 ***	3,536 ***	4,106 ***	114	11,616
	(436)	*(681)*	*(771)*	*(1,658)*		

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

Turning to the SECs, to be noted is that they display a rather large negative impact in the year of the start of the programme (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 stability and earnings greater 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 - ALCs and SECs overall impact on Public Administration: average annual per capita tax returns from labour earnings. ATT value 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

We estimated the overall impact of ALCs and SECs on income tax revenues 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 has been 521,028 euros[19].

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 possible 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,[20] are eligible for further local money transfers.[21] 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 - 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	49*	818	258,533
	(6)	*(26)*		
SEC	-4	-28	114	11,616
	(11)	*(64)*		

(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

This result can be explained by recalling that in Italy the eligibility for UBs depends both on unemployed 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 could happen that several persons in the control groups, though experiencing frequent and long-lasting unemployment spells, are not eligible for the UB.

[19] This is simply the result of the following sum ((126x818x4) + (318x114x3)).

[20] 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. For more detailed information on Italian legislation regarding unemployment benefits see Ferrera (2012) and Mazzarella *et al.* (2014).

[21] See footnote (13) above.

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 - 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)
ALC	4.8	2.2
SEC	14.5	4.1

(a)As stated in the main text, 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

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 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, the analyses of the impacts of ALCs and SECs on employment probability and on earnings were conducted 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 - 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 6	12	24	36	Number of obs. Treated	Controls
ALC	0.009	0.068***	0.061***	0.050 ***	833	264,787
	(0.015)	*(0.016)*	*(0.016)*	*(0.016)*		
SEC	-0.318***	0.182***	0.263***	0.284 ***	113	11,871
	(0.045)	*(0.047)*	*(0.050)*	*(0.050)*		

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

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 - 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	Number of obs. Controls
ALC	690***	728***	613***	379	2,411 ***	833	264,787
	(135)	*(211)*	*(237)*	*(258)*	*(720)*		
SEC	-3,183***	3,904***	3,605***		4,326 ***	113	11,871
	(444)	*(689)*	*(778)*		*(1,678)*		

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

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, it can be said that the overall size of the two sets of effects and their trends over time largely overlapped.

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 - 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	Num. of observations Controls
ALC	586 ***	647 ***	468 *	197	1,898 **	818	258,535
	(142)	*(215)*	*(242)*	*(262)*	*(735)*		
SEC	-3,265 ***	4,007 ***	3,767 ***		4,508 ***	114	11,615
	(436)	*(701)*	*(783)*		*(1,701)*		

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

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. Conclusions

The paper has presented the results of an evaluation of the impact on employment probability and gross earnings of long-period vocational training programmes, organised by two branches (AL and SE) of the PaT in 2010 and 2011. This study has been complemented by a cost-benefit analysis. 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 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 disappeared 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.[22]

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.[23] In both cases, the size of the economic deficit is striking.

One could obviously object that our cost-benefit analysis is incomplete for 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. 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,[24] deriving from an increase in the family incomes of formerly unemployed individuals. Third, we have completely ignored the value of other possible social benefits of ALCs and SECs. Indeed, it could be argued that training programmes may generate an increase in the level of social integration by strengthening the interpersonal networks and social relations of persons formerly lacking the money to reciprocate friends' invitations to home lunches, coffee bars, pubs, restaurants, and so on.

It is entirely apparent that we cannot disregard the first criticism of our analyses. However, it is quite difficult to accept it entirely. 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.

The second criticism 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

[22] The results of our analyses regarding the impact of SECs and ALCs on employment chances largely confirm those of previous studies (Card *et al.* 2015) maintaining that training programmes increase the unemployed chances of finding a job in the mid-term, with a larger effect among women.

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

[24] Since 2009, the PaT has guaranteed sizeable monetary transfers to individuals and families with yearly disposable equivalent incomes lower than 6,500 euros. A description of this measure and its socio-economic impacts can be found in Schizzerotto *et al.* (2014).

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.

Finally, one cannot exclude that ALCs and SECs have exerted social cohesion effects that are very important for the proper functioning of a society. Nonetheless, public budget constraints cannot be ignored, and it would be useful to find a way to reduce the overall costs of future editions of ALCs and SECs without limiting their actual and possible positive effects.

A rather effective way to achieve this result would be to eliminate the benefits received by the participants in the two sets of training courses simply because they attend them.[25] In the case of ALCs a further limitation of costs and a possible enhancement of the cost-benefits ratio could consist in an accurate redefinition of their targeting. We have shown that their effects, on both employment chances and earnings, are concentrated mainly on 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 raised in the title of this paper, conditionally on a reduction of costs of the training courses, an accurate targeting of their beneficiaries and the types of occupation addressed.

[25] Following the above suggestion ALCs could have saved 1,3 million euros and SECs 274 thousands

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Appendix

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

	ALC		SEC	
Participants	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)
ALC	818	3,953	1,838
SEC	114	1,657	468