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**Employment Impact of ESF Training Interventions on Particular Target
Groups**

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(do not quote)

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Introduction

When implementing policies, it is often necessary to check the effectiveness of interventions with regards to the goals set; sometimes the effective recipients do not match the anticipated ones or the results the expectations. Moreover, the impact of an instrument can vary according to the context and recipients to which it is addressed, so that the effectiveness has to be spelt out in relation to the different targets. The purpose of this study is to measure the employment impact of the vocational training interventions co-financed by the European Social Fund (ESF) on particular categories of recipients.

By definition, vocational training aims to provide skills that can be directly used on the labour market. This means that vocational training interventions specifically directed at jobseekers can become an active labour policy tool.

The participation in public vocational training interventions is often subsidised for particular target categories at major risk of exclusion from the labour market. Training interventions explicitly aimed at increasing the employability of specific categories of recipients have always represented a consistent proportion of the activities co-financed by the ESF. With the new 2000-2006 programme, the ESF has now formally become the tool for implementing the European Employment Strategy (EES) and many of its interventions are directly linked to the active policies contained in its guidelines².

The purpose of this paper is to present a methodology for measuring the net impact of vocational training courses on the employment outcomes of particular target groups and to provide some preliminary outputs of ESF co-financed vocational training interventions for 2000-2001. In other words, the impact of training policies on the probability of finding work, net of the results that would have occurred without an intervention.

The idea is to assess the effectiveness of vocational training as an active labour policy tool, independent of the fact that it belongs to a broader training system. For policymakers, it is important to be able to rely on a measurement of effectiveness that takes into account dead-weight effects, to prevent public funds being used to produce results that would anyway have been obtained.

The methodology proposed measures the impact of vocational training as a function of individual characteristics. It thus becomes possible to measure the

² Cfr. “La valutazione del contributo del Fondo sociale alla Strategia europea per l’occupazione”, Struttura nazionale di valutazione-Isfol (Evaluation of the ESF Contribution to the EES).

employment impact for some target categories since different typologies of persons reap different benefits from training interventions. In particular, it is analysed how vocational training courses can reduce the gap in employment chances between men and women, between those endowed with different human capital and between those with different lengths of unemployment.

The paper concentrates on training interventions aimed at increasing employment chances implemented in two Objective 3 regions with ESF co-financing. Thus only interventions concerning measures A2, A3, B1 and E1 of the Italian Community Support Framework (CSF) are considered. The reason for this is that - although each is aimed at a specific target category – these measures are consistent with the general objective of encouraging labour market placement. Also analysed are the interventions under measure C3 with similar aims.

Policy field A is split up into two specific objectives: “prevention of unemployment of young people and adults”, aimed at supporting the preventive approach outlined in the EES (cf. Guidelines 1 & 2) and “insertion and reinsertion of the long-term unemployed”, linked to the traditional “curative” approach. Measures A2 and A3 cover the preventive and curative objectives respectively.

Measure C3 promotes an appropriate supply of higher training. Albeit the system actions³ for strengthening the supply of vocational training are important in this measure, the interventions addressed to persons are similar to those implemented under measures A2 and A3. They can thus be ascribed respectively to the implementation of a preventive or curative approach according to the features of the recipients⁴. The same applies to measures B1 and E1, addressed to fostering the job placement of particular categories at risk of exclusion and of women.

Therefore, the relative effectiveness of interventions addressed to young school-leavers compared to interventions addressed to the long-term unemployed is analysed sorting out individuals on the basis of age and job-seeking duration. This provides indications on the relative effectiveness of a “preventive” rather than a “curative” approach to the general CSF employability objective. The effectiveness of the measures in fostering a re-equilibrium between men and women in labour market opportunities is also measured. The approach is a “mainstreaming” one in which equal opportunities is a theme cutting across all the policy fields.

³ Within the framework of the ESF 2000-2006 programme three macro-typologies of intervention are considered in the measures: interventions addressed to systems, interventions addressed to persons, interventions to support guidance.

⁴In this measure the aim of fostering labour market placement and employability is combined with the aim of facilitating the occupational mobility of the workers. Interventions addressed to the employed are not included. Interventions addressed to labour market placement implemented under the measure are: second and third level training interventions (post-diploma and post-graduate), higher technical training (IFTS) interventions, and vocational training modules within the framework of university pathways. Unlike measures A2 and A3, no first level training interventions are envisaged.

Finally, in relation to the different possibilities for individuals with different educational levels to access the labour market, it is important to see if the ESF interventions are equally effective with different human capital endowments. The analysis uses a sample panel that ISFOL constructed on the basis of the Emilia Romagna and Piemonte regions' surveys on the employment outcomes of training courses and on ISTAT's longitudinal microdata on the labour force.

The evaluations of effectiveness are based on two indicators:

- a) Job-placement rates (gross and net): indicators of result for measuring the direct effects (on actual recipients) produced by the co-financed policies. These indicators are calculated for the different recipient categories.
- b) The employment impact on particular target categories: indicators of impact based on the change in the probability of employment due to training participation, combined with the probability of participating in the training interventions for different target groups. They measure the impact of co-financed policies on the target population.

The gross rate of job placement represents the percentage of those employed one year after the courses have finished. The net rate of job placement measures the contribution of the co-financed policies on the employability of direct recipients *net* of what would have happened (always in terms of employability) without them. To evaluate the effectiveness of interventions in facilitating access to the labour market, we have to ask what the recipients' probability of finding work would be if they had not participated. The difference between the two probabilities is a measure of the net effect on the probability of finding work.

As a measure of impact we use the net rate of job placement multiplied by the probability of training participation. In this sense it can be interpreted as a kind of synthesis between the rate of placement and the rate of coverage of the policies.

The measurement of the net rates of placement involves a delicate problem of calculation. The simple comparison of the gross rates of placement of recipients with the results achieved by a sample of individuals who have not participated in the intervention gives biased results. This is because there are unobservable differences between the trained and non trained, involving a different probability of job placement apart from the participation or not in training activities (selection bias).

Likewise, the calculation of net employment impacts is also problematic. To take into account the unobservable differences between the trained and the non trained, a stochastic selection model with endogenous switching is used to calculate the probabilities of employment respectively in the case of participation and non participation in the intervention, together with the probability of belonging to the group of effective recipients. Both the above typologies of indicators can be calculated with this model.

Using the conditional probabilities of employment, the employment outcomes of courses for effective recipients can be calculated, as well as the potential effect of courses on the outcomes of individuals who have not participated, taking into account the possible effects of self-selection and sample selection. In addition, by using the probabilities of joining a training course it is possible to calculate the net impact of the courses on particular sub-groups, determinable for example on the basis of the identifying characteristics of the target populations.

The work is organised as follows: paragraph 1 describes the approach followed for constructing the database. Paragraph 2 describes the target population. Paragraph 3 talks about the evaluation problem and presents a non-experimental evaluation method. Paragraph 4 describes the analytical structure of the model submitted to empirical verification. Paragraph 5 discusses some preliminary results.

1. CONSTRUCTION OF THE DATABASE

The information bases used consist of a panel of jobseekers, interviewed twice at a 12-month interval, taken from the ISTAT surveys on the labour force and from the placement data bank on those taking vocational training courses co-financed by the ESF, interviewed 12 months after the end of the training interventions.

ISFOL reconstructed the panel sample⁵ on the basis of the labour-force surveys for the years 2000, 2001 and 2002. More specifically, the sample is made up of five panels referred to the four quarterly surveys of 2001 and the last survey of 2000 respectively. Starting from year 2000, the section on the vocational training of the labour force, first contained in the April survey only, is administered in all the analyses. With this section, those who had participated in vocational training courses in the month preceding the survey could be picked out of the aggregate of “jobseekers”. Thus the quarterly surveys were stripped of participants in vocational training courses to construct a “control” sample with which to compare the group of ESF intervention beneficiaries. Moreover, since the labour-force survey uses the family as an analysis unit it was possible to reconstruct and use family background variables also present in the regional surveys and of particular importance in estimating the model.

The placement data provide information on the employment outcomes of the vocational training courses offered by the Emilia Romagna and Piemonte regions managing Objective 3 Operational Programmes over the years 2000 and 2001⁶.

⁵ Cf. Centra M., Discienza R. and Rustichelli E., *Strumenti per le analisi di flusso nel mercato del lavoro*. A procedure for the reconstruction of the longitudinal structure of ISTAT's three-monthly survey of the labour force. ISFOL – Monografie sul Mercato del lavoro e le politiche per l'impiego, n. 2/2001, pagg. 48 – 64.

⁶ Placement surveys are carried out by various regions in the centre-north managing ESF Operational Programmes. In 1997 a working group was set up of Objectives 1 and 3 Managing Authorities, coordinated by the ISFOL's ESF National Evaluation Unit, to compare surveying tools and analysis methods for investigations of the employment outcomes of the trained. With reference to the 2000-2006 programme, the surveys currently available are on the Emilia

Between 2001 and 2002, surveys were carried out in Emilia Romagna and Piemonte on a sample consisting of 11,769 individuals who had benefited from vocational training interventions aimed at fostering job placement within the framework of the new programme. The overall rate of coverage of the interviews was around 50%. From the rates of coverage for each regions and typologies of intervention, weighting indexes were obtained used for repropotioning the sample units to the total of recipients⁷.

The ISTAT sample, stripped of the individuals who had carried out training activities in the month previous to the survey, was integrated with the regional surveys to constitute a single survey sample, broken down on the basis of the choice to participate or not in regional training activities (Manski-Lerman, 1977). In both cases, 14-45 year-olds were considered who were resident in Emilia Romagna and Piemonte⁸ and seeking work during the reference year. Their employment condition was observed one year later.

The fact that only residents in the two regions were used has meant eliminating around 50% of participants in training courses from the placement sample. The final sample consisted of 5504 trained and 651 non trained, representative of a population of about 11,684 and 141,000 respectively.

There are many methodological approaches for efficiently integrating information from heterogeneous statistical sources. Here, a representative sample of jobseekers was constructed, broken down according to their training choice. The placement data bank gives the total of ESF trained and can be considered representative of the universe of the trained. The universe of the non trained is taken instead from the labour-force surveys. The section involving the training activities can be used to identify how many have participated in vocational training courses in the month immediately prior to the interview, so that the ISTAT sub-sample can be stripped of individuals who have carried out these activities during the reference period.

In detail, the individuals of the ISTAT panel who had taken part in vocational training activities (trained) were replaced with beneficiaries of ESF courses coming

Romagna and Piemonte regions and the autonomous province of Trento. This latter survey was carried out six months after the end of the interventions and is not therefore comparable with the other two, which survey employment outcomes 12 months after. The survey by the Friuli Venezia Giulia region will also be available soon.

⁷ This data base has provided considerable information on the socio-demographic features and social and family context of those benefiting from training interventions, besides information on the employment condition of the same individuals one year after the interventions ended. This latter was reconstructed by crossing the regional information on placement with respect to the time elapsed between the end of the training course and the interview and between the end of the training course and the employment condition. The recipients of interventions who were employed at the time of registration were excluded from the analysis.

⁸ For these regions, there are variables available on the occupational position and condition of parents, as well as on the possibility of pinpointing cases in which the parents were present in the family. With this information, family background variables could be reconstructed homogeneously with those of the ISTAT sub-sample, in which the variables on the parents' condition are present only for those living in the original family nucleus.

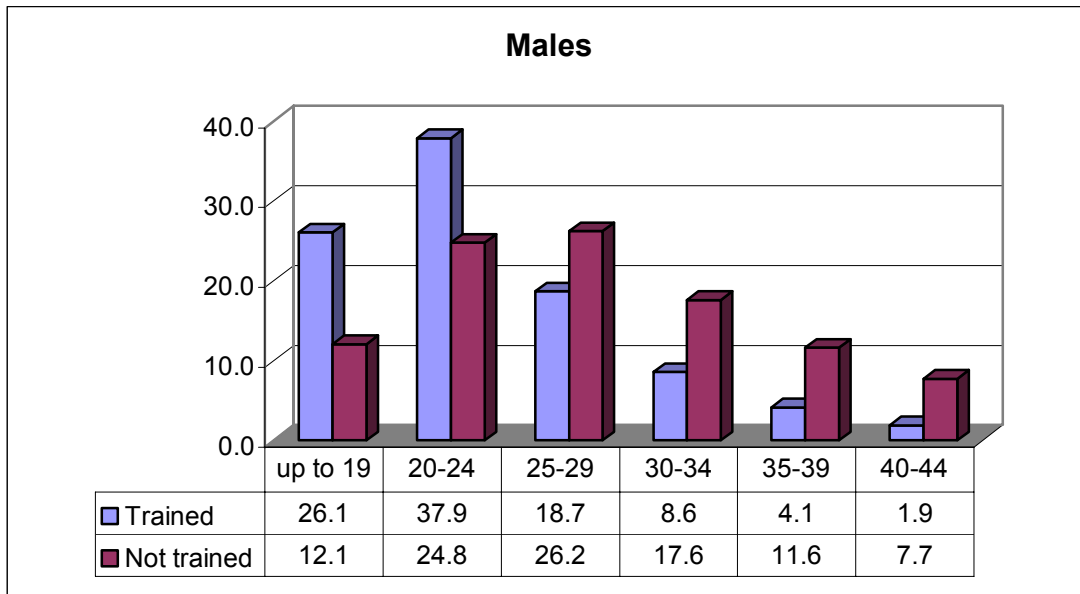
from the placement data bank. A descriptive analysis has demonstrated that the structural features of all the trained observed in both data bases are sufficiently homogeneous. Suitable weightings were applied to both the sub-samples to obtain a sample representative of all the jobseekers on a regional basis, broken down according to the choice of taking part in vocational training activities.

2. CHARACTERISTICS OF THE REFERENCE POPULATION

Before measuring the employment impact of vocational training on direct recipients, that is on the target population, it could be useful to compare participation (“trained”) with non participation (“non trained”) in regional training courses on the basis of age and educational level and duration of unemployment.

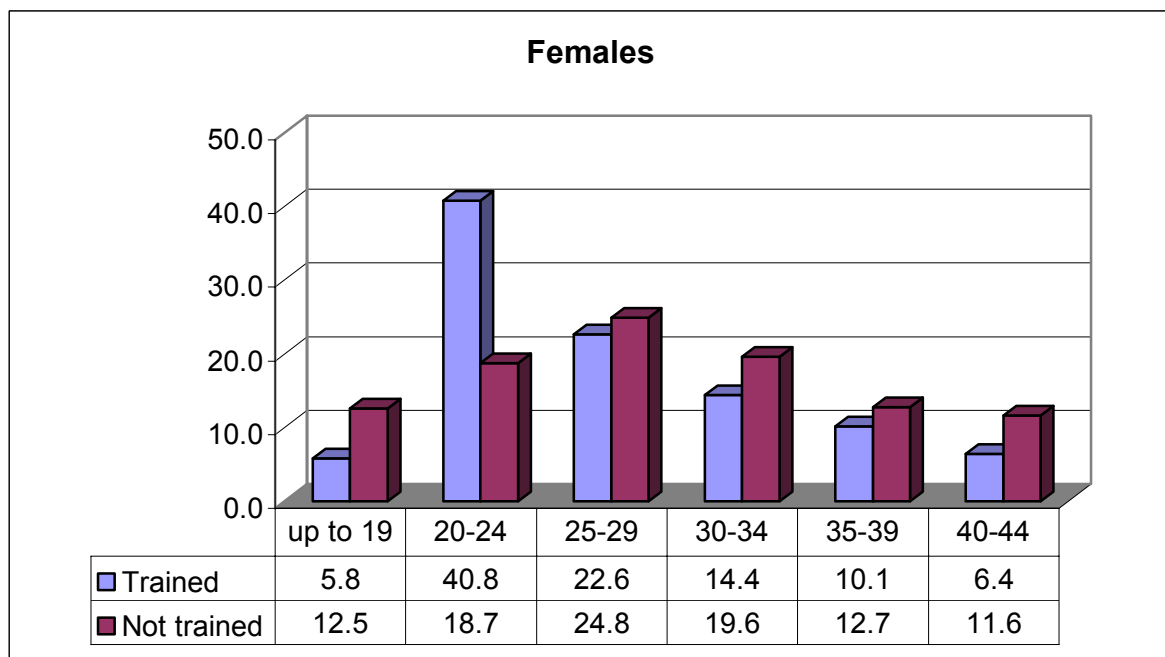
Graphs 1 and 2 compare the composition by age of the two groups, broken down into males and females. For the males, the search for jobs is more concentrated in the first age class than for the females, independently of participation in regional training interventions. Among the trained males, the lower age classes are over-represented, something already observed during the previous ESF programme. For the females, the training interventions mainly involve the 20-24 age class (41%).

Graph 1 – Composition by age of jobseekers: “trained” and “non trained”, average October 2000-Dicember 2001 (Males, percentage)



Source: ISFOL –ESF National Evaluation Unit’s processing of data from the Piemonte and Emilia Romagna Administrations and from ISTAT - microdata on labour forces

Graph 2 – Composition by age of jobseekers: “trained” and “not trained” average October 2000-Dicember 2001 (Females, percentage)

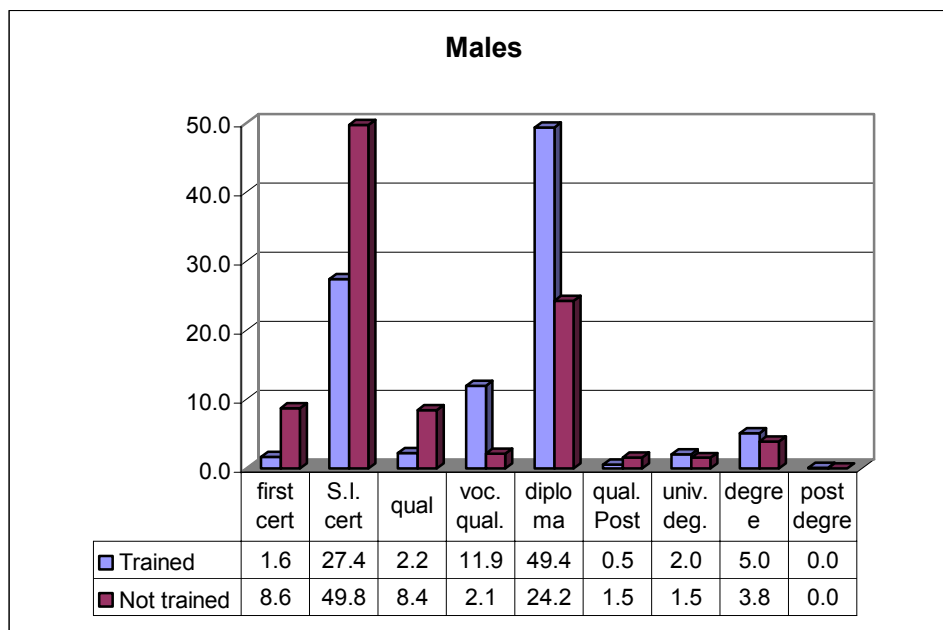


Source: ISFOL –ESF National Evaluation Unit’s processing of data from the Piemonte and Emilia Romagna Administrations and from ISTAT - microdata on labour forces

Graphs 3 and 4 refer to the composition on the basis of educational qualifications. For both sexes, the less educated are under-represented in the trained group, something already detected in the previous ESF programme. Vocational training seems mainly to involve individuals possessing high school diplomas. This is particularly true for the female segment, where those with diplomas represent 60% of the women involved in training interventions against the 28% of those not involved.

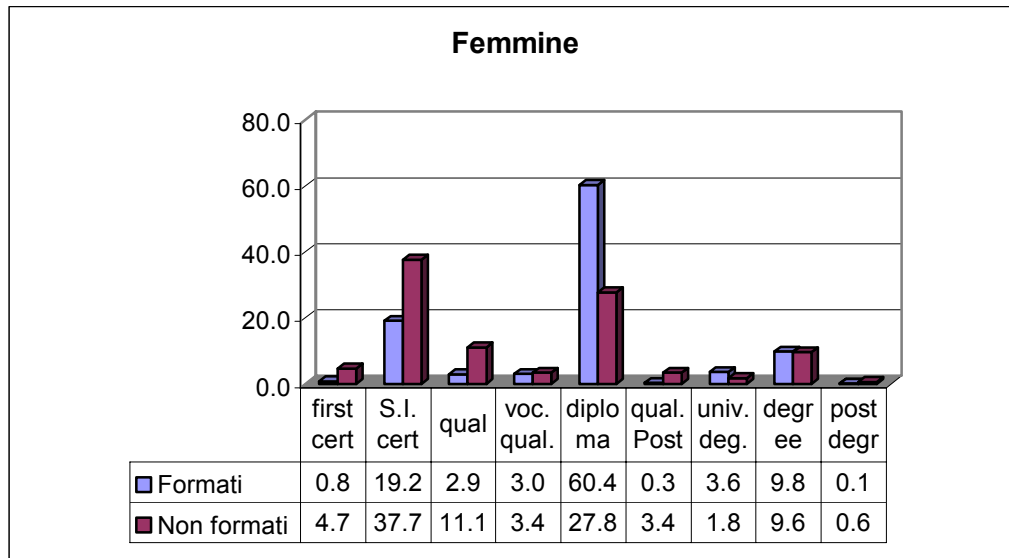
On the contrary, graduates have more or less the same weight in the two groups. There is a slight predominance of male participants in training interventions, with a large proportion already possessing a vocational qualification. For both sexes the main educational qualification is the high school diploma for the trained and school-leaving certificate for the non trained.

Graph 3 – Composition of jobseekers by educational level: “trained” and “non trained”, average October 2000-Dicember 2001 (Males)



Source: ISFOL –ESF National Evaluation Unit’s processing of data from the Piemonte and Emilia Romagna Administrations and from ISTAT - microdata on labour forces

Graph 4 – Composition of jobseekers by educational level: “trained” and “non trained”, average October 2000-Dicember 2001 (Females)



Source: ISFOL –ESF National Evaluation Unit’s processing of data from the Piemonte and Emilia Romagna Administrations and from ISTAT - microdata on labour forces

This analysis confirms that the younger and better-educated segments of the potential recipient populations tend to be involved in the ESF co-financed interventions. Among the trained, 64% of the males and 46% of the females are under 25-year-olds. The similar percentages for the non trained fall respectively to 37% and 31%. Among the effective recipients, 43% of the males and 26% of the females do not possess a school-leaving certificate, whereas the percentages rise to 69% for men and 57% for women for non participants in the regional training system

In previous evaluations⁹ we had demonstrated that the greater involvement of the younger and relatively educated segment - the result of strategies aimed at strengthening competitiveness – could mean moving away from the target of reducing disparities in placement probabilities. Within the framework of the current ESF programme, the youth of the effective recipients is in line with the goal of strengthening a “preventive” approach to reducing unemployment, whereas the difficulty of reaching the less educated segments would seem less justified.

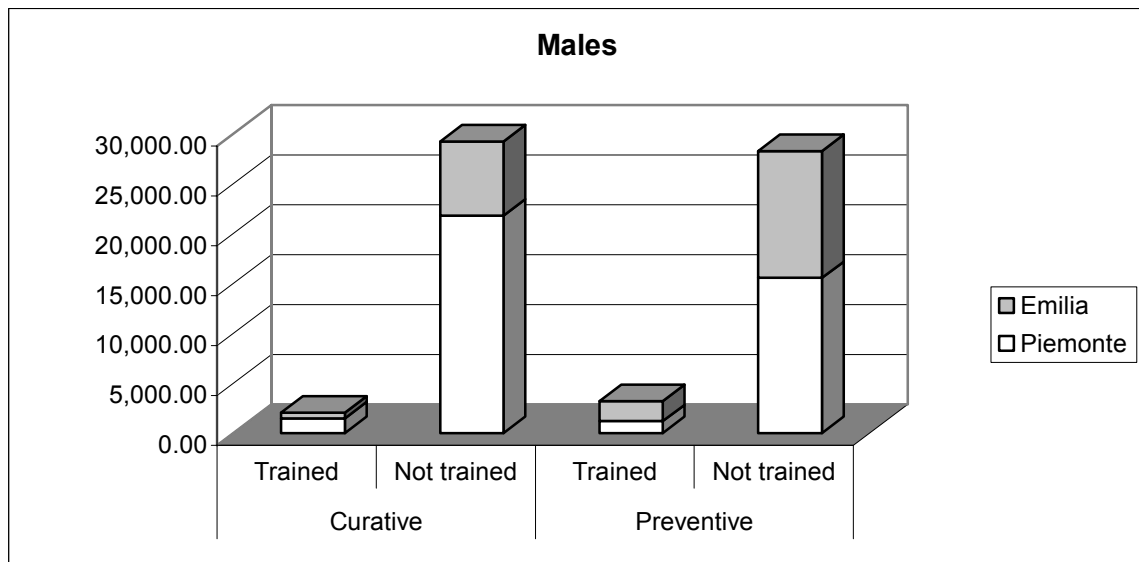
In graphs 5 and 6, the universe of jobseekers is classified as recipients of preventive and curative policies according to guidelines 1 and 2 of the European Employment Strategy. These guidelines define the preventive approach as that addressed to young people unemployed for less than six months and to adults unemployed for less than a year, whereas the curative approach refers to young

⁹ Cf. Bulgarelli A. (ed.), *Valutazione finale dell’Obiettivo 3 in Italia*, Franco Angeli, Milan 1999 and Centra M., De Vincenzi R. and Villante C., *Formazione professionale e occupabilità. La valutazione dell’impatto degli interventi formativi sugli esiti occupazionali*. ESF Books, Rome 2000, pp. 23-34 and 72-75.

people and adults with a longer period of unemployment. In the age group considered (15–44), women represent the most consistent slice of potential recipients of curative policies.

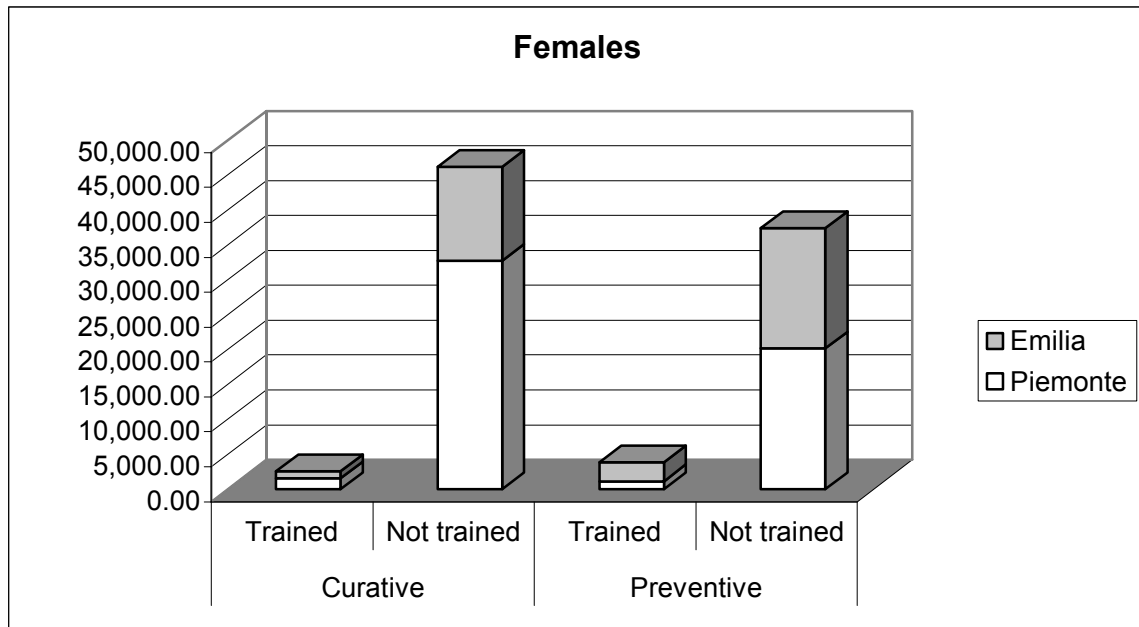
Independently of gender, the two regions considered have a different composition of jobseekers. Whereas in Piemonte there is a greater proportion of individuals needing a “curative” type of approach to the long-term unemployment condition, the opposite applies in Emilia Romagna. This different composition of the population reflects the composition of effective recipients of policies, with a greater weight in Piemonte of recipients of curative policies of both sexes.

Graph 5. – Effective (trained) and potential (non trained) recipients of preventive and curative policies for combatting long-term unemployment, average October 2000 - December 2001 (males).



Source: ISFOL –ESF National Evaluation Unit’s processing of data from the Piemonte and Emilia Romagna Administrations and from ISTAT - microdata on labour forces

Graph 6. – Effective (trained) and potential (non trained) recipients of preventive and curative policies for combatting long-term unemployment, average October 2000 - December 2001 (females).



Source: ISFOL –ESF National Evaluation Unit’s processing of data from the Piemonte and Emilia Romagna Administrations and from ISTAT - microdata on labour forces

3. THE EVALUATION PROBLEM AND A NON-EXPERIMENTAL EVALUATION METHOD

There are various interesting issues in the evaluation of a vocational training programme. In literature, the greatest emphasis is on measuring the effect of training on the effective participants. A second issue is the potential effect of courses on the employment outcomes of individuals who had not participated¹⁰, important for the purposes of extending the number of recipients. A third major issue is the overall impact of the programme on a particular target category, taking into account both the benefit achieved from participation and the capacity of the programme to involve the target population. The effects of training on effective or potential recipients are measured by rates of job placement, whereas the impact on the reference population is calculated by means of indicators based on the estimation of the probability of employment and on the probability of participation in the training interventions of the different target groups’.

The aforesaid placement rates and employment impacts are both used for measuring the training effectiveness. With the difference that the former measure the

¹⁰ Cfr. J.J. Heckman and J. A. Smith, “Experimental and nonexperimental evaluation”.

effect on the direct recipients and the latter use the information on the employment outcomes of direct recipients to infer the impact on the target population they belong to. But although both are indicators that measure the employment effect (alias “impact”) of the interventions, conventionally only the second are actual indicators of impact. The first are considered indicators of result, since they limit the analysis to the effects on direct recipients. In both cases we need to estimate the net effects, discounting the results that would have been achieved without the programme.

To assess the effectiveness of the courses in facilitating direct beneficiaries’ access to the labour market, it has to be asked what probability these individuals would have had to find jobs if they had not participated in the training activities. The difference between the two probabilities represents a measure of the net impact of training on the probability of finding work. The evaluation of the net impact involves a delicate problem of estimation when measuring the probability of employment after participating or not in training activities, since the information available only concerns the condition chosen and the outcomes of the alternative are unknown. It is necessary to construct a counterfactual situation corresponding to the unobservable alternative with which to compare the employment outcomes of participants.

In the absence of experimental procedures that assign individuals at random to the two sub-samples of trained and non-trained, a simple comparison with a sample of individuals who have not participated in the training intervention provides biased results because of the sample selection and self-selection process. The problem of self-selection arises because individuals make a choice to follow a training course and this is not exogenous with respect to employment outcomes. It can be said that this decision is based upon the comparison between the probabilities of potential employment for the two alternatives. In addition or alternatively, belonging to the trained group could be linked to the different probability that individuals have to learn about the existence of the courses. In addition to the self-selection process started up by the potential recipients there is the selection procedure implemented by the training providers, in many cases favouring the more able individuals¹¹. A similar reasoning is applied to the measurement of job-placement rates referred to potential instead of effective recipients or to the estimation of the impacts on particular target categories.

4. DESCRIPTION OF THE MODEL AND ESTIMATION METHOD

To control for selection mechanisms linked to the choice of following the courses, a stochastic selection model with endogenous switching has been used. The method used, referred to in Heckman's seminal work (1976), provides unbiased

¹¹ The features of participants are quite different from those of the non participants. The effective recipients are on average younger and better educated, thus showing the existence of observable selective phenomenon and the difficulty of intercepting the less-educated segments of the population. Cf. Bulgarelli (1999), Nicaise (1999), European Commission (2001), ISFOL (2001).

estimates even without an experimental control group. The bias caused by self-selection mechanisms is corrected by jointly estimating the probability of participation in the training courses and the probability of work in the two cases of participation and non participation to the programme, and more precisely by a switching bivariate Probit model (cfr. O'Higgins, 1994), that is the probit analogue to the switching linear regression model with endogenous switching discussed by Maddala (1983).

This model estimates employability on the basis of the decision to participate or not in vocational training. The behaviour of individuals with regards to training is captured by a choice function. The model thus consists of two equations for the employment status of trained and non-trained, and another for the choice function¹².

Given the possibility that the training impact differs for individuals with different characteristics, this model implies the estimation of two different parameter vectors to explain the employability of participants and non participants respectively. It is thus possible to explicitly model the different impacts of training on the employment prospects of individuals belonging to different target categories.

The probability of employment is estimated for each individual in the sample by using variables concerning personal data, educational level, local context and family background¹³. The family survey unit of the labour-force survey has enabled the use of family backgrounds also present in regional surveys and of particular importance in estimating the individual choice function. This latter is estimated with a training/no-training dichotomous variable regressed on a set of context variables, individual socio-demographical characteristics and a set of instrumental variables not included in the estimate of employability. The educational level of parents was used as instrumental variable.

Three equations are estimated: 1) the probability of employment after following training courses; 2) the probability of employment not having followed training courses; 3) the probability of following a training course (called "choice function"). In all three cases the dependent variable is a dichotomous variable that assumes the value 1 for the employed and course participants and zero otherwise.

The existence of three latent variables is assumed, expressed as I^* , O^*_F and O^*_{NF} , constituting the dependent variables of the function of decision and the two

¹² In this context, the choice or switching function plays a role similar to that played by the instrumental variables in the case of a single endogenous variable, that is of stripping the components linked to outcomes from the trained rather than the non-trained. The estimation of employability through a univariate Probit would provide estimates biased upwards because of the endogenous link between training and employability

¹³ The variables considered are: educational level, type of diploma, age class, employment status of father and mother if living together, occupational position of father and mother if living together, the condition of the head of the family, the provincial rate of unemployment according to gender, rate of variation of employment, region and province of origin, and some variables interacting between educational qualification and gender.

employment status functions respectively. The specification of the selection model with endogenous switching is the following:

- 1) $O^*_F = X_F \beta_F + \omega_F$ (if the training course has been followed)
- 2) $O^*_{NF} = X_{NF} \beta_{NF} + \omega_{NF}$ (if the training course has not been followed)
- 3) $I^* = Z\gamma + \varepsilon$ (decision to participate)

in which X_F , X_{NF} and Z are vectors of demographic variables concerning the individual and his or her family. If $O^*_F > 0$ the trained individual is employed the subsequent year, likewise if $O^*_{NF} > 0$ the non-trained individual is employed. If $I^* > 0$ the individual participates in the training course.

We assume the variable O^*_F , O^*_{NF} , and I^* to follow a multinormal distribution with average $(X_F \beta_F, X_{NF} \beta_{NF}, Z\gamma)$ and error variance matrix Σ .

$$\Sigma = \begin{bmatrix} 1 & \rho_{FNF} & \rho_{FI} \\ & 1 & \rho_{NFI} \\ & & 1 \end{bmatrix}$$

Further we impose the restriction $\omega_F = \omega_{NF}$, i.e., in terms of the error variance matrix, $\rho_{FNF} = 1$ and $\rho_{FJ} = \rho_{NFJ} = \rho$.

The likelihood function for this model is given by:

$$L = \sum_{\substack{I_i^* > 0 \\ O_{iF}^* \neq 0}} w_i \ln \{ \Phi_2(X_{iF} \beta_F, Z_i \gamma, \rho) \} + \\ \sum_{\substack{I_i^* \leq 0 \\ O_{iNF}^* \neq 0}} w_i \ln \{ \Phi_2(X_{iNF} \beta_{NF}, -Z_i \gamma, -\rho) \} + \\ \sum_{\substack{I_i^* > 0 \\ O_{iF}^* = 0}} w_i \ln \{ \Phi_2(-X_{iF} \beta_F, Z_i \gamma, -\rho) \} + \\ \sum_{\substack{I_i^* \leq 0 \\ O_{iNF}^* = 0}} w_i \ln \{ \Phi_2(-X_{iNF} \beta_{NF}, -Z_i \gamma, \rho) \}$$

where $\Phi_2(\cdot)$ represents the standardised bivariate normal distribution function.

This model is identified as long as Z contains at least one independent variable (instrument) not in X . The model enables the potential probabilities of employment, when a training course has been followed and when it has not, to be estimated for all individuals, independently of the choice made (and observed) to participate in the courses.

As in O'Higgins, we estimate the direct effect on recipients (effective or potential), expressed in terms of net placement rate, by the differences between the conditional probabilities:

$$\text{Net placement rate} = \frac{\Phi_2(X_{iF}\beta_F, Z_i\gamma, \rho)}{\Phi(Z\alpha)} - \frac{\Phi_2(X_{iNF}\beta_{NF}, -Z_i\gamma, -\rho)}{\Phi(-Z\alpha)}$$

where $\Phi(\cdot)$ represents the standardised normal distribution function.

As the formula shows, the impact depends explicitly both on the difference between parameters for participants and non-participants and on the effect individual characteristics had on the probability that a member of the target population participate on the programme (the denominator). This rate can be calculated both for effective participants and for the target population as a whole.

As a measure of the overall impact of the policy on target population we use an indicator obtained multiplying the net placement rate by the probability of participating in training activities:

$$\text{Net impact} = \left[\frac{\Phi_2(X_{iF}\beta_F, Z_i\gamma, \rho)}{\Phi(Z\alpha)} - \frac{\Phi_2(X_{iNF}\beta_{NF}, -Z_i\gamma, -\rho)}{\Phi(-Z\alpha)} \right] \Phi(Z\alpha)$$

With this model it has been attempted to answer three distinct questions:

- i) what was the effect of training courses on the probability of finding work for individuals who actually followed the courses;
- ii) what the effect of participation in the courses would have been on the probability of finding work for individuals who had not participated in them (albeit belonging to the same target population).
- iii) what was the overall effect of the training programme on the population of potential beneficiaries.

The answer to the first question is important in order to assess whether or not to repeat similar programmes in the future. The answer to the second could be important if it was decided to expand the range of beneficiaries, or to make the participation to the programme mandatory instead of voluntary. The third one provide a measure of the effectiveness of the programme with respect to the objective of increasing the employability of specific categories of recipients. Note that the availability of experimental data would permit an exact response to the first question but would not provide any answer to the second. The experimental data is based on the random assignment of individuals to the groups of the trained and non-trained within the framework of those who applied, or who demonstrated they were willing, to participate in the programme. It follows that this data enables to measure the effect of the training courses on those who applied for it, but if we used it to evaluate the effect of training courses on the entire population satisfying the requirements for

participation, we would have to take into account the self-selection mechanism linked to the presentation of the application to participate in the programme.

5. RESULTS

This paragraph describe the results obtained at a preliminary stage of the model estimation. However they provide an exemplification of the methodology and some suggestions for future policy evaluation.

Table 1 shows the estimated coefficient of the bivariate Probit model with endogenous switching for the measurement of the joint probability of finding work and participating in training activities. The employability has been modelled as a function of the unemployment on a provincial basis, of individual labour market career and on other individual characteristics such as age and educational level. The different gender-based work opportunities have been taken into account through variables of interaction between educational level and gender and through provincial unemployment rates differentiated according to gender.

The first two columns of the table show the estimates for the two cases of participation and non-participation in regional training programmes. The last two columns give the estimate of the endogenous switching function. It has been specified as a function of the covariates already used for the Probit on employment and of a set of instrumental variables, assumed to be exogenous to the individual status on the labour market. These instruments are usually associated with family background variables. In this work, it has been decided to use the occupational position of spouses as variable instruments.

Table 1: Bivariate Probit with endogenous switching
(joint estimation of employability and participation in training activities)

	<i>Employment training participants</i>		<i>Employment non-training participants</i>		<i>Training</i>	
	Coef.	P>z	Coef.	P>z	Coef.	P>z
occup						
Constant	-0.549	0.166	1.635	0.049	-1.050	0.000
Age	0.132	0.000	-0.111	0.045	-0.016	0.005
Age squared	-0.002	0.000	0.002	0.065		
Provincial unemployment rate*	-0.013	0.262	-0.066	0.006	0.054	0.000
Father's education:s.l. certificate	0.186	0.000	0.127	0.388		
diploma-female	-0.192	0.011	-0.145	0.390	0.393	0.001
diploma-male	-0.332	0.001	-0.447	0.034	0.292	0.006
s.l. certificate	-0.191	0.018	-0.344	0.013	-0.215	0.006
first certificate	-0.493	0.027	-0.097	0.693	-0.628	0.000
unemp.spell <6 months	0.201	0.007	0.346	0.004	0.157	0.020
unemp.spell 6 -12 months	0.101	0.296	0.425	0.016	0.333	0.001
Piemonte					-0.433	0.000
Parma					-0.358	0.084
Male aged 14-24					0.601	0.001
Female aged 20-24					0.269	0.040
Mother unemployed					-1.245	0.001
Father inactive					-1.716	0.001
post_dip					-1.029	0.001
Mother's education:s.l. certificate					-0.394	0.001
Mother's education:first certificate					-0.446	0.001
Mother's education:none					-0.679	0.001
/athrho					-0.503	0.036
rho					-0.465	
<i>Wald test of indep. eqns. (rho = 0): chi2(1) = 4.37454</i>					Prob > chi2 = 0.0365	
					Number of obs =6151	
					Wald chi2(40) =1368.920	
					Prob > chi2 =0.000	
<i>Log likelihood = -126992.23</i>						

It has been specified as a function of the covariates already used for the first equation and of a set of instrumental variables, assumed to be exogenous to the individual status on the labour market. These instruments are usually associated with family background variables. In this work, it has been decided to use the educational level of the mother as instrumental variable.

The decision to take part in training activities is significantly influenced by occupational status of the parents. Having an unemployed or inactive father strongly discourages the participation to training activities. Individuals with vocational training diploma are also less motivated to participate. On the contrary, a downturn in provincial labour-market conditions would encourage access to vocational training. Among the individual's socio-demographic characteristics, an older age would discourage participation in training activities; in particular, the effects of belonging to the 14-19 age class for males, and to the 20-24 age class for females are positive and significant. A diploma and, to a greater extent, a degree would increase the probability of taking part in training courses, especially for the female component. Participation in training rises when the employment spell is over six months. The mother's educational level, rather than the father's, has a positive and significant effect on the choice to join a training course.

The effect of the different characteristics on the probability of employment on those who have participated in a training course can also be deduced from Table 1. As far as the occupational status of parents is concerned, an inactive father or an unemployed mother provide a negative impact. As expected, less educated people face worst occupational chances. A short spell of unemployment presents a small, albeit highly significant effect. As the coefficients of the first couple of variables show, the probability of finding work increases at a decreasing rate with age.

Table 1 also gives estimates of the employment equation, corrected for self-selection effects, in the case of non-participation in training. The variables describing the educational level are not always significant. In the case of males the possession of a diploma rather than a school-leaving certificate provides less employment probabilities. On the opposite of above, in the case of non-participation in training activities, the probability of finding work decreases at a increasing rate with age.

Overall, the use of a model with selection-bias correction seems justified, as proved by the coefficient of correlation between the residuals of the selection function and the probability of employment. The net impacts on different segments of the population were calculated on the basis of the above estimates.

Tables 2 and 3 indicate the net job placement rates, obtained as the difference between the probabilities of employment corresponding to the choice of participating or not in the training course, respectively for direct beneficiaries and potential recipients. In the tables, the results obtained by the model described above are

compared with those obtained by a traditional Probit model, where the sample self-selection bias cannot be corrected. The model with self-selection corrects the estimates of net impacts downward with regards to the standard model. However, in the case of direct beneficiaries, the corrections are not as high as expected. Independently of gender, the effect on direct beneficiaries is higher than potential effect on the potential recipients belonging to the same target population. In both cases women obtain the higher benefits from the participation on training activities.

The tables also provide the observed job placement rates. A simple comparison between tables 2 and 3 shows a pronounced difference on the observed rates between trained and non-trained. The high proportion of employed observed one year after participation in training activities mainly depends on the type of training co-financed in the regions under observation. In fact, both regions finance training activities which include a period of on-the-job training. This often makes job placement easier.

**Table 2 – Effects of training on the beneficiaries’ probability of finding work:
job placement rates**

(comparison between results of self-selection and univariate Probit models)

	<i>Self-selection model</i>		<i>Probit model</i>		<i>Percentage of employed observed</i>	
	<i>Men</i>	<i>Women</i>	<i>Men</i>	<i>Women</i>	<i>Men</i>	<i>Women</i>
<i>Job placement rates</i>						
<i>Not participating on training</i>	.48	.43	.46	.41		
<i>Participating on training</i>	.73	.75	.73	.76	.74	.75
<i>Training effect</i>	.25	.33	.27	.35		

**Table 3 – Potential effects of training on non – beneficiaries’ probability of finding work:
job placement rates**

(comparison between results of self-selection and univariate Probit models)

	<i>Self-selection model</i>		<i>Probit model</i>		<i>Percentage of employed observed</i>	
	<i>Men</i>	<i>Women</i>	<i>Men</i>	<i>Women</i>	<i>Men</i>	<i>Women</i>
<i>Job placement rates</i>						
<i>Not participating on training</i>	.40	.34	.40	.34	.38	.35
<i>Participating on training</i>	.58	.62	.70	.71		
<i>Training effect (net rate)</i>	.19	.28	.30	.38		

In table 4 effectiveness of training activities is evaluated on the basis of the employment impacts on some target groups. The first column shows the impact

indicators while the following two indicate respectively job employment net rates and training participation probability. The last column shows the job placement rate in case of non participation in the programme. The numbers in table 4 are obtained averaging the indicators measured at an individual level over the relevant target group.

Table 4 – Training employment impacts on specified target groups

Target groups	Average indicators			
	Employment impact	Job placement net rate	Probability of being trained	Base job placement rate
Female	.0262	.28	.0770	.34
Male	.0200	.19	.0778	.40
Recipient of preventive policy	.0304	.24	.1018	.44
Recipient of curative policy	.0175	.25	.0551	.30
Educational level: up to f.l. certificate	.0017	.005	.0162	.35
Educational level: s.l. certificate	.0120	.24	.0418	.31
Educational level: qualification	.0192	.22	.0717	.44
Educational level: high school	.0479	.29	.1498	.39
Educational level: university degree	.0227	.28	.0641	.42

Vocational training have a stronger impact on individuals with a high school diploma, due to a higher job placement net rate and a better capability to capture this group of recipients. On the contrary, a smaller impact can be observed on individuals with an elementary school education who present very small placement effects and who are not easily captured. As the comparison with the last column shows the programme participation entails a partial balance of the employment probability of individuals with a high school diploma compared with graduates, on one hand, and an increased unbalance with respect to individuals endowed with less education.

The training impact is high for females who show a higher job placement net rate than males. A comparison with the last column shows as the effect of the programme goes towards a balance of the employment probability without training

intervention. The opposite is true as far as the balance between individuals with different spells of unemployment is concerned. In this case the difference in training probability causes a stronger impact of training on recipients of preventive versus curative policies.