DISCUSSION PAPER SERIES

IZA DP No. 3462

The Contribution of Vocational Training to Employment, Job-Related Skills and Productivity: Evidence from Madeira Island

Santiago Budría
Pedro Telhado-Pereira

April 2008

Forschungsinstitut
zur Zukunft der Arbeit
Institute for the Study
of Labor

The Contribution of Vocational Training to Employment, Job-Related Skills and Productivity: Evidence from Madeira Island

Santiago Budría
University of Madeira
and CEEAplA

Pedro Telhado-Pereira
University of Madeira,
CEEAplA, CEPR and IZA

Discussion Paper No. 3462
April 2008

IZA

P.O. Box 7240
53072 Bonn
Germany

Phone: +49-228-3894-0
Fax: +49-228-3894-180
E-mail: iza@iza.org

IZA Discussion Paper No. 3462
April 2008

ABSTRACT

The Contribution of Vocational Training to Employment, Job-Related Skills and Productivity: Evidence from Madeira Island*

In this paper, we analyze the transition to the labour market of participants in vocational training in Madeira Island. In a first stage, we investigate how the employment status at different dates (one month, one year, and two years after the completion of the training program) depends on relevant variables, such as age, gender, education and the content and duration of the training. In a second stage, we use the individuals' self-assessment regarding the effectiveness of the training program along three dimensions: employment, job-related skills and productivity. We find that respondents score training activities high in every dimension. Moreover, we find that training is more effective among the educated, indicating that vocational training is far from being remedial. We also find that long training programs and training in the area of tourism are particularly effective.

JEL Classification: C35, I21, J64

Keywords: training, employment, productivity, job-related skills, ordered logit

Corresponding author:

Santiago Budría
Department of Economics
University of Madeira
Campus da Penteada
9000-390 Funchal
Portugal
E-mail: sbudria@uma.pt

* We are indebted to the *Direcção Regional de Formação Profissional* in Madeira and, particularly, to Maria João Freitas and Ricardo Figueira for providing the dataset. We thank seminar participants at the European Research Network on Transition in Youth Conference Workshop.

0. Introduction

Education is a scarce and valuable good in the Portuguese labour market. Among EU State Members, Portugal is the country with the lowest schooling levels and the highest returns to education (Vieira, 1999, Martins and Pereira, 2004). This evidence has lead governments and institutions to support the implementation of policies aimed to increase the country's average level of education (OECD, 2005, CNCLSTP, 2006). However, the traditional schooling system is not a real option for many workers. For old and low educated workers as well as for individuals who dropped out of school, training is for the most part the only way to upgrade skills and acquire new competencies. In line with this view, the latest OECD Economic Survey for Portugal states that 'the participation of adults in training activities should be stimulated, by targeting support towards needy groups, enhancing the quality of training courses and evaluating the effectiveness of existing programs' (OECD, 2006).

At the international level, a number of studies have made progress in the task of assessing the impact of training activities on different labour market outcomes, including wages (Lynch, 1992, Pischke, 2001), productivity (Bartel, 1995, Black and Lynch, 1996, Conti, 2005, Van Reenan et al., 2006), employment (Richardson and Van den Berg, 2001, Jespersen et al., 2008) and job-related skills (Fitzenberger and Völterb, 2007). Despite a general conclusion emerges from these studies (i.e., *some* forms of training among *certain* population groups are rewarded in the labour market), the results are strongly case dependent and can be hardly transferred across countries and across training schemes. In Portugal, existing research has focused on the relation between wages and training (Saraiva, 1999, Hartog et al., 2000, Budría and Pereira, 2007), and has disregarded the dimensions of employability, job-related skills and productivity.

Arguably, these dimensions are also relevant for prospective trainees, employers and policy makers, so up to now there are many questions of economic relevance that cannot yet be answered on the basis of existing research.

In this paper we take a step towards filling this gap by exploring the contribution of vocational training to three important aspects in labour markets: i) employment, ii) job-related skills and iii) productivity. We use data from the Survey of Insertion (*Inquérito à Inserção*), a survey carried out to evaluate the effects of vocational training programs on the transition to the labour market in Madeira Island, Portugal. The information provided in the survey can be divided in two main blocks. In the first block, individuals are asked to report their employment status at three different dates: one month, one year, and two years after the completion of the program. We use this information to explore how the probability of employment depends on the individual characteristics and on the type of vocational program. In the second block, individuals are asked to assess the extent to which the training i) facilitated their access to employment, ii) was related to their current job and iii) enhanced their productivity in the job. We use this information to assess the contribution of training along these dimensions and to explore how this contribution differs across groups of workers and across training programs.

Relative to previous work, our analysis presents three main features. First, we explore the effectiveness of training along dimensions i), ii) and iii) simultaneously. This is an important differentiation, insofar as some types of training may raise productivity and provide fundamental skills but fail to attract new employment opportunities. Inversely, some training activities may promote employment but have a null effect on the workers' productivity. That would be the case if, for example, high ability and more committed individuals undertake training activities to signal their higher quality to employers who, in turn, use training

participation as a basis for the decision to offer a contract. If these signaling effects are important, it may well be that once employed these workers are more productive due not to their training but to their higher ability. By considering different outcomes simultaneously we examine what forms of training are more effective in a particular dimension.

Second, unlike most other papers, we do not confine the analysis to objective labour market measures. Rather, we include the individuals' subjective evaluation of the training activities. This approach offers a methodological advantage. The typical problem of isolating the impact of training on a particular outcome (e.g., wages, employment rates, job mobility, job offers) is that it is hard to isolate the pure effect of a given covariate (training) from other unobserved factors that are correlated with training and affect the observed outcome (e.g., ability, motivation, tenure). If individuals who receive training are not a random sample, but selected (or self-selected) because of some unobservable characteristics, then the estimates might be biased. This argument also applies to selection by subject of study: if high ability individuals are more prone to choose a specific area, the returns to training in this particular area will be higher because of the higher ability of the trainees and not only because of the content of training. Although there exist econometric techniques to deal with selectivity issues, the results are typically sensitive to the quality of the instruments and the specification of the participation equation (Bound et al., 1995). Subjective questions, in turn, provide direct information on the variable under scrutiny, do not require auxiliary distributional assumptions, and have a straightforward interpretation. Moreover, the returns to training may be obscured if workers from different occupations and employers have different opportunities to reap the benefits of the productivity gains associated with training (Bishop, 1994). If this is the case, asking directly to individuals rather than collecting objective measures may result into a more reliable set of information.

Subjective questions have received increasing attention in the literature, as they offer complementary and sometimes unique perspectives on relevant topics. Psychologists and recently economists have made ample use of individual assessments to study well-being, quality of life, job satisfaction, welfare and educational mismatches in modern societies[2]. Similarly, the use of self-report data is a research paradigm within firms ands studies evaluating the extent of knowledge acquisition among participants in industrial training (Rowold, 2007, Velada et al., 2007). Up to now, however, the use of subjective questions is infrequent in research focusing on labour markets and, more specifically, on the effects of vocational education on different employment-related outcomes. This is unfortunate, as self-reported measures of satisfaction given by training participants may go a long way towards fulfilling the OECD recommendation of 'evaluating the effectiveness of existing programs' and providing policy makers important clues to improve the national training systems. In order for the training to be effective, post-participation follow-up and feedback from participants is crucial to enable governments and training institutions to improve their own performance. After all, if we sought to know whether the training exercise helps participants learn skills and concepts that are applicable to the workplace or improve their employability, the most evident way is to ask them directly.

As a third feature, the paper contributes to the literature on regional economics. Madeira Island is a touristic region and, as such, a core part of its economy is oriented towards this activity. In the regional media, it is frequently argued that training schemes oriented towards this strategic sector should facilitate the employability of young individuals, increase the productivity of incumbent workers, improve the tourist's satisfaction and, in the last term, promote the region

[2] For a methodological discussion on the scope of this type of questions and a variety of economic applications, see Kahneman et al. (1999), Frey and Stutzer (2002) and, more recently, van Praag and Ferrer-i-Carbonell (2008).

in the international networks. This paper is the first to examine to what extent training in the area of Tourism provides individuals with marketable skills, and whether training in this area is more effective than training in other areas.

The rest of the paper is organized as follows. Section 1 presents the dataset and reports summary statistics of the estimating sample. Section 2 describes the transition from vocational training to work in Madeira and outlines some interesting patterns. Section 3 estimates the determinants of employment in different dates using a set of logit models. Section 4 examines the individuals' self-assessment regarding the effectiveness of training on promoting employment, job-related skills and productivity. The results shed further light on the contribution of the different training programs to employment, and uncover important differences across groups of workers. Section 5 discusses the findings of the paper and outlines some theoretical implications. Section 6 contains the concluding remarks.

1. The data

The Survey of Insertion (SI, henceforth) is a yearly survey conducted by the Regional Direction of Vocational Training in Madeira (*Direcção Regional de Formação Profissional*) to evaluate the transition to the labour market of participants in vocational training. In each year, a sample of some 500 individuals that completed a training program in the region is interviewed. Interviews are conducted in July and August, take place two years after completion of the program, and are conducted only among individuals that were not employed during the training. Participants are asked to report information on their educational background, age, and content and duration of the training activity. They are also asked to report their employment

status in three different dates: one month, one year and two years after exit from training. Those who declare to be employed in the time of the survey (84.7% of the sample) are asked to assess the extent to which the training i) contributed to get the job, ii) was related to the job, and iii) raised their productivity in the job. The choice of a two-year period is based on the assumption that this time provides a sufficient ground to evaluate the effectiveness of the training program.

For the present study, we use pooled data from the waves 2000 to 2005. After restricting the sample and dropping observations with missing values, we retain 2,057 individuals. In Table 1 we present the summary statistics. Men account for a large fraction of the sample (61.4%, against 38.6% of women). The distribution across educational levels differs slightly across genders. Relative to men, women are more concentrated towards the tails of the educational distribution. Specifically, the fraction of individuals in the lowest educational category is 0.6% among men and 7.3% among women. In turn, the fraction of individuals with secondary and tertiary education is, respectively, 12.7% and 1.4% among men and 17.5% and 2.8% among women. Notwithstanding this, average years of schooling are similar across genders (10.8 and 10.6 years, respectively). As regards the age distribution, men tend to be younger than women. Specifically, we find that the proportion of individuals aged below 21 is 43.0% in the male and 26.1% in the female subsample, while these figures are 14.6% and 26.1%, respectively, when we consider the above-25 age group. Vocational training in Madeira covers a variety of courses. We have grouped these courses into eight areas: Tourism; Accounting, Business & Administration; Agricultural Production & Food industry; Environment & Urbanism, Civil Construction; Electronics & Energy; Applied Computer Sciences; and the residual category ‘others’. Not surprisingly, in Madeira the most demanded courses are those in Tourism (19.9% among men and 32.2% among women). Men are inclined towards Civil Construction (15.4%), Electronics & Energy (12.2%) and Accounting, Business & Administration (11.3%), and rarely

enroll in Agricultural Production & Food industry (3.3%). Among women, Accounting, Business & Administration (21.4%) is, after Tourism, the most popular area, while Electronics & Energy (0.2%) and Environment & Urbanism (0.6%) are seldom demanded. The miscellaneous category 'others' accounts for 16.1% and 31.8% of the courses in the male and female subsamples, respectively[3].

------ Insert Table 1 about here ------

In the literature, the research on incidence, extent and impacts of training is biased towards participation versus non-participation in training, while corresponding results for the role of the training intensity are mostly lacking. Interestingly, our dataset includes information on the duration of the program. As Table 1 shows, the duration is quite evenly distributed. Although between 1200 and 2399 hours is the most frequent duration (50.2% and 37.9%, for males and females respectively), the proportion of courses with very long duration (more than 3,600 hours) is remarkably large (23.1% males and 24.2% females).

2. The transition from training to work

Using raw statistics, we can outline some interesting patterns in the from-training-to-work transition in Madeira. In Table 2 we report the labour status of training participants at different horizons. Two things are worth noting. First, most training recipients obtain a job immediately after training. One month after completion, 74.4% of men and 69.4% of women work as wage

[3] This category includes all courses that account for less than 3% of the total sample. It includes Social Service, Insurance Techniques, Clothing Industry, Information and Communication, Furniture Industry, Beauty Care, Training for Trainers, Vehicle Mechanics and Nursery.

earners, and an additional 3.8% and 1.0% are self-employed. These figures rise further when we consider the two-year period (80.1% and 72.9%, and 6.0% and 1.7%, respectively). Individuals who enter in a family job, the military service or decide to keep on studying account for a very small fraction of the sample.

Second, the evolution of the unemployment rate largely differs between men and women. Among men, unemployment decreases from an initial 12.7% to 5.9% in the first year and to 5.4% after two years. The evolution of this figure (parallel to an increasing proportion of wage earners) suggests a progressive integration in the labour market[4]. Among women, in turn, the unemployment rate is as high as 24.2% after the first month, declines to 12.3% after one year, and then upsurges up to 19.1% by the second year. All in all, these figures suggest that women not only face more difficulties in finding a job but enter in jobs that are less stable as well.

------ Insert Table 2 about here ------

3. Determinants of employment

In this section, we model the probability of being employed at different dates as a function of the individual characteristics and the type of the vocational program. We consider as employed those individuals who are self-employed as well as those who are wage earners. We do not consider as employed those who work for a family member and do not receive a salary. These workers, together with students and people in the military service, are dropped from the

[4] The regional unemployment rate has been stable and around 5% during the last years (http://estatistica.gov-madeira.pt).

sample[5].

We use a logit model in which the employment status of individual *i* (E_i = 1 employed, E_i = 0 unemployed) depends on a latent variable E^*, such that

$$E_i = \begin{cases} 1 \;\; if \;\; E_i^* \geq 0 \\ 0 \; if \;\; E_i^* < 0 \end{cases} \tag{1}$$

We model the latent variable as

$$E_i^* = \sum_{k=1}^{K} \beta_k H_{ki} + u_i \tag{2}$$

where H is a vector of individual characteristics including age, gender, educational background, and the content and duration (in hundred of hours) of the vocational program. Due to the small number of women in our sample (716 obs.), we do not run a separate regression for men and women. By including a gender dummy, we implicitly assume that the impact of the covariates on the dependent variable is the same for both genders. Finally, as we are using pooled data from 2000 to 2005, we also include a set of dummies to account for year-fixed effects. In each date, the probability of employment for individual *i* is given by

$$Prob[E_i = 1] = \frac{e^{\sum_{k=1}^{K} \beta_k H_{ki}}}{1 + e^{\sum_{k=1}^{K} \beta_k H_{ki}}} \tag{3}$$

We cannot conclude the description of the estimating model without noting that the information contained in the SI presents two limitations that condition our econometric strategy. First, the survey does not provide information on the dates at which the contracts are

[5] This exclusion restriction affects 7.2%, 7.9%, and 7.2% of the workers one month, one year and two years after completion, respectively.

offered. Ideally, we would like to observe the timing of the event 'obtaining a job' and the number of job offers that the individuals receive over different horizons. Such information would capture more accurately the employment opportunities of training participants and would allow us to estimate the hazard function that governs the duration of unemployment, as in Holm (2002) and Hujer et al. (2006). In turn, with the information at hand, our analysis will be confined to estimating a set of logit models in which the dependent variable is the employment status at different dates[6].

Second, the SI is confined to individuals that have completed a vocational program in Madeira Island and, thus, it does not report information on other population groups. This limitation does not allow us to compare the employment opportunities of those who participated (treated group) and those who never participated (control group) in a training program. The subjective questions analyzed later on in the paper allow us to partially overcome this problem.

3.1 Empirical results

In Table 3 we present the odds ratios of the estimated model. For the reference worker, they represent the factor by which the probability of employment increases for a marginal increase in a continuous variable and for a discrete change for dummy variables. We take as the reference individual a man, with less than primary education, aged below 21, who completed a course of the miscellaneous category 'others'. First, we discuss the results found for all the

[6] We also experimented with a 2-stage model in which the employment status at date *t* was estimated in a first stage and, in a second stage, the predicted probabilities were included as an additional regressor in the equation for employment at date *t+j*. The results (available upon request) are qualitatively similar to those obtained with independent logits. Specifically, we found that most variables that are significant in the longer run are also significant when we control for employment in the previous period.

variables included in the regression; then we turn to the findings on the relationship between training program and employment.

Schooling plays a crucial role in the access to employment. This effect, however, is only visible when we consider the longest time span. During the first month, the more educated do not show better results than the less educated. The only significant effect is due to primary education: relative to the remaining groups (secondary and tertiary as well as the reference group, less than primary education) individuals with the primary level face a lower probability of being employed. Interestingly, this situation reverts when we consider the two-year period. In this scenario, the educated show a much higher probability of employment. Specifically, we find that having primary, secondary and tertiary education increases the predicted probability by a factor of 1.75, 7.22 and 11.78, respectively. As it is shown, the estimates are highly increasing in the education level, pointing to an exponential effect of formal qualifications on the employment probability.

Using international data, Martins and Pereira (2004) showed that the labour market reward to education is, as measured by wages, particularly large in Portugal. Our results show that as far as training recipients in Madeira are concerned, education also pays in terms of employability. This positive effect, however, applies only for the longer term, probably because the educated are more inclined to reject initial job offers and to extend the duration of the job search. There are at least three channels by which these incentives may operate. First, the high-educated have higher reservation wages, and may optimally postpone entering employment in order to access high-level occupations. Second, having acquired skills and competencies through (costly) education, the educated have incentives to reject offers for jobs that are not commensurate with their qualifications. Third, more educated individuals are more likely to benefit from a safety

net that allows them to stay longer unemployed. There is consisting evidence that the educated tend to come from richer families, so that they can more easily finance unemployment spells and reduce the disutility from being unemployed[7]. Moreover, educated individuals tend to receive larger amounts from income sources others than wages, such as capital income, transfers and bequests (Budría and Díaz-Giménez, 2007).

Age does not significantly affect the probability of employment during the first year. However, it exerts a negative effect when we consider the two-year period. In this case, the odds ratio of the above-25 age group shows that older individuals have a probability of employment that is only 61.8% that of younger individuals. A candidate explanation for this pattern is that older workers tend to enter in jobs that are less stable or, alternatively, that they have a safety net that allows them to live without working.

We find that, irrespective of the time horizon considered, women are more prone to be unemployed after completing the training. Specifically, the probability for a woman of being employed in the first month is only 44.3% that of men, ceteris paribus. This figure rises to 50.1% one year after but then falls to a remarkably low 27.9% by the second year. Being a woman, therefore, reduces the probability of employment at the end of the period by a factor of almost four.

Next, we turn to the role of the training program. As regards the content of the training, we detect important differences across areas. Considering the 10% confidence level as a threshold for significant and non-significant, we find that during the first month individuals from a

[7] See Asplund and Barth (2005) for international evidence on the connection between family characteristics (including income) and educational attainment.

program in Agricultural Production & Food industry, Environment & Urbanism, Civil Construction and Applied Computer Sciences have a significantly lower probability of finding a job, relative to an individual from the reference program. One year after completion, the effect of Accounting, Business & Administration turns from non-significant to positive and significant, while differences between the remaining programs are not relevant. Finally, two years after the program, we find that Tourism as well as Electronics & Energy show positive and significant effects. Individuals from these areas have a probability of being employed that is, respectively, 4.9% and 37.6% higher than the probability of the reference individual.

The training duration is another relevant variable. The results in Table 3 are in line with the intuition that investing in human capital for longer periods must yield larger gains. The coefficients on duration and duration squared show that the number of hours exerts a positive though decreasing effect on the employment probability. This effect is particularly large when we consider the two-year period. In this case, for instance, a one-hundred increase in the number of hours raises the predicted probability by about 10%.

Finally, we note that the goodness of fit of the estimating model rises as we consider a longer time span. The low R-squared in the first two models (0.044 and 0.064 respectively) suggests that employment during the first year largely depends on unobservable characteristics. Notwithstanding this, the two models are jointly significant for employment determination. As opposite, the R-squared in the last model (0.206) is relatively high for a categorical dependent variable, indicating that the explanatory variables of the estimating equation are indeed relevant for employment determination in the longer run.

4. The participants' self-assessment

The SI asks individuals to self-evaluate several aspects of the training program. The key questions are:

- **(Q1)** *Has the vocational training program helped you to obtain your current job?*
- **(Q2)** *Was the vocational training program related to your current job?*
- **(Q3)** *Has the vocational training program improved your productivity at your current job?*

where the candidate answers range from '1' (completely disagree) to '4' (completely agree). We use Q1, Q2 and Q3 to examine to what extent training contributes to employment, provides skills that later on are used in the job, and raises productivity. We also examine how these effects differ between individuals with different observable characteristics and between training programs. As a limitation, the above questions are answered only by those individuals who were employed in the time of the survey (two years after training). Thus, we cannot explore the contribution of the training for shorter time spans[8].

Admittedly, Q2 cannot be regarded as a direct question on the skills acquired through training. However, it can be interpreted as an assessment on the quality of the match between the content

[8] The pattern of early career histories is diverse among young people, and some individuals may switch jobs frequently during the first months of job search. In our analysis, we have pooled together individuals who were in their first job after training (86.3% of the sample) and individuals who had had two or more jobs (13.7%). Admittedly, these two groups of workers may be inclined to respond differently, as the contribution of past training activities to the current job may differ depending on the number of jobs that the individual has had. Thus, for example, training may facilitate the access to a first job that may act as a stepping-stone to other jobs for which the skills acquired in the training are not needed anymore. Still, in results not reported here, we found that restricting the sample to individuals in their first job does not significantly change the results.

of the training and the skills required in the job, as individuals whose training does not relate to the job can hardly have acquired the necessary skills and competencies in the training. This question, moreover, closely resembles other survey questions that are typical in the emerging literature on skills and educational mismatches[9].

As our dependent variable is a ranked categorical variable, we adopt an ordered logit model in which the answer to a particular question (an ordinal variable *I* that takes values from 1 to 4) depends on a latent variable I^* that is not measured. This latent variable is continuous and has several threshold points that determine the observed value of *I*. In our particular case,

$$I_i = \begin{cases} 1 \; if \; I_i^* \leq \delta_1 \\ 2 \; if \; \delta_1 \leq I_i^* \leq \delta_2 \\ 3 \; if \; \delta_2 \leq I_i^* \leq \delta_3 \\ 4 \; if \; I_i^* \geq \delta_3 \end{cases} \tag{4}$$

Likewise in the simple logit specification, we model variable I^* as a function of our vector of explanatory variables

$$I_i^* = \sum_{k=1}^{K+1} \beta_k H_{ki} + e_i \tag{5}$$

where *H* now includes an additional covariate: the type of contract hold by the individual. This will allow us to explore whether the contribution of training to employment takes place through temporary or permanent contracts, and whether the type of contract fosters the utilization of skills acquired in the training.

[9] See, for instance, Alba-Ramírez and Blázquez (2002), Wasmer et al. (2007) and Budría and Moro-Egido (2008). Here, the key questions are 'To what extent is your formal training or education related to your current job?' and 'Have you had formal training or education that has given you skills needed for your present type of work?'.

4.1 Results from the participants' self-assessment

In Table 4 we report the estimates of the three ordered-logits. The coefficients represent the marginal effect of a given covariate on the mean of the dependent variable. The omitted category is a male worker, aged below 21, with less than primary education, with a temporary contract, and with training in the miscellaneous category 'others'.

Probably, the most remarkable finding is the complementarity between schooling and training. In the previous section we found that individuals with formal qualifications are more prone to be employed after exit from training. The results in the first column of Table 4 show that this performance can be partly attributed to training itself. Having secondary or tertiary education raises the score on employability significantly, by about 0.40 points, indicating that workers with these qualifications find the training particularly useful to obtain a job. Moreover, a glance to the second and third columns of Table 4 shows that individuals with a higher education level are more inclined to believe that the training activity is related to their current job, and that they are more productive due to the training program. The effects of having secondary and tertiary education on these scores range from 0.33 to 0.61, and are statistically significant at the 1% confidence level. Reversely, individuals with primary education or less find the vocational training less effective in every dimension. All in all, the results indicate that, relative to the educated, the low-educated get a worse match between the skills acquired through training and the skills needed to either obtain or perform a job.

The results for the remaining variables are as follows. Age is an additional determinant of the contribution of training to employment. Specifically, we find that relative to younger

individuals, those aged above 25 find the training program less effective when it comes to obtain a job. The estimated coefficient, -0.221, is statistically significant, but turns to non-significant when we switch to columns two and three. Regarding job-related skills and productivity, therefore, we do not detect significant differences across age groups.

In the previous section we showed that relative to men, women are more prone to be unemployed after the training. As is apparent in Table 4, this employment gap is not driven by a differential effect of training on the employment opportunities of both genders. In other words, there is no evidence that upon the employment dimension training is more effective among men. Regarding the remaining dimensions, we find that training is similarly related to the job in both genders. Still, the impact of training on productivity is higher among women (0.083), a result that can be interpreted as some evidence that women tend to obtain a better match between the job requirements and the skills acquired through training.

In the previous section we found that in the longer term Tourism was associated with a higher probability of employment. The results in Table 4 indicate that this is also the perception of respondents: those who completed a program in Tourism feel that their investment significantly contributed to obtain their current job. Moreover, employment does not come at the expense of a bad job match. Participants in Tourism report that the program was related to the job or, to put it different, that they access jobs that are related to the skills acquired in the training. Still, this effect is significant only at the 10% confidence level. The last column of Table 4 suggests that participants in Tourism programs are inclined to belief that the training activity raised their productivity, but the effect fails to be statistically significant. Regarding the remaining courses, we find that Applied Computer Sciences shows the worst results. Individuals from this area find the training less valuable in every dimension, and the estimates

are significant at the 1% confidence level. We also find that individuals from Accounting, Business & Administration and Agricultural Production & Food industry tend to find jobs that are less related to the vocational program. However, this does not translate into lower productivity levels.

The duration of the training activity is positively related to the probability of finding a job, the quality of the match between the training content and the job, and productivity. Specifically, an increase by 100 hours in the duration of the training raises the score on these dimensions by between 0.03 and 0.04 points. This result matches a priori expectations, as individuals from longer training schemes are more likely to have acquired skills and competencies that later on allow them to access certain occupations and be more productive in their jobs.

Last but not least, we find that the type of contract is a strong determinant of the perceived effectiveness of training. According to the results, training attenders benefit from additional opportunities of being offered a permanent contract (0.231). This finding suggests that in the regional labour market employers may be using training as a screening device to hire workers permanently. It may well be that high ability and more committed individuals undertake training activities to signal their higher quality to the regional employers who, in turn, use the training experience as a basis for the decision to offer a permanent contract. Still, the mechanism operating here is not a pure signal effect. There is also a human capital effect, as those with a permanent contract obtain jobs that are more related to the vocational course (0.270) and, probably as a consequence, end up being more productive in their jobs (0.222).

All in all, we must note that despite significant differences across groups of workers regarding the benefits of the training program, the general evaluation is fairly good. This can be seen in

the bottom part of Table 4 (with the heading 'Average score'), where we report the average response in the 1-4 scale provided by the trainees. The three dimensions are scored high on average (3.31, 3.13 and 3.32, respectively), indicating that training completers more than agree that training improves the chances of having a job, is related to future jobs and raises one's productivity.

5. Discussion

According to Human Capital Theory (Becker, 1964), individuals may raise their productivity by investing in education. However, while the positive effects of formal schooling on earnings, employment and productivity have been widely documented in the literature, the labour market implications of training and vocational education are less clear cut. There is evidence pointing to beneficial effects of training activities on unemployment duration, productivity and wages (Richardson and van den Berg, 2001, Conti, 2005, Van Reenan et al., 2006). Still, evaluation studies of public training programmes in OECD countries often report that adult and vocational training have little directly measurable labour market effects, failing to attract earnings returns and new employment opportunities (Fitzenberger and Prey, 2000, Martin and Grubb 2001, Machin and Vignoles 2005).

The results in this paper provide further support to the Human Capital Theory. We showed that vocational training may importantly improve the labour market prospects of training completers, providing job-related skills, enhancing productivity and bringing new employment opportunities. The divergence with previous research may be due to at least three factors. First, there is evidence to suggest that the contribution of training to productivity and employment

may be not an independent effect, but the outcome of a positive interaction between schooling and training. Specifically, the observation that educated individuals benefit to a larger extent from training activities suggests that vocational training acts by fostering the effects of formal schooling rather than by replacing limited or outdated education. This result warns training practitioners and researchers in the field that the interaction between schooling and training should be explicitly taken into account for the design of effective training schemes. Second, in some countries the proliferation of vocational qualifications and schools may have lowered the average quality of training attenders and weakened the signal of what students who go through a vocational program learn. To some degree, this mechanism may be operating in those countries where vocational schemes fail to be effective. In Madeira Island, in turn, the public provision of vocational training is highly centralized at the regional level, which has resulted in a relatively small number of vocational paths, a clearer mapping between the regional labour market needs and vocational courses, and a wider recognition by regional employers. Screening and signaling effects are likely to operate in this particular context, providing training completers with useful labour market credentials. Third, in Portugal the returns to education are remarkably large, partly due to the low educational attainment and training participation of the labour force[10]. The fact that vocational training completers benefit from better opportunities in Madeira Island than in other countries is consistent with this pattern.

In theoretical discussions about the relation between education and training, the question of complementarity or substitutability between these two different forms of human capital is frequently raised. If training is more effective among the educated, then an expansion in

[10] In Portugal, only 27.6% of the adult population (25-64 years old) has completed upper secondary education, while in Europe as a whole (EU-25) this proportion rises to 69.7%. Similarly, training participation in Portugal is 3.8%, against 10.1% in EU-25 (Eurostat, 2007).

training provision may deteriorate the labour market position of already disadvantaged individuals. On the other hand, if training acts as a substitute of formal schooling existing differences in labour market performance and productivity between educated and uneducated workers could be ameliorated. The results in this paper give support to the complementarity hypothesis, thus warning that equality of training provision may result into further labour market inequalities. Lynch (1992) for the US, Blundell et al. (1999) for the UK and Brunello (2004) for Europe as a whole report similar findings.

Finally, there are at least two factors that may explain the complementarity between vocational training and schooling documented in this paper. First, schooling plays a particularly important role during the screening process of recent school-leavers, who unlike more experienced workers normally do not possess productivity signals other than their education. Therefore, we expect that those with a higher level of schooling tend to benefit from additional opportunities after the completion of the training. Second, it has been documented that mental ability and motivation are strong determinants of the extent of knowledge acquisition among training participants, and that these factors are closely related to the individual's educational attainment (Cannon-Bowers et al., 1995, Colquitt et al. 2000). It is likely, therefore, that the higher capacity of knowledge acquisition of the educated leads them to increased productivity and more occupational opportunities.

6. Conclusions

One of the major concerns for the Portuguese economy over the last years has been to promote productivity, economic competitiveness and occupational integration. To that purpose, the

development of new vocational training schemes was regarded as crucial by national and international economic authorities. In an earlier report, the OECD indicated that reforms in the Portuguese labour market 'should be accompanied by a stronger emphasis on vocational training, to ease the school-to-work transition. New rules permitting employment of unqualified youths on condition that training is provided by the employer may help, but it would be better if the schools themselves were better able to provide school-leavers with qualifications useful to employers […]. The government's aim to provide employment-related training to all youths that are registered in employment centers and a renewed emphasis on life-long training are welcome' (OECD, 2003).

Understanding and improving the process of knowledge transfer and labour market integration has become, thus, a primary concern for training practitioners, governments and researchers. In this paper, we contributed towards a better perception of this process by analyzing the transition to the labour market of participants in vocational training programs. We explored how the employment status after the completion of the program depends on relevant variables, including age, gender, education, and the content and duration of the training. We found that educated, young and male individuals are more prone to be employed after exit from training, particularly in the longer run. Moreover, we found that training with long duration and training in specific areas raise the probability of employment.

The results were complemented with the individuals' self-assessment regarding the effectiveness of the course along three dimensions: employment, job-related skills and productivity. The average score in every dimension was fairly high, indicating that the beneficial effects of training are widely recognized among participants. We found that more educated individuals find the training program more effective in every dimension. This result

leaded us to conclude that training significantly contributes to the faster transition to employment experienced by this group of workers. We also reported that women tend to benefit more from the productivity gains acquired through training, and that the perceived effectiveness of training depends on the content and duration of the program.

Our results have several implications for public policy. First, they warn policy makers that vocational training is far from being remedial, at least in Madeira Island. Current vocational training is not a substitute of formal schooling. The strong complementarity between schooling and training found in the data suggests that training schemes oriented to the less educated may be less effective than previously thought. In an earlier work (Budría and Pereira, 2007), we reported that in Portugal less educated workers earned a higher wage premium from training activities, and concluded that training had a remedial nature. The results in this paper suggest that this is not the case when it comes to employment opportunities, job-related skills and productivity. If policy makers are concerned with promoting employment among the less favoured in the labour market, the existing training schemes should be redesigned in order to amend the educational and skills limitations that some training participants exhibit from the start. In this respect, training aimed to acquire general skills and competencies rather than specific knowledge may be of particular importance.

Second, educational and skills mismatches are a hot topic in contemporary labour markets. A significant proportion of the labour force in western economies works in jobs that are not commensurate with the skills acquired through their education and training (Groot and van den Brink, 2000). These workers end up earning less, being less productive and reporting lower levels of job satisfaction (Hartog, 2000, McGuinness, 2006). In this paper we showed that training provides individuals with skills that later on are required to either obtain or perform a

job. This result indicates that policies aimed to encourage and increase the overall participation in training may importantly reduce the extent of skills mismatches by aligning the workers' skills with the realities and needs of the labour market. Still, the quality of the match between the requirements of the job and the skills acquired through training importantly differs across groups of individuals. Here, again, the emphasis should be placed on the less educated, among which the quality of the match was found to be lower. Clearly, future research should examine the generalizability of our results to other regions and training schemes.

Third, there is evidence to suggest that training in Tourism, an activity that is core for Madeira Island, improves the labour market prospects of individuals. This was assessed using an objective measure of employability (the labour market status two years after the completion of the program) and a subjective measure (the individuals' self-assessment). This finding adds to the regional debate of how and to what extent private and state interventions should be oriented to develop workforce skills that are necessary for the successful development of the region. The evidence presented here suggests that training in the area of Tourism is particularly beneficial. It may well be that participants in Tourism programs contribute to sustainable and well-managed tourism by raising the general level of knowledge in the sector, inculcate appropriate environmental and organizational attitudes and values, and provide the tools to apply these to specific jobs in the regional labour market. The fact that individuals with training in the field are more prone to be employed seems to be consistent with this view.

The next natural step of this research is to examine the labour market consequences of participation versus non-participation in training activities, and to expand the set of self-assessed questions provided by training participants. There is evidence suggesting that motivation to learn, trainees' expectation fulfillment and perceived training difficulty may be

relevant factors explaining knowledge acquisition (Colquitt et al., 2000, Rowold, 2007). Due to data limitations, these dimensions were not explored in the present study. Also, the acquisition and development of new training data containing detailed information on the labour market status of participants and non-participants in vocational training would be valuable to shed light on important questions, such as the individual returns to training and the effects of training participation on job security and employment rates. Similarly, longitudinal data containing the timing of the investment in which the employment situation at different dates is the focus of the analysis would be desirable, insofar as the temporal ordering of cause and effect could be established. These efforts are a compelling task for future research.

References

Alba-Ramírez, A. and M. Blázquez (2002), Types of Job Match, Overeducation, and Labour Mobility in Spain, in *Overeducation in Europe: Current Issues in Theory and Policy*, Büchel, F., A. de Grip and A. Meitens (eds), Edward Elgar Publishing, Cheltenham, UK.

Asplund, R. and E. Barth (2005), *Education and Wage Inequality in Europe: A Literature Review*, The Research Institute of the Finnish Economy, Helsinki.

Bartel, A.P. (1995), Training, wage growth, and job performance: evidence from a company database, *Journal of Labour Economics* 13, 401–425.

Becker, G. (1964), *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education*. New York: Columbia University Press.

Bishop, J. (1994), The impact of previous training on productivity and wages, in *Training and the Private Sector: International Comparisons*, Lynch, L. (ed), The University of Chicago Press, Chicago.

Black, S. and L. Lynch (1996), Human-capital investments and productivity, *American Economic Review* 86, 263-267.

Blundell, R., L. Dearden and B. Sianesi (1999), Human capital investment: the returns from education and training to the individual, the firm and the economy, *Fiscal Studies* 20(1), 1-23.

Bound, J., D. Jaeger and R. Baker (1995), Problems with Instrumental Variables Estimation when the Correlation Between the Instruments and the Endogenous Explanatory Variable is Weak, *Journal of the American Statistical Association* 90, 443-450.

Brunello, G. (2004), On the Complementarity between Education and Training in Europe, in *Education, Training and Labour Market Policies in Europe*, Checchi, D. and Lucifora, C., (eds.), Palgrave.

Budría, S. and P.T. Pereira (2007), The Wage Effects of Training in Portugal: Differences across skill groups, genders, sectors, and training types, *Applied Economics* 39, 787-807.

Budría, S. and J. Díaz-Giménez (2007), Economic inequality in Spain: The European Union Household Panel Dataset, *Spanish Economic Review* 9(1), 1-38.

Budría, S. and A. Moro-Egido (2008), Education, Educational Mismatch, and Wage Inequality: Evidence for Spain, forthcoming in *Economics of Education Review*.

Cannon-Bowers, J.A., E. Salas, S. Tannenbaum, and J.E. Mathieu (1995), Toward theoretically based principles of training effectiveness: a model and initial empirical investigation, *Military Psychology* 7, 141–164.

CNCLSTP (Cabinet of the National Coordinator of the Lisbon Strategy and Technological

Plan) (2006), *The Portuguese Technological Plan*, Lisbon.

Colquitt, J.A., J.A. LePine and R.A. Noe (2000), Toward an integrative theory of training motivation: a meta-analytic path analysis of 20 years of research, *Journal of Applied Psycology* 85, 678-707.

Conti, G. (2005), Training, productivity and wages in Italy, *Labour Economics* 12(4), 557-576.

Eurostat (2007), Structural indicators, Luxembourg. Available at: http://epp.eurostat.ec.europa.eu.

Fitzenberger, B. and H. Prey (2000), Evaluating Public Sector Sponsored Training in East Germany, *Oxford Economic Papers* 52(3), 497-520.

Fitzenberger, B. and R. Völterb (2007), Long-run effects of training programs for the unemployed in East Germany, *Labour Economics* 14(4), 730-755.

Frey, B. and A. Stutzer (2002), *Happiness and Economics: How the Economy and Institutions Affect Human Well-Being*. Princeton: Princeton U. Press.

Groot, W. and H. van den Brink (2000), Overeducation in the Labour Market: A Meta-Analysis, *Economics of Education Review* 19, 149-158.

Hartog, J. (2000), Mismatch and earnings: where are we, where should we go, *Economics of Education Review* 19, 131-147.

Hartog, J., P.T. Pereira and J.C. Vieira (2000), Vocational Training and Earnings in Portugal, *Economia* 24, 1-24.

Holm, A. (2002), The effect of training on search durations: a random effects approach, *Labour Economics* 9(3), 433-450.

Hujer, R., S.L. Thomsen and C. Zeiss (2006), The effects of vocational training programmes on the duration of unemployment in Eastern Germany, *Advances in Statistical Analysis* 90(2), 299-321.

Jespersen, S.T, J. Munch and L. Skipper (2008), Costs and benefits of Danish active labour market programmes, forthcoming in *Labour Economics*.

Kahneman, D., E. Diener and N. Schwarz (1999), *Well-Being: The Foundations of Hedonic Psychology*. New York: Russell Sage Foundation.

Lynch, L. (1992), Private sector training and its impact on the earnings of young workers, *American Economic Review* 82(1), 299-312.

Machin, S.J., A. Vignoles, eds. (2005), *What's the Good of Education? The Economics of Education in the UK*, Princeton University Press.

Martin, J.P. and D. Grubb (2001), What Works and For Whom: A Review of OECD Countries' Experience with Active Labour Market Policies, *Swedish Economic Policy Review* 8(2), 9-56.

Martins, P.S. and P.T. Pereira (2004), Does Education Reduce Wage Inequality? Quantile Regressions Evidence from 16 Countries, *Labour Economics* 11(3), 355-371.

McGuinness, S. (2006), Overeducation in the Labour Market, *Journal of Economic Surveys* 20(3), 387-418.

OECD (2003), *Portugal – Assessment and Recommendations*, OECD Economic Surveys, available at http://www.bportugal.pt/publish/other/ocde03e.htm

OECD (2005), *Education at a Glance*, Paris.

OECD (2006), *Economic Survey of Portugal, 2006*. OCDE Policy Briefs, available at: http://www.OCDE.org/dataOCDE/62/28/36497355.pdf

Pischke, J-S. (2001), Continuous training in Germany, *Journal of Population Economics* 14(3), 523-548.

Richardson, K. and G.J. van den Berg, (2001), The effect of vocational employment training on the individual transition rate from unemployment to work, *Swedish Economic Policy Review* 8, 175-213.

Rowold, J. (2007), Individual influences on knowledge acquisition in a call center training context in Germany, *International Journal of Training and Development* 11(1), 21-34.

Saraiva, A. (1999), Incidência e Impacto Salarial da Formação Profissional em Portugal (Extent and Wage Impact of Training in Portugal), *Economia* 22, 27-43.

Van Praag, B.M.S. and A. Ferrer-i-Carbonell (2008), *Happiness Quantified: A Satisfaction Calculus Approach*, Revised Edition, Oxford University Press, Oxford, UK.

Van Reenan, J., H. Reed and L. Dearden (2006), The impact of training on productivity and wages: evidence from British panel data, *Oxford Bulletin of Economics and Statistics* 68(4), 397–421.

Velada, R., A. Caetano, J.W. Michel, B.D. Lyons and M.J. Kavanagh (2007), The effects of training design, individual characteristics and work environment on transfer of training, *International Journal of Training and Development* 11(4), 282-294.

Wasmer, E., P. Fredriksson, A. Lamo, J. Messina and G. Peri (2007), *The Macroeconomics of Education in Europe*, Oxford University Press, Oxford, UK.

Tables

Table 1. Summary statistics (%)

	Men	Women
	61.4	38.6
Education level		
Less than 4 years of schooling	0.6	7.3
1st cycle of Basic Schooling (4th year)	11.8	10.9
2nd cycle of Basic Schooling (6th year)	26.0	18.7
Primary education (9th year)	47.4	42.8
Secondary education (12th year)	12.7	17.5
3-year Bachelor's Degree	0.9	1.5
5- year Bachelor's Degree	0.5	1.3
Average years of schooling	10.8	10.6
Age		
< 21	43.0	26.1
21 – 25	42.4	47.8
> 25	14.6	26.1
Training Program		
Tourism	19.9	32.2
Accounting, Business & Administration	11.3	21.4
Agricultural Production & Food industry	3.3	7.7
Environment & Urbanism	8.3	0.6
Civil Construction	15.4	1.3
Electronics and Energy	12.2	0.2
Applied Computer Sciences	7.2	4.8
Others	16.1	31.8
Training Duration (hours)		
300 – 1199	16.6	25.7
1200 – 2399	50.2	37.9
2400 – 3599	10.2	12.2
> 3600	23.1	24.2

Table 2. Labour status after the completion of the program (%)

	After one month		After one year		After two years	
Status	Men	Women	Men	Women	Men	Women
Wage earner	74.4	69.4	79.3	80.9	80.1	72.9
Self-employed	3.8	1.0	4.6	1.3	6.0	1.7
Family Job (unpaid)	2.5	1.0	1.6	0.6	0.3	0.3
Student	4.6	3.4	5.4	3.9	6.0	4.8
Military Service	1.6	0.2	2.6	0.2	2.0	0
Unemployed	12.7	24.2	5.9	12.3	5.4	19.1
Others	0.4	0.9	0.5	0.9	0.3	1.1

Table 3. Determinants of employment

	After one month		After one year		After two years	
	Odd ratio	z-ratio	Odd ratio	z-ratio	Odd ratio	z-ratio
Primary education	0.785*	-1.63	1.283	1.26	1.749***	3.08
Secondary education	1.235	0.82	2.941***	2.88	7.222***	5.25
Tertiary education	2.115	1.31	2.016	1.21	11.775***	3.23
20 < Age ≤ 25	0.855	-1.09	0.978	-0.11	0.944	-0.30
Age > 25	0.865	-0.85	0.714	-1.58	0.618**	-2.41
Female	0.443***	-5.34	0.501***	-3.35	0.279***	-5.94
Tourism	0.797	-1.32	1.020	0.91	1.049**	2.23
Accounting, Business & Administration	0.811	-1.07	1.628*	1.67	1.219	0.74
Agricultural Production & Food industry	0.533**	-2.34	0.994	-0.02	0.333***	-3.69
Environment & Urbanism	0.400***	-2.73	1.154	0.25	0.968	-0.06
Civil Construction	0.592*	-1.75	0.734	-0.81	0.945	-0.14
Electronics and Energy	0.881	-0.32	2.026	1.10	1.376***	2.60
Applied Computer Sciences	0.600*	-1.80	0.674	-1.11	0.811	-0.54
Duration	1.035*	1.83	1.035	1.40	1.103***	4.00
Duration squared	0.999**	-2.25	0.999	-1.62	0.999***	-3.84
Average Probability	0.800		0.895		0.853	
Pseudo R-squared	0.044		0.064		0.206	
No. of Observations	1,915		1,915		1,915	

Note: * denotes significant at the 10% confidence level, ** denotes significant at the 5% confidence level, *** denotes significant at the 1% confidence level.

Table 4. Effectiveness of the training program

	Helped to obtain current job		Related to current job		Increased productivity in current job	
	Coeff.	z-ratio	Coeff.	z-ratio	Coeff.	z-ratio
Primary education	0.092	1.60	0.056	0.92	-0.004	-0.08
Secondary education	0.407**	5.81	0.537***	7.25	0.331***	4.86
Tertiary education	0.395***	4.06	0.609***	6.88	0.481***	6.51
20 < Age ≤ 25	-0.025	-0.44	-0.024	-0.41	0.037	0.73
Age > 25	-0.221***	-2.81	0.001	0.01	-0.001	0.55
Female	0.083	1.51	0.026	0.45	0.083*	1.69
Tourism	0.092**	2.30	0.065*	1.79	0.048	1.59
Accounting, Business & Administration	-0.072	-0.89	-0.226***	-2.61	-0.057	-0.80
Agricultural Production & Food industry	-0.138	-0.84	-0.413**	-2.29	-0.246	-1.60
Environment & Urbanism	0.164	1.41	-0.031	-0.22	-0.021	-0.18
Civil Construction	0.067	0.67	-0.129	-1.10	0.030	0.33
Electronics and Energy	-0.031	-0.25	-0.009	-0.07	-0.076	-0.66
Applied Computer Sciences	-0.714***	-4.52	-0.590***	-3.94	-0.367***	-2.79
Duration	0.031***	3.94	0.037***	4.52	0.031***	4.35
Duration squared	0.000***	-3.36	-0.001***	-3.93	0.000***	-3.67
Permanent contract	0.231***	4.80	0.270***	5.35	0.222***	5.11
Average Score	3.31		3.13		3.32	
Pseudo R-squared	0.046		0.048		0.041	
No. of Observations	1,621		1,621		1,621	

Note: * denotes significant at the 10% confidence level, ** denotes significant at the 5% confidence level, *** denotes significant at the 1% confidence level.