Is workplace training more beneficial for vocationally educated workers?

A comparison between England and Germany

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Abstract

There is evidence that participation in workplace training has a positive effect on wages; however, it is unknown whether training returns differ across different types of educational attainment. This exploration is relevant because it may indicate a way to redress wage gaps in the labour market. Using the German Socio Economic Panel and the British Household Panel Survey, this paper looks at individuals educated at the secondary level in Germany and England and examines whether workplace training has a positive association with wages for them and, if so, whether the returns vary by their type of education, vocational or general. This study uses a difference-in-differences approach and its combination with propensity score matching to address the problem of training endogeneity. Results indicate that training returns differ across countries and by type of educational attainment; however, any significant 'effects' disappear when selection of trainees is taken into account demonstrating the importance of model choice on results found.

JEL classification: J31, J24, J41

1. Introduction

Workplace training participation may positively influence individuals' wages (Lynch, 1992, Oecd, 1999). Yet, results of previous research on the effects of workplace training on wages are still mixed. While some studies find strong correlation between workplace training and wage levels (Lynch, 1992, Neumark, 1994, Gerfin, 2004), others find only small or not significant returns (Pischke, 2001, Leuven and Oosterbeck, 2002, Dieckhoff et al., 2007). Knowledge about the existence of an association between workplace training participation and wages is highly important since it indicates whether investment into training benefits the employees besides acquiring new knowledge. Second, if there is association, training might impact on income inequalities present in the labour market. This relates to the question on how returns vary across different socio-economics groups. Whilst it has been established that training is mostly addressed to tertiary educated individuals who are also those who benefit from it the most (e.g. Brunello, 2004), it is still unknown how training participation differs among the majority of the workforce having attained a secondary level of education in terms of general or vocational qualifications. Research on the association between the type of education and wages suggests that vocational and general qualifications are attached to wages in a different way. Vocational education holders usually earn lower wages over the life course compared to general educated (Conlon, 2001, Corvers et al., 2010). However, the gap in wages between them is likely to reflect differences in the socio-economic status rather than in the educational background. This is because of the tendency of vocational schools to attract pupils from lower family backgrounds, associated with poor school-achievements (Oecd, 2012) and, consequently, worse labour market prospects (Dustmann, 2004, Unesco, 2012). Workplace training may play a role in redressing this gap. So far, however, there has been no research on how returns differ by education type. The contribution of this paper is therefore to extend the knowledge on the association between workplace training and wages by analysing how returns vary for different types of educational attainment.

Furthermore, this work recognises the role institutional settings may play in determining labour market rewards by offering comparative evidence of workplace training returns in Germany and England. The two countries show diverse educational and labour market systems, which may differently influence the process of labour market rewards. Few studies have attempted cross-country analyses of training returns, presumably because of the difficulty in finding data sets that define training consistently across countries. Performing a comparative analysis will increase the understanding of the role the institutional context may play in determining how distinct educational groups benefit differently from workplace training. This paper addresses therefore the following questions: does workplace training have an association with wages? If so, is training more beneficial for vocationally educated workers compared to generally educated? Is there any difference between Germany and England?

By answering these questions, this study examines whether the choice of the method used for estimating the 'effect' of training impacts on the results found. A well-known problem in the study of training returns is endogeneity; this means that trainees and non-trainees may have different observed and unobserved characteristics that, if not considered, may bias the results. Using data from the German Socio-Economic Panel and the British Household Panel Survey, this study addresses the endogeneity issue by using a variety of counterfactual impact evaluation methods.

The structure of this paper is as follow. Section 2 provides the theoretical background in which the research is embedded. This is followed by a description of the data and methods in Section 3 while results are presented and discussed in Section 4. Section 5 concludes.

2. Theoretical background

Various elements may play a role in the explanation of the relationship between workplace training participation and wages. The arguments of this study are built using the following theoretical approaches: the human capital (Becker, 1964), the job matching (Sattinger, 1975, Jovanovic, 1979) and the credentialist (Collins, 1979) theories. The human capital theory is prevalent in economic studies and predicts that education and workplace training increase individuals' productivity, which employers are willing to reward. This approach is used in this work to motivate why training is expected to yield a monetary premium; our hypothesis is therefore that workplace training has a positive association with wages. However, the human capital theory does not make any reference to education types; motivations for the variation of returns between individuals with vocational or general qualifications cannot thus be derived from it. To the best of our knowledge, this topic was not previously tackled in the literature and this makes it also difficult to draw on existing theories. However, two other theoretical views might help in understanding the possible mechanism at play. The job matching theory stipulates that higher productivity and earning are determined by the quality of the fit between the skills possessed and those required on the job: a successful match between these two elements leads to better wages. This reasoning may explain differences in wage levels: vocational education holders are more likely to meet the details of specific job descriptions than those with general education (Heijke et al., 2003) and hence should receive higher wages. Complementarily, the same argument may be extended to training returns; if it holds, vocationally educated would also benefit more from the increased specialisation and additional job fit which derives from training participation. This view raises though some concerns. In fact, generally educated will also benefit from a close attachment to the job and it is ambiguous whether the effect of training for vocationally qualified will outweigh that for the general ones. Another concern is that the views proposed by the above theories assume that it is only the workers' productivity that impacts on the formation of wage levels and returns. In contrast, proponents of the credentialist perspective (e.g. Collins, 1979) sustain that earning are based on more than individuals' characteristics (such as human capital) (Bol and Van De Werfhorst, 2013). Specifically, it is the group membership that determines earnings and occupational prestige (Walters, 2004). Essentially, Collins (1979) sustains that education allows people to purchase more desirable occupations through practices of social closure. This means that those in elite positions tend to maintain their dominant status by controlling the requirements for the admission to specific groups (also likely to be linked to higher wages). This may also explain variations in wage levels and returns by education type. In countries where vocational schools are likely to attract students from poorer economic backgrounds, it is plausible that the prestige associated with vocational qualifications is low and we suggest that individuals with such background may be excluded from occupations of higher prestige, thereby plausibly being also excluded from workplace training opportunities and rewards. This contradicts the prediction derived from the job matching theory.

The literature commonly contrasts countries following occupational labour markets (OLM) traditions with those where internal labour markets (ILM) prevail (e.g. Kirpal, 2011, Kogan and Matkovic, 2012). In OLM (typical in Germany), the link between education and labour market is tight and this should favour a better match between qualifications and jobs. This is expected to reduce the need for workplace training, which may have also implications for its returns. Moreover, as a consequence of the close fit between credentials and jobs (Bills, 2004), vocationally educated – who are more likely to be employed in their area of domain - should earn and gain more from training because benefiting from a 'comparative advantage' (Heijke et al., 2003) compared to generally educated. However, in Germany vocational institutes tend to attract pupils from lower socio-economic background (Mueller et al., 1998) often associated with low performance (Unesco, 2012). Vocationally educated are thus less likely to enter prestige occupations and take part in training that has the potential to increase wages compared to generally educated.

In ILM (like England), the link between schools and labour markets is looser: a substantial amount of training is therefore expected to happen on the job and a lower importance is given to educational credentials to determine job allocations and wages. We therefore argue that the job matching theory describes the patterns of labour market outcomes in the English context; hence, due to the better quality of the job fit, vocationally educated are expected to earn higher wages and to benefit more from training participation compared to general ones in England.

3. Data and methods

Data

The data used are the German Socio-Economic Panel (GSOEP) and the British Household Panel Survey (BHPS) which both contain information on workplace training, wages, and a wide range of individuals' background characteristics in a longitudinal format. In GSOEP, information on training participation is available in a special module collected every four years, thus comparable training information is present for the years 2000, 2004 and 2008. The survey question identifies workplace training as '*training related to participation in professionally oriented courses'*. In BHPS, the questionnaire includes information on training courses attended since September of the year preceding the interview from 1998. However, to favour a direct comparison with GSOEP, the data available is reshaped and only waves 2000, 2004 and 2008 are considered for the analysis. The constructed variable on training reports whether individuals have participated in training in the three years preceding the interview. The BHPS survey question captures any training schemes *'including part-time college or university courses, evening classes, training provided by an employer either on or off the job, government training schemes, Open University courses, correspondence courses and work experience'* in which the respondent has taken part.

The definitions of workplace training differ across datasets considerably. The GSOEP question captures only professionally oriented courses and does not provide any examples. The BHPS question includes a wider set of training events which are named in order to remind the respondents of possible courses they need to take into account. As a consequence, we would expect the BHPS item to identify more training events than that of the GSOEP if the sample were exactly the same. The different nature of the item formulation is very likely to impact on both, the number and the type of individuals being identified as training participants, which needs to be taken into account for the comparison of results between the countries.

Sample

The analysis performed in this paper focuses on a sample of individuals aged 18 to 65 (English and German retirement age) who declared to be employed (full-time or part-time) at the time of the interview and who obtained a secondary school certificate as highest level of education (either general or vocational)[1]. Individuals employed in irregular and marginal jobs have been excluded (due to their possible need for special training which is not the focus of the paper) as well as those who are in education (to rule out other forms of training). The BHPS sample only includes data on England and Northern Ireland[2]. After these exclusions, the final number of individuals covered in both years 2004 and 2008 is 4789 for BHPS and 14476 for GSOEP[3]. The definition of the type of education (as opposed to level) is not straightforward. Especially in the case of Germany, the different qualifications are also highly correlated with ability. In fact, traditionally, the German school system is characterised by early ability streaming of pupils; it involves the separation of students in different tracks according to their school performance. As a result of this, for instance, the Hauptschule is thought to attract low ability pupils compared to Gymnasium. As such, without taking ability into account, it is difficult to separate between education types and levels in the country; this is a limitation

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[1] In Germany, this refers to individuals who have completed a Hauptschule and Realschule or Gymnasium. In England, this refers to individuals who have completed a sixth form college and have obtained an A-level qualification or a qualification among those belonging to the National Vocational Qualification (NVQ) scheme. The distinction by education type is possible by using a CASMIN education variable in GSOEP and a specific variable that allows to identify whether the respondent has attained a vocational certificate in BHPS.
In both countries, the level of qualification corresponds to ISCED 3 and 4. All those who have achieved qualifications below or above these levels were excluded from the analysis.

[2] Wales and Scotland have been excluded due to differences in their education systems compared to the other UK constituent countries. Throughout the text, for brevity reasons, we refer only to England even tough the sample includes data on England and Northern Ireland.

[3] Information on the sample composition is available upon request.

of this study even though the focus on secondary educated could mitigate this problem up to some degree.

Methods

The estimation of the training ‘effect’ on wages is a treatment effect problem (Gerfin, 2004). The estimated ‘effect’ is obtained by subtracting the trainees’ wages with the wage received had they not taken part, the counterfactual result. Since it is impossible to observe both outcomes as an individual cannot participate and non-participate at the same time, the counterfactual is estimated using a group of untreated. To get unbiased estimates, those who have participated in training (treatment group) and those who have not (control group) should be as similar as possible to each other with respect to both observed and unobserved characteristics. This work uses two different methods for constructing the comparison group: propensity score matching (PSM) and difference-in-differences (DiD).

Propensity score matching (PSM) matches each treated individual with an untreated who is as similar as possible to treated on the basis of observable characteristics. Matching can be done by using a propensity score[4]; which is the probability of treatment (i.e., participation in training) conditional on pre-treatment characteristics; it recovers the average treatment effect on the treated (ATT). To estimate the propensity score, we perform a probit model of training participation; next, a Kernel matching is used to combine treated and control observations. For PSM to work, the conditional independent assumption (CIA) that assumes that selection intro treatment and control group is independent of any variables not available in the data set (unobservable variables), needs to be fulfilled. This is a strong assumption. For example, for this study this means that unobserved variables like ability or motivation do not affect both training participation and wages beyond the observable variables take into account for matching.

In contrast, DiD does not rely on the CIA but accounts for time-invariant unobservable differences between treatment and control groups by comparing the difference in average wages before and after training participation for the treatment group with the difference in average wages

[4] See Rosembaum, P. & Rubin, D. B. (1983). The Central Role of Propensity Score in Observational Studies for Causal Effects. *Biometrika,* 70.

before and after for the control group (for details, see Angrist and Pischke, 2009). This approach relies on one main assumption: the common time trend across groups (in our application, the same parallel development of wages over time). For its application, it is therefore necessary to accept the assumption that, in the absence of the treatment, the unobserved differences between treatment and control groups are the same over time[5].

This assumption is especially problematic, if individuals in treated and control groups differ greatly in their characteristics, since different characteristics might be associated with different time trends of the wage variable. However, the characteristics of individuals can be made similar using PSM. This combination of PSM with DiD has been named the difference-in-differences matching (DDM) estimator (Heckman et al., 1997, Smith and Todd, 2005). The benefit of this joint estimation arises from the fact that PSM identifies comparable treatment and control groups, whereas DiD eliminates the effect of time-invariant unobservables. In this paper, we first use DiD alone for estimating the 'effect' of workplace training on wages using the whole sample; then we apply it with the treatment and control groups originated by the propensity score estimation. The relevance of PSM for the identification of the control group in this study stems from the large difference documented in terms of observable characteristics between treated and untreated groups used for the DiD estimation. It is also motivated by the findings of Heckman et al. (1997) showing that non-overlapping support and different distribution of covariates (likely to affect DiD) are more important than the bias related to selection on unobservables. It is worth noting, however, that results of the two models are not comparable and expected to differ. In fact, whilst DiD recover the average treatment effect (ATE), DDM recover the average treatment effect on the treated (ATT).

The DiD estimation is defined as shown in equation (1):

$$(1) \qquad Ln\ Y_{it} = \alpha + \beta_1 Treatment_i + \beta_2 Time_t + \beta_3(Treatment_i * Time_t) + \beta_4 Education_i + \beta_5(Treatment_i * Time_t * Education_i) + \beta_6 I_i + \varepsilon_{it}$$

where the logarithm of the dependent variable Y_{it} is the hourly wages, *Treatment* is a dummy variable identifying the treatment (1) and control group (0). *Time* takes value 1 for year 2008 (post-) and 0 for

[5] Generally, also the so called 'Ashenfelder dip' is problematic (see Ashenfelter, O., 1978). However, since this paper only focuses on employed individuals any initial income disadvantage for the trainees should not be of importance for this analysis.

year 2004 (pre-treatment). β_3 measures the difference between the treatment and control groups after training and therefore provides the estimate of the impact of treatment. *Education* indicates the type of educational qualification attained at the end of secondary school. Generally educated are the reference group (for Germany it refers to Gymnasium). We also add an interaction term on treatment and education to measure the association of training on wages by education type. I_i denotes a set of characteristics of worker *i.* ε_{it} is the error term. In this model, the treatment group is formed by individuals who have not taken part in any training in the 'pre-treatment' year (2004) but have participated in workplace training in the time laps between the 'pre-' and 'post-treatment' year (2008). The control group includes all those who have not taken part in any training in the 'pre-treatment' year and have not until the 'post-treatment' year[6]. Control variables are gender, age, immigrant status, tenure, part-time work and dummies for firm size and type of occupation (ISCO classification).

Second, we run a combined PSM and DiD estimation for all education types and also separately by type. The PSM estimation is defined as shown in equation (2):

(2) $$Y_{t1\text{-}t0\ i} = \alpha + \beta_1 Treated2_i + \beta_2 I_i + \varepsilon_i$$

where the dependent variable $Y_{t1\text{-}t0\ i}$ is the difference between hourly wages in 'pre-' and 'post-treatment' years[7], $Treated2_i$ is the new dummy variable indicating the treatment and control groups identified by the PSM estimation[8]. I_i denotes a set of workers' characteristics (control variables are identical to those used for DiD estimations). ε_i is the error term.

4. Results

Table 1 presents the results from the DiD estimation, for GSOEP and BHPS data. Three nested models (adding control variables successively) are run to identify, first, the mere training 'effect' for generally educated (Column 1) and, then, how it changes when personal (Column 2) and employment characteristics (Column 3) are controlled for. For all models, first the 'effect' is discussed for the group of generally educated. In a second step, differences to vocationally educated

[6] This definition of treatment and control group reduces considerably the number of observations used in the estimations; in fact, individuals who have participate in training in both 2004 and 2008 or have participated in 2004 but not in 2008 were not considered.
[7] The difference in hourly wage levels is used to measure mean differences. The use of a wage difference as dependent variable is driven by the setup of the PSM command in the software Stata.
[8] To perform propensity score matching and covariate balance testing, we use the command 'psmatch2'.

are considered. For Germany, Model 1 (controlling only for type of qualification) displays a coefficient of 0.121 which indicates that treated individuals having attended training within the last three years before the interview experience a significant 12.7% (exp(0.121)) wage increase compared to individuals who have not undergone any training[9]. Models 2 and 3 indicate that this association remains significant also after personal and employment characteristics are controlled for: the coefficient reaches 0.158 (Column 3) showing that personal and employment characteristics were not responsible for a highly significant association found in Model 1. If we assumed unobservable characteristics like ability and motivation to be constant over time, the estimate should not be impacted upon by the exclusion of these unobserved variables as long as the common trend assumption is valid.

The results fit the human capital theory: training participation leads to a wage premium. This would also be plausible if related to the labour market tradition present in Germany. In OLM, a lower amount of training is expected to take place[10]; this may favour the presence of a monetary reward for those workers who do undertake training courses on the job.

For BHPS data, the DiD model shows a positive and significant training 'effect' of about 14% (exp(0.13)) (Column 1). The 'effect' remains positive also after personal and employment characteristics are controlled for; however, it falls into significance. Training therefore does not impact on wages in the English labour market, given our data. This result may reflect the structure of the ILM labour market typical of England. There, workplace training is expected to happen on the job to equip individuals with working competencies necessary for their work. As such, the aim of the training provided in England might be more intended to let individuals catch up with necessary knowledge than deepen their knowledge for increasing their productivity. Only the latter kind of knowledge increase might be associated with a wage premium.

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[9] It is worth noting that there is variability in the time window of when training takes place. On average, if training incidence is normally distributed during the three years, we expect to estimate an impact of training around one and a half years after training took place.

[10] This is also demonstrated by descriptive statistics, not included in this paper, but available from the authors upon request.

Table 1

Difference-in-differences coefficients of training 'effect'.

Average treatment effect (ATE)[11].

	GERMANY			ENGLAND		
	DiD			DiD		
	1	2	3	1	2	3
Treatment 'effect' for generally educated	0.121**	0.146**	0.158***	0.130**	0.125**	0.075
	(0.08)	(0.07)	(0.07)	(0.06)	(0.05)	(0.04)
Education type	-0.186***	-0.216***	-0.130***	0.199***	0.131***	0.097***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)
Interaction Treatment*Vocational Education	-0.040	-0.058	-0.062	-0.201***	-0.205***	-0.097*
	(0.05)	(0.04)	(0.04)	(0.06)	(0.05)	(0.06)
N	6231	6231	6231	1210	1210	1210

Significance level: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses. Model 1 controls only for educational qualifications, Model 2 controls additionally for gender, age and migration background. Model 3 also controls for tenure, firm size, part-time work and occupation. Each model contains also an interaction term between treatment and type of qualification, as results display.

Are there any differences in the association of training with wages for vocationally educated? As discussed above, individuals with vocational education attainment could benefit to a lower extent from workplace training than individuals with general educational attainment in Germany; conversely, the opposite should be valid for England. To test this hypothesis, interaction terms between training participation and types of qualifications and time are included in all the models. In Germany, the interaction term between education and training across models is not significant (see Table 1, reference category: Gymnasium). This indicates that there is no difference in returns across qualification types. This finding is quite surprising, although the type of education in Germany is highly associated with ability (this makes qualifications very different from each other; in particular, Hauptschule qualifications are usually associated with lower ability compared to Gymnasium ones), no significant difference appears across them.

In England, the negative and significant interaction between training and type of qualifications indicates that vocationally qualified individuals benefit less compared to their generally educated peers (reference category). Vocational education holders possess occupation-specific skills

[11] For space reasons, both tables of results report only main coefficients of interest. However, full table of results are available from the authors upon request.

that are likely to enhance their fit to the job; this determines -as results show- higher wages for them (i.e. the coefficient of 0.097 in Model 3 which translates in about 10% higher wages for vocationally compared to generally educated). However, the same advantage does not hold when they undertake training on the job. This finding confutes our hypothesis derived from the job matching theory. Nevertheless, this result suggests that participation in workplace training may improve the levels of wages for the generally qualified who receive on average lower wages. As a consequence, training returns seem to equalise earning inequalities that exist between vocationally and generally educated.

Table 2 illustrates the results of the joint estimation between DiD and PSM, the DDM estimator. After making the treatment and control groups similar on observable characteristics, results change and the estimates of the association between training and wages do not reach significance at any conventional levels in neither Germany nor England. Specifically, the coefficient for Germany of 0.448 indicates that treated have higher hourly wages compared to controls by 0.448 Euros (the dependent variable here is not any more log wages, but actual level of the currency); however, this is not significant. For England, a coefficient of 0.121 indicates that for those in the treatment group, wages are 0.121 Pounds higher but this is not significantly different from controls. Moreover, no significant difference exists also across education types in both the countries. The findings from the DDM question the results shown by DiD models and suggest that the 'effect' of training on wages derived from a DiD estimation may be driven by a compositional effect, namely that is it due to observed differences between treatment and control groups used for the DiD estimator, which make the common trend assumption unlikely to be met.

As a robustness check, we run the same estimations for the years 2000 and 2004, for GSOEP and BHPS (as DiD alone and DiD combined with PSM. Results not shown). In those years, training is not significantly associated with wages with any of the two methods used. This result indicates that the 'effect' of policies and interventions are embedded into time, institutional and economic settings. As such, it is necessary to be careful when generalising policy 'effects' to different time periods (also of short time distance between each other).

Table 2

Difference-in-Differences

Matching Estimator Coefficients of Training 'effect'.

Average Treatment Effect on the Treated (ATT).

	GERMANY	**ENGLAND**
	DDM	**DDM**
Treatment 'effect'	0.448	0.121
	(0.26)	(0.21)
Treatment 'effect' for vocationally educated	0.517	-0.252
	(0.31)	(0.39)
Treatment 'effect' for generally educated	0.298	0.533
	(0.68)	(0.32)

Significance level: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses. The following variables are included in the probit model estimating the propensity score: educational qualifications, gender, age, migration background, tenure, firm size, part-time work and occupation. Number of matched treated (T) and controls (C) in each country: Germany - T: 635, C: 2470; England - T: 251, C: 519.

On a substantial level - based on DDM results – these results challenge the existing literature showing that training increases workers' wage profiles. Moreover, they suggest that – based on DID results – it is also important to consider education in terms of types (as opposed to levels) in the exploration of workplace training returns. In fact, results from England show that differences exist across types of educational qualifications.

From a methodological perspective, the results of this study show that the choice of the method impacts on the 'effect' of workplace training on wages found. In fact, DiD relies on a rigid common trend assumption and the difference recorded between treatment and control group in the DiD estimation is likely not to satisfy it. In addition, with regard to the difference in results between Germany and England in terms of size and significance of the coefficients, it is important to recall the difference in the survey questions, which capture different forms of training. Second, the time window when training could have taken place is rather wide.

5. Conclusion and discussion

This study investigated whether training has an 'effect' on wages and, if so, whether returns vary across types of educational attainment in Germany and England. The majority of the population in advanced western nations is educated to the secondary level; the results of this work are therefore of interest for the larger part of the working population. Moreover, to the best of our knowledge, this is the first attempt to explore training returns by type of qualification attained. A number of points have arisen from the analyses presented.

First, the study has analysed whether workplace training is associated with wages overall. Results reveal that returns from workplace training are not homogeneous and vary across different estimation methods, countries and years. Using DiD, we find that training does increase wages in Germany but not in England. However, these results should be considered with caution given the common trend assumption on which DiD are based. As such, alternative control and treatment groups are obtained by using PSM: this equalises the composition of the groups and improves the chance for the common trend assumption to be valid. After making groups similar with regard to both observed and unobserved characteristics, the 'effect' of training on wages disappears. The absence of a homogeneous positive 'effect' of workplace training on wages makes us cautious to draw conclusions about the role of training in addressing issues of income inequalities.

Second, again using DiD, we find that training impacts on wages similarly for vocationally and generally educated in Germany while in England vocationally educated individuals benefit less. Explanations are linked to the educational systems and qualifications typical of the two nations. The finding for England may suggest that training could have a potential role in redressing wage gaps existing in the labour market. Results are however to be considered carefully as differences between education groups disappear when using a combination between DiD and PSM.

At last, the study shows that the choice of the counterfactual impact evaluation method used is important for the result found. Each method relies on different assumptions that need to be fulfilled to produce unbiased estimates. This is relevant to consider when selecting which method to use for the investigation of workplace training effects.

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