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Train the worst or train the best? The determinants of employer-sponsored training in five European countries

by

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Abstract

The quality of human capital is a key competitive asset for EU firms to prosper in a globalised economy and provide high-quality jobs to their employees. Continuing education and training are therefore crucial for tuning, maintaining and developing employees' skills and capabilities, especially in a fast-changing world. Given the substantial direct and indirect costs of training, employers are expected to focus training provision on employees affected by skill deficits and organisation members with the strongest potential in terms of skills development. To answer the question on employers' capability to target the employees who would most benefit from training this paper investigates whether a measure of employee-job fit and a measure of employee potential are significant determinants of participation in employer-sponsored training undertaken for job-related reasons. The empirical analysis, extended to five large EU countries (France, Germany, Italy, Spain, and the UK), is based on OECD PIAAC Survey.

Keywords: Training, Employee-job fit, Employee potential, International analysis

JEL Codes: M53, J24

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1. Introduction

The recent decades have been characterised by a growing emphasis on human capital as a source of sustainable competitive advantage. If capital-intensive technologies improve productivity and speed up products and services innovation it is human skills and competences that enable the full exploitation of new technological and market opportunities and support continuous improvement and change. Along with new interest in human resource development (Merriam and Leahy, 2005), the renovated centrality of human capital has brought in also growing claims of mismatch between required and provided skills that often result in blaming the poor quality of formal education systems. However, the lack of systematic evidence connecting skill mismatch to the educational achievements of a workforce that on average spent a longer time in the labour market than in school suggests that continuing education and training are at least as important as formal education in smoothing skill mismatches and skill shortages (Cappelli, 2015). The key role played by continuing education and training is indirectly supported also by some recent studies that emphasise the role of dynamic complementarities in the acquisition of skills over the life cycle (Heckman and Mosso, 2014). By claiming that the returns to training will be higher for better endowed individuals, *i.e.*, individuals with the most successful learning history, this research stream supports the idea that the ultimate target of early learning is supporting additional learning later in life.

Researchers, practitioners, and policy makers have developed multiple definitions of education and training initiatives undertaken by adult individuals. This paper adopts the definition proposed by the European Commission (2015, p.151), which identifies continuing education and training (CET) as “education or training after initial education and training or after entry into working life, aimed at helping individuals to: improve or update their knowledge and/or skills; acquire new skills for a career move or retraining; continue their personal or professional development”. The EC definition outlines the two main objectives of continuing education and training. First, it aims at providing underskilled or wrongly skilled individuals with the competences and the abilities required to perform successfully in their present or prospective job. Second, CET targets also the development of individual talent to meet changes in organisational requirements and to favour personal progression along individual career paths.

Despite the crucial role recognised to lifelong learning in filling up skill gaps and accommodating incoming changes a large part of education and training efforts do not result in the expected learning outcomes. For instance, Merriam and Leahy (2005) report that less than 10% of the expenditures in adult education and training succeed in transferring new knowledge, skills, and behaviours to the workforce. If the literature has devoted a considerable amount of resources to discussing specific determinants of CET participation and intensity, much less attention has been directed to understanding how successful are these activities in providing organisations with the required skills and abilities and in developing employees' talent. Questions concerning CET successfulness in targeting underskilled individuals and developing the potential of the most promising employees still lack a definite answer.

This paper tackles the above issue by disentangling the impact of employee-job fit and employee potential on participation in CET. The proposed empirical analyses test whether a synthetic measure of employee-job fit and a synthetic measure of employee potential are significantly associated with the probability of receiving training. In line with other papers (Cabrales *et al.*, 2014; Dämmrich *et al.*, 2014; Bassanini *et al.*, 2007) this study includes only employer-sponsored training activities undertaken for job-related reasons. Focus on employer-sponsored training, *i.e.* on training initiatives that firms regard worthy to invest in, is expected to reflect the employer's commitment to either close possible gaps between job demands and employee abilities or develop employees' potential. At the same time the exclusion of non-job related CET centres the analysis on those training efforts most probably aimed at solving present and future skill needs actually experienced at the workplace.

The renovated interest in assessing the match between required and provided skills is supported by a growing availability of reliable and detailed datasets that answer the need for diversified measures of skill mismatch and human capital (Desjardins and Rubenson, 2011; OECD, 2013a). The proposed empirical analysis takes advantage of the Survey of Adult Skills, promoted by OECD in 22 countries within the Programme for the International Assessment of Adult Competencies (PIAAC) and released in late 2013. The surveys provides a wide range of measures concerning current and past work experience, education, training, and personal background of stratified national samples of individuals aged 16-65. This paper focuses on individuals in employment in the five largest EU countries including France, Germany, Italy, Spain, and the UK.

The paper includes five additional sections. The next section characterises the core constructs of this study, namely employee-job fit and employee potential, as the explicit targets of CET. Section 3 presents the PIAAC data and the empirical strategy adopted by the paper, whereas section 4 illustrates the outcomes of the empirical analyses. More in detail, paragraph 4.1 operationalises the empirical measures of employee-job fit and employee potential and paragraph 4.2 discusses the determinants of participation in CET. Section 5 summarizes the main findings of the paper and outlines some concluding remarks.

2. Employee-job fit and employee potential

There is a large agreement on the benefits of CET for both individuals and organisations (Merriam and Leahy, 2005; Carneiro *et al.*, 2010). Performance and satisfaction increase when employees' traits and skills fit in with job requirements (Holland, 1985) and participation in CET activities results in higher wages (Bassanini *et al.*, 2007; Brunello, 2001). Tests of the positive and significant relationship between training and wages, consistently reported by cross-country studies¹, are usually regarded as evidence in support of the effectiveness of training programs predicted by the theory of human capital. Training improves individual productivity (Colombo and Stanca, 2014), which employers acknowledge by means of an increase in employee's reward². The positive relationship between training and wages thus provides indirect evidence that CET improves the fit between employees and jobs. In addition, training improves the odds of remaining in the labour market in difficult times (Filippetti *et al.*, 2016), since training reduces job loss and increases the probability of re-employment after job displacement (Ok and Tergeist, 2003).

However, past literature has also shown that access to CET is by no means equally available to all participants in the labour market. In the case of employer-sponsored training there is evidence that managers select participants' characteristics in order to maximise the organisational returns to (costly) CET initiatives (Vignoles *et al.*, 2004; Bassanini and Ok, 2004). Privileged antecedents to participation in CET include higher educational attainments (Brunello 2001; Pischke, 2001; Arulampalam

¹ Exceptions are provided by Leuven and Oosterbeek (2008) and Albert *et al.* (2010).

² Besides economic returns, investments in education and training provide additional individual and collective benefits that do not display in conventional rates of return analyses, such as better parenting skills, improved health conditions, reduced crime, civic participation, and social inclusion (Carneiro *et al.*, 2010; OECD, 2014a).

et al., 2004) and, more generally, pre-training human capital (OECD, 2014a). Also hierarchical position within an organisation (Bassanini and Ok, 2004) and job complexity (Barron *et al.*, 1999; Bassanini and Ok, 2004) are positively associated with participation in and intensity of CET.

The outcomes of education and learning are not uniform along the lifecycle. In general terms, individual propensity to participate in learning activities decays with age (Kubeck *et al.*, 1996). In addition, the rates of return to investments in human capital sharply decline with age and the strong complementarity between early and late investments conditions the possibility of catch up for late learners (Carneiro and Heckman, 2003; Carneiro *et al.*, 2010; Hanushek *et al.*, 2011; Heckman and Mosso, 2014). Nevertheless, whereas the development of cognitive skills is markedly more productive in the early stages of the lifecycle, significant improvement in non-cognitive skills is still possible later in life (Carneiro *et al.*, 2010; Heckman and Mosso, 2014).

Employers' training policies represent an important source of labour market segmentation. Existing studies show that vulnerable groups of employees are offered lower CET opportunities that subsequently condition their careers. Due to discontinuous participation in the labour market and childcare female employees display lower participation to training initiatives (Dieckhoff and Steiber, 2011) that on average last for shorter hours³ (Bassanini and Ok, 2004). Access to CET is harder also for part-time employees (Leuven and Oosterbeek, 1999) and temporary employees (OECD 2002; Arulampalam *et al.*, 2004). Based on PIAAC micro data Cabrales *et al.* (2014) document the large gap in participation in on-the-job training between employees on permanent and temporary contracts. In addition, CET is significantly and positively associated with establishment and firm size (Lynch and Black, 1998; Bassanini and Ok, 2004).

The brief survey of the main stylised facts about education and training outlined above suggests that the antecedents and the consequents of CET participation and intensity can be classified in three categories. The first dimension concerns the capability of CET to achieve a fit between individual characteristics and organisational roles by filling up skill gaps, solving skill mismatches, or answering

³ Arulampalam *et al.* (2004) question these standard findings by showing no significant difference in training probability between male and female employees in 10 EU countries.

skill shortages⁴. Person-job fit can be defined “as the relationship between a person’s characteristics and those of the job or tasks that are performed at work” (Kristof-Brown *et al.*, 2005, p. 284). In particular, demands-abilities fit occurs when an individual can provide the abilities required to meet all the challenges posed by her or his organisational role (Sekiguchi, 2004). Successful CET targets individuals somehow misaligned with their job requirements, improves their human capital, hence their productivity and wage.

The second dimension outlined by the literature concerns the development of employee potential to anticipate future needs due to changes in either the organisation or the employee position. Whereas employee-job fit represents a target of CET given a specific organisational and production configuration, the development of employee potential involves a dynamic dimension, which includes “the advancement of knowledge, skills, and competencies for the purpose of improving performance within an organization” (Gilley *et al.*, 2002, p.5) and addresses both individual targets (personal and career development) and organisational objectives (performance management and change management). From the point of view of employee potential successful CET targets individuals with the highest chance to succeed in the proposed learning path, possibly identified based on their pre-training human capital.

The third category of CET drivers concerns employee-specific, organisation-specific, or institutional setting-specific features not immediately related with the explicit targets of training activities. For instance, employee-specific factors include employee’s age or gender. Organisation-specific factors include firm size, which drives the amount of monetary and non-monetary resources available for training, or organisation culture, which drives training policies towards vulnerable categories of employees. Institutions significantly affect the outcomes, the quality, and the quantity of CET programs by shaping the incentives to provide and participate in learning initiatives (Carneiro and Heckman, 2003; Hanushek and Woessmann, 2008).

The two former categories of CET drivers concern the explicit targets recognised by the European Commission’s definition of CET recalled in the previous section (*i.e.*, “improve or update [...] knowledge and/or skills” and “acquire new skills for a career move or retraining [and] continue [...] personal or professional development”, respectively). The variables measured by existing studies within these categories

⁴ See Cappelli (2015) for a discussion of these concepts.

provide various proxies for the underlying concepts of employee-job fit and employee potential. However, to the author's knowledge, so far no study has tried to provide a comprehensive measure of each construct, accounting for conceptual and measurement overlapping among different variable (for instance, education mismatch and skill mismatch in the case of employee-job fit, or educational achievements and family background in the case of employee potential). A possible justification to this limit of the literature is the lack of datasets allowing for multiple measures related to the same construct, a limit now mitigated by the availability of more detailed archives such as the OECD Survey of Adult Skills.

3. Data and empirical strategy

The PIAAC Survey offers suitable data to test the effectiveness of employer-sponsored CET in targeting training needs and individual potential. Besides providing a suitable measure of employer-sponsored CET undertaken for job-related reasons and characterise employee-job fit and employee potential, this dataset offers information to control for employee-specific, job-specific, and organisation-specific characteristics.

The Survey of Adult Skills (OECD, 2013b; OECD, 2013a), developed by OECD within the wider Programme for the International Assessment of Adult Competencies (PIAAC), was run between August 2011 and March 2012 and inquires a sample of adult population (*i.e.*, individuals aged 16-65) in the 22 countries that participated in the first round of the Survey. Information was collected by means of computer-assisted personal interviews that lasted between 30 and 40 minutes and preceded field tests for the assessment of individual proficiency in literacy and numeracy⁵. The public-use dataset, with micro-data on the 22 participating countries, was released in October 2013 and is freely available at <http://www.oecd.org/site/piaac/publicdataandanalysis.htm> with documentation on dataset design and background questionnaire.

The PIAAC Survey investigates a range of education and training initiatives undertaken in the twelve months preceding the survey, including formal education activities leading to the achievement of an educational qualification, non-formal adult

⁵ Interviewees' cognitive skills in literacy and numeracy were assessed by means of either computer-delivered or paper-and-pencil delivered sets of tasks characterised by different degrees of difficulty. In 18 out of the 22 participating countries the field tests concerned also problem solving activity in a technology-rich environment.

education and training in line with the proposed definition of CET, and informal training such as on-the-job training⁶. In the case of formal adult education and CET the survey discriminates between initiatives undertaken for job-related reasons and initiatives undertaken for non-job related reasons. In addition, the dataset indicates whether an employer paid totally or at least partially for training-related expenses, thus allowing the identification of job-related employer-sponsored CET. Information on education and training experience is complemented by a large set of questions concerning experience in the labour market, working conditions, and personal and household background.

The present study focuses on individuals in employment in the five largest EU countries (France, Germany, Italy, Spain, and United Kingdom⁷). Focus on individuals in employment is justified by their much larger exposure to training and adult education compared to non-employed and self-employed individuals and by the more immediate economic impact expected from training this population group⁸.

Table 1 reports some comparative statistics. If the distribution of age and the share of native workers among employees are substantially homogeneous across the examined countries, the remaining variables display considerable differences. Italy has a much lower share of female employees (43.2% versus figures above 47% in the remaining countries). The use of fixed-term contracts is more frequent in Spain (26%) and Italy (22%), whereas the use of part-time work is more intense in Germany (26% of contracts) and in the UK (22%). Table 1 displays also a large variation in CET participation in the 12 months preceding the survey. Participation rates range from 30.9% in Italy to 63.0% in the UK. Table 2 focuses on CET undertaken for job-related reasons. The comparison between the last row of Table 1 and the first column of Table 2 shows that job-related CET accounts on average for 78.9% of surveyed CET initiatives, from 68% in Italy and Spain to almost 90% in Germany. Over half of German employees report participation in CET for job-related reasons, with the highest share of employer-sponsored initiatives (40.6%). The UK displays a

⁶ According to PIAAC questionnaire, formal education concerns “studies that, when completed, result in formal qualifications at primary, secondary, university or post-secondary level”. Non-formal adult education and training involves “any organised learning activity including courses or private lessons conducted also through open or distance education, organized sessions for on-the-job training or training by supervisors or co-workers, and seminars or workshops”. Informal training includes “any organised training activity outside the established formal system”.

⁷ In the UK the Adult Skill Survey was implemented in England and Northern Ireland only.

⁸ The analysis excludes apprentices, whose participation in CET activities only partially depends on employer’s or employee’s choice.

comparable participation rate in CET programmes for job-related reasons (49.8%), but the share of employees who report no financial support from their employer is much higher than in Germany (13.2 versus 9.7%). Italian employees present the lowest participation rate in job-related CET (21%) and, at the same time, the highest incidence of self-supported training, which accounts for almost 30% of reported job-related CET.

Table 1. Descriptive statistics, five countries

		France		Germany		Italy		Spain		United Kingdom		Total	
Age	N	3,836		3,425		2,126		2,701		5,051		17,139	
	Mean	40.88		41.83		40.73		40.46		39.58		40.85	
	Std. Dev.	11.32		11.86		10.35		10.61		12.45		11.52	
		N	%	N	%	N	%	N	%	N	%	N	%
Gender		3,836	49.9%	3,425	48.0%	2,126	43.2%	2,701	47.5%	5,051	48.5%	17,139	47.7%
Native		3,831	88.0%	3,424	87.0%	2,126	89.0%	2,701	87.0%	5,051	86.0%	17,133	87.0%
Fixed term		3,733	14.0%	3,197	17.0%	2,105	22.0%	2,620	26.0%	4,763	18.0%	16,418	19.0%
Part time		3,733	18.0%	3,197	26.0%	2,105	17.0%	2,620	15.0%	4,763	22.0%	16,418	21.0%
CET *		3,836	42.22%	3,425	56.05%	2,126	30.86%	2,701	56.72%	5,051	63.03%	17,139	50.86%

* In the 12 months preceding the survey
Weighted observations. Employees only

Table 2. Participation in CET for job-related reasons in the 12 months preceding the survey

	Participated in CET for job-related reasons	Employer-sponsored CET for job-related reasons	Non-employer sponsored CET for job-related reasons
France	30.3%	24.2%	6.1%
Germany	50.3%	40.6%	9.7%
Italy	21.0%	14.7%	6.3%
Spain	38.7%	28.0%	10.7%
UK	49.8%	36.6%	13.2%
Total	40.1%	30.9%	9.3%

Weighted observations. Employees only

Maximum likelihood estimates of probit models have been carried over on weighted country samples to identify the impact of employee-job fit and employee potential on CET participation. Given their multi-dimensional nature, the latter two constructs can hardly be measured by a single questionnaire item. At the same time, the use of multiple regressors to represent each construct is not viable. Besides posing interpretive problems, the inevitable correlation between the variables used to describe an articulated concept (for instance, skill mismatch and education mismatch

in the case of employee-job fit, or educational qualification and literacy score in the case of employee potential) may result in biased outcomes (Bassanini and Ok, 2004). For these reasons the empirical analysis makes use of synthetic indicators of employee-job fit and employee potential resulting from confirmatory factor analyses based on a range of related primitive variables.

4. Empirical results

The first paragraph of this section presents the operative measures used to identify CET needs and opportunities (*i.e.*, employee-job fit and employee potential). The following paragraph tests the suitability of these variables to explain participation in CET.

4.1. Measures of employee-job fit and employee potential

The PIACC Survey offers a range of variables to capture the multi-dimensional constructs of employee-job fit and employee potential. Since misalignments between provided abilities and role demands signal potential inadequacy of employee capabilities (Sgobbi and Suleman, 2013), the variables expected to identify employee-job fit concern educational mismatch⁹ and skill mismatch. In contrast, the variables aimed at capturing employee potential describe individual past and present human capital. Table 3 reports the variables used to capture employee-job fit and employee potential.

Variable EduMismatch is calculated as the difference between provided and required education measured in standard education years. Slightly over half of employees in the examined countries (51.6%) declare matching between required and provided education level, whereas 19.1% declare undereducation and 29.1% claim to be overeducated compared to their job needs.

⁹ Unfortunately, the recent changes brought in by the Bologna process make required and provided education subject to both objective and subjective measurement errors. For instance, in the case of Italy the PIAAC Survey classifies all University certificates obtained before the Bologna reform of curricula as bachelor degrees (a certificate that involved a marginal share of Italian tertiary education, dominated by five-, six-, and above all four-year curricula). This choice leads to an over-estimate of the returns to education for older Italian university graduates when education is classified along ISCED levels. In contrast, still irrespective of the actual length of curricula, 18 years of education are imputed to all university graduates, with consequent under-estimate of the returns to each year of education for all individuals on four-year or shorter programs. In addition, given the long tradition of no-bachelor degree certificates, it is questionable whether employees (as well as employers!) with longer labour market experience are able to discriminate between a bachelor degree and a master degree when self-assessing the educational needs of their job.

Overskilling is identified when employees declare to have “the skills to cope with more demanding duties than those [...] required to perform in [the] current job” (PIAAC questionnaire). In contrast, underskilling is signalled by the need for “further training in order to cope well with [...] present duties” (PIAAC questionnaire). Overskilling is recognised by almost 89% of the sample, with the highest rates declared by German (93%) and Spanish (92%) employees. Underskilling, reported by a much lower share of the sample (about 34%), is more highly dispersed across countries and ranges from 21% in the UK to 46% in Germany. Allen and van der Velden (2001) identify different types of skill (mis)matches based on underskilling and overskilling. Skill match corresponds to no skill deficit and no skill underutilisation, whereas their simultaneous presence identifies wrongly skilled individuals. Skill deficit without skill underutilisation corresponds to skill shortage and the opposite situation (skill underutilisation without skill deficit) is defined as skill surplus. In the examined sample only 7.4% of employees report a skill match, whereas 4.1% declare a skill deficit, 57.6% present a skill surplus and a quite high share of 30.9% (with a peak of 42.8% in Germany) fall in the category of wrongly skilled employees.

The variables aimed at capturing employee potential describe individual past and present human capital. Variable *EduYears* corresponds to the years of education imputed to the highest qualification obtained by interviewed employees and proxies for the cognitive skills developed via formal education programmes. Two variables account for family background, hence for cultural and educational stimuli received in early life. *PARED* reports the highest educational qualification achieved by parents and *Books@home* concerns the number of books at interviewees' home when teenagers. Two additional variables, *PVLIT* and *PVNUM*, measure the respondents' proficiency in literacy and numeracy tests along a 500-point scale. They are assumed to account for further knowledge and skills acquired after completing formal education and to proxy for employees' capability to develop additional cognitive and non-cognitive skills. All employee development-related variables differ significantly across the examined countries, with Italy and Spain consistently scoring the poorest performances.

**Table 3. Employee-job fit and employee potential:
Descriptive statistics of variables that enter the factor analysis**

Variable	Description	Min	Max	Mean	Std. Dev.
EduMismatch	Difference between years of provided and required education	-14	13	0.36	2.68
Overskilled	1 for employees who report that they "have the skills to cope with more demanding duties"	0	1	0.89	0.32
Underskilled	1 for employees who report that they "need further training in order to cope well with [their] present duties"	0	1	0.34	0.47
EduYears	Standard years of education to achieve the highest qualification attained	5	21	12.73	3.20
PARED	Highest of mother or father's level of education: from 1 (Neither parent has attained upper secondary education) to 3 (At least one parent has attained tertiary education)	1	3	1.83	0.76
Books@home	Number of books at home when the interviewee was 16: from 1 (up to 10 books) to 6 (more than 500 books)	1	6	3.11	1.40
PVLIT ^a	Literacy scale score	73.89	419.18	268.84	46.96
PVNUM ^a	Numeracy scale score	40.52	446.14	266.33	51.95

Weighted observations Employees only

^a *PVLIT and PVNUM are the first literacy and numeracy plausible values reported by PIAAC datasets.*

**Table 4. Employee-job fit and employee potential:
Rotated Component Matrix**

Variables	Components	
	Fit	Potential
EduMismatch	0.830	0.126
Overskilled	0.463	0.106
Underskilled	-0.434	0.219
EduYears	0.313	0.732
PVLIT	-0.090	0.840
PVNUM	-0.097	0.848
PARED	0.073	0.667
Books@home	0.016	0.700

Weighted observations. Employees only,

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

A confirmatory rotated factor analysis fit on the eight variables summarised in Table 3 identifies two components that jointly explain 52% of the observed variance. Initial factor analyses included also a measure of experience gap, defined as the difference between the level of required experience to succeed in the current position and

employee tenure. However, this variable was dropped because of possible measurement errors due to differences in the scales along which the PIACC questionnaire collects information on required and provided work-related experience. An index of individual attitude towards learning (agreement along a 7-point scale with the statement “I like learning new things”) was dropped because of poor scoring in the rotated component matrix (loading=0.284). Also a binary variable signalling whether an interviewee ever left before completing a formal qualification programme was dropped because its addition resulted in a new component including only this variable and, with a negative loading, educational mismatch.

The loadings in Table 4 confirm that the components resulting from the factor analysis reflect the underlying constructs of employee-job fit and employee development potential. The first component, named Fit, is associated with educational and skill mismatch. Positive association with growing overeducation (EduMismatch) and overskilling and negative association with underskilling suggest that variable Fit is inversely connected to required skills, hence CET needs. In contrast the second component, labelled as Potential, is positively associated with all the variables expected to favour a further development of individual human capital. Low values of variable Potential discourage employer-sponsored training by signalling risky returns to investments in education and training. A negative impact of variable Fit and a positive impact of variable Potential on CET participation and CET intensity would consequently signal effective mechanisms of selection into employer-sponsored training. Preliminary evidence based on correlation indexes confirms a negative correlation between CET and Fit and a positive correlation between CET and Potential. Nevertheless, calculated coefficients are comparatively low (never higher than 0.250), despite statistically significant.

4.2. Determinants of participation in employer-sponsored CET for job-related reasons

A binary variable that takes value 1 for employees who undertook employer-sponsored CET for job-related reasons in the 12 months preceding the survey (CET12) provides the dependent variables to explore whether CET initiatives succeed in targeting individuals with higher skill needs (*i.e.*, low values of variable Fit) and individuals with the strongest potential to develop additional capabilities (*i.e.*, high values of variable Potential). Table 5 reports the marginal effects of country-

specific probit regressions that test the determinants of participation in CET with PIAAC data. All proposed regressions include binary variables to account for 1-digit ISCO occupational groups, firm size class effects, and industry fixed effects.

The exam of Table 5 shows that employee-job fit and employee potential always display the expected sign (negative for variable Fit and positive for variable Potential). Employee potential is always a significant determinant of participation in CET activities, whereas the coefficient of employee-job fit is significant only for Germany and the UK. However, the quantitative impact of these variables on the probability to participate in training is comparatively small. *Ceteris paribus*, a German or a British employee whose job-fit level is one standard deviation below the sample mean has a 3% higher probability of being selected into employer-sponsored training for job-related reasons compared to an employee in line with the sample mean¹⁰. As for employee potential, one standard deviation increase in variable Potential is associated with an increased probability of participating in CET that ranges from 4.1% in Germany to 5.7% in France. Despite significant these effects are offsets, for instance, by the impact of contract type.

Also the remaining controls displayed in Table 5 offer some interesting evidence. Variable High_Autonomy takes value 1 when interviewees declare that they can decide “to a high extent” or “to a very high extent” how to do their work. This variable, introduced to account for the impact of job complexity on CET participation (Barron *et al.*, 1999; Bassanini and Ok, 2004) has a moderate positive and significant impact in the regressions with German and British data. But in the case of Italy, the significant and opposite in sign coefficients of linear and squared age confirm a reverse U-shaped impact of experience accumulation on the probability of receiving employer-sponsored training (Cabrales *et al.*, 2014). Age-related marginal effects continue to increase up to the age of 65, despite with a declining growth. Gender displays a significant and negative coefficient only in the case of Germany, whereas birth in the same country of residence at the time of the survey involves a higher probability of CET in France and Germany. Atypical labour contracts are consistently associated with lower CET probability, both in the case of fixed-term employment (but for Italy) and part-time work (but in the British case).

¹⁰ It has to be reminded that, resulting from a factor analysis, variables Fit and Potential are normalised variables.

Table 5. Determinants of participation in employer-sponsored CET by country

	France		Germany		Italy		Spain		UK	
	dy/dx	Robust Std. Err.								
Fit	-0.011	0.007	-0.031	0.012 **	-0.011	0.009	-0.001	0.010	-0.030	0.014 **
Potential	0.057	0.011 ***	0.041	0.013 ***	0.044	0.013 ***	0.054	0.013 ***	0.047	0.015 ***
High_Autonomy	0.010	0.016	0.043	0.019 **	0.016	0.019	0.023	0.019	0.040	0.024 *
Age	0.012	0.006 **	0.020	0.007 ***	0.006	0.007	0.018	0.007 **	0.015	0.007 **
SqAge	-1.38E-04	7.26E-05 *	-2.41E-04	8.05E-05 ***	-5.26E-05	8.57E-05	-2.13E-04	8.77E-05 **	-1.68E-04	8.73E-05 *
Gender	-0.011	0.018	-0.050	0.023 **	-0.008	0.019	0.003	0.022	0.020	0.026
Native	0.048	0.028 *	0.076	0.031 **	-0.014	0.035	0.022	0.033	0.051	0.034
Fixed_term	-0.119	0.028 ***	-0.075	0.027 ***	-0.105	0.029 ***	-0.066	0.025 ***	-0.045	0.031
Part_time	-0.051	0.024 **	-0.062	0.024 **	-0.011	0.026	-0.095	0.030 ***	-0.080	0.029 ***
Number of obs.		2,821		2,875		2,056		2,458		3,685
Log pseudolikelihood		-8104152		-17068840		-5867442		-6968310		-8692913
Pseudo R2		0.104		0.128		0.113		0.119		0.098

Probit Models (Marginal Effects). Dependent variable: CET12. All regressions include fixed-effects for 1-digit occupation, firm/establishment size class, and industry

Statistically significant at the .10 level; ** at the .05 level; * at the .01 level.*

Weighted observations.

Table 6. Determinants of participation in employer-sponsored CET by country: Restricted PIAAC sample

	France			Germany			Italy			Spain			UK		
	dy/dx	Robust Std. Err.		dy/dx	Robust Std. Err.		dy/dx	Robust Std. Err.		dy/dx	Robust Std. Err.		dy/dx	Robust Std. Err.	
Fit	-0.045	0.010	***	-0.067	0.011	***	-0.023	0.014	*	-0.093	0.013	***	-0.061	0.010	***
Potential	0.020	0.009	**	0.017	0.009	*	0.051	0.016	***	0.034	0.013	***	0.000	0.009	
High_Autonomy	0.037	0.015	**	-0.017	0.014		0.004	0.029		0.035	0.019	*	0.023	0.012	*
Age	-0.011	0.006	*	0.004	0.004		0.020	0.011	*	0.003	0.008		0.005	0.003	
SqAge	1.66E-04	7.67E-05	**	-3.98E-05	5.12E-05		-1.62E-04	1.34E-04		-2.05E-05	9.50E-05		-6.50E-05	4.08E-05	
Gender	-0.021	0.014		-0.046	0.017	***	0.030	0.029		0.016	0.020		0.009	0.012	
Native	-0.010	0.021		-0.030	0.021		0.045	0.044		-0.013	0.038		-0.020	0.016	
Fixed_term	-0.034	0.016	**	0.020	0.018		-0.015	0.038		-0.015	0.024		0.022	0.017	
Part_time	-0.018	0.017		0.011	0.016		0.074	0.042	*	-0.077	0.031	**	-0.018	0.014	
Number of obs.		663			1.184			275			706			1542	
Log pseudolikelihood		-351456			-1633679			-332085			-871805			-729791	
Pseudo R2		0.423			0.274			0.463			0.287			0.320	

Probit Models (Marginal Effects). Dependent variable: CET12. All regressions include fixed-effects for 1-digit occupation, firm size class, and industry

Statistically significant at the .10 level; ** at the .05 level; * at the .01 level.*

Weighted observations.

The estimates reported in Table 5 do not account for possible biases due to the endogeneity of independent variables with participation in training that may occur when both dependent and independent variables are affected by unobserved and non-randomly distributed motivations and skills. A low level of motivation could result in poorer employee-job fit and minor individual potential, as well as in lower interest to participate and lower probability to be selected in CET. An original solution to this problem is proposed by Leuven and Oosterbeck (2008), who suggest to restrict the estimate sample to employees who actually took part in training and employees who were willing to participate but had to give up due to some random event. Such a restricted sample presents the advantage to include individuals with similar motivations and attitudes towards learning and avoids a negative endogeneity bias. Leuven and Oosterbeck's approach has already been applied to PIAAC data to estimate the impact of temporary employment on participation in training (OECD, 2014b; Cabrales *et al.*, 2014) thanks to a questionnaire item that inquires why employees who wanted to take additional training had to renounce. Following OECD (2014b) and Cabrales *et al.* (2014), I identified employees randomly excluded from training as the interviewees who answered that they had to renounce to a CET opportunity either because "the course or programme was offered at an inconvenient time or place" or because "something unexpected came up that prevented [them] from taking education or training".

The results of country-specific probit regressions run on restricted samples of employees who either participated in CET in the 12 months before the PIAAC Survey or had to renounce due to a random event are reported in Table 6. The comparison between the coefficients reported in Table 6 and in Table 5 shows a higher significance and a stronger impact of variable Fit. A low motivation to learning and improving one's skills is actually associated with both larger skill gaps and lower propensity to join training initiatives. In contrast, Table 6 displays lower and less significant coefficients for employee potential, probably due to the fact that the latter variable tends to capture non-randomly distributed individual motivations.

The comparison between the coefficients reported in Table 6 and in Table 5 also shows a lower impact of control variables in estimates with restricted samples. In particular, the weaker significance of the coefficients associated with atypical work suggests that less motivated workers have a disproportionate propensity to select into fixed-term and part-time employment contracts.

5. Concluding remarks

The quality of human capital is a key competitive asset for EU firms to prosper in a globalised economy while providing high-quality jobs to their employees. Continuing education and training are therefore crucial for tuning, maintaining and developing employees' skills and capabilities, especially in a fast-changing world. Given the substantial direct and indirect costs of CET, employers are expected to focus training provision on employees affected by skill needs and organisation members with the strongest potential in terms of skill development. To answer the question on employers' capability to target those employees that would most benefit from CET initiatives this paper has investigated whether a measure of employee-job fit and a measure of employee potential are significant determinants of CET participation.

The empirical analysis extended to five large EU countries (France, Germany, Italy, Spain, and the UK) and based on the PIAAC Survey of Adult Skills provides mixed evidence. On the one hand, employee-job fit and employee potential proved to be significant determinants of CET participation. In addition, coefficient signs reflect expectations: participation in training increases with skill deficit and development potential. On the other hand, the quantitative impact of employee-job fit and employee potential on CET participation is comparatively small and in most cases the effect is offset by other job-specific or firm-specific factors.

Overall, the proposed empirical results suggest large opportunities to increase the effectiveness of CET programmes by improving employers and managers' capabilities to identify the skill needs and the development potential of their employees. More effective training programmes require investing in the design and development of CET programmes that account for both firm skills needs, individual career development plans, and employees involvement. Accordingly, "traditional" training measures have to go along with organisational change and human resource development plans. However, the time constraints posed by the increasing pace of technological and market changes and the financial constraints due to the recent economic crisis may hamper the exploration of new approaches to identify and solve the training needs of firms.

The proposed outcomes also show a moderate between-country variation in the effects of employee-job fit and employee potential, despite the significant differences among the examined countries in CET diffusion rates, CET traditions, and CET

practices. Continuous education and training confirm to be complex phenomena that cannot be grasped by a simplistic opposition between “good” or “bad” training systems. All countries display significant opportunities to improve the effectiveness of training programmes by improving their focus on employee-job fit and employee potential. Once again, the tight economic policies imposed on EU governments by the recent economic crisis risk to limit public support to training initiatives and may consequently hamper employers’ efforts. However, this constraint could also represent an opportunity to re-design and rationalise CET initiatives also by re-thinking participation criteria.

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