



Participation in training of adult workers in European countries.

Evidences from recent surveys

Mircea Bădescu and Massimo Loi

EUR 24563 EN - 2010

Participation in training of adult workers in European countries.

Evidences from recent surveys

The mission of the JRC-IPSC is to provide research results and to support EU policy-makers in their effort towards global security and towards protection of European citizens from accidents, deliberate attacks, fraud and illegal actions against EU policies.

European Commission
Joint Research Centre
Institute for the Protection and Security of the Citizen

Contact information

Address: Via E. Fermi 2749, TP 361, Ispra (VA), I-21027, Italy
E-mail: mircea.badescu@jrc.ec.europa.eu
Tel.: +39 0332 78 5732
Fax: +39 0332 78 5733

<http://ipsc.jrc.ec.europa.eu/>
<http://www.jrc.ec.europa.eu/>
<http://crell.jrc.ec.europa.eu/>

Legal Notice

Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use which might be made of this publication.

***Europe Direct is a service to help you find answers
to your questions about the European Union***

**Freephone number (*):
00 800 6 7 8 9 10 11**

(*) Certain mobile telephone operators do not allow access to 00 800 numbers or these calls may be billed.

A great deal of additional information on the European Union is available on the Internet. It can be accessed through the Europa server <http://europa.eu/>

JRC 61100

EUR 24563 EN
ISBN 978-92-79-17202-1
ISSN 1018-5593
doi:10.2788/3263

Luxembourg: Publications Office of the European Union

© European Union, 2010

Reproduction is authorised provided the source is acknowledged

Printed in Italy

Table of Contents

Summary of the main findings	7
List of Tables and Charts	9
Introduction	11
1. An overview on some findings from studies on continuing training of adults	13
2. Training across European countries	15
2.1 Data sources and issues	
2.2 The level of training	
2.2a <i>Participation in training</i>	
2.2b <i>The volume of training</i>	
3. Correlation analysis	22
4. Conclusions	23
Annex – Data used in this publication	
References	

Summary of the main findings

- ***The level of adult training differs significantly across the European countries;*** surveys show that adults' participation in organised learning is constantly among the highest in the Scandinavian countries and the United Kingdom. The evidence is quite robust that continuing training is relatively low in southern European countries and relatively higher in the most Nordic countries. Drawing on data for 28 European countries, the rankings of countries give broadly similar results across different surveys. Sweden, Denmark, Finland and the United Kingdom show systematically very high participation, whereas Romania, Hungary, Greece, and Malta have comparatively lower rates.
- There also appears to be ***some trade-off between the extensive and intensive margins of training.*** A country that provides a little training for many workers is emphasising the extensive margin and will tend to score higher on the participation than on the volume measures. Data suggest that this pattern may characterise Sweden, Denmark and Finland whereas Hungary, the Netherlands and Malta put emphasis on the intensive margin and, consequently, score higher on measures of hours of training.
- There is ***considerable consistency across the four surveys used in this paper*** and the cross-survey correlations for participation measures indicate a statistically significant high consistency in ranking countries by this dimension of training; the consistency is present to a lesser extent among measures of the training volume. This is encouraging and suggests that it is possible to make qualitatively valid cross-country comparisons of training participation rates.
- Several European initiatives coordinated by Eurostat in the last decade have been implemented to collect harmonised survey data on training. All these surveys provide various measures of the level of continuing education and training among the population. Nonetheless, it is rather difficult to make precise comparisons, because different surveys use different methodologies, time reference periods, and range of relevant learning experiences. ***The heterogeneity in the training questions introduces problems of comparability between surveys across the countries.*** Yet, little is known about the extent to which these conceptual measurement problems lead to actual measurement errors.

List of Tables and Charts

Table 1: Overview of European surveys providing data on continuing training

Table 2: Adult participation in training for European countries

Table 3: Volume of adult training in European countries

Table 4: Rank correlations of statistics on training participation and volume in different surveys

Chart 1: Cross-survey indices of training participation and volume

Chart 2: Patterns of adult training in European countries

Introduction

The importance of a highly skilled workforce has become increasingly relevant in the context of the European Union new strategy for smart, sustainable and inclusive growth - 'Europe 2020'. At the individual level, a good education is increasingly decisive for employment prospects and earnings levels. Hence, education and training systems must generate new skills, to respond to the nature of the new jobs which are expected to be created, as well as to improve the adaptability and employability of adults already in the labour force.¹

The skills and competences of the workforce are the product of a large variety of learning activities that take place in diverse institutional contexts. While good initial education provides an essential foundation, learning continues through the working years. Policies encouraging wide participation in continuing training are therefore an important component of lifelong learning strategies.

Very little is known concerning differences in continuing training or their causes and consequences. Such information would be useful for assessing policy choices related to training, such as whether to encourage an overall increase in training levels or to attempt to redirect training investments toward groups currently receiving little training.

This publication deal with some of these issues. **Chapter 1** surveys prior research on continuing training of adults. In **Chapter 2**, some aggregate measures using harmonised data from the European surveys of training are constructed and analysed; a set of stylised facts concerning differences in the level of training across European countries are discussed based on these aggregate measures. **Chapter 3** presents a more formal analysis of the robustness of cross-country differences in the level of training; cross-country rank correlations are calculated between the various measures of training. A concluding section considers some policy implications for in this area.

Several limitations of the analysis require highlighting. In this publication only some types of continuing training are analysed. Moreover, the analysis is limited to incumbent workers between the ages of 25 and 64 years, since this restriction avoids complications related to differences in initial education and retirement patterns. Because most continuing training of employees is sponsored - at least in part - by employers, employer-provided training is emphasised. Furthermore, training is only measured in terms of the resources invested and not in terms of the outcomes achieved.

¹ *New Skills for New Jobs*, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Brussels, COM(2008) 868 final.

1. An overview on some findings from studies on continuing training of adults

The importance of education and training for labour market performance is likely to have increased in the past years. It is now well established that training activities may enhance the potential benefits that individuals can reap from participating in the labour market; the empirical analysis of the links between training and employment lend support to these findings. There is a strong cross-country correlation between employment performance, on the one hand, and both initial education and adult training, on the other. This finding is essentially due to the robust correlation between human capital investments and labour force participation, which may reflect the fact that such investments make work more attractive, because either expected wages are higher or employment prospects better than in the absence of training (*OECD, 2004*).

According to the standard theoretical model of training as a human capital investment (*Becker, 1964*), firms train workers to increase productivity and output while workers undertake training to realise future earnings gains associated with these increases in productivity. In the past years the empirical literature has focused on testing the predictions of Becker's conventional model. Research was carried out in recent years to investigate mainly the impact of training on the future earnings and on the productivity, as well as on the possibility to distinguish between general and firm-specific skills and to further investigate the specificities of training provided by firms.²

Generally, most empirical work has found a positive impact of training on earnings growth. In particular, some studies have concluded that the earnings gains from training are significantly larger for groups of workers less likely to be trained: less-skilled workers in the United States (*Bartel, 1995*) mid-educated workers in the United Kingdom (*Blundell et al., 1996*) and women in the United Kingdom (*Booth, 1991*) and in Germany (*Pischke, 1996*). However, earnings growth after training and the event of training may not be independent variables. Unobserved individual characteristics may determine both the probability that someone is trained and the fact that they earn higher than average wages after the training.

Also, there is very scant evidence that earnings of trainees are lower than those of comparable workers, with the exception of apprentices. Some research found that vocational certification predicted higher wages for youth from different school tracks; for cohorts in which general education was more prevalent, formal vocational certification was an important predictor of higher initial wages for both high and low quality school tracks. By comparing the earnings five, ten and 13 years after labour market entry, it appears that vocational training results in higher initial wages while apprenticeship leads to higher wages over time (*Cooke, 2001*).

Along this line, recent evidence from CRELL based on EU-SILC micro-data across the 24 European countries suggests a potential association between earning differentials and the structure of educational systems. In many countries where vocational programmes are widespread (over 60% of the upper secondary students follow a vocational programme), the differences in earnings³ reported by workers aged 25-to-65 is also more pronounced. One assumption could be that, in countries where vocational programmes are prevailing at the upper secondary and

² Findings on other topics such as the relationship between training and job tenure or between training and turnover or whether the market allocates training optimally, are also available. They are not discussed in this section.

³ OLS estimates of the rate of return to education calculated based on Mincerian wage equation.

post-secondary level, people who fail to attend these levels - and to get a vocational qualification - may also be much stronger penalised on the labour market by employers (*CRELL, 2010*).

The literature generally confirms a positive impact of training on productivity (*Bartel, 1995; Black and Lynch, 1996; Boon, 1998*). However, most studies suffer from the fact that it is hard to disentangle the pure effect of training from other alternative explanations of any rise in productivity.

Several recent studies have investigated whether firms provide general or firm-specific training. Generally, since it is hard to measure the content of training, inferences are made using information on tenure, quits, turnover rates and on earnings growth of job movers. Inferences based on such evidence favour the view that most firm training is of a general nature and exportable to other firms (*Blundell et al., 1996; Goux and Maurin, 1997; Loewenstein and Spletzer, 1998*). A possible explanation is that training that is firm-specific may often be complementary to general training so that some elements of both have to be provided by the firm. It is also unlikely that any training will be useful only to one specific firm or vice versa to all firms in the economy.

In sum, the predictions of a positive impact of training on workers' earnings and productivity are generally confirmed by the empirical literature.

2. Training across European countries

2.1 Data sources and issues

Several European initiatives coordinated by Eurostat in the last decade have been implemented to collect harmonised data on the continuing training of the adult workforce.⁴ In all cases national statistical offices collect survey data which are afterwards reported in a common format. With a goal to assemble comparable data, the various initiatives differ however in terms of specific definitions of training activity, the population sampled or the countries and years for which data are available.

Table 1 in the Annex describes some of the main characteristics of training statistics which are used in this publication: the European Labour Force Survey (LFS), including a module conducted in 2003 on lifelong learning (LLL), the Continuing Vocational Training Survey (CVTS) and the Adult Education Survey (AES). Regarding the instruments for compiling the statistics on training activities, the AES uses the Classification of Learning Activities (CLA). This instrument was designed to be applied to surveys to collect quantitative information on different aspects of participation of individuals in learning, covering all intentional and organised activities (either formal, non-formal or informal), all types of learning opportunities and education and learning pathways. The definitions used in the CLA remain consistent with the classification of educational activities covered in the LFS and based on ISCED where learning is understood to be “*any improvement in behaviour, information, knowledge, understanding, attitude, value or skills*”. While ISCED describes learning by the intended outcome, in the CLA the focus is on the process of learning.⁵

All these surveys provide measures of the level of continuing education and training among the adult workforce. However, there are important differences in how the training questions are phrased. One important difference is that AES distinguish between different contexts of education and training, namely formal, non-formal and informal. A second difference is that the CVTS poses the training questions to employers and not workers; there are likely to be systematic differences in how these two groups report training activities. Moreover, respondents in the CVTS are asked to distinguish between initial and continuing training, so that the former can be explicitly omitted from the training estimates. Finally, another important difference is that the LFS asks about training over the prior 4 weeks, whereas the others use a 12-month reference period.

The amount of training reported depends on the reference period covered by each survey. As a result, the retrospective nature of the self-reported training measures can introduce some errors. These measurement errors are expected to increase both with the span of time between the training spell and the interview, and with the detail of the training questions. The questions measuring training flows (i.e. the amount of training reported over a specific period of time) are probably more accurate than those attempting to measure stocks. Surveys often ask about training incidence, but increasingly try to measure the length of training spells in an attempt to more accurately measure training effort (*Bassanini et. al, 2005*).

⁴ For a more detailed description of data sources see CRELL (2007) and Cedefop (2010).

⁵ Eurostat, *Classification of Learning Activities - Manual*, Luxembourg (2005).

These surveys also differ with respect to how much employer involvement is required for a training event to be reported. The comparison between all job-related training and only employer-supported, job-related training is most critical for assessing the comparability of surveys, since the CVTS only records employer-supported training while the others also record job-related training events not supported by the employer. The heterogeneity in training questions introduces problems of comparability between surveys and even within surveys, particularly across countries. As such, the interpretation of the term “training” varies across groups in the population, in particular employers, employees, and training researchers. Yet, little is known about the extent to which these conceptual measurement problems lead to actual measurement error.⁶

The population sampled also differs between some of the surveys. The employees between the ages of 25 and 64 years, which are the target population of most of the following analysis, can be exactly identified only in the LFS (incl. LLL) and AES. The CVTS data cover employees of all ages in the surveyed enterprises. It also excludes workers in enterprises with fewer than ten employees and all workers in certain sectors. This could bias upward the training participation rates calculated using CVTS data, since the rates rise with enterprise size over the observed range (*Eurostat, 2002*).

The formulations of questions in each survey may result in different reporting of some forms of training and, hence, provide dissimilar estimates.⁷ The informal training is perhaps the category most commonly present and in fact it is reported separately in the AES and LLL. The LFS is probably intermediate in the amount of informal training reported, since the survey question asks about any “*education and training received in the last four weeks*”. The information relates to all education and training activities, whether or not relevant to respondent’s current or possible future jobs. Employers in the CVTS, with its focus on CVT courses (structured training programmes), probably report little or no informal training. There is some evidence, however, that formal and informal training are positively correlated (*Loewenstein and Spletzer, 1994*), suggesting that relative levels of training for different groups or countries might not be as notably affected by cross-survey differences in the extent to which informal training is recorded, as are absolute levels.

2.2 The level of training

What is the share of the adult workforce receiving training in the European countries? Does a larger proportion receive training in some countries than in others? Since the boundary between training and the learning that accompanies work experience is so difficult to draw in practice, it could not be expected that some very precise statements can be made about how much higher training is in one country than another. Nonetheless, it should be possible to position the European countries in terms of training intensities based on the evidence from these surveys and this section deal with this issue.

⁶ *Barron et al. (1997)* use data from a matched employer-employee survey to see to what extent their responses are consistent. They find that correlations between the worker and the establishment measures are less than 0.5 and that establishments report 25 percent more hours of training on average than workers do. On average, incidence rates are similar between worker and establishment reports, although 30 percent disagree on whether on-site formal training occurred. This suggests that training is measured with substantial error.

⁷ These effects could be quite large since data indicates that participation in informal training activities is at least as widespread as participation in formal training.

2.2a Participation in training

Training participation rates are shown in **Table 2**. Looking first at the unweighted column means calculated over all countries for which data are available, the average participation rates in the LFS are much lower than those for the other three surveys. This is in line with expectations since the four-week reference period used by the latter will miss many of the episodes of training occurring during the previous twelve months. The average participation rate from the CVTS (32 per cent) is consistent with employers not reporting some vocational training activities reported by workers (ex. training undertaken on their own initiative outside of work or less formal activities at the work site).

Table 2: Adult participation in training for European countries

European countries		Labour Force Survey ^a (reference year 2009)		Adult Education Survey ^b (reference year 2007)		Continuing Vocational Training Survey ^c (reference year 2005)		Lifelong learning module ^d (reference year 2003)		Cross-survey index of participation rate (average=0)	
		Participation rate (%)	Rank	Participation rate (%)	Rank	Participation rate (%)	Rank	Participation rate (%)	Rank	Mean	Rank
Belgium	BE	7.2	<u>16</u>	48.9	<u>10</u>	40	<u>7</u>	26.1	<u>9</u>	0.19	<u>10</u>
Bulgaria	BG	1.2	<u>27</u>	50.2	<u>8</u>	15	<u>25</u>	2	<u>27</u>	-0.89	<u>24</u>
Czech Republic	CZ	7.8	<u>13</u>	47.6	<u>15</u>	59	<u>1</u>	16.6	<u>16</u>	0.41	<u>7</u>
Denmark	DK	32.3	<u>1</u>	48.5	<u>11</u>	35	<u>10</u>	53	<u>2</u>	1.33	<u>2</u>
Germany	DE	7.8	<u>13</u>	53	<u>6</u>	30	<u>16</u>	16.3	<u>17</u>	-0.09	<u>14</u>
Estonia	EE	12.5	<u>10</u>	49.2	<u>9</u>	24	<u>21</u>	18.5	<u>13</u>	-0.09	<u>16</u>
Ireland	IE	6	<u>18</u>	:	:	49	<u>3</u>	6.1	<u>26</u>	-0.85	<u>23</u>
Greece	GR	3.1	<u>24</u>	17.8	<u>23</u>	14	<u>28</u>	12	<u>21</u>	-1.25	<u>26</u>
Spain	ES	10.6	<u>11</u>	35.9	<u>19</u>	33	<u>12</u>	24.9	<u>11</u>	-0.09	<u>15</u>
France	FR	6.5	<u>17</u>	42.3	<u>17</u>	46	<u>5</u>	17	<u>15</u>	0.02	<u>12</u>
Italy	IT	5.9	<u>19</u>	27.7	<u>22</u>	29	<u>18</u>	7.4	<u>24</u>	-0.76	<u>21</u>
Cyprus	CY	8.1	<u>12</u>	48	<u>13</u>	30	<u>16</u>	25.4	<u>10</u>	-0.01	<u>13</u>
Latvia	LV	5.7	<u>21</u>	40.1	<u>18</u>	15	<u>25</u>	17.2	<u>14</u>	-0.67	<u>19</u>
Lithuania	LT	5.3	<u>23</u>	43.4	<u>16</u>	15	<u>25</u>	9.9	<u>23</u>	-0.75	<u>20</u>
Luxembourg	LU	15.2	<u>8</u>	:	:	49	<u>3</u>	19.6	<u>12</u>	-0.33	<u>17</u>
Hungary	HU	2.5	<u>26</u>	12.1	<u>24</u>	16	<u>24</u>	6.3	<u>25</u>	-1.42	<u>27</u>
Malta	MT	7.3	<u>15</u>	:	:	32	<u>15</u>	13.9	<u>19</u>	-1.02	<u>25</u>
Netherlands	NL	18.5	<u>6</u>	52.7	<u>7</u>	34	<u>11</u>	13.2	<u>20</u>	0.27	<u>9</u>
Austria	AT	14.9	<u>9</u>	48.3	<u>12</u>	33	<u>12</u>	30.2	<u>7</u>	0.35	<u>8</u>
Poland	PL	5.6	<u>22</u>	30.1	<u>21</u>	21	<u>22</u>	14.9	<u>18</u>	-0.76	<u>22</u>
Portugal	PT	5.8	<u>20</u>	31.5	<u>20</u>	28	<u>20</u>	10.9	<u>22</u>	-0.66	<u>18</u>
Romania	RO	1.1	<u>28</u>	:	:	17	<u>23</u>	0.8	<u>28</u>	-1.75	<u>28</u>
Slovenia	SI	16.3	<u>7</u>	47.7	<u>14</u>	50	<u>2</u>	30.5	<u>6</u>	0.74	<u>6</u>
Slovakia	SK	2.9	<u>25</u>	54	<u>5</u>	38	<u>9</u>	28.5	<u>8</u>	0.14	<u>11</u>
Finland	FI	24.1	<u>2</u>	62	<u>2</u>	39	<u>8</u>	49.5	<u>3</u>	1.33	<u>3</u>
Sweden	SE	21.7	<u>4</u>	79.3	<u>1</u>	46	<u>5</u>	53.2	<u>1</u>	1.76	<u>1</u>
United Kingdom	UK	22.2	<u>3</u>	56.6	<u>4</u>	33	<u>12</u>	42.4	<u>4</u>	0.93	<u>4</u>
Norway	NO	19	<u>5</u>	60.3	<u>3</u>	29	<u>18</u>	38.4	<u>5</u>	0.75	<u>5</u>
Unweighted mean		10.6		45.3		32.1		21.6		0	
Standard deviation		7.9		14.4		12.3		14.7		0.9	

Source: CRELL calculations based on Eurostat data

(-) Missing or not available

a) Percentage of the employed population aged 25-64 participating in education and training over the four weeks prior to the survey

b) Participation rate in formal or non-formal education and training of employed adults (aged 25-64)

c) Percentage of employees (all enterprises) participating in CVT courses

d) Participation in non-formal education/training of employed adults (aged 25-64)

The values in **Table 2** reveal that there is consistency across the surveys concerning differences in participation rates. The Scandinavian countries and the United Kingdom show systematically very high participation, whereas Romania, Hungary, Greece, and Malta, have comparatively lower rates. However, Czech Republic, France and Ireland illustrate a more mixed pattern, with below-average participation in the LFS, but among the highest rates in CVTS. Slovakia provides the most extreme example of cross-survey inconsistency, being rated very high in three surveys (LLL, AES and CVTS) but having among the lowest rates in LFS. Nevertheless, it appears that

most of the countries can be characterised, with some confidence, as being low, near average or high in the European hierarchy of training rates.

On the other hand, data in **Table 2** also confirm that differences in survey design are likely to lead to significantly different estimates of the absolute level of training.⁸ Each of the surveys indicates considerable cross-country differences. This variation suggests that training patterns differ significantly between countries, especially since it is quite pronounced for AES and LLL (standard deviations of 14.4, respectively 14.7, and a highest-lowest difference of 61, respectively 52 percentage points in the participation rate).

In the last column of **Table 2** the information from surveys is combined to calculate an aggregate measure of the relative participation in training among the European countries. The cross-survey index of training (CSIT) merges exclusively relative measures on participation in training from the four surveys. The index is constructed as the unweighted mean of the standardised participation rates, where the average for each country is calculated across only the surveys in which it participated (*see the box below*).⁹

An aggregate measure of training: The cross-survey index on training (CSIT)

In order to average a country's ranking across all of the sources for which data are available, it is first necessary to convert the four sets of participation rates into comparable units. This is due to differences in questionnaire design (such as different reference periods), meaning that the absolute levels of training are not comparable across the four data sources. Thus, each registered value for participation was standardised into a mean deviation in standard deviation units. For example, the training participation rate for Belgium from the LFS (7.2 per cent) is approximately 0.45 standard deviations below the cross-country mean value (10.6 per cent). So, its standardised value is calculated as $(7.2-10.6)/7.9$ or -0.43. The cross-survey index is the unweighted mean of these standardised participation rates, where the average for each country is calculated across only the surveys in which it participated. By construction, the index has a mean value of zero; it is more reliable for the countries participating in a greater number of the surveys.

The index suggests that training participation tends to be very high in the Scandinavian countries and the United Kingdom and much lower in Romania, Hungary, Greece and Malta. Overall, the Nordic countries show higher levels of participation compared to countries in the southern Europe (Romania, Greece and Malta).

2.2b The volume of training

Participation rates provide an incomplete measure of the level of training. As training could be seen as a form of economic investment, this suggests that a continuous measure of the resources invested in training would be more informative than a simple, yes/no measure of whether any investment was made. Yet, in practice it is difficult to gather accurate information of this type. Neither workers nor their employers routinely track the magnitudes of training investments and their attempts to estimate them in a survey interview are likely to be quite inaccurate (*OECD, 1999*). One option is to utilise both participation and volume measures to estimate the level of training, rather than only relying on one or the other, since they both have strengths and weaknesses.

⁸ Similar findings were presented during a workshop organised in Berlin (December 2010) to discuss the survey differences in adult training across the European countries.

⁹ For more details on methods to construct aggregate measures, see OECD and JRC (2008).

The primary measure of training volume examined here is hours of training.¹⁰ The three sources of harmonised training statistics for which data is available - AES, CVTS and LLL - yield quite different estimates of the average hours of training (**Table 3**).

Table 3: Volume of adult training in European countries

European countries		Adult Education Survey ^a (reference year 2007)		Continuing Vocational Training Survey ^b (reference year 2005)		Lifelong learning module ^c (reference year 2003)		Cross-survey index of training volume (average=0)	
		Number of hours	Rank	Number of hours	Rank	Number of hours	Rank	Mean	Rank
Belgium	BE	140	<u>7</u>	31	<u>9</u>	69	<u>11</u>	0.51	<u>7</u>
Bulgaria	BG	70	<u>21</u>	30	<u>11</u>	68	<u>12</u>	-0.19	<u>19</u>
Czech Republic	CZ	75	<u>20</u>	23	<u>26</u>	47	<u>21</u>	-1.00	<u>26</u>
Denmark	DK	188	<u>1</u>	30	<u>11</u>	57	<u>15</u>	0.68	<u>4</u>
Germany	DE	108	<u>10</u>	30	<u>11</u>	74	<u>10</u>	0.23	<u>9</u>
Estonia	EE	93	<u>15</u>	27	<u>17</u>	56	<u>16</u>	-0.40	<u>21</u>
Ireland	IE	:	:	25	<u>22</u>	80	<u>6</u>	-0.08	<u>17</u>
Greece	GR	104	<u>13</u>	25	<u>22</u>	102	<u>2</u>	0.21	<u>10</u>
Spain	ES	146	<u>6</u>	26	<u>19</u>	85	<u>4</u>	0.41	<u>8</u>
France	FR	44	<u>23</u>	28	<u>16</u>	37	<u>25</u>	-1.03	<u>27</u>
Italy	IT	79	<u>19</u>	25	<u>22</u>	58	<u>13</u>	-0.65	<u>24</u>
Cyprus	CY	82	<u>18</u>	22	<u>27</u>	53	<u>17</u>	-0.93	<u>25</u>
Latvia	LV	159	<u>3</u>	26	<u>19</u>	58	<u>13</u>	0.13	<u>14</u>
Lithuania	LT	120	<u>8</u>	32	<u>6</u>	52	<u>18</u>	0.16	<u>11</u>
Luxembourg	LU	:	:	33	<u>5</u>	46	<u>22</u>	0.11	<u>16</u>
Hungary	HU	177	<u>2</u>	37	<u>1</u>	126	<u>1</u>	2.14	<u>1</u>
Malta	MT	:	:	35	<u>3</u>	80	<u>6</u>	1.09	<u>3</u>
Netherlands	NL	:	:	36	<u>2</u>	76	<u>9</u>	1.12	<u>2</u>
Austria	AT	105	<u>12</u>	27	<u>17</u>	85	<u>4</u>	0.13	<u>13</u>
Poland	PL	157	<u>4</u>	30	<u>11</u>	40	<u>24</u>	0.16	<u>12</u>
Portugal	PT	147	<u>5</u>	26	<u>19</u>	96	<u>3</u>	0.58	<u>6</u>
Romania	RO	:	:	31	<u>9</u>	80	<u>6</u>	0.62	<u>5</u>
Slovenia	SI	85	<u>16</u>	29	<u>15</u>	44	<u>23</u>	-0.49	<u>22</u>
Slovakia	SK	85	<u>16</u>	32	<u>6</u>	35	<u>27</u>	-0.39	<u>20</u>
Finland	FI	112	<u>9</u>	25	<u>22</u>	48	<u>20</u>	-0.51	<u>23</u>
Sweden	SE	99	<u>14</u>	34	<u>4</u>	50	<u>19</u>	0.11	<u>15</u>
United Kingdom	UK	60	<u>22</u>	20	<u>28</u>	35	<u>27</u>	-1.54	<u>28</u>
Norway	NO	106	<u>11</u>	32	<u>6</u>	36	<u>26</u>	-0.19	<u>18</u>
Unweighted mean	Mean	110.5		28.8		63.3		0	
Standard deviation	Std	38.1		4.3		22.7		0.8	

Source: CRELL calculations based on Eurostat data

(:) Missing or not available

a) Mean instruction hours spent by employed participant on formal/non-formal education and training

b) Hours in CVT courses per participant

c) Mean volume of hours per employed participant in non-formal learning

All surveys confirm that training volume differs between countries, but this variation ranges from quite modest in the CVTS to quite high in the AES (standard deviations of 4.3 and 38.1 hours, respectively). The major difference is the much lower level reported in the CVTS, which probably can be explained by the fact that the CVTS only reports hours spent in employer-provided courses, which is narrower than the range of training activities covered by the other surveys.¹¹

The comparison of volume seems to be less consistent across the surveys. Greece provides again the most extreme example of cross-survey inconsistency, being rated very low in the CVTS (22nd out of 28 countries) but

¹⁰ The CVTS provides an alternative measure of training volume, namely, employers' costs for training courses as a share of total labour costs. Overall, this measure of volume accords quite closely with the earlier analysis of participation rates, but less closely with the hours measures of training volume. In particular, the southern European countries with relatively low participation rates (*i.e.* Greece, Italy, Portugal and Spain) also have the lowest cost shares among the European countries, while the two countries with the highest participation rates (the United Kingdom and France) also rate highest in employer spending (see *European Commission, Progress towards the Lisbon objectives in education and training, 2008*).

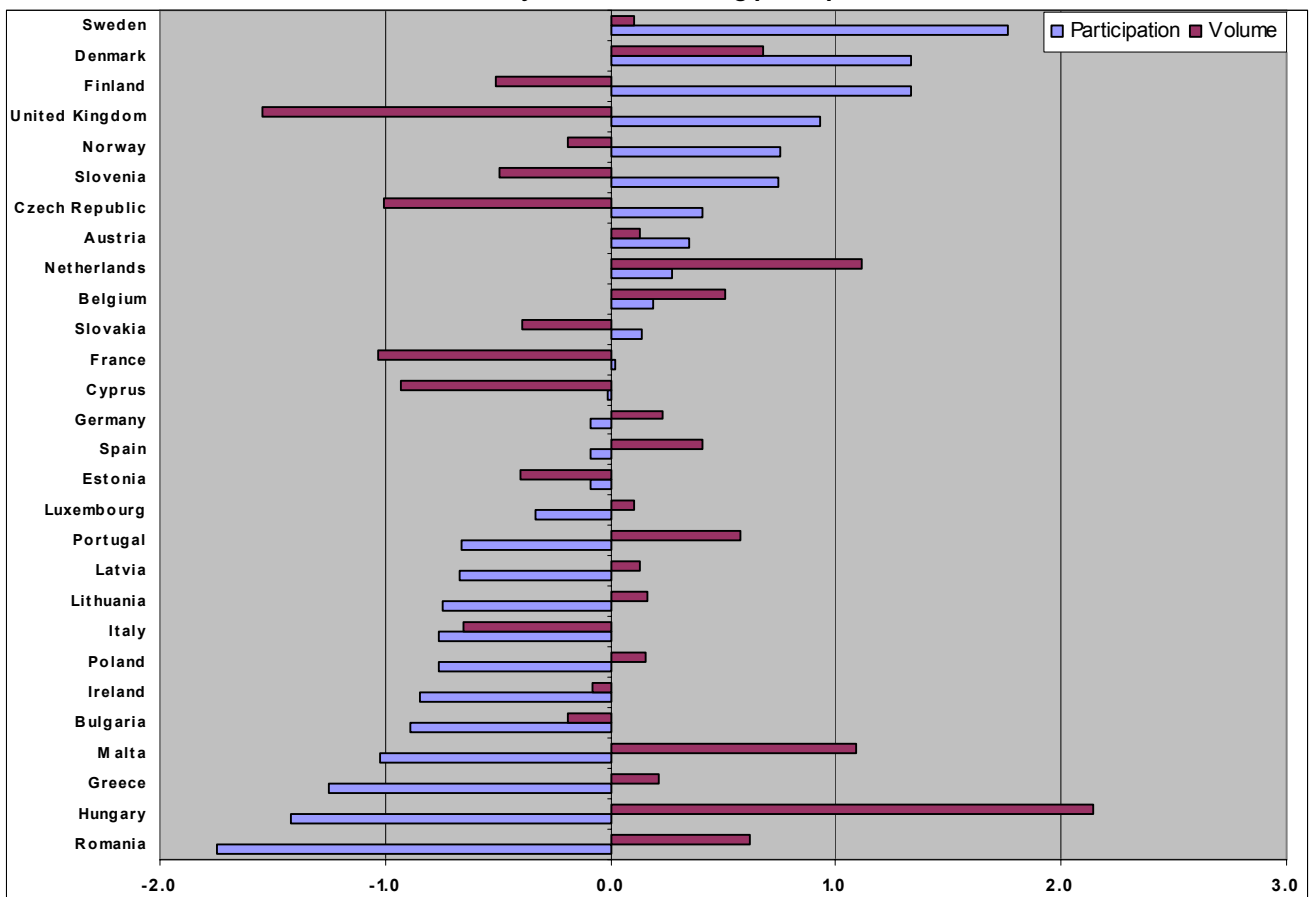
¹¹ Some of the cross-country differences in training hours measured could reflect either incompatible definitions or measurement errors.

having the second highest training volume in the LLL. On the other hand, Hungary, Germany, Czech Republic and the United Kingdom are examples of high cross-survey consistency being rate similarly in all three surveys.

Table 3 presents a cross-survey index of training volume, analogous to that previously constructed for participation. The index suggests that training volume tends to be very high in Hungary, the Netherlands or Malta and much lower in the United Kingdom, France or the Czech Republic. Overall the geographical patterns are more mixed for the volume of training compared to participation rates.

Another question related to the consistency of comparisons of training levels is whether the training participation and volume measures produce similar country rankings. **Chart 1** juxtaposes the two cross-survey indexes. These two measures provide somewhat different assessments of which countries invest most in continuing training. Slovenia and Czech Republic among the highest rated in terms of participation, are much lower in the volume of training, while Hungary is among the lowest in participation but has the highest training volume. However, there is some stronger association between the two measures for some countries: Denmark (in the upper ranges), Austria and Belgium in the middle or Italy in the lower ranges of the two distributions.

Chart 1: Cross-survey indices of training participation and volume

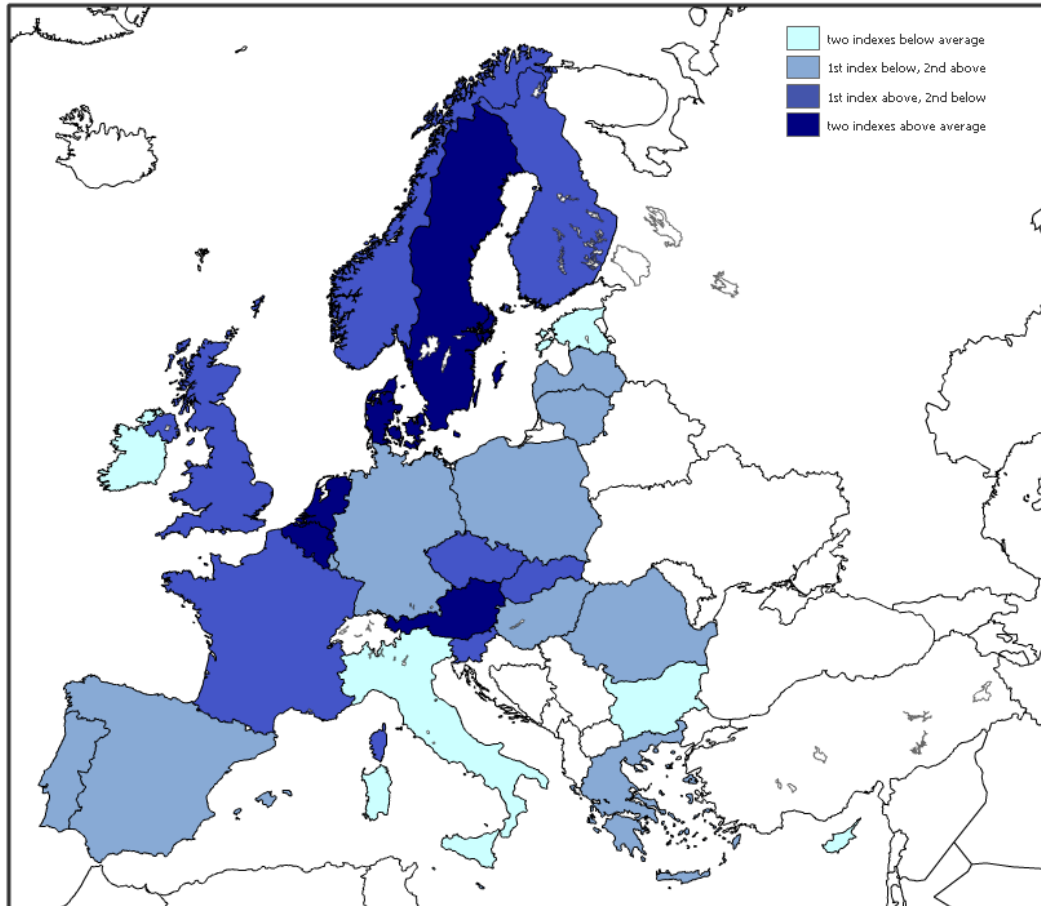


Source: CRELL calculations based on Eurostat data

The absence of a closer association between a country’s relative positions in training participation and volume for the majority of countries could reflect a trade-off between the extensive and intensive boundaries of training policies. A country that provides a little training for many workers is emphasising the extensive margin and will tend to score higher on the participation than on the volume index; data suggest that this pattern may

characterise Denmark and Sweden whereas Hungary or Malta put emphasis on the intensive margin. Only five countries have the two indexes (participation and volume) above the average: two Nordic countries (Sweden, Denmark), the Netherlands, Belgium and Austria whereas in three Southern countries (Bulgaria, Italy, and Cyprus), as well as in Estonia and Ireland the index values are both below the average (*see chart 2*).

Chart 2: Patterns of adult training in European countries



Source: CRELL

If there is indeed a trade-off between training wide spreading and intensity, how can it be estimated? If trainees received the same hours of training on average, independent of the participation rate, then the correlation between participation and volume should be 1.0 in the absence of measurement error. The overall correlation is -0.39, but the value for each survey data alone should be regarded as a better indication of the extent to which training intensity tends to fall as participation rises, since it is less affected by measurement problems. This issue will be discussed in the next section.

3. Correlation analysis

Table 4 presents a detailed statistical analysis of the robustness of cross-country differences in the level of training. Spearman rank correlations were calculated between the various measures of training participation and volume. These correlations provide a quantification of the degree of consonance across three types of comparisons: between different surveys using the same measure of training (ex. the 0.79 correlation between the LFS and LLL measures of participation); between different measures of training using the same survey (ex. the -0.53 correlation between the LLL measures of training participation and volume); and using different measures and different surveys (ex. the -0.45 correlation between the AES participation and the CVTS hours).

Table 4: Rank correlations of statistics on training participation and volume in different surveys

Surveys		Labour Force Survey with:				Adult Education Survey with:			CVTS with:		LLL with:
Measures of training		LFS	AES	CVTS	LLL	AES	CVTS	LLL	CVTS	LLL	LLL
<i>First</i>	<i>Second</i>										
Participation	Participation	1.0**	.59**	.57**	.79**	1.0**	.43*	.64**	1.0**	.5**	1.0**
Volume	Volume	:	:	:	:	1.0**	0.35	.45*	1.0**	.04	1.0**
Participation	Volume	:	:	:	:	-.28	.21	-.45*	-.04	-.38*	-.53**
Volume	Participation	:	:	:	:	-.28	-.31	-.02	-.04	-.08	-.53**

Source: CRELL calculations based on Eurostat data

(-) Missing or not available

* Significant at the 5% level

** Significant at the 10% level

For the LFS, the correlations with the other three surveys for participation are strongly positive and significant at the 10% level, indicating a high degree of agreement. The cross-survey correlations for participation range from 0.57 to 0.79, indicating a quite high consistency in ranking countries by this dimension of training. This suggests that it is possible to make qualitatively valid comparisons of training participation rates. The participation and volume measures are negatively correlated in all three surveys. However, the correlation is substantially smaller than 1.0, suggesting either a cross-country trade-off between the number of workers being trained and the duration of training received or some measurement errors in the volume measures.¹² As already mentioned, the absence of a correlation between a country's relative positions in training participation and volume for the majority of countries (the rank correlation is -0.366) could reflect a trade-off between the extensive and intensive boundaries of training policies. This pattern could also suggest some measurement errors or large conceptual differences in the data collection. Finally, the cross-survey correlations for training volume are positive for all three sources, but lower than those for participation.

Table 4 shows that the correlation among the training measures is relatively high and statistically significant. This does not come as a surprise as previous findings revealed that there is considerable consistency across the surveys concerning differences in participation rates. This is encouraging and allows to further proceeding in the next analysis of training patterns by using large cross-country datasets.

¹² This pattern suggests some measurement errors, since it is difficult to believe that increases in the share of workers being trained are associated with greater than proportional decreases in the training duration.

4. Conclusions

1. The value of adult learning to employability is widely acknowledged across the EU. The European Commission adopted a Communication on Adult Learning¹³ in October 2006, followed up by an Action Plan that was endorsed in May 2008 by national education ministers.¹⁴ One of the five urgent issues identified in these policy documents was to increase participation in lifelong learning, particularly to address the decrease in participation over the age of 34. The work on these priorities should be done by improving the monitoring of the adult learning sector and analysing the effects of reforms in other educational sectors on adult learning.
2. Adult participation in lifelong learning varies greatly and is unsatisfactory in many EU countries. The European Union set a target for average participation in lifelong learning throughout the EU to at least 15% by 2020 for adults aged 25-64; in 2009, the average participation was 9.3%. Surveys show that the Nordic countries are near the top of most comparisons of participation in adult training. Overall, the Scandinavian countries and the United Kingdom together with the Czech Republic and Slovenia show higher levels of participation compared to Romania, Hungary and some other countries in the southern Europe (Greece, Malta and Bulgaria).
3. Comparing national participation rates in adult learning as a whole is problematic because different surveys use different methodologies, time reference periods, and range of relevant learning experiences. Drawing on primarily European data in 28 countries, country rankings give broadly similar results across different surveys. Sweden, Denmark and Finland, show systematically very high participation, whereas Romania, Hungary and Greece have comparatively lower rates.
4. There also appears to be some trade-off between the extensive and intensive margins of training. A country that provides a little training for many workers is emphasising the extensive margin and will tend to score higher on the participation than on the volume measures. Data suggest that this pattern may characterise Sweden, Denmark and Finland whereas Hungary, the Netherlands and Malta put emphasis on the intensive margin and, consequently, score higher on measures of hours of training.
5. Several European initiatives coordinated by Eurostat in the last decade have been implemented to collect harmonised data on the continuing training of the adult workforce. However, further harmonisation of training statistics is needed. Nonetheless, it is possible to draw several tentative conclusions with the data currently available. There is considerable consistency across the surveys concerning differences in participation rates and less among the training volume. This is encouraging and allows to further proceeding in the next analysis of training patterns by using large cross-country datasets.

¹³ *Adult learning: It is never too late to learn*, Communication from the Commission, COM(2006) 614 final, Brussels

¹⁴ Council conclusions of 22 May 2008 on adult learning (2008/C 140/09)

Annex

Table 1: Overview of European surveys providing data on continuing training

Name Year(s)	Countries covered	Type of survey	Definitions	Reference period	Observations
Labour Force Survey (EU LFS) 1983-2009	33 countries All European Union member states, plus Croatia, Iceland, former Yugoslav Republic of Macedonia, Turkey, Norway, Switzerland	EU-LFS is a quarterly large sample survey covering the population in private households. From 1998 it has progressively become a continuous quarterly survey; this transition was completed in 2005. The sample size amounts approximately to 1.5 mill. individuals in each quarter. The quarterly sampling rates vary between 0.2% and 3.3% in each country. The national statistical institutes are responsible for selecting the sample, preparing the questionnaires, conducting the direct interviews among households, and forwarding the results to Eurostat in accordance with the common coding scheme.	Participation: Lifelong learning refers to persons aged 25 to 64 who stated that they received education or training in the four weeks preceding the survey. Data collected refer to all education or vocational training whether or not relevant to the respondent's current or future employment. They include initial education, additional education, continuing or additional training, training in enterprises, apprenticeships, on-the-job training, seminars and workshops, distance education, evening classes, self-learning, etc. They also include courses followed out of personal interest in subjects such as languages, computers, art, etc. Volume of training: No data available	4 weeks	From 2003 onwards, the definition has been restricted to regular education or other taught activities. Due to the transition to harmonised concepts, breaks in series are reported for several countries.
Adult Education Survey (AES) 2007	29 countries All European Union member states except Ireland and Luxembourg, plus Croatia, Turkey, Norway, Switzerland	AES is part of the EU Statistics on lifelong learning. The survey has used for the first time a common EU framework including a standard questionnaire, tools and quality reporting. The survey covers participation in education and lifelong learning activities (formal, non-formal and informal learning) including job-related activities, characteristics of learning activities, self-reported skills as well as modules on social and cultural participation, foreign language skills, IT skills and background variables related to main characteristics of the respondents. Relatively small sample size, between 2200 and 27000 individuals in each country (sampling rates vary between 0.01% and 1.14%).	Participation: All learning activities undertaken throughout life, with the aim of improving knowledge, skills and competences, within a personal, civic, social, and employment related perspectives. Learning is defined as any activity of an individual organised with the intention to improve knowledge, skills and competences. Intentional learning (as opposed to random learning) is defined as a deliberate search for knowledge, skills, competences, or attitudes of lasting value. Organised learning is defined as learning planned in a pattern or sequence with the explicit or implicit aims. Volume of training: Mean instruction hours spent by participant on formal/non-formal education and training.	12 months	The Classification of Learning Activities is used. It is designed to be applied to surveys to collect information on different aspects of participation in learning, covering all intentional and organised activities (formal, non-formal or informal) all types of learning opportunities and education and learning pathways
Continuing Vocational Training Survey (CVTS) 1993, 1999, 2005	28 countries (2005) All European Union member states plus Norway	CVTS is an employer survey of enterprises with 10 or more persons employed belonging to certain NACE categories. CVTS3 provides comparable statistics on training enterprises such as: participation in training, the volume of CVT courses and its costs, and some information on Initial vocational training (IVT) courses. The survey is based on common specifications with large sample sizes (50000 enterprises).	Participation: Continuing Vocational Training (CVT) is defined as training measures and activities, which the enterprise finances, partially or entirely, for their employees who have a working contract. A participant in courses is a person who attended one or more CVT courses, at any time during the reference year; participants are counted only once, irrespective of the number of times they attended courses. The courses are events designed solely for the purpose of providing training or vocational education which should take place in a training centre located away from the workplace where participants receive instruction from teachers or tutors for a period of time specified in advance. Volume of training: Hours in CVT courses per participant. The number of hours includes only the actual training time, excluding any periods of normal work in between training or the travelling time.	12 months	CVTS excludes enterprises with fewer than 10 employees or in NACE Rev 1.1 sectors (A, B, L, M, N, P, Q)

Source: Eurostat

Table 1: Overview of European surveys providing data on continuing training (cont.)

Name Year(s)	Countries covered	Type of survey	Definitions	Reference period	Observations
<p>Lifelong learning module</p> <p>2003</p>	<p>30 countries All European Union member states plus Iceland, Norway and Switzerland</p>	<p>The survey was carried out as an ad hoc module to the EU Labour Force Survey (LFS). The population units refer to individual persons living in private households (using the LFS specifications). The target population is the entire population covered by the LFS; however results are presented only for the age group 25-64. The limitations in the EU LFS influence the coverage of different aspects of lifelong learning in the ad hoc module (see the information for LFS). The Lifelong learning (LLL) data base's target population are all persons in private households aged 25-64 years. The priority of this module is to measure participation and volume of lifelong learning.</p>	<p>Participation: Lifelong learning encompasses all purposeful learning activity, whether formal or informal, undertaken on an ongoing basis with the aim of improving knowledge, skills and competence. Formal education and training (referred to as "formal education" in the indicators used) corresponds to education and training in the regular system of schools, universities and colleges. Non-formal education and training (referred to as "non-formal education" in the indicators used) includes all types of taught learning activities which are not part of a formal education programme. Informal learning corresponds to self-learning which is not part of either formal nor non-formal education and training, by using: printed material, computer-based learning/training or Internet-based web education or educational broadcasting or offline computer based (Audio or Videotapes) or by visiting facilities aimed at transmitting educational content (library, learning centres etc.)</p> <p>Volume of training: Mean volume of hours</p>	<p>12 months</p>	<p>The aim of this survey was to distinguish between learning activities from non-learning activities (like cultural activities, sports activities, etc.) especially when discussing the informal learning. The concepts used in the ad hoc module took into account the definitions used by Eurostat Task Force on measuring lifelong learning in 2001.</p>

Source: Eurostat

Annex – Data used in this publication

Table 2 Adult participation in training for European countries

Indicator		Percentage of the employed population aged 25-64 participating in education and training over the four weeks prior to the survey	Participation rate in formal or non-formal education and training of employed adults (aged 25-64)	Percentage of employees (all enterprises) participating in CVT courses	Participation in non-formal education or training of employed adults (aged 25-64)
Name of survey	Labour Force Survey	Adult Education Survey	Continuing Vocational Training Survey	Lifelong learning module	
Reference year	2009	2007	2005	2003	
European countries					
Belgium	BE	7.2	48.9	40	26.1
Bulgaria	BG	1.2	50.2	15	2
Czech Republic	CZ	7.8	47.6	59	16.6
Denmark	DK	32.3	48.5	35	53
Germany	DE	7.8	53	30	16.3
Estonia	EE	12.5	49.2	24	18.5
Ireland	IE	6	:	49	6.1
Greece	GR	3.1	17.8	14	12
Spain	ES	10.6	35.9	33	24.9
France	FR	6.5	42.3	46	17
Italy	IT	5.9	27.7	29	7.4
Cyprus	CY	8.1	48	30	25.4
Latvia	LV	5.7	40.1	15	17.2
Lithuania	LT	5.3	43.4	15	9.9
Luxembourg	LU	15.2	:	49	19.6
Hungary	HU	2.5	12.1	16	6.3
Malta	MT	7.3	:	32	13.9
Netherlands	NL	18.5	52.7	34	13.2
Austria	AT	14.9	48.3	33	30.2
Poland	PL	5.6	30.1	21	14.9
Portugal	PT	5.8	31.5	28	10.9
Romania	RO	1.1	:	17	0.8
Slovenia	SI	16.3	47.7	50	30.5
Slovakia	SK	2.9	54	38	28.5
Finland	FI	24.1	62	39	49.5
Sweden	SE	21.7	79.3	46	53.2
United Kingdom	UK	22.2	56.6	33	42.4
Norway	NO	19	60.3	29	38.4

Source: Eurostat

(:) Missing or not available

Table 3 Volume of adult training in European countries

Indicator		Mean instruction hours spent by employed participant on formal/non-formal education and training	Hours in CVT courses per participant	Mean volume of hours per employed participant in non formal learning
Name of survey		Adult Education Survey	Continuing Vocational Training Survey	Lifelong learning module
Reference year		2007	2005	2003
European countries				
Belgium	BE	140	31	69
Bulgaria	BG	70	30	68
Czech Republic	CZ	75	23	47
Denmark	DK	188	30	57
Germany	DE	108	30	74
Estonia	EE	93	27	56
Ireland	IE	:	25	80
Greece	GR	104	25	102
Spain	ES	146	26	85
France	FR	44	28	37
Italy	IT	79	25	58
Cyprus	CY	82	22	53
Latvia	LV	159	26	58
Lithuania	LT	120	32	52
Luxembourg	LU	:	33	46
Hungary	HU	177	37	126
Malta	MT	:	35	80
Netherlands	NL	:	36	76
Austria	AT	105	27	85
Poland	PL	157	30	40
Portugal	PT	147	26	96
Romania	RO	:	31	80
Slovenia	SI	85	29	44
Slovakia	SK	85	32	35
Finland	FI	112	25	48
Sweden	SE	99	34	50
United Kingdom	UK	60	20	35
Norway	NO	106	32	36

Source: Eurostat

(:) Missing or not available

References

- Arulampalam, W., Booth, A. and Bryan, M. (2004), *Training in Europe*, Journal of the European Economic Association, 2 (2-3), pp. 346-360
- Bassanini, A. (2004), *Improving Skills for More and Better Jobs? The Quest for Efficient Policies to Promote Adult Education and Training*, presented at the Conference on Quality and Efficiency in Education, Brussels
- Bassanini, A. *et al.* (2005), *Workplace training in Europe*, IZA Discussion paper, No. 1640
- Bishop, J. (1997), *What We Know about Employer-Provided Training: A Review of the Literature*, in Polachek, e Solomon, W., eds., *Research in Labor Economics*, London, JAI Press, pp. 19-87
- Brunello, G., Garibaldi, P., Wasmer, E., eds. (2009), *Education and Training in Europe*, Oxford University Press
- Brunello, G. (2003), *On the Complementarity between Education and Training in Europe*, in Checchi and Lucifora, (eds.), *Education, Training and Labour Market Outcomes in Europe*, Palgrave, McMillan
- Brunello, G. and Medio, A. (2001), *An Explanation of International Differences in Education and Workplace Training*, *European Economic Review*, vol.1, pp. 307-322
- Cedefop (2010), *Employer-provided vocational training in Europe Evaluation and interpretation of the third continuing vocational training survey*, Luxembourg
- Cedefop (2008), *Evaluation of Eurostat education, training and skills data sources*, Luxembourg
- CRELL (2010), *Returns to education in European countries: Evidence from the European Community Statistics on Income and Living Conditions (EU-SILC)*, European Commission-JRC, (forthcoming)
- CRELL (2008), *Improving the scope of indicators for monitoring developments in vocational education and training in Europe*, European Commission-JRC, EUR 23512 EN
- CRELL (2007), *Measuring the outputs and outcomes of vocational training-towards a coherent framework for indicators*, European Commission-JRC, EUR 22305 EN
- Eurostat (2009), *Potential use of existing international surveys: Continuous Vocational Training Survey*, 'Employers' surveys on skill needs: feasibility work' (workshop, Milan, 7-9 May 2009)
- Eurostat (2006), *The 3rd Continuing Vocational Training Survey (CVTS3): European Union Manual*, Eurostat Population and Social Conditions Working Paper 3/2006/F/N°32, Luxembourg
- Eurostat (2005), *Classification of Learning Activities - Manual*, Luxembourg
- Eurostat (2002), *Continuing Vocational Training Survey (CVTS2)*, Luxembourg
- European Commission (2009), *Progress Towards the Lisbon Objectives in Education and Training - Indicators and Benchmarks*, Commission Staff Working Document, SEC(2009) 1616, Brussels
- Loewenstein, M. and Spletzer, J. (1994), *'Informal Training: A Review of Existing Data and Some New Evidence'*, US Bureau of Labor Statistics, mimeo, June
- OECD (2009), *Education today. The OECD perspective*, Paris
- OECD and JRC (2008), *Handbook on constructing composite indicators. Methodology and User Guide*, Paris
- OECD (2004), *Improving Skills for More and Better Jobs: Does Training Make a Difference?*, in OECD Employment Outlook, Paris
- OECD (1999), *Training of adult workers in OECD countries: Measurement and analysis*, in OECD Employment Outlook, Paris
- *** *Adult learning in comparative perspective - understanding differences across countries*, Discussion paper, AES International workshop, Berlin, 9-10 December 2010

European Commission

EUR 24563 EN – Joint Research Centre – Institute for the Protection and Security of the Citizen

Title: Participation in training of adult workers in European countries. Evidences from recent surveys.

Author(s): Mircea Bădescu and Massimo Loi

Luxembourg: Publications Office of the European Union

2010 – 33 pp. – 21 x 29.7 cm

EUR – Scientific and Technical Research series – ISSN 1018-5593

ISBN 978-92-79-17202-1

doi:10.2788/3263

Abstract

The importance of a highly skilled workforce has become increasingly relevant in the context of the European Union new strategy for smart, sustainable and inclusive growth - 'Europe 2020'. At the individual level, a good education is increasingly decisive for employment prospects and earnings levels. The skills and competences of the workforce are the product of a large variety of learning activities that take place in diverse institutional contexts. While good initial education provides an essential foundation, learning continues through the working years. Policies encouraging wide participation in continuing training are therefore an important component of lifelong learning strategies.

Very little is known concerning differences in continuing training or their causes and consequences. Such information would be useful for assessing policy choices related to training, such as whether to encourage an overall increase in training levels or to attempt to redirect training investments toward groups currently receiving little training.

This publication deal with some of these issues. First, some aggregate measures using harmonised data from European surveys on training are constructed and analysed. Next, a set of stylised facts concerning differences in the level of training across European countries are discussed. A more formal analysis of the robustness of cross-country differences in the level of training is included; cross-country rank correlations are calculated between the various measures of training. A concluding section considers some policy implications for this area.

How to obtain EU publications

Our priced publications are available from EU Bookshop (<http://bookshop.europa.eu>), where you can place an order with the sales agent of your choice.

The Publications Office has a worldwide network of sales agents. You can obtain their contact details by sending a fax to (352) 29 29-42758.

The mission of the JRC is to provide customer-driven scientific and technical support for the conception, development, implementation and monitoring of EU policies. As a service of the European Commission, the JRC functions as a reference centre of science and technology for the Union. Close to the policy-making process, it serves the common interest of the Member States, while being independent of special interests, whether private or national.

