Chapter 5

Upgrading Workers' Skills and Competencies

Upgrading skills is an essential component of any comprehensive lifelong learning strategy; it is particularly important to improve the employment prospects of under-represented groups. Yet, in all OECD countries, these groups receive much less training than those who are already highly skilled or have a good job. What explains the relatively low training incidence among the less educated, older workers, women, immigrants, part-timers and temporary workers? How can training policies effectively reduce these inequalities and what is the role of co-financing arrangements in such a strategy?

Introduction

While Chapters 3 and 4 focus on policies to mobilise underutilised labour resources by improving their employment and wage prospects, this chapter looks at human capital policies to improve the career prospects of those that are already in employment. Education and training have in fact a significant impact on output growth as well as on individual wages and employability (OECD, 1994, 1999a, 2001a). Although initial education must remain a priority to foster growth in the long-run, policy strategies to increase human capital should also focus on adult learning. In 10-15 years from now, the bulk of the labour force will still be composed of individuals who are currently in the labour market. Furthermore, due to population ageing and the effect of policies aimed at prolonging working life, most of these individuals will have completed their initial schooling many years before, and rapid technological change will have made part of their competencies obsolete. The education and training they receive after having started their working life is therefore crucial for both output growth and individual career prospects.

There is a lively debate, however, concerning whether the current level of investment in training is adequate. Furthermore, past research has shown that training activities are unequally distributed, with workers who are already in a better position in the labour market having more opportunities and incentives to acquire new skills. To remedy these problems, policy innovations – intended to increase investment in and equal access to adult education and training – have been experimented in OECD countries in recent years. Nevertheless, implementation problems have sometimes accompanied the introduction of these innovations, usually because the factors behind inadequate training outcomes have not been addressed properly. The purpose of this chapter is therefore twofold: *a)* to identify the reasons behind possible under-provision of training and inequality of outcomes; and *b)* to discuss policy approaches, by mapping each policy instrument into the potential problems it can address.

The empirical analysis of this chapter focuses on formal continuous vocational training (CVT). This is done for three reasons. First, there are no cross-country comparable data on informal training. This is an important limitation, since research conducted in Australia and the United States has shown that informal training represents at least one half of total training and it is conceivable that inequality patterns in the provision of informal training might differ from those associated with formal training (Australian Bureau of Statistics, 1990; Barron *et al.*, 1997; and Loewenstein and Spletzer, 1999a). Second, formal CVT accounts for the largest share of formal education and training of the adult workforce in almost all OECD countries. Third, CVT is closely related to the labour market and therefore must be analysed separately from the market for formal education.

The first section of the chapter quantifies the relative weight of training and education in adult learning and provides further evidence of inequality in training participation and

intensity across the different labour market groups identified in Chapters 1 and 2. The second section looks at the evidence of under-provision of training, as well as at the determinants of uneven training incidence. It also presents econometric evidence of training supply and demand effects for different groups. In the light of the empirical results, different policy instruments are reviewed in the third section, with particular attention devoted to co-financing schemes. Good practices are discussed, although little empirical evaluation exists for most schemes. The final section draws some conclusions.

Main findings

- There is large cross-country variation in the incidence and intensity of CVT. In practically all countries, CVT is unequally distributed across individuals and firms, with women, older workers, low-skilled workers, immigrants as well as workers in small firms receiving less training. For example, the probability of receiving employer-sponsored training is estimated to be on average 9 percentage points smaller for workers with less than upper secondary education than for individuals with a tertiary qualification, and 6 percentage points smaller for immigrants than for natives.

- There is some evidence of under-provision of formal training, although the extent of the problem is difficult to quantify and its implications may be somehow softened by the presence of informal training. Pay scales do not reflect productivity closely; in most cases, therefore, employees cannot fully reap the benefits from training, which reduces their incentives to invest in human capital. As a result, most of the training is entirely funded by employers. However, employers themselves might be investing less than is optimal, since a significant share of employer-sponsored formal training appears to concern skills that are transferable across firms. Although there is some evidence that employers may have some market power over their pool of trained workers, thereby being able to appropriate part of the benefits from training in transferable skills, current employers are unlikely to be able to internalise the benefits that will accrue to other employers, when a trained worker switches firm.

- There is also some empirical evidence of other market failures in the market for training – such as individual borrowing constraints for training purposes and lack of contractibility of training content and quality. These failures prevent an efficient sharing of the costs of, and benefits from, training between employers and employees, thereby reducing the incentives to invest in workers' human capital.

- Disentangling employers' supply – training opportunities employers offer to their employees – from workers' demand of training is a difficult exercise. Even more complex is to identify the supply or demand channel through which the above mentioned market failures may affect training outcomes. Nonetheless, the empirical analysis suggests that low training is mostly due to the workers' demand side in the case of low-educated and older workers. Conversely, for women, immigrants, workers with low literacy, involuntary part-time and temporary workers and employees in small firms, employers' supply seems to fall short of employees' demand, sometimes dramatically.

- The above findings suggest that public policy may have a role to play to improve individuals' and employers' incentives to invest in human capital. Appropriate policy

schemes may enhance efficiency – by tackling market failures – and increase equity. In order to do this it is important that policy schemes identify the appropriate channel, *i.e.* the choices and the behaviour of employers or employees. Moreover policy schemes should take into account the risk of inefficient substitution between formal and informal training and the links between adult training activities and the education system through which they had earlier passed.

● Co-financing strategies involving employers, including corporate tax deductions (*e.g.* as in Austria, Luxembourg and the Netherlands) and pay-back clauses, can help raise overall training provision. Insofar as low-educated and older workers are not disfavoured by employers, providing incentives to the latter may also boost the relative position of these groups.

● However, in order to reduce inequality of access for those groups which have a relatively high demand for training but nevertheless receive little employer-sponsored training (*e.g.* women, immigrants, temporary workers), raising individual incentives is likely to yield a better outcome than channelling co-financing through employers. This can be done through individual subsidy schemes, such as individual learning accounts (*e.g.* as in the United States) and/or provisions for training leave (*e.g.* as in Sweden) or part-time study (*e.g.* as in Australia).

● In any case, due to the heterogeneity of workers' needs, a comprehensive policy strategy is required in order to reduce both under-investment in training and inequality. However, due to the methodological complexity of *ex-post* assessment in this area, evaluation mechanisms should be included into policy design to ensure timely corrections of policy mistakes.

1. Continuous vocational training: a glance at the data

Vocational training accounts for two thirds of adult learning…

In almost all the OECD countries participating in the International Adult Literacy Survey (IALS),[1] CVT accounts for at least 60% of adult education and training,[2] with the only exception of Australia (Chart 5.1). Furthermore, on average, two-thirds of total CVT is employer-sponsored – that is provided or paid for by the employer, at least partially.

### *… but training participation and intensity vary considerably across countries…*

There is substantial cross-country variation in the incidence and intensity of employer-sponsored CVT courses. On average, 26% of employed persons participate in employer-sponsored CVT each year with an annual training volume of 18 hours per employed person, *i.e.* equivalent to two and a half working days (Table 5.1). These figures imply that each participant receives on average about 68 hours of training per year – that is slightly less than nine working days. The country with the highest CVT volume (as well as the highest participation rate) is Denmark where workers receive on average 36 hours per year of employer-sponsored CVT, which translates into 81 hours per participant per year or about two working weeks.

… and across groups

Despite the fact that the intensity of CVT is relatively low on average, CVT appears to have a key role in improving career prospects, in terms of better earning profiles and

Chart 5.1.   **CVT courses account for more than two thirds
of formal adult learning**

Decomposition of the volume^a of formal education and training$^{b,\,c}$
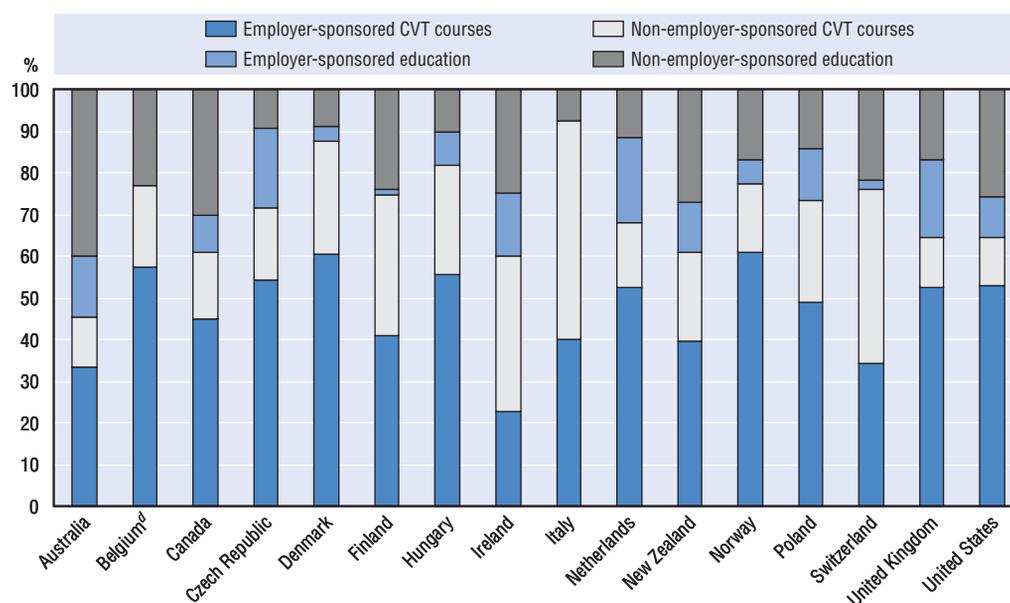
a) Hours spent in CVT courses undertaken for job or career-related purposes.
b) Data refer to employed persons aged 26 to 65 years.
c) Data refer to 1994 for Canada, Ireland, the Netherlands, Poland, Switzerland (German and French-speaking regions) and the United States, to 1996 for Australia, Belgium, New Zealand and the United Kingdom, and to 1998 for the Czech Republic, Denmark, Finland, Hungary, Italy, Norway and the Italian-speaking regions of Switzerland.
d) Flanders only.

Source: IALS.

employment security (Box 5.1). Therefore, if those already having greater earnings or employment security receive more training, CVT may increase inequalities between different worker groups. Chart 5.2 shows the incidence and volume of employer-sponsored CVT by gender and age. There does not appear to be any significant difference in participation rates by gender. Nevertheless there is a clear gender-training gap in terms of volume, with female workers receiving on average 17% fewer hours of training than male.

The incidence of training tends to decline with age. In particular, the average training participation rate of workers aged 56 to 65 years is about three-quarters of that of prime-age workers (aged 36 to 45 years). The participation profile is flatter at younger ages. However, the inverse correlation between age and training is more clear-cut when measured in terms of training volume. On average, workers aged 56 to 65 years receive 12 hours of CVT courses per year, against 18 hours for workers aged 36 to 45 years and 21 hours for workers aged 26 to 35 years.

Likewise, training participation and intensity differ considerably across educational and occupational groups (Chart 5.3). Participation in low-skilled occupations (13%) is about one-third of participation in high-skilled occupations (38%). A similar pattern is found between different educational groups (16% for workers with less than upper secondary education against 35% for those having a tertiary degree).

The worker's position in the hierarchical ladder has an impact on his/her training opportunities. Chart 5.3 also shows that employees with a high degree of supervisory

Table 5.1. **Cross-country variation of training outcomes is large**

Employer-sponsored education and training[a]

	Participation rate[b]			Annual volume (hours per employed person)		
	Total job-related education and training	*of which:*		Total job-related education and training	*of which:*	
		CVT[c] courses	Formal education		CVT[c] courses	Formal education
Australia	27	24	5	22	15	7
Belgium[d]	13	13	0	10	10	0
Canada	31	28	3	21	17	3
Czech Republic	20	16	5	18	13	5
Denmark	45	45	1	39	36	2
Finland	42	42	1	23	23	1
Hungary	15	14	2	15	13	2
Ireland	12	10	2	14	9	6
Italy	14	14	0	8	8	0
Netherlands	27	24	3	30	21	8
New Zealand	36	34	4	30	23	7
Norway	46	45	1	38	35	3
Poland	12	11	2	10	8	2
Switzerland	15	14	0	9	9	1
United Kingdom	45	44	3	30	22	8
United States	35	33	3	22	18	3
Unweighted average	**27**	**26**	**2**	**21**	**18**	**4**

a) Data refer to job-related education and training that employers provided (or partially paid) to their workers aged 26 to 65 years in 1994 for Canada, Ireland, the Netherlands, Poland, Switzerland (German and French-speaking regions) and the United States, in 1996 for Australia, Belgium (Flanders only), New Zealand and the United Kingdom, and in 1998 for the Czech Republic, Denmark, Finland, Hungary, Italy, Norway and the Italian-speaking regions of Switzerland.
b) Ratio of employed persons participating in training to total employment (in per cent).
c) Continuous vocational training.
d) Flanders only.
Source: IALS.

Box 5.1. **The impact of CVT on earnings and employment security**

Most studies find a positive and persistent effect of training on earnings (see *e.g.* Bishop, 1997; OECD, 1999b; Ok and Tergeist, 2003). However, the majority of them use only dichotomous explanatory variables (such as training participation dummies), making it difficult to assess precisely the impact on earnings of short training spells. Recent studies, however, use the volume of training as an explanatory variable and permit a sharper evaluation. For instance, Loewenstein and Spletzer (1999b) estimate for the United States that one week of employer-paid training of newly hired workers leads to 1.4 percentage point higher wage growth in the two years after hiring and that 17% of the average wage growth in the same period can be explained by CVT (whose average length in the sample is of about one and a half weeks per year). Similarly, Booth and Bryan (2002) estimate for the United Kingdom that one week of accredited formal training leads to about 1% greater wages at subsequent employers. The effect of CVT on employment security is less well established in the literature. Yet, certain analyses point to a greater probability of rapid re-employment in the case of involuntary job loss if the worker has previously received training (see Bishop, 1997; and Ok and Tergeist, 2003).

Chart 5.2. **Older workers and women receive less training**

Employer-sponsored CVT courses by gender and age[a, b]
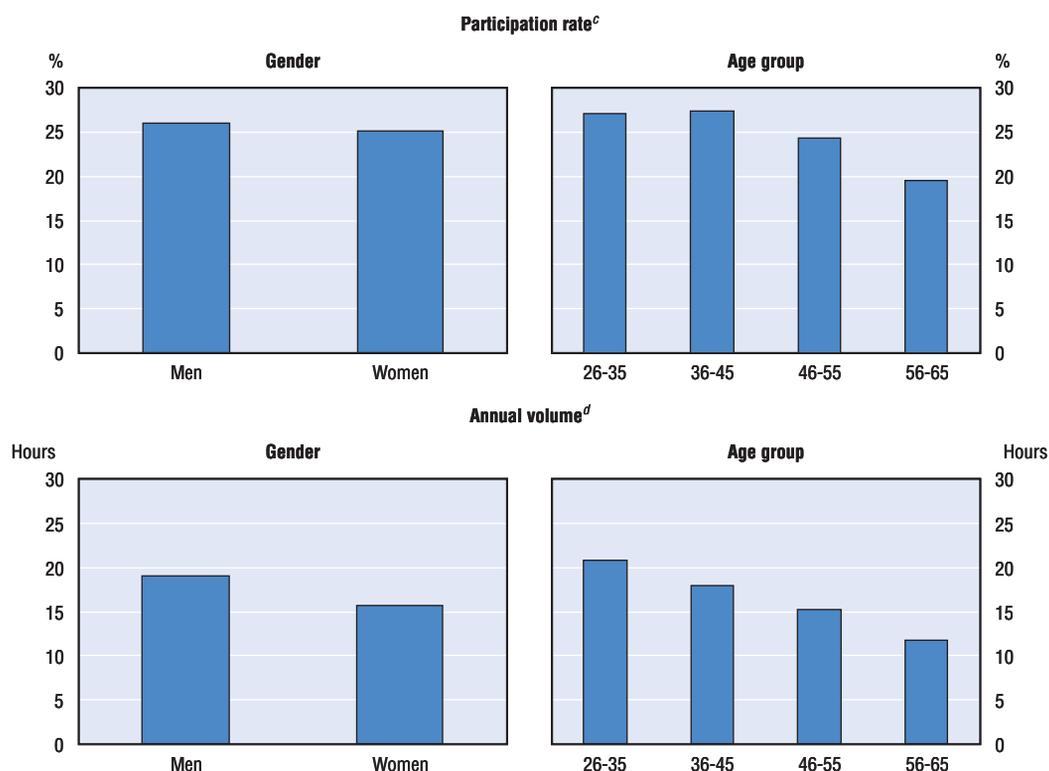
Participation rate[c]

Annual volume[d]

a) Data refer to employed persons aged 26 to 65 years.
b) Unweighted average of Australia, Belgium (Flanders only), Canada, the Czech Republic, Denmark, Finland, Hungary, Ireland, Italy, the Netherlands, New Zealand, Norway, Poland, Switzerland, the United Kingdom and the United States.
c) Ratio of employed persons participating in training to total employment (in per cent).
d) Volume of hours spent in CVT courses per employed person.
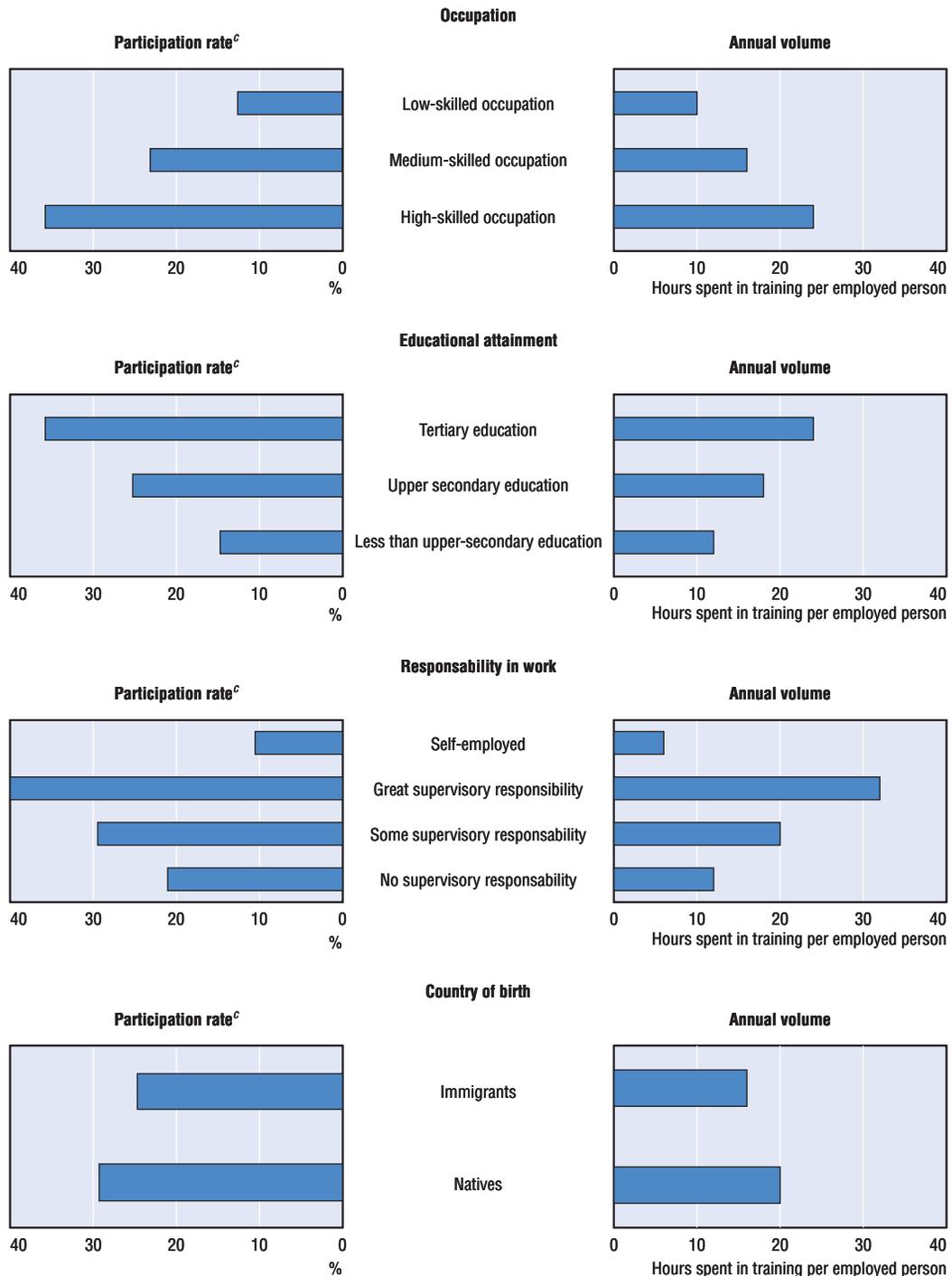
Source: IALS.

responsibility are twice as likely to participate in employer-sponsored training as are employees without any supervisory role. This pattern is more pronounced in terms of hours of training: on average, employees performing non-supervisory functions spend less than one-third as much time on training as employees with a strong supervisory role. Training incidence is also particularly low in the case of the self-employed.

Immigrants are somewhat less likely to participate in employer-sponsored CVT than natives, but the difference is not large (about 5 percentage points).[3] Immigrants also receive fewer hours of training on average (16 hours per employed person per year, *i.e.* about three hours less than their native peers). However, immigrants receive more employer-sponsored training than natives in Canada and Italy, as well as in the Netherlands (participation rates only) and Australia (training volume only).

Finally, data on training rates in large and small firms from the European Continuing Vocational Training Survey (CVTS) show that workers in small firms receive less employer-sponsored training than workers in large firms (Table 5.2).[4] Except in a few countries (*e.g.* Ireland and the United Kingdom), this gap is even greater when training is measured in volume terms: workers in large firms receive almost twice as many hours of employer-sponsored training as workers in small firms.

Chart 5.3.   **Native and skilled workers receive more training**

Employer-sponsored CVT courses by socio-economic characteristics[a, b]

Occupation

Participation rate[c]

Annual volume

Educational attainment

Participation rate[c]

Annual volume

Responsability in work

Participation rate[c]

Annual volume

Country of birth

Participation rate[c]

Annual volume

a) Data refer to employed persons aged 26 to 65 years.
b) Unweighted average of Australia, Belgium (Flanders only), Canada, the Czech Republic, Denmark, Finland, Hungary, Ireland, Italy, the Netherlands, New Zealand, Norway, Poland, Switzerland, the United Kingdom and the United States. Due to missing data, Belgium is excluded from "Occupation"; Australia, Denmark, Ireland, New Zealand and Norway are excluded from "Responsibility in work"; Belgium, the Czech Republic, Finland, Hungary and Poland are excluded from "Country of birth".
c) Ratio of employed persons participating in training to total employment (in per cent).
Source: IALS.

Table 5.2.   **Workers in small firms receive relatively little training**

Employer-sponsored CVT courses by firm size, 1999[a]

Number of employees in the firm	Participation rate[b]			Annual volume (hours per employee)		
	10-49	> 1 000	All[c]	10-49	> 1 000	All[c]
Austria	24	43	31	7	14	9
Belgium	20	66	41	7	21	13
Czech Republic	24	55	42	6	12	10
Denmark	48	56	53	18	24	22
Finland	38	62	50	16	20	18
France	23	62	46	8	25	17
Germany	25	38	32	6	10	9
Greece	3	33	15	1	12	6
Hungary	7	26	12	3	10	5
Ireland	28	52	41	13	14	17
Italy	11	52	26	4	16	8
Luxembourg	19	59	36	8	20	14
Netherlands	36	42	41	11	19	15
Norway	. .	. .	. .	12	22	16
Poland	8	46	16	3	11	4
Portugal	4	43	17	2	14	7
Spain	10	46	25	6	18	11
Sweden	51	68	61	15	22	18
United Kingdom	35	52	49	12	10	13
Unweighted average	**23**	**50**	**35**	**8**	**17**	**12**

CVT = Continuous vocational training.
a)   Initial vocational training is not included.
b)   Ratio of employees participating in training to total employees (in per cent).
c)   All firms with at least ten employees.
Source: CVTS2, New Cronos.

Bivariate correlations can however be misleading, to the extent that certain characteristics are correlated (for instance, occupation, education and supervisory role). In order to correct for such a bias, a multivariate analysis has been carried out. The resulting estimates (see Annex 1) seem to broadly confirm the qualitative patterns of training inequality discussed above. For example, the probability of receiving employer-sponsored training is estimated to be on average 6 percentage points smaller for immigrants than for natives, and 9 percentage points smaller for workers with less than upper secondary education than for individuals with a tertiary qualification. Furthermore, the gender training gap, in terms of training volume, remains significant even after controlling for part-time status. Finally, the overall conclusion remains that important differences in training participation and intensity exist between OECD countries, even after adjusting for a considerable number of characteristics of both workers and their employers.

2. Not enough and not equal? A closer look at the determinants of training patterns

The above section identifies patterns of unequal training provision across different worker groups. This section examines the source of the inequalities and assesses whether the observed patterns are optimal in terms of economic efficiency. More specifically, Section 2.A reviews the empirical evidence on the existence of various market failures

affecting training outcomes. However, although their impact may differ across worker groups, these market failures do not explain training gaps entirely. For instance, training provision might increase with educational attainment simply because it is more profitable for a firm to train high-educated workers or because high-educated workers are more eager to participate in training courses, due to greater rates of return. In general, it is important for policy to understand the source of training inequalities, and in particular, whether training gaps are due to either employers' or employees' behaviours. For this reason, Sections 2.B and 2.C examine how employers' supply and employees' demand vary across worker groups. Implications for policy-making are then derived in Section 3.

### A. Market failures affecting training outcomes

In order to understand the incentives of individual workers and employers to invest in human capital, it is important to make a distinction between firm-specific and general training:

● In principle, the optimal amount of investment in *firm-specific* human capital – *i.e.* those skills that are valuable only at the firm providing them – can be obtained only if costs and returns can be shared by the worker and the firm (Becker, 1975; Hashimoto, 1981). Sharing is required for two reasons: *i)* this investment creates rents to continuing a relationship, which the parties can bargain over; and *ii)* once training expenditures have been made, the firm incurs a greater loss if the worker quits. As a consequence, there is an incentive for the employer to increase post-training wages to prevent voluntary quits (see *e.g.* Parsons, 1986).

● By contrast, only the worker will pay for *general* training – that is training that raises productivity at other employers to the same extent as at the employer who provides it – under perfect competition in the labour market. This occurs because only the worker can reap the benefits from this type of training, since any alternative wage offer rises proportionately with his/her productivity. However, imperfections in other markets (*e.g.* the capital market) may prevent workers from choosing the optimal amount of human capital investment (Becker, 1975).

Most employer-paid training courses provide skills that are transferable across firms

Chart 5.4 shows that most CVT courses are entirely paid by employers. With the exception of three countries (Ireland, Italy and Switzerland) where about one-half of CVT courses are paid by employers, firms fully pay for more than 70% of CVT courses.[5] Does this mean that most of the recorded training is firm-specific? In fact, empirical evidence suggests that purely firm-specific skills are relatively rare (see *e.g.* Neal, 1995). Stevens (1994, 1999) argues that, in practice, most skills provided through training are likely to be neither fully general nor fully firm-specific and uses the term "transferable skills" for skills that are valuable at more than one firm but nonetheless are not valuable at all firms.

Few national surveys contain explicit information about the generality of skills provided through formal training. From those that do, it appears that most formal training is quite general and almost all is transferable.[6] Furthermore, it seems that off-site CVT courses (*i.e.* courses occurring outside the workplace) impart essentially general skills. By contrast, it is more difficult to establish the generality of workplace training (Loewenstein and Spletzer, 1999b). When the analysis is restricted to CVT fully paid by the employer, it emerges that only 35% of the formal courses take place at work (Chart 5.5). Even in the United Kingdom, the country for which the greatest share of workplace training is

Chart 5.4. **Most training is entirely paid by employers**

Percentage of CVT courses entirely paid by employers[a]
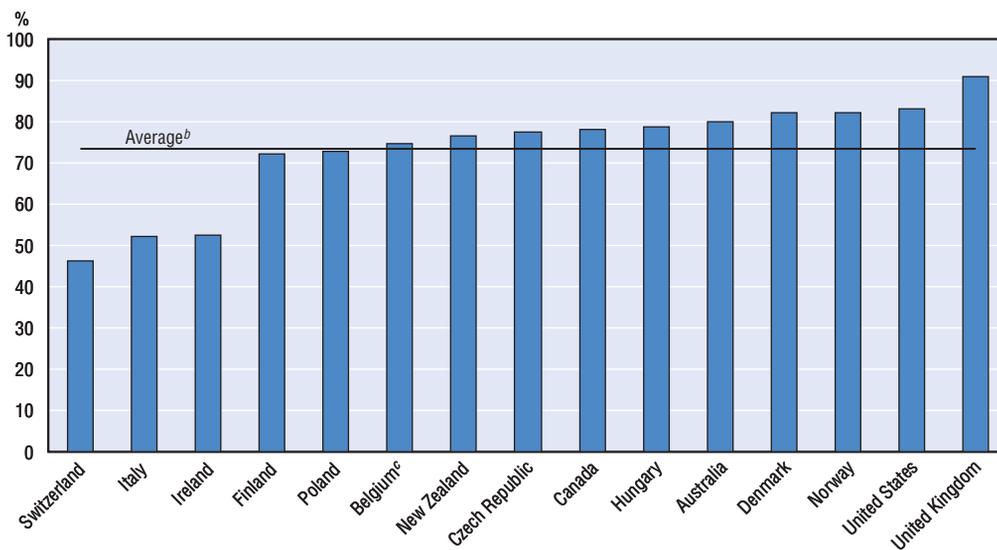
a) Data refer to all CVT courses (both employer-sponsored and non-employer-sponsored) received by employed persons aged 26 to 65 years and to 1994 for Canada, Ireland, Poland, Switzerland (German and French-speaking regions) and the United States, to 1996 for Australia, Belgium (Flanders only), New Zealand and the United Kingdom, and to 1998 for the Czech Republic, Denmark, Finland, Hungary, Italy, Norway and the Italian-speaking regions of Switzerland. Countries are ranked from left to right in ascending order.
b) Unweighted average of countries shown.
c) Flanders only.
Source: IALS.

Chart 5.5. **Employer-paid CVT less frequently imparts firm-specific skills**

Percentage of employer-paid CVT courses taking place at work[a]
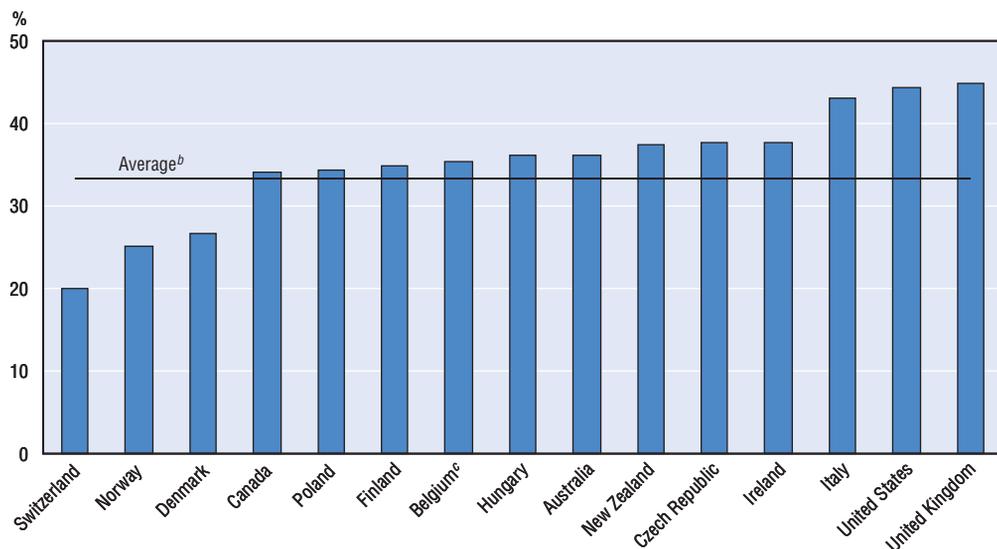
a) Data refer to CVT courses that are entirely employer-paid and provided to employed persons aged 26 to 65 years. Also, they refer to 1994 for Canada, Ireland, Poland, Switzerland (German and French-speaking regions) and the United States, to 1996 for Australia, Belgium (Flanders only), New Zealand and the United Kingdom, and to 1998 for the Czech Republic, Denmark, Finland, Hungary, Italy, Norway and the Italian-speaking regions of Switzerland. Countries are ranked from left to right in ascending order.
b) Unweighted average of countries shown.
c) Flanders only.
Source: IALS.

reported, more than 50% of reported training occurs outside the workplace. In other words, most of the employer-paid training reported in available cross-country data seems to be transferable. This finding runs counter to the theory whereby employers should not fully pay for courses that provide transferable skills.

Labour market imperfections explain why employers invest in transferable skills…

This inconsistency between theory and evidence suggests that, in fact, labour markets are not perfectly competitive. This would explain why firms have an incentive to pay for a significant share of training courses, which are in fact general or transferable. For example, if firms have some degree of monopsony power over their trained personnel, employers may be able to recoup training costs by paying a trained worker less than his/her post-training marginal product, while still retaining the worker (see *e.g.* Acemoglu and Pischke, 1999a; Stevens, 1999). Stevens (1994, 2001) argues that these conditions are particularly likely to prevail for skills that cannot be useful at many other employers. But this also applies in the case of fully general training in the presence of a wide range of imperfections such as asymmetric information and lack of certification (or lack of recognition of qualifications), frictions and search costs, wage-bargaining institutions, adverse selection affecting quits and lay-offs, or complementarity with specific investments (Acemoglu and Pischke, 1999b).

… but these imperfections may also reduce training participation

Imperfect competition in the labour market is likely to result in under-provision of training. Employers' monopsony power, by compressing the wage distribution, creates the conditions under which a significant share of general training costs is borne by the firm – since, under these conditions, firms are more able to reap the benefits of training. But under-investment is nevertheless likely to occur, because current employers cannot internalise the benefits from training that will accrue to future employers.[7]

Labour market imperfections, such as those described above, also reduce workers' incentives to invest in general training. In particular, if pay scales do not reflect marginal productivity, workers cannot fully reap the benefits from general training and, therefore, are not able to internalise its lifetime benefits (in contrast with what they could do under perfect competition; Becker, 1975).

Empirical evidence shows that under-provision is likely to occur in all OECD countries. For example, Barron *et al.* (1999a) estimate that, in the United States, productivity gains after training are seven times larger than wage increases, suggesting that firms reap most of the returns from training. Furthermore, Loewenstein and Spletzer (1998, 1999b) find that general training received at previous employers, at least if certified, has a greater effect on wages than training provided by the current employer, who can exploit its market power to recoup the costs of training – at least partially. From a longer term perspective, Lengermann (1999) finds that the effect of general training received at current employers increases over time. Empirical studies for a number of European countries have obtained similar results (see *e.g.* Booth and Bryan, 2002; Ok and Tergeist, 2003; and Fougère *et al.,* 2001).

Other market failures also affect training outcomes (see Box 5.2). Combined with labour market imperfections, capital and training market failures might reduce disproportionately the training opportunities for low-educated workers. In fact, recent empirical studies suggest that credit constraints may create a barrier to training for

Box 5.2. **Non-labour market sources of market failures: theoretical aspects**

There are several sources of non-labour market failures that may affect training outcomes. The most frequently considered in the literature on general training are:

Training market imperfections: First, workers and employers may lack information on teaching quality and be unable to distinguish between different providers of educational services. Second, and perhaps more importantly, training might not be fully contractible: while the amount of training can be written down in a contract, its type and quality are less likely to be specified in a manner that is verifiable by third parties such as tribunals (Malcomson, 1997, 1999; Gibbons and Waldman, 1999). This may induce both the employee and the employer to behave non-co-operatively and invest in training separately without bargaining, leading to sub-optimal outcomes (Acemoglu and Pischke, 1999a). The non-contractibility of training might also exacerbate possible conflicts between employers and employees – the former preferring providing specific training and the latter receiving general skills that can be re-sold in the labour market (Stevens, 1994; Barron *et al.,* 1999b).

Capital market imperfections: Unlike physical capital, human capital cannot be used as collateral for borrowing (Becker, 1975). Moreover, individual human capital investment is often indivisible so that the risk associated to it cannot be diversified. Furthermore this risk can be insured only partially, if at all: in practice, private insurance markets are unlikely to work in a proper way, due to the unobservability of the trainee's effort and the size of human capital investments (the level of individual liability required to avoid adverse selection would be too high, see *e.g.* Stevens, 1999). The employer can partially relax the employee's credit constraint to the extent that the employee accepts a lower wage during the training period. However, in order to smooth consumption over time the employee may not accept large wage cuts and there is a limit to the extent to which small firms can borrow to finance training expenditures using physical capital as collateral.

Co-ordination failures: When returns to training are interdependent, both employers and workers may decide not to invest if each side expects low returns. A bad co-ordination equilibrium may therefore arise, leading to sub-optimal investment in training (Redding, 1996). The same argument can be applied to specialisation in high-tech industries. Workers and firms in low-tech industries have little incentive to invest in further training since the "upskilled" worker would not perform an "upskilled" activity in the same firm and industry, while opportunities for the worker in other (high-tech) industries are small if the share of the latter in national output is small (Crouch *et al.,* 1999).

low-educated (low-income/low-wealth) workers or, alternatively, that these workers find it difficult to negotiate with their employers about the content and quality of training programmes.[8] In such a situation, co-financing policies that increase incentives for firms to invest in training (such as corporate tax deductions, see Section 3) are likely to have a positive impact also on the amount of training received by low-educated workers.

B. Disentangling employers' supply from employees' demand

The findings of Section 2.A suggest that market failures might have an impact on the level of training. Some evidence also suggests that these imperfections might lie behind training inequalities, although the magnitude of their impact has not been established yet. Beyond market failures, training outcomes will depend on the extent to which employers and employees will have an incentive to invest in human capital. From the point of view of

policy making it is essential to understand whether possible under-investment and inequalities are mainly due to either employers' or employees' behaviour, and this is the task of this section.

The market for CVT can be broken into *two sub-markets*: an upstream market, in which employers buy training services from a training provider; and a downstream market, in which employers re-sell these training services to their employees, with the price for training hidden in wages.[9] In the downstream training market, one can in principle distinguish between supply (by the employer) and demand (by the employee). Training outcomes represent the resulting equilibrium between supply and demand.

While the amount of employer-sponsored training supplied by employers and demanded by workers at the equilibrium price in the downstream market can be observed, demand and supply curves cannot. However, the IALS contains information on CVT courses that workers would have liked to have taken but could not because they could not afford (or did not want) to pay for the implicit or explicit price required. This information is used in this section to identify supply and demand factors underlying equilibrium outcomes (see Annex 2).[10] For different groups of workers, Table 5.3 shows relative patterns of demand (by employees) and supply (by employers), derived from the estimation of bivariate probit models of the probability of demanding training at zero cost for the employee and receiving employer-sponsored training in equilibrium.[11]

Women and immigrants are less likely to be included in employer-paid training.

Female workers have greater demand but lower supply than their male peers. Supply is also smaller for immigrants with respect to natives. These results possibly reflect lower expected benefits – in the case of women, due to career breaks, maternity leave, etc. – or higher expected costs – in the case of immigrants, due to the need of providing complementary language courses – for the employer.

Older workers and the low-educated have low demand for training…

Training supply for young workers (aged 16 to 25 years) appears to be smaller than that of prime-age employees, while the opposite occurs for older workers who, by contrast, have a lower demand for training.[12] Age might in part capture the effect of tenure, for which there are insufficient controls in the equation due to data limitations. However, the result for older workers might reflect possible differences in pay-back periods between employers and employees.[13] In equilibrium, pay-back periods for general training are likely to be longer for the employee than for the employer.[14] As a consequence, the age above which it is no longer profitable to pay for training (because the pay-back period is longer than the remaining number of years before retirement) is likely to be lower for the employee than for his/her employer.

Demand for training is estimated to be greater the higher the level of educational attainment, but this is not the case for supply.[15] These results might arise because of non-economic factors affecting demand (such as access to information, motivational aspects, and lack of appropriate pedagogy; see OECD, 2003a) or as a result of employers' monopsony power, credit constraints and training market imperfections – *e.g.* imperfect information or contractibility – that appear to be greater the lower the level of educational attainment (see Section 2.A).

Table 5.3.   **Training supply and demand vary across firms and individuals**
Estimated changes in the demand and supply of training associated with each factor[a]

	Demand	Supply
Gender		
(reference: men)		
Women	+	–
Country of birth		
(reference: born in country of interview)		
Immigrants	0	–
Age groups		
(reference: aged 36-45)		
Aged 16-25	0	–
Aged 26-35	0	0
Aged 46-55	–	+
Aged 56-65	–	+
Educational attainment		
(reference: upper secondary)		
Less than upper secondary	–	0(?)
Tertiary	+	0(?)
Literacy		
(reference: average literacy score)		
Greater literacy score	0	+
Part-time		
(reference: full-time)		
Family and health problems	0	–
Still in education	–	–
Voluntary part-time for other reasons	–	?
Involuntary part-time	+	–
Temporary contract		
(reference: permanent)		
Temporary contract	+	–
Occupation		
(reference: clerks)		
Managers	0	+
Professionals	+	?
Technicians and associate professionals	+	?
Service workers and shop and market sales workers	0	–
Craft and related trades workers	0	–
Plant and machine operators and assemblers	0	–
Elementary occupations	–	–
Supervisory role		
(reference: some supervisory role)		
No supervisory	–	?
Great supervisory	0	+
Firm size		
(reference: 100 to 199 employees)		
20 to 99 employees	0	–
200 to 499 employees	0	+
500 and more employees	0	+

a) Estimated shift in the demand and supply of training with respect to the reference individual, who is indicated in the table. Estimates are obtained subject to the assumption that, by threatening lay-offs and/or offering monetary compensation, an employer can always convince a worker to be trained. +, – and 0 mean that, with respect to the reference individual, a given characteristic is estimated to increase demand (supply), reduce demand (supply), leave demand (supply) unchanged. The sign ? implies that nothing can be said on the supply shift. See Annex 1 for detailed estimation results and Annex 2 for the description of the estimation method.

Source: OECD estimates based on IALS.

… while training supply by firms is affected by workers' basic competencies.

Demand and supply of training are likely to be influenced by individual histories preceding current job experience and entry in the labour market. These histories are not fully captured by educational attainment. For instance, literacy scores of those participating in employer-sponsored training are greater than those of non-participants at any level of education (Chart 5.6). The average literacy score of participants is 4% greater for

Chart 5.6. **Workers with better literacy skills receive more training**

Average IALS literacy scores, by participation in employer-sponsored CVT and educational attainment[a, b]
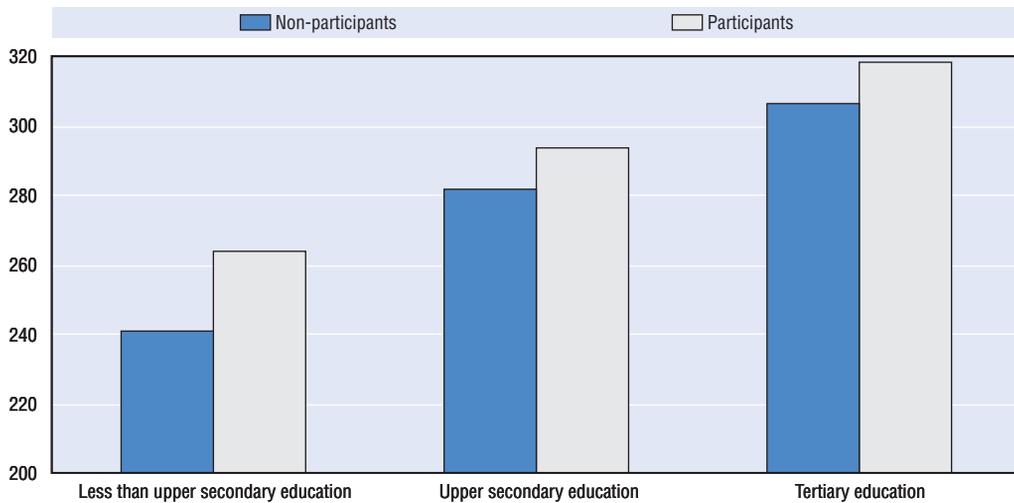
a) Data refer to employed persons aged 26 to 65 years.
b) Unweighted average of Australia, Belgium (Flanders only), Canada, the Czech Republic, Denmark, Finland, Hungary, Ireland, Italy, the Netherlands, New Zealand, Norway, Poland, Switzerland, the United Kingdom and the United States. The literacy levels are calculated as an average over the three types of literacy skills reported in the IALS, namely prose, documentation and quantitative skills.

Source: IALS.

workers with a tertiary qualification and 9% greater in the case of those with less than upper secondary education. Although the direction of causality is not clear-cut, there is some evidence that most literacy skills are developed by individuals at relatively young ages, typically before joining the labour market,[16] and that subsequent education or CVT spells do not modify the level of literacy in a significant way. Thus, Chart 5.6 suggests a causal relationship between literacy and training participation.

Instrumental variable (IV) techniques have to be used to confirm this statement.[17] The derived effect of literacy on training supply and demand based on IV estimates is shown in Table 5.3 (detailed estimation results are presented in Table 5.A1.3 in Annex 1). The table shows that, while training demand is not significantly affected by literacy, training supply is increasing with the level of literacy, suggesting that employers believe that learning ability increases (and therefore training costs decrease) with basic general skills, including literacy.

There are few employer-paid training opportunities for most part-time and temporary workers…

There is some evidence in the literature that in many OECD countries the incidence of employer-sponsored training is lower for part-time (Leuven and Oosterbeek, 1999) and

—

temporary workers (OECD, 2002a). As shown in Table 5.3, with respect to full-time employees, there is strong evidence that training supply for involuntary part-time workers is much lower than for full-time workers, while demand is not significantly lower. The same applies to workers with temporary contracts compared to those with permanent contracts. Statistical discrimination, tenure effects and higher probability of quitting (voluntarily) can plausibly explain these findings. Similarly, employees working part-time for family or health reasons tend to be confronted with lower supply than full-time workers, although estimates are not always significant.[18]

… as well as for workers in low-skilled occupations or tasks…

The estimates also indicate that the type of occupation has little influence on the demand for training, while supply is estimated to increase with the degree of skill-intensity (see also Table 5.A1.2). Similarly, training supply is unambiguously greater for individuals with a great supervisory role compared with individuals with some or no supervisory responsibility, while demand is not significantly different. These findings may suggest that employers tend to sort more able employees into better career and training opportunities simultaneously.

… and in small firms

Finally, training supply is estimated to be increasing with firm size while training demand is not. This pattern is consistent with the hypothesis that larger internal labour markets present greater opportunities to reap the benefits from training through internal promotion or re-assignment of trained workers. Large firms may also have lower unit costs of training and greater access to credit and information.

C. The impact of workers' opportunity costs on training participation

There are two reasons why the amount of training employers pay for or provide at the equilibrium and the amount of training workers' demand at zero cost may differ. First, the employer might not have been ready to share the cost of a given training course, but the worker might have borne all the direct and opportunity costs – such as foregone income and time. In this case, in the IALS questionnaire, this worker will report having participated in non-employer-sponsored training. Second, for a given desired training course, the worker may perceive either the direct or the opportunity costs involved as being excessively high. In this case, it can be expected that the worker will report that there is additional training he/she would have liked to take but could not. On average, in the OECD countries participating in the IALS, about one-fourth of employed workers did not take all the training they wanted (Table 5.4). In all countries except Finland, this condition is more frequent in the case of workers who participated in training than for non-participants (31.5% *versus* 23%). Amongst training participants, on average, almost 37% of workers who did not receive support from their employer would have liked to receive more training.

Lack of time is a serious obstacle to training participation…

The relative importance of different cost items on the gap between potential demand and actual equilibrium might have a bearing on the effectiveness of possible policy measures. For example, policy schemes allowing only relaxation of financial constraints (such as loan schemes or individual subsidies) will not help much when time-related

Table 5.4. **A quarter of all workers would like to take more training**

Percentage of workers reporting that they wanted to take further training, but did not[a]

| | All | Not trained[b] | Trained[c] | | |
| | | | | Of which: | |
			All trained	Not employer-sponsored	Employer-sponsored
Australia	26.9	25.2	31.2	34.5	30.3
Belgium[d]	19.2	17.2	30.8	38.9	28.9
Canada	33.6	30.2	41.4	64.3	37.4
Czech Republic	15.4	14.7	19.1	26.1	18.5
Denmark	33.3	31.1	35.4	39.1	34.6
Finland	38.1	38.9	37.2	38.6	37.0
Hungary	15.4	14.5	20.0	24.9	18.7
Ireland	19.2	17.5	29.0	29.2	29.0
Italy	24.1	21.1	34.0	36.4	32.2
Netherlands	22.5	21.7	24.6	23.9	24.7
New Zealand	33.0	28.2	40.3	48.6	38.5
Norway	34.4	29.4	39.9	30.6	41.0
Poland	16.0	14.6	25.5	36.8	22.8
Switzerland	27.2	26.6	29.7	25.3	31.4
United Kingdom	25.4	20.1	31.2	47.1	29.3
United States	26.1	21.9	34.6	43.1	33.6
Unweighted average	**25.6**	**23.3**	**31.5**	**36.7**	**30.5**

a) Data refer to employed persons aged 26 to 65 years, and to 1994 for Canada, Ireland, the Netherlands, Poland, Switzerland (German and French-speaking regions) and the United States, to 1996 for Australia, Belgium (Flanders only), New Zealand and the United Kingdom, and to 1998 for the Czech Republic, Denmark, Finland, Hungary, Italy, Norway and the Italian-speaking regions of Switzerland.
b) Employed persons who did not receive training for professional or career-related purposes.
c) Employed persons who received training for professional or career-related purposes.
d) Flanders only.

Source: IALS.

opportunity costs are the main obstacle to training participation. In the latter case, more effective policy instruments might be provisions for training leaves, part-time study or time accounts (see Section 3). As shown in Chart 5.7, around 15% of trained workers and 10% of non-trained workers claim that they could not take the desired additional training due to lack of time. Furthermore, a significant number of workers declare that they could not take all the training they wanted either because they were too busy at work, because the time schedule was inappropriate or because of family responsibilities. Since multiple answers are allowed in the survey, these figures are not additive. Nevertheless, taking multiple answers into account, time is an issue for more than 60% of the workers who could not take the training they wanted.

… but financial factors play a role for the low-skilled

Though less important than time-related costs, many employees also report that they could not afford or did not want to pay for the full cost of the training courses they wanted to take (about 7% of trained workers and 5% of non-trained workers).[19]

The incidence of each constraint varies significantly across groups. In particular, the probability of reporting financial reasons is 4 percentage points lower for managers than for clerical workers, while it is 7 percentage points higher for workers in elementary occupations (Chart 5.8). Conversely, among workers who did not take all the training they

Chart 5.7. **Time is the most frequently reported reason for which training costs may be too high for the workers**

Percentage of workers who could not take the additional course they wanted, by reason[a, b]

Trained[c]

Not trained[d]

- Too busy/lack of time
- Too busy at work
- Course not offered
- Family responsibility
- Too expensive/no money
- Lack of qualification
- Lack of employer support
- Course offered at inconvenient time
- Language reasons
- Health
- Other

a) Employed persons aged 26 to 65 years.
b) Unweighted average of Australia, Belgium (Flanders only), Canada, the Czech Republic, Denmark, Finland, Hungary, Ireland, Italy, the Netherlands, New Zealand, Norway, Poland, Switzerland, the United Kingdom and the United States.
c) Individuals who received training for professional or career-related purposes.
d) Individuals who did not receive training for professional or career-related purposes.
*Source:* IALS.

wanted, the probability of being "time-constrained" is estimated to be, *ceteris paribus*, 9 percentage points greater for managers and 10 percentage points lower for workers in elementary occupations than for clerks. In other words, policy measures affecting direct costs (*e.g.* individual subsidies) may increase training participation of workers in low-skilled occupations even when they do not increase workers' time availability (*i.e.* even in the absence of schemes such as time accounts or training leave).

Family responsibilities are important constraints for women

Amongst those women working full-time who did not take all the training they wanted, the estimated probability of reporting either financial reasons or family responsibilities is 7 and 8 percentage points higher, respectively, than for men (Chart 5.8). This might be explained by two factors. On the one hand, women are less likely to be offered employer-sponsored training (see Section 2.B) and earn on average less than men – so that they might find training courses less affordable. On the other hand, women are less likely to exploit training opportunities available outside normal working hours, since these would make them stay away from home for even longer hours. The same argument applies to individuals working part-time because of health or family reasons. In particular, amongst women working part-time who did not take all the training they wanted, the estimated probabilities of reporting financial reasons or family constraints are 13 and 31 percentage points higher, respectively, than in the case of men working full-time.

Chart 5.8. **Cost factors vary across worker groups**

Probability of reporting a specific reason for not taking the desired additional course, conditional to reporting at least one reason[a]

Managers versus elementary occupations
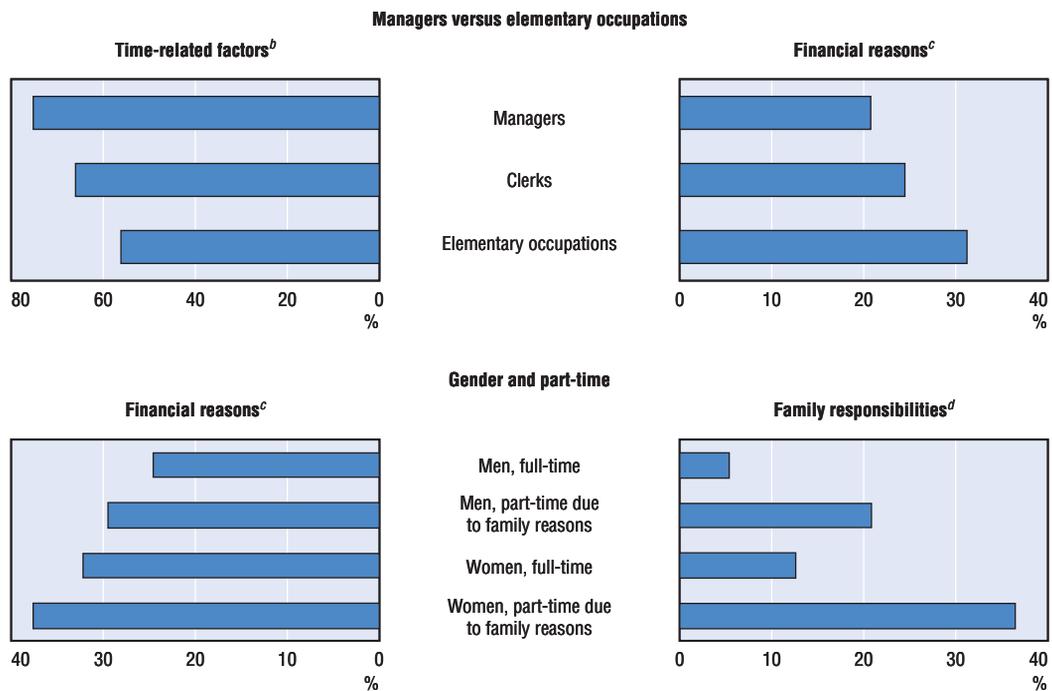
a) Estimated on the basis of a probit model, in which the dependent variable takes value 1 if the individual reported a given specific reason and 0 otherwise. The sample refers to employed persons who reported at least one reason of firms with more than 20 employees, with at least some education, aged 16 to 65 years and not working in the agricultural sector. All equations include dummies for gender, educational attainment, age classes, community size, part-time status, country of birth, number of employers (last 12 months), firm size classes, industries, occupations and countries, and are estimated only for those countries where sample size is greater than 200 observations (Australia, Canada, Denmark, Finland, Italy, New Zealand, Norway, Switzerland, the United Kingdom and the United States).

b) Too busy/lack of time, too busy at work, family responsibilities, and course offered at inconvenient time were reported as reasons for not taking the desired additional training.

c) Course too expensive/no money was reported as reason for not taking the desired additional training.

d) Family responsibilities were reported as reasons for not taking the desired additional training.

Source: OECD estimates based on IALS.

3. Policy approaches to improve training outcomes

As shown above, training opportunities are unevenly distributed across workers, and there is some evidence that the incidence of formal training falls short of socially desirable levels. Factors that affect the costs and benefits of CVT appear to contribute to both uneven distribution and under-investment in formal training. The purpose of this section is *i)* to shed light on how policy can address some of the factors behind training inequalities and under-provision, and *ii)* to document policy initiatives in this area.

A. *From diagnosis to remedies*

Section 2 has identified several sources of market failures (including labour, capital and training market imperfections) leading to under-investment in formal training, although more research is needed to quantify the impact of these failures on observed

outcomes. Furthermore, it has decomposed the downstream training market in order to trace the extent to which differences in the provision of employer-sponsored training across groups of workers are due to demand (by employees) or supply (by employers). The empirical results suggest that employers are less likely to include women, immigrants, young employees, involuntary part-time and temporary workers, workers in low-skilled occupations and workers with low literacy, when selecting which employees to train (Table 5.5). By contrast, lower demand appears to account for lower training participation

Table 5.5. **From evidence to policy**

Co-financing policy options likely to raise training participation of specific groups

Disadvantaged group	Main barrier to training[a]		Co-financing schemes
Older workers, low-educated workers	Weak demand with equal or higher employers' supply		– Incentives for employers (corporate tax deductions, pay-back clauses)
			– Low-educated/low income workers only: fostering demand by relaxing individual credit constraints (loan schemes, ILAs, pay-back clauses)
Women, immigrants, workers with low literacy, involuntary part-time workers, temporary workers, non-supervisory workers	Low employers' supply with equal or higher demand	Low supply due to individual characteristics	– Relaxing individual credit constraints (loan schemes, ILAs, pay-back clauses)
			– Relaxing individual time constraints (time accounts, training leave)
			– Improving cost-sharing (pay-back clauses)
Workers in small firms, workers in low-tech industries and/or industries with many firms		Low supply due to firm characteristics	– Relaxing individual credit constraints (loan schemes, ILAs, pay-back clauses)
			– Incentives for employers (targeted tax deductions, pay-back clauses)
Low literacy workers with low qualifications	Low demand and low employers' supply		– "Empowering" schemes (ILAs)

ILA: Individual learning accounts.

a) Barriers to training refer to the main reasons for the weak participation in employer-sponsored training of a particular worker group relative to the reference group, namely native, high-skilled, full-time, prime-age male employees in large high-tech firms.

Source: OECD estimates based on IALS.

of older and less educated workers. In the case of older workers, labour market imperfections affecting the distribution of training benefits and the length of employers' and employees' pay-back periods are perhaps behind this pattern. In the case of less educated workers, credit constraints and/or training market imperfections – due to lack of training information and contractibility between employers and employees – might partially explain this finding. However, non-economic factors, such as lack of motivation or bad pedagogical experiences, must also be taken into account. Finally, demand does not appear to vary with firm size. However, supply rises with firm size, perhaps due to lower unit costs of training, larger benefits, and greater access to credit and information for large firms.

Policies must address the causes of training inequalities as well as under-investment

Insofar as market failures are responsible for training inequalitites, a first-best approach would be to overcome them through structural reforms. However, some of these failures are due to "natural" imperfections of certain markets[20] and effective reforms to overcome them have not been proposed yet. Furthermore, other imperfections are induced by institutions and policies that do not concern primarily training outcomes (*e.g.* those affecting the wedge between wages and productivity such as minimum wages;

see Acemoglu and Pischke, 2003), whose reform cannot be undertaken without a careful evaluation of other relevant trade-offs. A second-best approach is to increase the economic incentives to invest in education and training, through fiscal policy and institutional arrangements favouring cost-sharing among private parties. This second-best approach can also target disadvantaged groups more easily, given that training gaps are due to market failures only partially (as discussed in Section 2.B). However, policy design is crucial, since some of the identified sources of market failure (*e.g.* lack of contractibility of training quality) can equally lead to policy failures, with the risk of large deadweight losses and heavy burdens for the public budget.

This section reviews the experience of OECD member countries with various second-best approaches to surmount financial and economic barriers to the provision of and participation in adult education and training. However, great care must be exerted when drawing general conclusions from this type of exercise for three reasons. First, in most cases, public policies focus on formal education and training. This entails a risk of inefficient substitution between formal and informal training. This risk must be taken into account in the case of policies affecting employers' incentives to provide formal training, to the extent that informal training is more likely to be employer-paid, since it imparts competencies that are less easily signalled to the external labour market (making informal training, *de facto*, firm-specific, see Acemoglu and Pischke, 1999b; and Barron *et al.,* 1999b). Second, policies are discussed here in a partial equilibrium framework – that is, without considering the effect of the distortions induced by fund-raising schemes required to finance training policies. Third, and perhaps more importantly, the analysis is essentially based on deductive arguments derived from the empirical results of the previous sections. In fact, there are only few empirical evaluations of existing schemes and, with few exceptions, those available are limited to descriptive statistics and do not build up counterfactuals against which a rigorous assessment could be made. The lack of evaluations can partly be ascribed to the novelty of the policy initiatives. However, in principle, well-designed policies should include evaluation mechanisms in their design to ensure timely corrections of policy mistakes.[21] For these reasons, it is only possible to discuss the problem each specific policy can try to address and, to a limited extent, whether it has been implemented in a consistent way. But, at this stage, it is not possible to make a more general assessment of whether each intervention has been excessive, insufficient or just right *vis-à-vis* the target.

Co-financing arrangements lie at the heart of a comprehensive strategy to foster training

Since the 1960s, policies were formulated to address, first and foremost, perceived rigidities on the supply side that interfered with adult education. The underlying assumption was one of substantial economic and social demand for adults to return to formal education. Thus, the objective of *recurrent education* was to improve learning opportunities for individuals by enhancing the capacity of the formal education sector to accommodate those wishing to return to education. However, recurrent education never emerged as an enduring widespread practice, in part because its associated costs were never adequately funded.

More recently, greater emphasis has been devoted to the demand-side. This new emphasis has entailed a shift in the target of public policy from providers and systems geared to provision of education and training with relatively homogeneous content to the

demand of individuals and employers for more heterogeneous learning outcomes. In other words, in contrast to children in initial education, learning objectives of individual adults are ever-changing and very heterogeneous so that such needs can best be met through a more differentiated arrangement of providers and courses than the delivery mode characterising initial education. As a consequence, policy strategies to increase human capital accumulation of adults have shifted from direct subsidisation of external (public or private) providers of training services to co-financing schemes intended to increase incentives for employers and/or individuals to invest in more specific education and training. The shift towards this policy approach is based on three general principles:

● in most societies, because of budget constraints, public authorities alone cannot provide the necessary financial resources for lifelong learning;

● as lifelong learning generates considerable private returns, employers and employees should finance most of its costs; and

● greater reliance on market forces could strengthen the incentives both for learners to seek more efficient learning options and for providers to achieve higher levels of efficiency.

Co-financing mechanisms – *i.e.* schemes that channel resources from at least two parties among employers, employees and governments – can be designed so as to increase incentives to invest in human capital for employers, for individuals or for both.

Since the primary reason for which employers may invest in training less than the socially optimal amount is that current employers cannot internalise benefits from training that will accrue to future employers (as discussed in Section 2.A), *tax arrangements* or *grant schemes* for enterprises can be used to tackle aggregate under-investment. By modifying the marginal cost of training, these schemes may raise employers' supply towards the socially optimal level. These schemes can also be complemented by policies favouring cost-sharing between employers and employees, such as regulatory provisions for *pay-back clauses* and *time accounts*, to the extent that training market imperfections are not too strong. In fact, cost-sharing is unlikely to occur if the content and quality of training are not contractible (see Box 5.2). Moreover, transparent accounting and disclosure practices can have an important role in channelling resources from the stock market towards training firms, thereby increasing their incentives to train (OECD and Ernst & Young, 1997).

It can be inferred from the analysis of Section 2 that co-financing incentives directed to employers (such as tax arrangements and grant schemes) might help to foster training participation of prime-age skilled men and of those with little demand, whose training is nonetheless profitable for firms, such as older workers and the low educated (see Table 5.5).[22] For the same reason, this kind of policies is also likely to benefit workers in large firms, high-tech industries and industries where the number of competitors is relatively small. If targeted, these policies might improve the position also of other groups, particularly workers in small firms, but the risk of inefficient substitution between targeted and untargeted workers is high.

For workers who have less frequent opportunities to receive employer-sponsored training – namely women, immigrants, involuntary part-time and temporary workers, workers in small firms, in low-skilled occupations, in low-tech industries and/or workers with low literacy within each educational attainment class – it is likely to be difficult to target policies focussing on employers' incentives in an efficient way (Table 5.5). Individual-based demand-side policies (such as *loan* and *subsidy schemes*), by relaxing

individual borrowing constraints and increasing expected rates of return, can thus play a role. Furthermore, some of these policies (*e.g.* subsidy schemes such as *individual learning accounts*) address both economic and non-economic barriers to adult learning. However, they require information that workers often do not have. In addition, portability of skills must be assured, particularly in the case of CVT not delivering formal diplomas. As a consequence, financial incentives must be accompanied by adequate framework conditions. Even in this case it might be difficult to target with precision certain workers (such as workers with poor literacy skills among the group of low-educated workers). Strengthening delivery of initial education emerges therefore as a necessary complementary policy instrument (see OECD, 2002b).

On the basis of OECD member countries' experience, the next two subsections describe co-financing strategies to overcome the economic and financial barriers to invest in adult learning as well as framework conditions necessary to make these strategies effective. With few exceptions (for example in the case of issues of "portability" and "signalling" of skills), most of the co-financing schemes and framework conditions that are discussed therein concern both adult education and CVT.

B. Strategies for addressing economic and financial barriers

Tax arrangements for enterprises

Tax-based schemes have the advantage of building on existing institutional arrangements for taxation, allowing them to be generally and immediately applied with limited implementation costs; for the same reason they have the disadvantage of being difficult to target precisely. When these schemes are targeted, they may induce inefficient substitution across groups (see below). In fact, tax-based schemes typically leave total freedom to choose training content and participants to firms, and must be seen mainly as instruments to reduce aggregate under-provision.

"Train or pay" schemes, which establish training levies to be paid by employers who do not train, are a route to tackling free-riding and under-provision that was popular in the 1970s. France first adopted this approach with the *Loi du 16 juillet 1971*, which introduced a minimum training expenditure and required that each firm pays as a levy an amount equal to the difference between this legal minimum and its actual training expenditure. The law initially required employers to invest an amount equal to 0.8% of total payroll. That requirement has risen gradually to 1.5% in recent years, being even higher for temporary work agencies and workers with fixed-term contracts. A number of other countries including Australia, the Quebec province of Canada, Korea and the United Kingdom adopted similar provisions in subsequent years, but abandoned them later. Today, only Quebec is still following the French model.

Up to the legal minimum, train-or-pay schemes confront employers with a financially neutral choice between training (and not paying the tax), or not training (and paying the tax). Strictly speaking firms receive no automatic subsidy since grants are not necessarily awarded (grant schemes are discussed separately, below). "Train or pay" levies, however, are equivalent to schemes where there is an additional tax of a given percentage of payroll independent of training expenditures and a 100% subsidy of training expenditures up to that percentage of payroll. For this reason, dead-weight is large in the case of employers that would have spent more than the legal minimum anyway.[23] Moreover, the scheme is likely to be quite burdensome for those companies for which returns to training are small[24]

and/or might induce them to target expenditure with little attention to quality and effective needs. Finally, to the extent that payroll taxes can be shifted onto wages, training levies based on payroll act more as a device to reduce under-investment by employees due to credit market imperfections than as a policy instrument to reduce under-investment by employers, at least insofar as transferable training is concerned. In fact, if payroll taxes can be shifted onto wages, the training levy induces an implicit transfer from workers who do not receive training to those who do, but leaves incentives for employers unchanged (except that they can choose the recipients of the transfer, that is the workers to be trained). Conversely, tax incentives targeting profits are likely to be more effective to address under-provision of employer-sponsored training caused by externalities due to labour market imperfections (Stevens, 2001).

Public authorities in certain countries – including Austria (in 2000), Italy (in 2001), Luxembourg (in 1999) and the Netherlands (in 1998) – have attempted to address this issue by allowing employers to deduct more than 100% of the cost of CVT from turnover when determining taxable income (Table 5.6).[25] The extra-deduction amounts to 10% of training expenditures in Luxembourg, 20% in Austria and the Netherlands and up to 50% in Italy.

Table 5.6.   **Corporate tax deductions for training expenditures in selected OECD countries**

	Main provisions	Restrictions
Austria	Deduction of 120% of CVT cost from turnover. Alternatively, deduction of 6% from previous or subsequent year's tax liability (since 2002).	For externally provided CVT that is relevant to company interests (since 2000); for internal CVT organised by a separate in-company training unit (since 2003).
France	Training expenditure tax credit of 35% applying to expenditure in excess of that made in the previous year (since 1988).	In 2002, restricted to SMEs with turnover of less than EUR 7.63 million and for which at least 75% of the capital is owned by physical persons.
Italy	Deduction of 150% of CVT cost from turnover (since 2001). If no taxable income in a given year, deduction can be postponed for up to four years.	150% deduction only for expenditures normally counted as operating costs (such as trainees' and trainers' wages). Deduction may include up to 20% of payroll.
Luxembourg	Deduction of up to 110% of CVT cost from turnover (since 1999). If no taxable income in a given year, deduction can be postponed for up to ten years.	
Netherlands	Deduction of 120% of CVT cost from turnover (since 1998). More generous schemes for small firms and low-educated workers.	Only for training that is relevant to current functions of trainee. In the case of internal training, only cost of time spent by trainer can be deducted, with the exception of training for previously unemployed workers (aged 23 years or older) that are trained to basic qualification level, for which employers can deduct also workers' wages and indirect training costs such as those due to extra supervision and modification of production plans (since 2002).

CVT: Continuous vocational training.
Source: OECD Secretariat on the basis of information supplied by the countries in question.

The main differences across countries concern the type of expenditures that are eligible for deduction. In fact, although internal training expenditures are more difficult to define in a clear and transparent way, covering only external expenditures might lead to inefficient substitution of external for internal training, with little or no impact on the overall volume. While in the Netherlands and Luxembourg both external and internal training are covered by these schemes, in Austria internal training expenditures are eligible for deduction only if provided by an in-company training institution (or separate legal entity; see Box 5.3).[26] Another key issue is whether only direct costs are eligible for the extra tax deduction or if trainees' wages are also considered. For instance, in the Italian

Box 5.3. **Corporate tax deductions training expenditures in Austria**

Since 2000, Austrian employers can claim a special tax allowance for investment in training. This training incentive is regulated by federal tax law. Initially, the tax allowance was 9% of the expenses on external training only. From 2003 onwards, the allowance has been increased to 20% and extended to training measures organised internally. The incentive allows companies not only to deduct the actual cost of training as a business expense from their taxable income but also an additional "virtual expense" of 20%. Thus, the tax base is diminished by 120% of the actual expense. Companies that do not make enough profit in a given year to benefit from this tax deduction can, as an alternative, claim a credit for training expenses of 6% of the actual expense which is deducted from the tax liability or paid out to the firm.

Criteria for the tax allowance for external training measures:

● The training must be provided by a training organisation different and independent from the company claiming the tax allowance.

● The recipients of the training measure must be employees of the company.

● The training has to be in the interest of the company and has to be fully paid for by the employer claiming the tax allowance.

Criteria for the tax allowance for internal training measures:

● Only expenses resulting from training organised and offered by the company itself for its employees can be deducted.

● The department (or subsidiary) providing the training must have a degree of independence and organisational autonomy (*e.g.* own accounting system).

● Training must be formal (*e.g.* a course, a seminar) and must be verifiable (*e.g.* proof of attendance lists, curricula, etc.).

● The maximum amount per day to serve as a basis for the tax allowance is EUR 2 000, irrespective of the number of participants.

Note that the training tax credit of 6% is subject to the same criteria as the tax allowance for external training. Employers can only receive the credit if they have not already claimed the tax allowance.

As these measures have been introduced relatively recently, no evaluations are available as yet. After the most recent changes, it has been estimated that the loss of tax revenue due to them is about EUR 60 million annually.

scheme the latter are included up to 20% of payroll, while in the Dutch scheme they are generally excluded. When trainees' wages are excluded, it can be expected that these types of incentives tend not to be neutral with respect to trainees' characteristics and favour those for whom employers' opportunity cost of training (in terms of wage plus foregone productivity) is lower, such as inexperienced newly-hired workers. Nevertheless, most of these schemes are very recent and therefore there are no rigorous evaluations of their impacts.

Tax deductions provide no incentive to increase training if employers do not expect positive profits in a given fiscal year. This is particularly undesirable insofar as it is precisely during slack periods that the economic cost of foregoing production during training is lowest. To address this issue, Austrian law provides that 6% of all training

expenditures incurred in a given year, which cannot be deducted in that year, can be either paid out to the firm or subtracted from the firm's tax liability in the previous or subsequent year. Similarly, deductions of training expenditures can be postponed for up to four and ten years in Italy and Luxembourg, respectively, if taxable income is negative. A Swedish survey reports that employers would expect to increase training expenditures significantly if similar arrangements were introduced in their country (Håkanson *et al.,* 2002).

While targeting certain types of firms whose training supply is particularly low (such as small firms) through additional corporate tax deductions is feasible – at least in principle, targeting specific worker groups may involve undesirable *substitution* effects. For example, Leuven and Oosterbeek (2003) show that the 40% extra-deduction to train workers aged 40 years or older, introduced in the Netherlands in 1998 and recently abolished, induced significant substitution between training workers above the age threshold and training workers immediately below it. Once the substitution effect is taken into account, the overall effectiveness of the scheme becomes questionable.

Summarising, it can be tentatively concluded that an effective use of tax incentives to reduce firms' *under-investment* in training requires extra-deductions of training expenditures rather than deductions from payroll taxes. This is particularly likely to be the case if the latter are envisaged in the framework of "train or pay" schemes, which involve a large deadweight cost. It is also desirable that these deductions can be postponed for several years if companies have no positive profits in the year they make the expenditure.

Grant schemes and special funds for enterprises

In "train or pay" schemes, the levy is payable only if the firm's own training effort falls short of a legal minimum. By contrast, other *levy/grant schemes* imply that all companies pay a training levy independently of their training expenditure – normally as a percentage of payroll – after which they can try to recover (part of) their payment through applications for grants to fund training. Grants do not tend to reflect company payments and therefore allow redistribution of funds towards predefined priorities.

Prime examples of this kind of levy/grant schemes at national level are found in Belgium and Spain. In Belgium, a nation-wide collective agreement, which was later converted into a law, requires employers to pay 0.25% of payroll into a training fund, a sum that can be topped up by branch-level collective agreements. In Spain, employers pay 0.7% of payroll into a training fund administered by the Tripartite Training Foundation, where sectoral commissions staffed by employer and trade union representatives decide and manage training grants.

In addition to systems established by nation-wide legislation, a number of countries have sectoral training levies established through branch-level collective agreements. For example, the Netherlands and Denmark have followed this route, with half of the Dutch and one-third of the Danish workforce currently covered by sectoral levies and training funds (Gasskov, 2001). The average contribution rate in the Netherlands is 0.5%, but with considerable variation across branches. Other countries, such as Belgium and France, have set up many sectoral funds on top of their national levy regulation. Similarly, the United States has compulsory schemes for making contributions to training funds in a few sectors or companies with high trade union density, such as the automotive industry. Typically, there is a bipartite or tripartite joint governance of the training funds financed through levy

schemes (see Ok and Tergeist, 2003, for detailed examples), but there are some exceptions (notably Korea, where the public employment service administers the respective fund).

Apart from programmes financed through specific levies, most OECD countries (*e.g.* European Union countries, the Czech Republic, Japan, Korea, Mexico, Poland, and the United States) have some programmes for subsidising company training expenditures that are financed out of the central government budget. EU countries have often integrated their respective subsidies with resources from the European Social Fund (ESF) in this area. ESF support is designed to contribute to projects undertaken by member states in a complementary fashion; matching funds comes from central and local governments. Nevertheless, countries freely determine the type of expenditure (*e.g.* participant salaries and/or overhead costs), the share of expenditure (up to 50%, *e.g.* in the case of Finland), and the type of firms that can be subsidised (often special provisions apply to small firms). Similar variation can be found in non-EU countries. Internal guidelines and/or laws usually specify which preconditions must be fulfilled for an application for subsidies to be accepted, such as choice of recipients (with a view to equity of access) or a proof of participation by workers' representatives in the set-up of the training plan.

Grant schemes, whether financed through a special levy or out of the normal budget, have the drawback of high administrative costs. Also, there is a trade-off between allowing flexibility to accommodate demand-driven needs and constraining the scheme via rigid eligibility criteria to ensure transparency and minimise abuse (see also Section 3.C). Furthermore, it has been argued that small firms may find comparatively more costly to meet all the conditions required to file grant applications (Gasskov, 1998).

Pay-back clauses and apprenticeships

In principle, statutory or contractual pay-back clauses can specify that a worker leaving the firm within a specified period after an education or training spell has to agree to reimburse at least part of the training costs incurred by the employer. Pay-back clauses are intended to mitigate two of the market failures potentially affecting education and training. On the one hand, they limit the extent to which future employers can appropriate the benefits from current employers' investments in training through the poaching of trained employees, thereby allowing current employers to recoup the cost of training by setting wages below productivity after the training spell. On the other hand, they permit workers to share the costs of training even in the presence of serious individual credit constraints, by *de facto* borrowing from their employers with low default risk.

In Luxembourg, if no collective agreement specifies differently, the *Loi cadre 22 juin 1999* establishes a pay-back clause covering part of the expenses paid by the employer in the three years preceding a voluntary quit, except when the latter is due to the employer's misconduct. Similar provisions apply also in the case of lay-offs for serious fault by the employee. In many countries (*e.g.* Austria, the Czech Republic, Germany, Italy, Korea, the Netherlands, Norway, Switzerland, and the United States), pay-back clauses are not established by law but are permitted within certain limits in individual contracts or collective agreements. Finally, the United Kingdom is planning to introduce legal provisions allowing employers to sign contracts with their employees whereby the employer finances training costs through loans but, if the worker quits for another job after the training spell, the responsibility for remaining payments shifts to the new employer.

Even where pay-back clauses are legal, their application might be limited due to problems of contractibility of training contents that discourage an effective sharing of training costs (see Section 2.A). Pay-back clauses may be well suited for formal education or external training programmes, leading to certification, since training-related expenditures, training content and quality as well as the value of being trained for the employee (*i.e.* the market price for the skills acquired through education or training) can be easily assessed. However, this is not the case for many other types of training.[27] For instance in Italy, pay-back clauses have been used particularly for newly hired managers enrolling in MBA programs. Similarly, statutory provisions in Luxembourg apply only to training leading to certification and in the context of an agreed firm training plan, while in Germany courts have found contractual pay-back clauses admissible only if the quitting employee can benefit from the content of training in other jobs. Nonetheless, Bellmann and Düll (2001) report that about 15% of German enterprises apply pay-back clauses.[28]

Apprenticeships are another type of contract that allows sharing the cost of training in a similar way to pay-back clauses. In many countries, apprenticeships represent a longstanding system of combining training and employment so that people entering an occupation can receive instruction in the specific skills needed while working in that particular occupation. Common features of apprentice contracts are that they last for a duration specified at the start, apprentices are paid less than their productivity during most of the period covered by the contract, and a recognised qualification is delivered at the end, with the apprentice receiving a substantial wage increase if he/she stays with the same firm. These features make apprentice contracts a valid option even for non-contractible training (Malcomson *et al.,* 2003). Similarly to contracts involving pay-back clauses, employers can recoup the cost of training by paying workers less than their marginal product in the final stage of the apprenticeship. But contrary to pay-back clauses workers can quit before the end of the contract without penalty except that, if they do, they do not receive the final certification. For this reason, workers have an interest to stay at least until the end of the apprenticeship, but firms have an interest to provide good-quality training to minimise quits. To the extent that there are no age limits, apprentice contracts can be successful also within groups of low-qualified mature workers. For instance, in Australia, since all age restrictions were removed from apprenticeships and traineeships in 1992, the number of apprentices and trainees aged 25 years and over has grown enormously, but this strong growth has not come at the expense of younger apprentices whose number also rose (OECD, 2003b).

Working-time and training-time accounts

In many OECD countries, increased flexibility of working-time arrangements, featuring *inter alia* the annualisation of working hours or long hours-averaging periods, has led to the creation of working-time accounts for individual employees. The basic idea behind working-time accounts is that over a certain period of time an employee is able to work longer or shorter hours than the standard working time established by the employment contract, and thereby accumulate working-time credits or debits in an individual account, which are later compensated for by additional free time or work. As a result, they can be used to share training costs in a similar way to pay-back clauses, except that with working-time accounts workers *de facto* anticipate their share of the cost. Additionally, they may facilitate overcoming those constraints posed by time constraints,

which are one of the most important factors preventing workers from taking the desired amount of training (see Section 2.C).

Already in 1994, France adopted a law introducing a "time-saving account" for employees (*compte épargne-temps*). This account allowed workers to accumulate time credits over a number of years – using, for example, overtime hours or reduced working hours in the framework of the move towards the 35-hour week – and subsequently decide whether to make use of this "time capital" for, *inter alia*, early or gradual retirement, the take up of part-time work, or training leave. So far, the use of the account for training has occurred only in a small minority of cases. However, the social partners are currently negotiating about how to stimulate the use of working-time accounts for training purposes, for example by introducing the separate category of a "training-savings account" (*compte épargne formation*; MEDEF, 2001).

In the Netherlands, about one-fourth of large collective agreements establish the possibility of saving spare time for educational purposes. Compensating accumulated overtime hours in the form of extended leave at a later date is a very common practice in Denmark (EIRO, 2001). In a recent employer survey in western Germany (excluding Berlin), 11% of all companies that offer training – primarily the larger ones – and that operate working-time accounts offer the option of using the accumulated working-time capital for training purposes (Dobischat and Seifert, 2001). Such "training time accounts" can be fed through accumulated overtime hours or through special employer bonuses. As in the case of other instruments that facilitate a sharing of training costs between employers and employees, time accounts are likely to be effective only to the extent that training is contractible. As such, their use is likely to be limited when training opportunities must be chosen by the employee within the training plan of the company, except when the latter has resulted from an effective negotiation among social partners (see Section 3.C).

Loan schemes

As discussed in Section 2.A, one of the main sources of market failures affecting CVT stems from the difficulty for employees of financing training through borrowing. Public authorities can put in place schemes – such as loan guarantees, subsidisation of interest payments and/or lending by public bodies – to address the reluctance of private financial institutions to make loans for education or training purposes.

Two problems have arisen in connection with loan schemes for tertiary education. One is the general issue of levels of *student indebtedness*. In New Zealand, for example, much of the recent expansion of tertiary education was made possible by a student loan scheme introduced in 1992. However, this success has also raised concerns that the resulting debt levels for students pursuing higher education would seriously depress consumption, delay child-bearing, impinge on future credit-worthiness and stimulate a "brain drain" among graduates who may leave the country to avoid repayment or in search of higher salaries to facilitate repayment (Tertiary Education Advisory Committee, 2001; also see Callender, 2002). A second issue concerns *risk* – uncertainty over whether an individual will be able to earn enough to pay off a loan, which can discourage individuals from financing human capital investment through borrowing. As more countries have introduced or raised student fees, authorities have attempted to address this issue by implementing loan schemes that include provisions for income-contingent repayment. Experience in countries with long histories of reliance on student loans, such as the United States, however, suggests that default rates among student borrowers are quite high; therefore

schemes involving income-contingent repayments can be quite expensive for the public budget.

These issues appear to be relevant also for the feasibility of loans for financing individual costs of any type of adult learning. A few countries (*e.g.* the United Kingdom and the United States) have established loan schemes that are available also for CVT and are intended to provide adults with financial resources to cover cost of living as well as direct costs. For example, Career Development Loans were launched in the United Kingdom in 1988. They allow adults (18 and over) to borrow from GBP 300 to GBP 8 000 to pay for vocational education or training while public authorities subsidise interest repayments for the duration of training. In the first 13 years of operation, more than 150 000 individuals have taken loans averaging around GBP 3 700. Though more than 80% of borrowers reported that they would not have taken the training if it had not been for the loans, the overall number approved has fallen far short of what was expected. Furthermore, loan recipients have been mostly males (who have been twice as likely as females to receive loans; see Quarrie, 2002). This experience suggests that loan schemes may have only limited appeal because adults tend to be more reluctant than younger persons to finance learning through loans, perhaps, due to existing debts (*e.g.* home mortgages), family responsibilities, or shorter payback periods (Callender, 2002).

Tax incentives for individuals

While loan schemes try to address capital market failures only, most other individual-based demand-side schemes try to address simultaneously individual borrowing constraints and low or uncertain rates of return for specific groups who typically do not receive employer-sponsored training (see Section 3.A above). The main rationale for individual-based demand-side schemes is that they can be more precisely targeted than financial incentives for employers (or training institutions), while providing the individual with a greater range of training choices.

While expenditures for formal education usually can be deducted from personal income taxes, tax systems are typically more restrictive in their treatment of CVT expenditure by *individuals*. Generally, such expenditure cannot be deducted from the taxable income of individuals, except under circumstances in which such CVT is required for the job they currently hold. Moreover, when employers provide financial support for training that leads to recognised qualifications, the expenditure by the employer may be treated as taxable income to the learners.

However, some initiatives have been taken to relax these restrictions. For instance, starting in 2003, Austrian legislation will allow individuals to deduct costs related, not only to training required for their current job, but also for training that equips them to change jobs or enter a new profession. However, tax deductions of current individual expenses for education and training are likely to be more effective for short and/or part-time training as well as for high-wage employees, since individuals can only make use of these deductions if they earn enough in a fiscal year to be liable to pay taxes. There is no such limitation only when tax deductions apply to saving schemes to finance future learning activities (*e.g.* individual learning accounts and leave-saving schemes, see below).

Subsidies to individuals

Most countries have schemes to subsidise directly individuals enrolling in training courses. Subsidies are flexible instruments that can target specific groups. However, they

often require careful attention to framework conditions in order to work properly (see also Section 3.C below). Three issues are key in the economic analysis of subsidies to individuals: *i)* what the subsidy covers (fees and/or living expenses and/or foregone income); *ii)* what requirements individuals must satisfy to qualify for the subsidy; and *iii)* to what extent individuals are free to choose the type and timing of training as well as the training provider.

There is an evident tension between, on the one hand, increasing training demand and individual choice without boosting costs and, on the other hand, conveying adequate information about training quality to individuals and preventing possible abuses. In principle, the former objective would require allowing the supply of training services to respond freely to demand through free entry and course innovations. However, a certain amount of time-consuming screening, monitoring and control is called for by the second objective (see also Section 3.C). In practice, subsidy schemes that give total freedom of choice to individuals are rare. In most cases governments compromise between these conflicting objectives by constraining training choices within a more or less wide menu and adjusting the subsidy rate accordingly.[29] For instance, training vouchers (used, for example, in certain regions of Austria, Italy and Switzerland) typically leave free individual choice within courses offered by accredited training providers (see Box 5.4).

Box 5.4. **The Geneva Training Voucher**

The May 2000 Act on Continuing Training for Adults in the Swiss canton of Geneva contains the feature of an annual training voucher, up to a value of CHF 750, available for all adults residing in the canton. The voucher is a response to a survey conducted in 1996 by the Swiss Statistical Office, which expressed concern over the low participation of the lower-skilled in CVT.

The voucher can be used for basic training, training in professional skills, or the acquisition of new skills. The amount of CHF 750 is equivalent to 40 hours of continuing training courses. The voucher can be carried over from one year to the next for a maximum of three years. It entitles trainees to attend courses offered by public or community training institutions, but also by certain accredited private establishments.

Currently about 400 courses offered by 62 institutions are accessible via the training voucher. Applicants usually submit their request for a voucher in one of the vocational training offices of the canton, after having identified a particular training course. In 2001, five out of six such applications (out of a total of 1 240) were granted. 61% of beneficiaries were women and 44% were foreign residents (Broyon *et al.*, 2002). However, the share of low-skilled applicants has remained low (persons with no more than compulsory schooling were only 16% of applicants in 2001).

In some cases, subsidies target explicitly specific segments of the population. For instance, in Germany, the government subsidises training expenditures of workers aged over 50 and workers with no vocational qualification (or those with vocational qualifications but who have been in semi-skilled or unskilled occupations for more than four years). In Korea, subsidies are provided by the Employment Insurance Fund for government-designated training courses taken by workers at risk of redundancy and workers aged 50 years or older. Even when not targeted, however, subsidy schemes might be effective in reaching groups that participate in training less frequently. For example,

many of the beneficiaries of the Geneva Canton voucher scheme in 2001 were foreign citizens (see Box 5.4). This is particularly true for schemes that are available only for workers taking training leaves as well as those that combine tax arrangements and/or loans together with subsidies and/or cost-sharing arrangements (such as individual learning accounts).

Individual learning accounts (ILAs)

ILAs emerged in the late 1990s as an alternative to traditional subsidy and loan schemes. ILAs are savings accounts that can be opened by individuals for the purpose of funding future learning activities. Third parties (employers and government) may also contribute to the account while individuals generally retain freedom of choice concerning the type and timing of training, training provider and amount invested. The philosophy underlying these initiatives is to "empower" individuals in education and training markets by encouraging them to take responsibility in an asset-building process.

In a review of recent experience with ILAs, the OECD and the European Learning Account Network identified ILA initiatives in five OECD countries (Canada, the Netherlands, the Basque region of Spain, the United Kingdom and the United States; see OECD, 2003b). Another special scheme has been established in Sweden by Skandia, a private insurance company. Most of these schemes have been set up on a trial basis to test the feasibility of a savings-based approach to increase training. They differ significantly with respect to their purposes and the details of their structure and administration, but conform to the broad framework described above (Table 5.7).

The main differences between such schemes are the objectives and, as a consequence, their financial scale. The approach adopted most often is to establish accounts to help defray the direct costs of education and training, including course fees, instructional materials, and transportation. In this case, contributions by third parties are relatively low. Only few cases of ILA initiatives are intended to replace income for individuals who pursue full-time learning activities.

In the case of ILAs, accountability issues have been problematic, due to pressure to put large innovations into place quickly and the concern of ensuring their "user-friendliness", since the aim of these schemes is to reach persons who do not typically participate in learning activities. Where direct contributions have been involved, the most common approach to preserve accountability has been for the co-financing partner (government or employer) to match individual contributions at the time of a transaction to purchase education or training services. However, this has not always prevented that either individual's or co-finance partners' funds were spent on activities that were not allowable.[30]

Unfortunately, despite this recent burst of interest in ILAs, there is little evidence on their impact on learning behaviour and subsequent labour market outcomes. Estimating impacts is made difficult by the newness of most of the initiatives and the fact that most of them (with the exception of the British national ILA schemes) are small-scale initiatives. However the available evidence suggests that ILA schemes have been popular among individuals, even those who usually do not participate in training. In most cases they have managed to reach middle-aged poorly qualified people of both genders, although young and older workers have been under-represented (Owens, 2001; CINOP, 2002; York Consulting, 2002). Evidence from evaluations of the US Individual Development Accounts

Table 5.7. **Individual learning accounts in OECD countries**

Country	Targeted worker groups	Funding shares	Use of funds	Other conditions
Canada *Learn*$ave (pilot project)	Eligibility conditions: *i)* adults aged 21 to 65 years or 18 to 21 years who have been out of school for at least two years; *ii)* adults who are not full-time student; *iii)* households with pre-tax income below a specified threshold (*e.g.* CAD 19 390 for one-person families); *iv)* adults who have liquid savings less than 10% of their annual income	– The fund contributes CAD 3 for every CAD 1 saved by the participants – Participants have up to three years to save a maximum of CAD 1 500 – *i.e.* the maximum value of the financial asset at the end of the period is CAD 6 000	– Purchase of education or training services – Setting up own business	– Participants should save at least 12 months before they can withdraw matched saving credits (up to three years) – The matched contributions are never paid directly to the participant but instead are paid directly to the supplier of the good or service being purchased
Netherlands (eight pilot projects)	Low-educated workers	– The government contributes up to EUR 454 – In two projects, participants are asked for a contribution – In seven projects, the government contribution is supplemented by contributions by the employer or by sectoral training funds	Only direct costs of training in most of cases	. .
Spain (the Basque region) IKASTXEKIN (pilot projects)	Vocational training teachers	Credit accounts cover 75% of the direct learning expenses, while the remaining 25% is borne by individuals.	Direct learning expenses	– The beneficiaries must take training courses provided by officially approved training centres – The credit accounts must be used in a given period which cannot exceed two years
Sweden (Skandia)	Company-based schemes (with priority given to low-skilled workers)	– Both the employee and the employer pay one half – The contribution share is ¼ and ¾ , respectively, for the low-paid employees – Up to 10% of annual salary per year (20% for low-skilled and low-paid employees)	– Direct training costs – Living expenses during the training	. .
United Kingdom Nation-wide programmes (suspended)	– Any individual older than 19 can open an ILA – Public contribution is allowed only to workers who are not enrolled in full-time training or education that is already publicly supported	– Public contribution of GBP 150 against individuals' contribution of at least GBP 25 for the first million ILA holders – 20% discount on standard rate courses (up to GBP 100 per year) – 80% discount on higher rate courses (up to GBP 200 per year) – Employers' contributions are voluntary and subject to tax relief	Direct training costs or some associated costs (*e.g.* assessment fees)	The balance in the account should be used during the first year
United States[a] (Arkansas)	Employed persons who have a household income less than 180% of the poverty line and no more than USD 10 000 assets other than a house and a car are eligible	The government pays USD 3 for every USD 1 saved by the individual	Home-ownership, post-secondary education, starting-up a small business	Account holder must take six classes in economic literacy

. . Information not available.

a) For the United States, ILAs exist under various forms depending on the state. The case of Arkansas is taken only as an example.

Source: OECD Secretariat on the basis of information supplied by the countries in question.

suggests that such schemes may have a positive impact on economic self-sufficiency, self-esteem, credit-worthiness, and savings behaviour, as well as the likelihood of establishing educational plans (Scanlon and Page-Adams, 2001). No evaluation of the deadweight loss involved is however available.

Training leaves and part-time study

The analysis of Section 2.C has highlighted the role of *time constraints* in reducing training participation. Meeting the training needs of employed individuals may frequently require them to stop working for a considerable period of time. In many OECD countries access to training under these circumstances is facilitated by statutory or contractual training leave schemes that guarantee employees the right to return to their jobs after completing the training course. Some countries have also facilitated access to training and education on a part-time basis. For instance, in the Australian technical and further education colleges it is possible to study part-time, at distance and on week-ends, and access requirements also take into account previous work experience. As a result, in Australia, 12% of the enrolees in the formal education system are aged 35 and over, which is three times the OECD average (OECD, 2001a).

Wurzburg (2003) suggests that *foregone income* depresses individual rates of return to full-time adult education more than any other factor. This implies that subsidy schemes need to compensate in part for foregone income to reach low-income/low-wealth labour force segments, in particular when training requires a prolonged period of service (and wage) reduction. For this reason, in some countries, special training leave subsidies (Table 5.8) are available, particularly to cover living expenses or partially replace foregone income. In Germany, a special subsidy also exists for part-time workers participating in training. Other policy alternatives include ILAs with large matching funds from a third party and tax incentives, but they have been rarely established in practice by governments. One exception is the possibility for Dutch employees, introduced in 2001, to join a "leave-saving scheme", which allows them to set aside up to 10% of their gross yearly wage in a saving account with privileged tax treatment to finance a personal leave, with training or studies being one of the declared aims of such leave. Provisions for training leaves are also often included in collective agreements, even in countries where statutory schemes do not exist (such as Australia and Portugal).

In most countries that have training leave schemes, however, only a very limited number of employees have participated in them. Belgium and Sweden, where about 1% of workers have been on leave each year since the establishment of the schemes, are two exceptions to this pattern. However, training leaves tend to be more popular among women than men, since they are seen as a flexible way to reconcile further training needs with family responsibilities. For instance, in Denmark there were about 2 000 men and 6 000 women on training leave in the second quarter of the year 2000 (representing about 0.1% and 0.5% of employment, respectively; EIRO, 2001). In Sweden, women take-up training leave twice as frequently as men. In Austria, training sabbaticals were disproportionately used by women until the scheme was reformed and going on training leave soon after maternity leave forbidden. Belgium, where only one-fourth of the employees on training leave were women in mid-1990s, is an exception to this pattern, probably due to the fact that part-time workers are excluded by the Belgian scheme (CEDEFOP, 2001).

Table 5.8. **Training-leave schemes in selected OECD countries**

Country[a]	Eligibility	Subsidies provided to	Subsidy ranges	Funding mechanism	Numbers of beneficiaries (% of total employment)	Comments
Austria	Workers with a work history of over three years and with the current employer for the past two years	Individual workers	A daily allowance of EUR 14.53 for a period of 3-12 months	Austrian Employment Service	2 263 in 2002 (0.1%)	
Belgium	Full-time workers	Employers	Full wage costs (up to 80-120 hours for general education, 120-180 hours for vocational training, and 180 hours for workers who take both general and vocational courses during the same year) and the direct costs	Social Security Contribution	60 270 during the 2000/2001 academic year (1.5%)	
Finland	Employees with a work history of over ten years	Individual workers	EUR 440 per month plus an earning-related amount covering 15-20% of the last monthly wage up to 1 year	Education and Training Insurance	5 236 in 2002 (0.2%)[b]	
France	Workers with a work history of over 24 months and who worked with the current employer during the last 12 months	Individual workers	80-90% of the foregone wage up to one year or 1 200 hours	Employers' contribution (0.2% of the wage bill) to the accredited bipartite organisations (OPACIF)	26 169 in 2001 (0.1%)	
Japan	Employed persons who are covered by the Employment Insurance	Employers	¼ of the wage costs and ¼ of the direct costs (⅓ for SMEs)	Employment Insurance	3 265 in fiscal year 2002 (0.01%)	A budget of JPY 0.7 billion was made available for fiscal year 2002.
Korea	. .	Employers	⅓ of the wage costs and part of direct costs	Employment Insurance	7 756 in 2000 (0.04%)	Total subsidy of KRW 5 589 million in 2000
Norway	Workers with a work history of over three years and with the current employer for the past two years	Individual workers	NOK 80 000 per year, of which 60% is a loan, 25% is an unconditional grant and 15% is converted from loan to grant when the student succeeds in the examination	State Education Loan Fund	. .	Only for formal education
Spain	Workers who have been employed by the same firm for at least one year	Individual workers	Full foregone wages up to 200 working hours	Social partners' mandatory contribution to the Tripartite Foundation	1 394 in 2002 (0.01%)[c]	
Sweden	Workers who have been employed for at least six consecutive months or with a work history of over 12 months during the last two years	Individual workers	Grants and loans of SEK 33 880 for 20 weeks full-time studies; a supplementary loan for the workers aged 25 or older if the income of the beneficiary during the 12 months immediately preceding the studies has been above a certain threshold	Study allowance by the government	0.7% in 2002	Only for formal education

. . Information not available.

a) Countries without specific subsidy schemes or where the related schemes are governed by collective agreements, such as Australia, Germany, the Netherlands and Portugal, are not included in the table.

b) The figure refers to the number of employees who have taken alternation leaves, of which only roughly 17% indicate studying was the major reason.

c) The figure refers to the number of individual training permits approved by FORCEM.

Source: OECD Secretariat on the basis of information supplied by the countries in question.

C. Framework conditions

The effectiveness of policies that aim to increase demand by employers and employees (demand in the upstream market) hinges in part on certain *framework conditions* – the policy and institutional environment in which they are implemented. This section will focus on framework conditions that have a primary effect on training outcomes. It must be noted at the outset that other framework conditions, whose primary effect is not on training or education, may have second-order effects on training demand and supply. For instance, institutions in the labour market affecting the distribution of wages, such as the minimum wage and employment protection legislation, modify the incentives of employers and employees to invest in training (see *e.g.* Acemoglu and Pischke, 1999b). Furthermore, the progressiveness of the income tax may have a bearing on individual incentives, to the extent that, on the one hand, it reduces individual appropriability of the benefits from training and, on the other hand, it reduces the opportunity cost of taking unpaid training leaves or opting for part-time work. Finally, a major obstacle for women to participate in adult learning is represented by the fact that the burden of family responsibilities is still unevenly shared within the couple (see Section 2.C). Policies that affect the ability of households to reconcile work with family needs (see OECD, 2002a, 2002c and Chapter 3) can have an impact on the gender-training gap. A detailed analysis of these framework conditions is, however, outside the scope of this chapter.

A number of framework conditions appear to have a primary effect on adult learning. First, barriers to entry of *bona fide* training providers must be relatively low to allow supply shifts accommodating demand needs without raising costs. Second, information on the nature, conditions (location, duration, timing), cost and quality of education and training opportunities must be readily available to individuals and employers in order to ensure efficient allocation of resources for investment in education and training and foster cost-sharing as well as co-operative behaviours. Third, information on the nature and level of skills and competencies that are acquired by individuals through self-financed CVT must be transparently signalled to external labour markets so that workers can capitalise on what they have learned.

Most often, countries have chosen to limit subsidies and other co-financing schemes to training undertaken with accredited providers (see Section 3.B for examples of this kind). Accreditation, however, constrains the capacity of training service supply to respond to sudden changes in demand. Conversely, the entry of new providers can expand training capacity and thus increase the price elasticity of demand for each individual provider. However, massive entry of new providers might raise concerns about quality. In the case of the English ILA initiative, there is evidence that some companies were abusing the system offering low value, poor quality learning (OECD, 2003b). In the case of the Australian levy scheme, many of the new providers were of dubious quality (Fraser, 1996). The implication is that measures to lower barriers to entry need to be introduced in such a way that it is possible to ensure quality. For example, an evaluation of the ILA programme that was carried out in Scotland suggested limiting future ILA initiatives to providers certified through the Scottish Quality Management System as well as small firms for which their Local Enterprise Company is willing to act as a sponsor (York Consulting, 2002).

Smooth functioning of the markets for education and training depends also on adequate information on learning opportunities, particularly for individuals. In the case of the Individual Development Accounts initiative in the United States, counselling and

guidance were provided as part of a comprehensive policy package of support services (OECD, 2001b). However, the effectiveness of the strategies for guidance and counselling depends on the extent to which there exist systems for quality assurance by which the quality of education and training opportunities can be evaluated, and systems for assessment and recognition of learning outcomes, to indicate the portability of CVT "qualifications".

In order to foster incentives for individuals to pay for their own training and/or share the cost of CVT with their employers, it is necessary that learning outcomes are transparent and easily signalled to the current or future employer. In contrast to formal education, in which established degrees and diplomas serve as signalling devices, CVT (except where it culminates in a formal degree or diploma) requires mechanisms to assess and recognise smaller increments of learning. However, to function effectively and credibly, such mechanisms need skills "standards" to provide the metric and language for measuring outcomes unambiguously, robust procedures for assessment, and involvement of appropriate stakeholders (Colardyn, 2002).

Many countries have put into place initiatives to certify workers' skills acquired through CVT as well as work experience and, thereby, guarantee portability and market-reward of skills, although evaluations of their effectivenress are scarce. Some initiatives aim to assess outcomes predominantly in terms of labour market skills. For example, in Finland, France, Ireland, the Netherlands and the United Kingdom, governments introduced competence-based qualifications systems, according to which acquisition of qualifications is not conditioned on course attendance in a vocational training or educational institutions. Under this system, workers are allowed to take individual skill tests independently of the way skills are acquired. In many cases, social partners are heavily involved in the elaboration of these certification schemes through "expert groups" (*e.g.* Finland) or joint management/labour bodies (*e.g.* France).

Collective agreements and trade union participation may play an important role in ensuring an equitable distribution of training outcomes, not only by diffusing information and jointly defining curricula, but also by increasing and twisting employers' supply towards more general types of training (see Ok and Tergeist, 2003). For example, a study by the American Society for Training and Development (ASTD) of major joint labour-management training programmes suggests that these joint initiatives do result in a different mix of training activities. While only 2% of firm-supported training addresses basic literacy skills according to the ASTD's benchmarking data base, this figure soars to 15% for the joint programmes (van Buren and Erskine, 2002). The sharing of training costs between employers and individuals can also be fostered by joint CVT agreements to the extent that unions and work councils are in a better place to monitor training content and quality. In most European countries, participation in employer-sponsored training is significantly greater in firms with a joint CVT agreement than in firms without it (Chart 5.9).[31] Differences in training participation rates are particularly large in Mediterranean countries (for which the participation rate in firms with negotiated agreements is more than twice as large as in other firms). Conversely, these differences are not particularly significant in the Nordic countries (except Finland) and the United Kingdom, where however training participation rates are high also in firms without joint CVT agreements.

Chart 5.9. **Training participation is greater in firms with a joint CVT agreement**

Percentage of employees in all enterprises with/without a joint CVT agreement with social partners participating in employer-sponsored CVT courses, 1999[a]
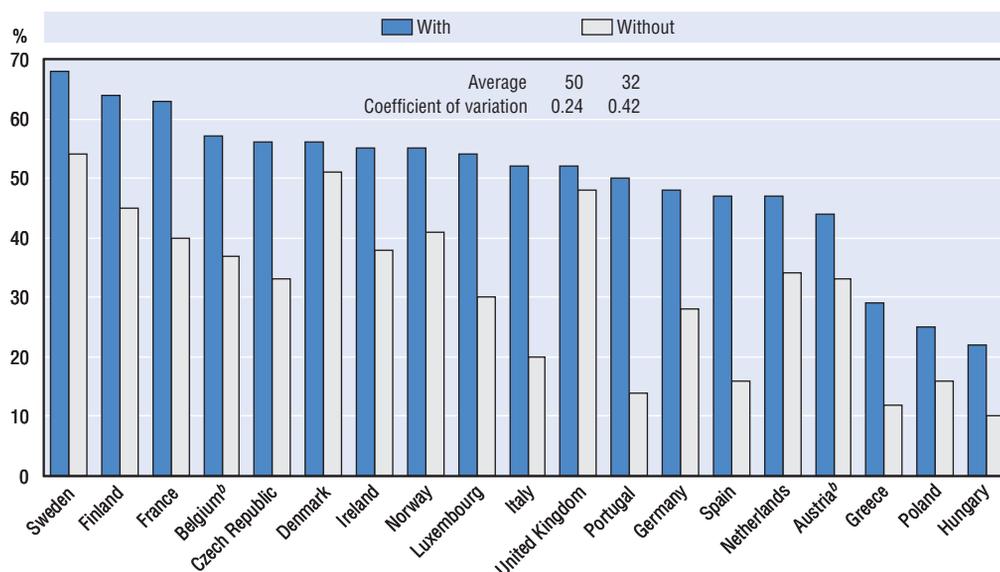
a) Countries are ranked from left to right in descending order of the percentage of employees in all enterprises with a joint CVT agreement participating in employer-sponsored CVT.
b) Estimations include a very small number of non-training enterprises due to missing values.
Source: CVTS2.

Conclusions

It is increasingly acknowledged that education and training of the adult labour force is a key policy issue to meet the challenge posed by technological change and improve career prospects for disadvantaged groups. Although early education is a key aspect of human capital development, the fact that the ageing process will increasingly interest most OECD countries gives a paramount importance to education and training of the adult labour force, since most of the workers who will apply the new technologies will be adults far from their school days. The review of the literature contained in this chapter suggests that, due to market failures in the labour, capital and training markets, training outcomes are likely to fall short of socially desirable levels, although the size of the shortfall remains an open question. Furthermore, the chapter provides empirical evidence that disparities in training outcomes across workers – not necessarily due to market failures – tend to reinforce labour market inequalities insofar as those who are already in a worse position in the labour market tend to receive less employer-sponsored training, leading to worse career prospects, lower wages and less employability.

It is therefore essential to address the thorny issue of how to increase access to education and training for disadvantaged groups by spreading more evenly the costs and benefits, otherwise the life-long learning strategy may remain largely in the realm of rhetoric. Nevertheless, the empirical and policy analysis of this chapter suggests that: i) different policies serve different and sometimes conflicting objectives; ii) policy design is crucial but complex because the identified sources of market failure (*e.g.* lack of contractibility of training quality) and the risk of inducing inefficient substitution between different types of education

and training can equally lead to government failures; and *iii*) a comprehensive policy strategy involving corporate tax deductions, pay-back clauses, loan schemes and some specific individual subsidy schemes (such as individual learning accounts) is more likely to be effective in reducing both training under-investment and inequalities.

Nevertheless, several important questions remain open for further research:

● More rigorous evaluations of policy initiatives are urgently needed. In this chapter, empirical and theoretical analyses are used to deduce normative implications for policy. However, little or no direct assessments of the various policy schemes are available, only partially due to their novelty and small scale.

● It is necessary to investigate further the role of informal learning in the accumulation of competencies and assess the magnitude of the effect of market failures on both formal and informal training provision. However, the lack of adequate data is, in this area, the main obstacle.

● The policy implications of the relationship between technological or organisational changes and training must be further investigated. For example, by requiring new competencies, technological change induces more rapid human capital scrapping – that is, the phenomenon of obsolescence of previously acquired skills. This might lead certain categories of workers to give up investing in the new competencies since the pay-back period may be too short.

● Different sectors and jobs require different skills. Co-ordination failures can be of paramount importance not only for under-investment in training but also for skill-mismatch. A society may therefore find itself equipped with competencies that are not useful in those sectors for which technological change is more rapid and global demand expanding faster.

● Additional analysis is required to evaluate the effects of off-the-job training on individual productivity and welfare. This assessment will have important bearings not only for demand-side policy strategies based on employees' incentives but also for training policies for individuals at the margin of the labour market, such as the long-term unemployed.

● A comprehensive analysis of the market for training services (the "upstream market" using the terminology of this chapter) would be desirable. This chapter has just pointed out some of the relevant trade-offs (for example between competition and quality). A thorough analysis of these trade-offs – as well as of possible policy innovations to overcome them – is key to put in place an effective co-financing strategy for lifelong learning.

● A more extensive concept of framework conditions should be considered. The analysis of this chapter has shown that market failures in many different markets appear to have an impact on training outcomes. A comprehensive analysis of the effect of policies and institutions on training performance should therefore include the analysis of policies aimed at improving performance in other markets (such as tax policy, labour market flexibility, etc.), but which, nonetheless, affect incentives to train and be trained.

Notes

1. Unless otherwise specified, all the data in this chapter are from the IALS. Data refer to 1994 for Canada, Ireland, the Netherlands, Poland, Switzerland (German and French-speaking regions), and the United States, to 1996 for Australia, Belgium (Flanders only), New Zealand and the United Kingdom and to 1998 for the Czech Republic, Denmark, Finland, Hungary, Italy, Norway and the Italian-speaking regions of Switzerland. Country rankings, as well as discrepancies with the data reported in Table 5.2 for European countries, can be partially ascribed to cross-country differences in the survey years and must be interpreted with great caution.

2. Measured as hours of education and training per employed person aged 26 years or older. Only formal education and training undertaken for career or job-related purposes is considered.

3. Note, however, that language courses are included in the CVT measure.

4. There are several reasons why data from the CVTS are more suitable than IALS data for the analysis of training incidence by firm size: i) employers know better about firm size and employer-sponsored training than employees; ii) employer-provided CVT courses are more precisely defined in the CVTS; and iii) intensity figures from the CVTS are more precise (while the IALS is likely to underestimate training intensity, see Annex 1). IALS data are used, instead of the CVTS, in the other tables, because the latter provides no information on socio-economic and demographic characteristics of the recipients (except gender).

5. Even when employers alone are reported to pay for training, they may not bear the full cost because workers may indirectly pay for these services through wage adjustments and accepting to be trained outside normal working hours. Similarly, newly-hired workers can be offered a contract with lower than usual starting pay combined with the prospect of receiving training and a steeper than usual tenure-earnings profile. The empirical literature shows, however, little evidence that workers accept lower wages to co-finance training (Barron *et al.,* 1999a; Loewenstein and Spletzer, 1998; and Booth and Bryan, 2002), although there is some evidence that workers bear some of the opportunity cost of training by accepting to be trained outside normal working hours, at least under certain circumstances (Autor, 2001).

6. As regards the United States, 76% of respondents in the Employer Opportunity Pilot Project (EOPP; employers) and 73% in the 1993 wave of the National Longitudinal Survey of Youth (NLSY; employees) believe that most of the skills acquired through training would be useful at other firms. Fewer than 8% of respondents reported that the skills gained through training would not be at all useful at other employers (Loewenstein and Spletzer, 1999b). In the United Kingdom, 85% of training recipients in the 1998-2000 waves of the British Household Panel Survey (BHPS) view their training as general (Booth and Bryan, 2002). In Germany, 62% of training recipients in the 1989 wave of the German Socio-Economic Panel (GSOEP) state that they received a certificate from their training (58%, if only training during work hours is considered; see Pischke, 2001).

7. This externality is often associated with the phenomenon of "poaching" – that is, a firm can free ride other firms' investment in training by making better wage offers to trained employees.

8. See Arulampalam *et al*. (2002) and Bassanini and Brunello (2003) for the EU countries, and Acemoglu and Pischke (2003) for the United States. The evidence for the United States is, however, less conclusive (see Neumark and Wascher, 2001).

9. The price of the latter transaction might be zero – *i.e.* when the employer bears all the cost.

10. However, while this analysis can track demand and supply factors behind inequality patterns, it cannot identify the role of market imperfections – *i.e.* whether supply and demand are optimal from the point of view of economic efficiency. The role of market imperfections cannot be directly tested through this identification strategy, but can only be underlined in the discussion of possible explanations of the estimated patterns.

11. These models are estimated subject to the assumption that, by threatening lay-offs and/or offering monetary compensation, an employer can always convince a worker to be trained. For the equilibrium outcome, the dependent variable takes value 1 if the individual participated in employer-sponsored training and 0 otherwise. For demand, the dependent variable takes value 1 if the worker either took training courses that were not sponsored by the employer or would have liked to take training but could not and 0 otherwise. The latter equation is estimated only for workers that did not participate in employer-sponsored training (see Annex 2 for a discussion of the estimation issues involved). Detailed estimation results are presented in Table 5.A1.2 in Annex 1.

12. Both the probability of receiving training in equilibrium and of demanding training at zero cost are estimated to be lower for older workers than for prime-age men. Nevertheless, the shift of the

equilibrium outcome is much smaller than that of demand, leading to the conclusion that supply is not significantly smaller for employees in this age class than for prime-age workers.

13. The pay-back period is defined as the number of years an investment needs to yield the expected revenue in order to be profitable.

14. The length of the pay-back period for human capital investments for both employers and employees is likely to depend mainly on individual characteristics that affect the cost of, and total potential benefits from, training. The difference between employers' and employees' pay-back periods is likely to depend on the wage structure, educational attainment and other factors affecting the sharing of the benefits from training, but plausibly not on age. In equilibrium – that is, given a certain division of costs and benefits from training – it is plausible that rates of returns from training are approximately equal for the employee and for the employer. However, the employee retains his/her share of benefits upon quitting, while the employer does not. As a consequence, pay-back periods for general training are likely to be longer for the employee than for the employer because the latter knows that the former has a positive probability of quitting and takes it into account into the calculation of the pay-back period.

15. The only statement that can be made about supply is that it does not increase significantly with educational attainment, but it cannot be established whether it decreases or remains approximately constant. This is due to the fact that the estimated probabilities of demanding training at zero cost and of receiving training in equilibrium increase by approximately the same amount (see Annex 2).

16. In most countries, the mean performance of PISA (Programme for International Student Assessment) students (at age 15) on the IALS literacy scale is greater than the mean performance of IALS individuals both in the whole sample and restricting the comparison to IALS individuals aged 26 to 35 years who completed secondary education (see OECD and Statistics Canada, 2000; and OECD, 2003c). Also, Green and Riddell (2003) find that the coefficient attached to education is altered by literacy in an earnings regression for Canada, while the coefficient attached to experience is not.

17. For five countries (Australia, Canada, Finland, Italy and the United States), the IALS contains a large set of information on parental background that can be used as instruments for literacy in a training regression since their effect on training demand and supply is likely to occur only through literacy and education.

18. In this case, there may be a different explanation. Demand is identified at zero implicit or explicit costs for the worker, including day care for children and relatives. Part-time workers for family reasons are therefore likely to find certain types of training too expensive in terms of their associated day-care costs (see Section 2.C).

19. Given the ambiguity of the question on desired further training ["Since August (Year), was there any training or education that you wanted to take for career or job-related reasons but did not?"] as well as of the definition of this reason in the questionnaire ("too expensive/lack of money"), it is unlikely that all individuals that are credit-constrained reported this reason. Plausibly, this reason is likely to capture direct costs, such as unaffordable course fees, but not issues related to foregone income. The effect of market failures – such as lack of contractibility of training and difficulties to smooth consumption due to individual borrowing constraints – is likely to show up mainly in lower demand at zero cost.

20. The lower level of competition in the market for workers who have acquired transferable skills is the easiest example. In contrast to purely general skills, transferable skills are not valuable at every firm. Therefore, although training in these skills increases potential job opportunities for the worker, finding them may require a long and costly search process.

21. It is true that policy innovations are often tried and evaluated as pilot programs first. However, certain experiences (such as with the British ILAs, see Section 3.B) show that not all the possible implementation problems of mass-scale programs can be anticipated on the basis of small pilot experiments.

22. However, since public policies in this area mainly address formal training, care has to be taken that the low-educated are not forced into a learning environment, which did not work for them in the past. Indeed, lack of appropriate pedagogy is one of the reasons behind school drop-outs (see OECD, 2003a).

23. Since marginal effective training costs for firms that spend more than the legal minimum are not affected by the scheme, these firms are not likely to modify their training expenditure. Still they receive an implicit 100% subsidy up to the legal minimum.

24. To be more precise, in the case of France, a minimum levy of 0.6% of payroll must be paid in all cases. Therefore the 100% implicit subsidy covers only expenditures in excess of 0.6% of payroll (but below 1.5%). As a consequence, the incentive to increase training expenditure for firms that would otherwise invest much less than 0.6% of payroll for that purpose is likely to be extremely small.

25. In many other OECD countries, the costs associated with CVT (*e.g.* fees, instructional material, transportation) are treated by tax regulations as a cost of doing business and deducted from taxable income of employers. As such, however, the treatment is similar to that of investment in fixed assets (where depreciation is deducted from taxable income), and certain forms of investment in intangible capital (such as R&D costs that are deducted from taxable income), but cannot be really considered a tax incentive.

26. The Italian case is more complex since before the "Tremonti-bis" Act (*Legge 383/2001*), training expenditures were not treated as costs of business. As a consequence, the law has introduced a true extra-deduction only for those expenditures that are normally counted as operating costs (such as trainees' and internal trainers' wages) and has only partially caught-up with the legislation of most other countries for other types of training expenditures.

27. Note also that in countries where employment contracts in which the employer can unilaterally change the terms of the contract (*employment at will*) are admissible, such as the United States, pay-back clauses might not be attractive for employers. Stipulating such a clause would transform the employment relationship into a *de facto* long-term relationship and, in the case of long-term relationships, unilateral changes of the terms of contract can be successfully challenged by employees in courts (see Malcomson, 1997).

28. Pay-back clauses might also be more viable if stipulated through collective agreements, since trade unions are in a better position to monitor training contents than individual workers (see Section 3.C).

29. The greater the freedom of choice, the greater is the need that part of the quality monitoring be accomplished by subsidy recipients. Individuals are more likely to be effective in monitoring service quality when the subsidy is a *matched* contribution and they have some own resources at stake. Conversely, monitoring incentives are weak when the subsidy is intended to cover essentially all costs up to a certain limit.

30. For example, the English nation-wide ILA programme was forced to shut down operations prematurely because of allegations of fraud and theft (see Section 3.C).

31. However, to the extent that most grant schemes require previous agreement from trade-unions (see Section 2.B), the causal relationship suggested by Chart 5.9 might be spurious.

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ANNEX 1

Data Description and Detailed Estimation Results

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A. Data sources

The quantitative analysis in this chapter is based on data from two sources:

a) International Adult Literacy Survey (OECD and Statistics Canada)

The *International Adult Literacy Survey* (IALS) is an individual survey using a common questionnaire. The survey asks whether the workers have received any training or education during the 12 months prior to the survey, but it includes details only about the three most recent courses (purpose, financing, training institution, duration, etc.). For this reason, the number of hours of training is underestimated in the case of workers having taken more than three courses. Data refer to 1994 for Canada, Ireland, the Netherlands, Poland, Switzerland (German and French-speaking regions) and the United States, to 1996 for Australia, Belgium (Flanders only), New Zealand and the United Kingdom and to 1998 for the Czech Republic, Denmark, Finland, Hungary, Italy, Norway and the Italian-speaking regions of Switzerland. For more details, see OECD and Statistics Canada (2000).

b) The second Continuing Vocational Training Survey (Eurostat)

The second *Continuing Vocational Training Survey* (CVTS2) was carried out by Eurostat in 2000 in EU member states, Norway and nine EU candidate countries. This is an enterprise survey covering establishments with at least ten employees. It provides information on employer-sponsored training, which relates to the year 1999, for employed persons, excluding apprentices and trainees. The survey provides a large set of characteristics for the enterprises, but only gender, training participation and total training hours for the employee. For more details, see Eurostat (2000).

B. Data definitions

Continuous Vocation Training (CVT) may entail the following forms of training (see *e.g.* Eurostat, 2000):

a) Courses which take place away from the place of work, *i.e.* in a classroom or training centre, at which a group of people receive instruction from teachers/tutors/lecturers for a period of time specified in advance by those organising the course.

b) Planned periods of training, instruction or practical experience, using the normal tools of work, either at the immediate place of work or in the work situation.

c) Planned learning through job rotation, exchanges or secondments.

d) Attendance at learning/quality circles.

e) Self-learning through open and distance learning, (methods used in this type of learning can include using video/audio tapes, correspondence courses, computer-based methods or the use of a Learning Resources Centre).

f) Instruction at conferences, workshops, lectures and seminars.

In practice, the definition of CVT in different surveys varies and thereby the coverage of the different forms of training is not the same across surveys. In the CVTS2, the definition of CVT conforms strictly with item a) above, including post-graduate education but excluding other types of formal education and initial training – *i.e.* training received by a person when hired in order to make his/her competencies suited to his/her job assignment. In the IALS, there is a distinction between job- or career-related training and training for other purposes. Furthermore, education and training courses are divided into seven mutually exclusive categories: *i)* leading to a university degree/diploma/certificate; *ii)* leading to a college diploma/certificate; *iii)* leading to a trade-vocational diploma/certificate; *iv)* leading to an apprenticeship certificate; *v)* leading to an elementary or secondary school diploma; *vi)* leading to professional or career upgrading; and *vii)* other. For the purpose of this chapter, only job- or career-related training has been considered in the analysis. Moreover, in order to thoroughly exclude formal education courses, only items *iv)*, *vi)*, and *vii)* have been retained in the definition of CVT courses, while items *i)*, *ii)*, *iii)* and *v)* are subsumed into the category of formal education (*cf.* Table 5.1 and Chart 5.1).

The occupation classification used in this chapter corresponds approximately to the one-digit level of the International Standard Classification of Occupations (ISCO-88). In Chart 5.3, data have been grouped as follows: high-skilled occupations corresponding to managers, professionals, technicians and associate professionals (ISCO-88 codes 1 to 3); medium-skilled occupations corresponding to clerks, service and sales workers, craft and related trade workers, plant and machine operators and assemblers (ISCO-88 codes 4 to 8); and low-skilled occupation corresponding to elementary occupations (ISCO-88 code 9).

The average literacy score used in Section 2.B is the simple average of the three literacy scores reported in the IALS that measure proficiency in prose, reading and quantitative skills on a 0-500 quantitative scale (see OECD and Statistics Canada, 2000).

C. Detailed estimation results

Tobit and probit models of the determinants of employer-sponsored training

Maximum likelihood estimations of a probit model for training participation and a tobit model for training hours have been carried out on a pooled sample of 15 countries to provide further evidence on the training gaps discussed in Section 1. Estimates based on these models are reported in Table 5.A1.1. Probit regressions are standard when the dependent variable is a dummy variable. Conversely, tobit regressions are standard when the dependent variable is continuous but censored. In the probit model, the dependent variable takes value one if the individual participated in at least one employer-sponsored CVT course in the 12 months preceding the survey and zero otherwise. The table reports in

Table 5.A1.1. **Probit and Tobit estimates of the determinants of training**

	Training participation	Average hours spent in training
	Probit[a]	Tobit[b]
Gender		
(reference: men)		
Women	−0.011	−0.205*
Age groups		
(reference: aged 36-45)		
Aged 16-25	−0.076*	−0.683*
Aged 26-35	−0.010	−0.070
Aged 46-55	−0.022**	−0.231**
Aged 56-65	−0.065*	−0.711*
Educational attainment		
(reference: upper secondary)		
Less than upper secondary	−0.040*	−0.389*
Tertiary	0.052*	0.411*
Community size		
(reference: urban)		
Rural	−0.001	0.012
Full-time/part-time		
(reference: full-time worker)		
Part-time workers	−0.124*	−1.414*
Country of birth		
(reference: born in country of interview)		
Immigrants	−0.055*	−0.500*
Number of employers (last 12 months)		
(reference: more than one employer)		
One employer only	0.016	0.092
Firm size		
(reference: 100 to 199 employees)		
20 to 99 employees	−0.024***	−0.335**
200 to 499 employees	0.053*	0.433*
500 and more employees	0.099*	0.847*
Industry		
(reference: manufacturing, mining and energy)		
Construction	−0.039***	−0.488**
Wholesale and retail trade	−0.051*	−0.572*
Transport, storage and communications	0.027***	0.283**
Financing, insurance, real estate and business services	0.048*	0.341*
Community, social and personal services	−0.006	−0.104
Occupation		
(reference: clerks)		
Managers	0.110*	1.059*
Professionals	0.053*	0.529*
Technicians and associate professionals	0.056*	0.549*
Service workers and shop and market sales workers	−0.033**	−0.299
Craft and related trades workers	−0.059*	−0.501*
Plant and machine operators and assemblers	−0.113*	−1.181*
Elementary occupations	−0.176*	−2.067*
Country		
(reference: Australia)		
Belgium[c]	−0.162*	−2.418*
Canada	−0.035**	−0.366**
Czech Republic	−0.180*	−2.063*
Denmark	0.180*	1.591*

Table 5.A1.1. **Probit and Tobit estimates of the determinants of training** *(cont.)*

	Training participation	Average hours spent in training
	Probit[a]	Tobit[b]
Finland	0.132*	0.990*
Hungary	−0.197*	−2.454*
Ireland	−0.202*	−2.907*
Italy	−0.166*	−1.888*
New Zealand	0.137*	1.056*
Norway	0.128*	1.113*
Poland	−0.189*	−2.889*
Switzerland	−0.112*	−1.194*
United Kingdom	0.148*	1.048*
United States	−0.017	−0.262
Predicted at vector 0	**0.345**	**−0.830**
Log likelihood	**−11 138**	**3 043**
Number of observations	**19 062**	**18 853**
Number of countries	**15**	**15**
Pseudo R^2	**0.115**	**0.057**

*, **, ***, statistically significant at 1%, 5% and 10% levels respectively.

a) Estimated change in the probability of training participation with respect to the reference individual. The sample population is employees of firms with more than 20 employees, with at least some education, aged 16 to 65 years and not working in the agricultural sector. The reference individual is indicated in the table.

b) The dependent variable is equal to log (1+T) where T stands for hours of training.

c) Flanders only.

Source: OECD estimates based on IALS.

this case the estimated change in the probability of receiving training associated with each specific characteristic for an individual otherwise identical to the reference individual. The tobit model estimates the association of training hours with the characteristics reported in the table, correcting for the sample selection bias due to the fact that individuals with different characteristics have different probabilities of participating in training. The dependent variable in this model is the logarithm of one plus training hours received by the individual. This logarithmic form is chosen to eliminate exponential heteroskedasticity. The argument of the logarithm is augmented by one because otherwise observations for non-participants would be eliminated from the sample. Coefficients can be interpreted as in a standard linear regression.

The reference individual is indicated in the table. Australia is the reference country since it is the country with the largest sample size. Estimations are carried out for a limited number of individual characteristics (including, gender, age, education, country of birth, part-time status and occupation) and firm characteristics (firm size, sector), in order to maximise country coverage. Supervisory role and the distinction between self-employed and employees are not taken into account (the inclusion of these variables would have limited the analysis to only ten countries). As a consequence, the analysis is also restricted to workers of firms with more than 20 employees to eliminate as much as possible self-employment. Moreover, the sample is limited to workers with at least some education (since those without education are an exception and are concentrated in few countries) and not working in the agricultural sector (because of the special character of the agricultural labour market). The sample includes individuals aged 16 to 65 years. This is done for comparison with the empirical results of the analysis of demand and supply of

training (Section 2.B) where young individuals are added to preserve a sufficiently large sample size in the case of the estimation of models including literacy as an explanatory variable (see below). All the results presented in this chapter are, however, robust to the elimination of this age class.

Demand and supply of training

Table 5.A1.2 reports complete maximum likelihood estimation results of bivariate probit models of demand and equilibrium outcomes, estimated under two sets of alternative hypotheses (see Annex 2 for a discussion of the identification issues involved). Relative changes of demand and supply derived from these estimates are reported in Table 5.3. Three sets of estimates are considered: a baseline model and two extended specifications (including also supervisory role and temporary contract, respectively) that are estimated on smaller country samples. Countries included in the baseline specification are Australia, Belgium (Flanders only), Canada, the Czech Republic, Denmark, Finland, Hungary, Ireland, Italy, New Zealand, Norway, Poland, Switzerland, the United Kingdom, and the United States. Countries included in the second specification (including dummies for supervisory role) are Canada, Belgium, Czech Republic, Finland, Hungary, Italy, Poland, Switzerland, the United Kingdom and the United States, while in the third specification (including both dummies for supervisory role and temporary contract) are Canada, Finland, Hungary, Italy, Poland, Switzerland, the United Kingdom and the United States. The choice of country samples is motivated by data availability. The summary of results reported in Table 5.3 is based on the baseline specification (when possible), estimated under the hypothesis that, by threatening lay-offs and/or offering monetary compensation, an employer can always convince a worker to be trained (hypothesis A in Table 5.A1.2).

For five countries (Australia, Canada, Finland, Italy and the United States), the IALS contains a large set of information on parental background – namely, educational attainment of parents, father's occupation and a dummy for whether the mother has worked. The effect of parental background on training demand and supply is likely to occur essentially through literacy and education. Accordingly, these background variables can be used as instruments for literacy in a training regression. To instrument literacy, the literacy score is therefore regressed on parental background variables, education and other available characteristics (such as gender, age, community size, country of birth, and country dummies) that are relatively unlikely to be determined by the level of literacy. To avoid reverse-causality bias, other characteristics such as part-time status, industry, occupation, firm size and number of employers are excluded from the instrumental regression. Mother's work status is included separately in the final instrumental variable (IV) regressions estimating the effect of literacy on demand and equilibrium. In fact, mother's work status might not fulfil the orthogonality condition required for an instrument to be valid, to the extent that it affects directly other determinants of training – such as individual motivation and work attachment, particularly of women. This intuition is confirmed by the fact that this is the only parental background variable that is found to be significant when included in demand and equilibrium equations (both with and without the additional inclusion of literacy). Complete estimation results obtained under two sets of alternative hypotheses (see Annex 2) are reported in Table 5.A1.3, but only results obtained under hypothesis A are included in Table 5.3 in the main text.

Table 5.A1.2. **Training demand and supply**

Bivariate probit estimates[a]

	Baseline model			
	Hypothesis A[b]		Hypothesis B[c]	
	Demand	Equilibrium outcome	Demand	Equilibrium outcome
Part-time				
(reference: full-time worker)				
Family and health reasons	−1.74	−9.65 *	−8.68 *	−10.12 *
Still in education	−7.46*	−19.92 *	−19.20 *	−24.50 *
Voluntary part-time for other reasons	−12.05*	−8.55 *	−14.45 *	−0.17
Involuntary part-time	8.45*	−13.30	−2.17	−22.52 *
Gender				
(reference: men)				
Women	2.53**	−1.65 **	0.49	−4.32 *
Age groups				
(reference: aged 36-45)				
Aged 16-25	2.73	−5.49 *	−2.01	−8.66 *
Aged 26-35	1.71	−0.74	0.61	−1.93
Aged 46-55	−7.13*	−2.12 **	−5.75 *	3.13 **
Aged 56-65	−15.16*	−6.48 *	−13.79 *	4.32 **
Educational attainment				
(reference: upper secondary)				
Less than upper secondary	−4.91*	−4.07 *	−5.92 *	−0.79
Tertiary	5.38*	5.16 *	6.55 *	2.06
Community size				
(reference: urban)				
Rural	−3.66*	−0.18	−2.26 **	2.35 ***
Country of birth				
(reference: born in country of interview)				
Immigrants	2.25	−5.29 *	−2.43 ***	−7.83 *
Number of employers (last 12 months)				
(reference: more than one employer)				
One employer only	−9.62*	1.29	−5.35 *	6.92 *
Firm size				
(reference: 100 to 199 employees)				
20 to 99 employees	1.83	−2.46 ***	−0.59	−3.69 ***
200 to 499 employees	0.76	5.57 *	4.05 **	5.55 **
500 and more employees	1.80	9.89 *	7.51 *	8.79 *
Industry				
(reference: manufacturing, mining and energy)				
Construction	6.42**	−3.84 ***	1.33	−8.97 *
Wholesale and retail trade	2.84	−4.31 *	−1.64	−5.91 *
Transport, storage and communications	0.80	2.52 ***	2.08	3.41 **
Financing, insurance, real estate and business services	−1.18	4.39 *	2.42	5.54 *
Community, social and personal services	5.33*	−0.57	2.76 **	−4.21 **
Occupation				
(reference: clerks)				
Managers	1.24	10.74 *	8.49 *	9.57 *
Professionals	6.43*	5.11 *	7.08 *	1.62
Technicians and associate professionals	3.72**	5.24 *	5.55 *	3.62 ***
Service workers and shop and market sales workers	−1.95	−2.92 **	−3.23 **	−2.00
Craft and related trades workers	−2.88	−5.82 *	−5.53 *	−5.10 **
Plant and machine operators and assemblers	−3.03	−10.99 *	−9.96 *	−12.56 *
Elementary occupations	−8.75*	−16.52 *	−18.12 *	−16.00 *
Predicted at vector 0	**39.91**	**31.48**	**58.75**	**55.10**
Log likelihood	**−6 799**	**−10 990**	**−11 591**	**−6 200**
Number of observations	**11 763**	**18 811**	**18 811**	**10 709**
Number of countries	**15**	**15**	**15**	**15**
Pseudo R²	**0.068**	**0.117**	**0.099**	**0.099**

Table 5.A1.2. **Training demand and supply** (cont.)

Bivariate probit estimates[a]

	Including supervisory role		Including temporary contracts	
	Hypothesis A[b]		Hypothesis A[b]	
	Demand	Equilibrium outcome	Demand	Equilibrium outcome
Part-time				
(reference: full-time worker)				
Family and health reasons	–3.95	–6.22 *	–6.16 ***	–5.75 **
Still in education	–10.21 **	–17.30 *	–12.10 *	–16.37 *
Voluntary part-time for other reasons	–11.33 *	–7.86 **	–12.16 *	–7.27 **
Involuntary part-time	1.14	–12.08 *	–0.61	–8.98 *
Supervisory role				
(reference: some supervisory role)				
No supervisory	–6.63 *	–8.52 *	–6.47 *	–7.51 *
Great supervisory	–4.29 ***	4.75 *	–3.45	5.00 *
Temporary contract				
(reference: permanent)				
Temporary contract			7.85 *	–12.67 *
Gender				
(reference: men)				
Women	2.85 ***	–2.00 ***	3.49 **	–1.22
Age groups				
(reference: aged 36-45)				
Aged 16-25	2.04	–4.17 **	2.11	–2.14
Aged 26-35	2.20	0.22	2.28	0.08
Aged 46-55	–6.80 *	–2.40 ***	–7.00 *	–4.01 *
Aged 56-65	–14.87 *	–4.23 **	–13.46 *	–4.27 ***
Educational attainment				
(reference: upper secondary)				
Less than upper secondary	–5.10 *	–5.29 *	–4.93 **	–5.09 *
Tertiary	7.48 *	4.34 *	7.05 *	4.16 *
Community size				
(reference: urban)				
Rural	–1.59	–0.28	–2.67 ***	–0.27
Country of birth				
(reference: born in country of interview)				
Immigrants	0.10	–5.58 *	0.17	–4.96 **
Number of employers (last 12 months)				
(references: more than one employer)				
One employer only	–12.74 *	0.23	–11.27 *	–1.07
Firm size				
(reference: 100 to 199 employees)				
20 to 99 employees	3.23	–1.77	3.56	0.06
200 to 499 employees	–0.65	6.93 *	1.04	7.99 *
500 and more employees	2.58	11.93 *	2.72	14.07 *
Industry				
(reference: manufacturing, mining and energy)				
Construction	5.02	–1.51	3.97	–1.55
Wholesale and retail trade	4.22	–5.17 *	4.03	–3.72 ***
Transport, storage and communications	1.96	6.77 *	1.85	6.77 *
Financing, insurance, real estate and business services	4.28	5.81 *	5.16 ***	8.00 *
Community, social and personal services	6.83 *	–1.79	7.12 *	0.04

Table 5.A1.2. **Training demand and supply** (cont.)
Bivariate probit estimates[a]

	Including supervisory role		Including temporary contracts	
	Hypothesis A[b]		Hypothesis A[b]	
	Demand	Equilibrium outcome	Demand	Equilibrium outcome
Occupation				
(reference: clerks)				
Managers	−1.07	3.26	−2.76	3.50
Professionals	7.81 *	4.02 **	6.61 **	5.35 *
Technicians and associate professionals	5.09 **	3.15 ***	5.72 **	2.71
Service workers and shop and market sales workers	−4.39 ***	−5.12 *	−3.98	−5.39 *
Craft and related trades workers	−5.29 ***	−8.70 *	−5.57 ***	−7.51 *
Plant and machine operators and assemblers	−7.05 **	−11.91 *	−6.50 **	−10.83 *
Elementary occupations	−10.27 *	−18.54 *	−10.19 *	−17.31 *
Predicted at vector 0	**45.77**	**36.96**	**43.65**	**34.61**
Log likelihood	**−3 943**	**−6 197**	**−3 432**	**−5 491**
Number of observations	**7 228**	**11 043**	**6 099**	**9 623**
Number of countries	**10**	**10**	**8**	**8**
Pseudo R^2	**0.094**	**0.129**	**0.091**	**0.131**

*, **, ***, statistically significant at 1%, 5% and 10% levels respectively.

a) Estimated percentage change in the probability of demanding training (receiving training in equilibrium) with respect to the reference individual. Equations are estimated by maximum likelihood assuming no correlation between residuals. The sample are employees of firms with more than 20 employees, with at least some education, aged 16 to 65 years and not working in the agricultural sector. The reference individual is indicated in the table. The dependent variable for demand takes value 1 if the individual received training or wished to be trained. For the equilibrium outcome the dependent variable takes value 1 if the individual received employer-sponsored training. All equations include country dummies.

b) Employees cannot refuse to be trained. Subject to this hypothesis, the demand equation is estimated only on the sub-sample of those who did not receive employer-sponsored training.

c) Employees can refuse to be trained. Subject to this hypothesis, the equilibrium outcome equation is estimated only on the sub-sample of those who received training or wished they had.

Source: OECD estimates based on IALS.

Table 5.A1.3. **Training supply and demand: the effect of literacy**
Bivariate probit estimates[a]

	Hypothesis A[b]		Hypothesis B[c]	
	Demand	Equilibrium outcome	Demand	Equilibrium outcome
Literacy	0.5	5.0 **	3.7	4.0
Mother has worked	5.2 **	3.4 ***	6.6 *	–0.5
Gender				
(reference: men)				
Women	1.8	–3.1 **	–0.3	–5.1 *
Age groups				
(reference: aged 36-45)				
Aged 16-25	–0.4	–9.6 *	–6.7 *	–9.7 *
Aged 26-35	1.9	–2.8 ***	–0.5	–3.7 **
Aged 46-55	–6.2 *	–2.2	–6.9 *	3.7 ***
Aged 56-65	–10.2 *	–0.6	–9.5 *	8.7 **
Educational attainment				
(reference: upper secondary)				
Less than upper secondary	–3.4	0.1	–2.7	1.6
Tertiary	5.5 **	–1.6	3.2	–5.1 ***
Community size				
(reference: urban)				
Rural	–0.9	0.6	–0.2	0.4
Full-time/part-time				
(reference: full-time)				
Part-time workers	–0.5	–13.2 *	–8.8 *	–15.8 *
Country of birth				
(reference: born in country of interview)				
Immigrants	3.0	–0.6	1.6	–3.0
Number of employers (last 12 months)				
(reference: more than one employer)				
One employer only	–6.7 *	1.6	–5.4 *	5.3 *
Firm size				
(reference: 100 to 199 employees)				
20 to 99 employees	3.6	–0.1	3.3	–3.6
200 to 499 employees	–1.8	9.7 *	4.6	8.4 *
500 and more employees	3.1	12.2 *	10.3 *	7.0 *
Industry				
(reference: manufacturing, mining and energy)				
Construction	6.5 ***	–8.2 **	–0.3	–14.0 *
Wholesale and retail trade	5.2 **	–5.7 **	0.0	–9.5 *
Transport, storage and communications	2.6	2.9	4.0	2.0
Financing, insurance, real estate and business services	3.3	1.9	3.8	–0.7
Community, social and personal services	7.6 *	–1.9	4.6 **	–7.6 *
Occupation				
(reference: clerks)				
Managers	1.8	6.1 **	5.8 **	4.2
Professionals	3.4	4.3 **	5.6 **	1.7
Technicians and associate professionals	5.8 **	2.7	6.1 *	–0.5
Service workers and shop and market sales workers	0.7	–6.2 *	–3.4	–7.3 **
Craft and related trades workers	5.5 ***	–6.9 *	0.2	–12.7 *
Plant and machine operators and assemblers	–0.3	–14.1 *	–10.5 *	–16.1 *
Elementary occupations	–2.6	–17.8 *	–14.0 *	–20.4 *
Predicted value at the average literacy score[d]	**22.5**	**34.0**	**48.3**	**72.3**
Average literacy score	**291.3**	**294.4**	**294.4**	**298.0**
Number of observations	**4 437**	**6 973**	**6 973**	**4 141**
Log likelihood	**–2 760**	**–4 185**	**–4 408**	**–2 530**
Number of countries	**5**	**5**	**5**	**5**
Pseudo R^2	**0.050**	**0.084**	**0.064**	**0.085**

Table 5.A1.3. **Training supply and demand: the effect of literacy** *(cont.)*
Bivariate probit estimates[a]

*, **, *** statistically significant at 1%, 5% and 10% levels, respectively.

a) Estimated percentage change in the probability of demanding training (receiving training in equilibrium) with respect to the reference individual. For literacy, which is a continuous variable, the effect of a 10% increase in the literacy score from the sample average is reported. Equations are estimated by maximum likelihood assuming no correlation between residuals. Literacy, being potentially endogenous, has been instrumented using parental background characteristics, education, gender, age, community size, country of birth and country dummies. The sample population is employees of firms with more than 20 employees, with at least some education, aged 16 to 65 years and not working in the agricultural sector. The reference individual is indicated in the table. The dependent variable for demand takes value 1 if the individual received training or wished to be trained. For the equilibrium outcome the dependent variable takes value 1 if the individual received employer-sponsored training. All equations include five country dummies.

b) Employees cannot refuse to be trained. Subject to this hypothesis, the demand equation is estimated only on the sub-sample of those who did not receive employer-sponsored training.

c) Employees can refuse to be trained. Subject to this hypothesis, the equilibrium outcome equation is estimated only on the sub-sample of those who received training or wished they had.

d) Predicted probability at the average literacy score for the reference individual.

Source: OECD estimates based on IALS.

ANNEX 2

Identification and Estimation of Training Demand and Supply

Information on workers who would have liked to have taken additional training but could not can be used to identify the demand for training of employed persons. Workers declaring that they could not take all the training they wanted clearly believe that their return from training is non-negative, at least if they do not have to pay for it. It can be said that an individual has a positive demand (at zero cost for the individual) if he/she declares to have taken non-sponsored training courses and/or to desire further training. From this information, the probability of demanding training can be estimated as a function of personal and job characteristics. Taking two different groups of individuals and assuming that demand curves are downward sloped (with respect to the implicit or explicit price of training) and do not cross each other, it is therefore possible to estimate whether one group has greater demand than another by estimating their respective probabilities of desiring further training at zero cost (points A and A' in Chart 5.A2.1).

Chart 5.A2.1. **Demand and supply of training: solving the identification problem**
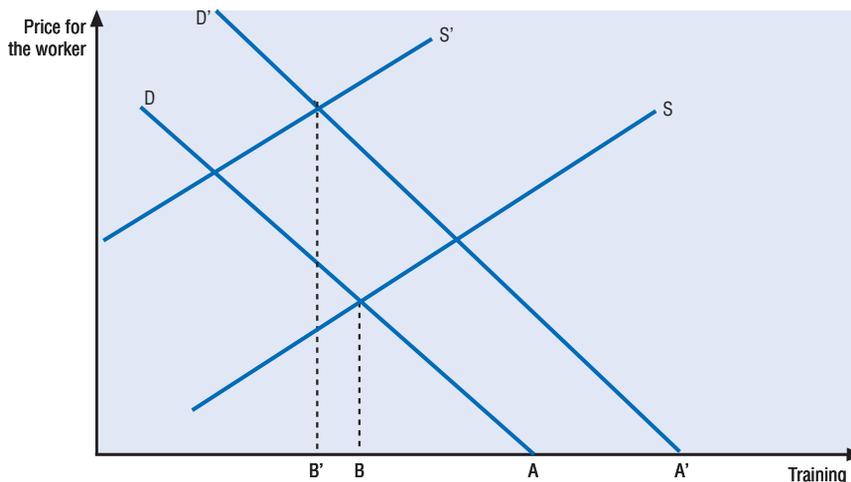
Rigorously speaking, without additional assumptions on employers' behaviour, the demand-identification strategy described above is valid only for employees not receiving employer-sponsored training. Indeed, workers who receive employer-sponsored training

may or may not have a positive demand for training, depending on employers' behaviour and training bargaining outcomes. Two extreme alternative assumptions can be selected:

● *Hypothesis A*: by threatening lay-offs and/or offering monetary compensation, an employer can always force a worker to be trained, therefore demand at zero cost for workers receiving employer-sponsored CVT might not be positive and its sign is unobservable; or

● *Hypothesis B*: as assumed by Oosterbeek (1998) in a similar analysis for the Netherlands, employers cannot force their employees to be trained against their will (even at zero cost for the employees, which implies that equilibrium prices in the downstream training market cannot be negative), therefore training takes place only if the worker's demand is non-negative.

Hypothesis B allows the identification of demand on the whole sample while, under hypothesis A, demand can be consistently estimated only on the subsample of those not receiving employer-sponsored training (see Table 5.A2.1). Furthermore, these additional assumptions on employers' behaviour and bargaining outcomes allow deriving the relative positions of supply schedules from the simultaneous estimation of demand and equilibrium outcomes (the training amount corresponding to the intersection between supply and demand, B and B' in Chart 5.A2.1).

Table 5.A2.1. **Samples and dependent variables**

	Demand	Equilibrium outcome
	Dependent variable: 1 for participants in sponsored and non-sponsored CVT or workers who wanted to take further training but did not, and 0 for the others	Dependent variable: 1 for participants in sponsored CVT only, and 0 for the others
Hypothesis A: Employers can always force a worker to be trained through monetary compensation or lay-off threats	Non-participants in sponsored CVT	Whole sample
Hypothesis B: Employers cannot force their employees to be trained against their will	Whole sample	Participants in sponsored and non-sponsored CVT or workers who wanted to take further training but did not

CVT: Continuous vocational training.

More formally, it can be assumed that the equilibrium outcome and demand are described by the following equations:

$$y_w = X\beta_w + \varepsilon_w \quad \text{if } y_w > 0 \quad \text{and } 0 \text{ otherwise,}$$

$$y_e = X\beta_e + \varepsilon_e \quad \text{if } y_e > 0 \quad \text{and } 0 \text{ otherwise,}$$

where y_w represents the quantity of employer-sponsored training demanded by the employee at zero cost borne by him/her (that is if the price of training charged by the employer were zero); y_e represents the quantity of employer-sponsored training demanded and supplied in equilibrium (that is, at the equilibrium price, which may differ across pairs of employers and employees), if hypothesis A holds, or that could have been supplied in equilibrium if there had been no constraint on equilibrium prices, if hypothesis B holds; X represents the vector of observed worker's characteristics; and ε_w and ε_e are error terms. Four different situations can arise: *i)* $y_w > 0$ and $y_e > 0$; *ii)* $y_w = 0$ and $y_e > 0$; *iii)* $y_w > 0$ and $y_e = 0$; and *iv)* y_w, $y_e = 0$.

In practice, under both hypotheses, the probability of receiving employer-sponsored training in equilibrium and the probability of demanding training at zero cost can be estimated in a bivariate probit framework as a function of personal and firm

characteristics. For the equilibrium outcome, the dependent variable takes value one if the worker has received employer-sponsored training – situations *i)* and *ii)* – and zero otherwise – situations *iii)* and *iv)*. For demand, it takes value one if the worker has taken any type of training course or would have liked to – situations *i)* and *iii)* – and zero otherwise – situations *ii)* and *iv)*. However, under hypothesis A, situations *i)* and *ii)* cannot be distinguished; therefore demand is estimated only conditional on the fact that the worker has not received any employer-sponsored training – that is, if situations *iii)* or *iv)* occur. By contrast the equilibrium outcome is estimated on the whole sample. Symmetrically, under hypothesis B, situations *ii)* and *iv)* cannot be distinguished, since the actual equilibrium amount of training can never be greater than the amount demanded at zero cost; therefore the equilibrium outcome is estimated only conditional on the worker having received training or being willing to be trained at zero individual cost, while demand is estimated on the whole sample. In principle, the correlation between the error terms of the demand and equilibrium outcome equations must be taken into account (to avoid selection bias). However, since Oosterbeek (1998), in a similar analysis for the Netherlands, does not find this correlation to be significant, for computational reasons the equations are estimated as if the residuals were incorrelated. Furthermore, Bassanini and Ok (2003) estimate a number of similar models allowing for correlation between unobservable characteristics and obtain similar results.

Under both hypotheses, information on the relative position of employers' supply for different groups can then be derived by comparing demand and equilibrium outcomes, on the basis of the assumption that supply curves are upward sloped and do not cross each other. Table 5.A2.2 summarises all possible combinations of demand and equilibrium estimates and their implications for employers' supply. For example, if training demand for, say, women is estimated to be significantly greater than training demand by men, but no significant difference is estimated for equilibrium outcomes (first row in the table), this can be interpreted as evidence that for any given price of training, employers' supply is greater for men than for women. Equivalently, the supply curve for women is above that for men (compare S and S' with D and D' in the Chart 5.A2.1). To the extent that results are consistent under both hypotheses A and B, some statements on supply and demand can be derived with some confidence. Table 5.3 is based only on estimates under hypothesis A. However, results are similar when estimations are carried over under hypothesis B (see Annex 1).

Table 5.A2.2. **Estimating supply differences across groups from demand and equilibrium estimates**[a]

Demand	Equilibrium outcome	Supply
+	0	–
+	–	–
0	–	–
0	0	0
–	+	+
–	0	+
0	+	+
+	+	Depends on the relative size of differences
–	–	Depends on the relative size of differences

a) +, – and 0 mean that, with respect to the reference individual, a given characteristic is estimated to shift the corresponding curve rightward, leftward and in no significant way, respectively. For example, the first line of the table means that if demand is estimated to shift rightward and no significant shift is estimated for the equilibrium outcome, then the derived supply schedule is estimated to shift leftward.

Finally, under hypothesis A, demand and supply are consistently estimated also if additional hypotheses are made to allow for a more plausible interpretation of respondents' reaction to the question on further training, which is phrased in the IALS as follows: "Since August (Year), was there any training or education that you wanted to take for career or job-related reasons but did not?" In fact, this formulation is somewhat ambiguous, and it can be expected that workers declaring themselves constrained are those who expect positive returns from training even taking part of the (direct or opportunity) cost of training into account (*e.g.* part of the foregone income and leisure time, alternative investment opportunities, displeasure they associate with formal learning due to bad pedagogical experiences, etc.). Nevertheless, the following hypotheses can be made: *i)* individuals interpret the question on additional desired training as asking whether they would like to receive more training for a fixed implicit or explicit cost borne by them; and *ii)* this perceived cost (or price) threshold does not depend on observable individual characteristics and can be modelled as a constant plus a standard error term. Subject to these additional hypotheses, the probability of demanding training is identified at the price threshold that is perceived to be implicit in the question on further training, rather than being identified at zero cost supported by the respondent.

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