4 Investments in adult lifelong learning

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1 Introduction

Over the past 25 years workers with substantial amounts of human capital in the form of education and training have been better able to survive the labor market challenges of technological innovation and globalization and have seen their earnings rise. In addition, as shown in Bresnahan et al. (2002), Black and Lynch (1996, 2004) and Lynch (2007), business investments in information and communication technologies have complemented investments in human capital and employers who have made these types of investments have experienced higher productivity. However, in spite of the growing rewards to skills, we see in many advanced industrialized economies that the supply of skilled workers does not seem to be keeping pace with the pressures of technological innovation and an increasingly international labor market. Policy responses to a growing skills shortage include improving the skills of new entrants to the labor market or changing immigration policy to increase the supply of skilled workers.

Reliance on changes in immigration policy to increase the stock of skilled workers often encounters considerable political resistance. In addition, just focusing on increasing the schooling experience of new entrant workers will not be enough to meet the human capital needs of a workforce that is also aging. For example, in the US the median age of the workforce is projected to be 42 by 2020, so most workers will have long since completed their formal education. Therefore, investments in human capital for the majority of workers will need to come from other sources, such as employer-provided training programs, government training programs, or continuing education programs that workers pursue in their own time.

Not all countries have pursued the same strategy to address the challenge of upgrading skills for an aging workforce. This reflects in part varying needs to increase skills. As shown in Table 4.1, a country such as Chile where more than 50 percent of the adult population has significant difficulty undertaking basic quantitative skills (addition, subtraction, multiplication and division) has much more basic skill needs than countries such as Denmark or Sweden where only 6 percent of the adult population have limited quantitative skills. But this is not just a case of stage of development since we see that in advanced industrialized countries such as the
US and the UK more than 20 percent of adults have difficulty with basic quantitative skills. Therefore, this chapter will review the theoretical explanations for varying investments in adult workers’ skills and the empirical evidence on returns to investments in adult learning. It will also summarize alternative policies countries have pursued to stimulate investments in adult worker training and education.

2  Theoretical framework

Under the standard model of investment in human capital, as detailed by Becker (1964) and Mincer (1958, 1962), individuals decide whether or not to invest in human capital such as education by assessing the costs versus

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**Table 4.1  Percentage of 16–65 year olds with low quantitative proficiency***

<table>
<thead>
<tr>
<th>Country</th>
<th>Percent</th>
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</thead>
<tbody>
<tr>
<td>Australia</td>
<td>16.8</td>
</tr>
<tr>
<td>Belgium (Flanders)</td>
<td>16.7</td>
</tr>
<tr>
<td>Canada</td>
<td>16.9</td>
</tr>
<tr>
<td>Chile</td>
<td>56.4</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>8.9</td>
</tr>
<tr>
<td>Denmark</td>
<td>6.2</td>
</tr>
<tr>
<td>Finland</td>
<td>11.0</td>
</tr>
<tr>
<td>Germany</td>
<td>6.7</td>
</tr>
<tr>
<td>Hungary</td>
<td>20.5</td>
</tr>
<tr>
<td>Ireland</td>
<td>24.8</td>
</tr>
<tr>
<td>Netherlands</td>
<td>10.3</td>
</tr>
<tr>
<td>New Zealand</td>
<td>20.4</td>
</tr>
<tr>
<td>Norway</td>
<td>7.7</td>
</tr>
<tr>
<td>Poland</td>
<td>39.1</td>
</tr>
<tr>
<td>Portugal</td>
<td>41.6</td>
</tr>
<tr>
<td>Slovenia</td>
<td>35.0</td>
</tr>
<tr>
<td>Sweden</td>
<td>6.6</td>
</tr>
<tr>
<td>Switzerland (French)</td>
<td>12.9</td>
</tr>
<tr>
<td>Switzerland (German)</td>
<td>14.2</td>
</tr>
<tr>
<td>Switzerland (Italian)</td>
<td>17.0</td>
</tr>
<tr>
<td>United States</td>
<td>21.0</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>23.2</td>
</tr>
</tbody>
</table>

*These are individuals who scored at Level 1. Level 1 indicates someone with very poor skills, where the individual may, for example, be unable to determine the correct amount of medicine to give a child from information printed on the package.

the benefits of such an investment. The costs of investing in education include the direct costs such as tuition and foregone earnings. The benefits are the higher future lifetime earnings workers will obtain (discounted at some appropriate rate) given the higher productivity that results from their education investments. As workers age, their human capital investments are more likely to be acquired through workplace or government training rather than formal schooling, as the opportunity costs of leaving employment to go back to school rise and the horizon over which they can recoup these costs gets shorter.

However, investments in workplace training differ from other forms of human capital investment such as education since there are at least two parties participating in the training decision – the worker (who may or may not be represented by a union) and the firm. These two parties may differ greatly in their levels of risk aversion, time horizons, information on the labor market, access to capital markets and preferences. Workers will make decisions about the returns to investing in training using similar tools to the investment decision of acquiring more education. They will compare the costs of acquiring the training (for example, accepting a lower wage during an apprenticeship) with future benefits (higher earnings and more job security). Employers who wish to upgrade the skills of their workforces have two choices – ‘make’ the skills in-house through training incumbent workers or ‘buy’ the skills from outside via employee recruitment. Their goal is to increase output and raise productivity but not incur costs of training (including direct costs plus higher wages paid to workers after training) that are more than productivity gains achieved. If employee turnover is high, firms may be reluctant to train workers in-house. In addition, if employers train workers in skills such as those associated with information technology that are also valuable to other employers, firms run the risk of having newly trained workers hired away by another employer. This poaching problem may cause firms to invest only in non-portable firm-specific skills rather than more general training. Smaller firms may well face higher training costs per employee because they cannot spread these costs across a larger number of employees. Finally, as detailed in Bartel (2000), most employers do not understand specific cost-benefit analysis of their training investments. As a result of all these issues, employers may end up investing in a sub-optimal level of training.

Since the training investment for incumbent workers is a two-party decision, even if workers want and need training, this is no guarantee that they will actually be able to obtain it. Under human capital theory, employees who have already shown an aptitude to learn new skills by having completed more years of schooling are more likely to receive additional human capital investments provided by an employer. This theoretical assumption
has been confirmed in empirical research, where it has been shown that firm-provided training is much more likely to be obtained by more educated employees (Lynch 1992). This creates both a ‘virtuous’ cycle and a ‘vicious’ cycle of human capital accumulation. Individuals who acquire more schooling are also more likely to receive post-school training from their employers. None of this would be a problem if workers just made up this skills deficiency by acquiring training or education on their own outside work. However, capital markets are far from perfect, and workers differ from employers in their attitudes towards risk and time horizons. In addition, as workers age, the costs of investing in education and training rise since the horizon over which they can reap the return is shorter (Bartel and Sicherman 1999). As a result, there may be a market failure in the provision of general training so that a smaller fraction of workers is trained in more general skills than would be optimal.

Stevens (1996) and Acemoglu and Pischke (1998, 1999) extended the standard human capital models of Becker and Mincer and showed market failures in the provision of general training in the context of imperfection competition. More specifically, Acemoglu and Pischke discussed how a firm can exhibit ex-post monopsony power and as a result workers decide not to invest in general training because they realize that part of the return will be appropriated by the firm. So workers could end up not investing in general training even if they were not credit constrained. Acemoglu and Pischke (1998) argue that there may be multiple training equilibriums – low training and high quit rates or low quit rates and high training, with the US representing a high quit rate and low training equilibrium and Germany and Japan representing a low quit rate and high training equilibrium. Booth and Chatterji (1998) argued that unions in this context of firm ex-post monopolistic power can increase social welfare by counterbalancing such a firm’s power in wage determination. As a result, local union–firm wage bargaining ensures that the post-training wage is set sufficiently high to deter at least some quits so that the number of workers that the firm trains is nearer the social optimum.

Not surprisingly, one reason cited for the increased demand for learning by workers is the rapid rate of technological change including information and communication technologies (ICTs). One group particularly vulnerable to changes associated with ICTs is older workers. If ICTs increase the depreciation rate of both physical and human capital due to obsolescence, and the payoff period to investments in human capital is shortened, older workers may become more marginalized in the workforce. In addition, as discussed by Williams and Murray (2007), there is evidence that there can be significant levels of literacy skill loss in adulthood. They find for Canada that some of this loss can be eliminated if workers receive additional
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training and education after they leave formal schooling. Therefore, for advanced industrialized economies that want to compete globally on skills it will be critical how they refresh, expand and redeploy the job skills of the growing numbers of mid- and late-career workers.

Human capital theory does not provide an unambiguous prediction of the effect of technological change on the optimal level of on-the-job training. As discussed by Bartel and Sicherman (1999), technological change may be positively or negatively correlated with training. The eventual sign will be determined by the degree of complementarity or substitutability between schooling and training and the impact of technological change on the marginal returns to training. In addition, new technologies themselves may lower the cost of providing training to workers. With marginal costs of training potentially being as low as zero, smaller firms may be able to overcome one of the obstacles they face in investing in their employees.

3 Empirical evidence: returns to post-school human capital investments

Since economic theory suggests that there can be a market failure in the provision of more general training, policy makers should be concerned about the capacity of the marketplace to generate sufficient skills training, especially those skills that are likely to be portable across employers. In Europe a key feature of the European Union’s Lisbon strategy is expanding investment in education and training of workers. However, empirical evidence across countries suggests that there are many workers who would like and/or need more training who are not currently receiving it and that there are large variations across countries in the probability that a worker will actually receive training (OECD 1999, 2004; International Labor Organization 1998b). For example, as shown in Table 4.2, Swedish employees are approximately 4.5 times more likely than French employees to have participated in education or job training annually. This is in spite of the fact that, as shown in Table 4.1, skills of Swedish workers are considerably higher than in many other European countries.

More generally, Table 4.2 shows that there is significant variation across the EU in the likelihood that workers will have participated in any education or training. Leuven and Oosterbeek (1999) examined the demand and supply of training in Canada, the Netherlands, Switzerland and the US and found that one in five workers in the Netherlands reported that they were not receiving the training they needed, one in four in the US reported they were undertrained, almost 30 percent of workers reported insufficient training in Switzerland, and one in three Canadian workers responded that they were not obtaining sufficient workforce development training. In addition, as summarized in Lynch (1994) and the ILO’s World Employment Report, 1998–99, workers typically less likely to receive employer-sponsored
training include women, minorities and those employed in the informal sector.

This variation in the proportion of workers receiving post-school investments in human capital is striking given the empirical evidence (Lynch
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that suggests workers who receive training have higher wages (10–26 percent) and the returns to employer-provided training appear to exceed the returns to a year of college. Displaced workers with greater amounts of multi-skilling in their pre-displacement job suffer smaller subsequent wage losses (Kuhn 2002). Unfortunately not all workers are equally likely to receive employer-provided training. As summarized in Lynch (1992, 1994) and Lynch and Black (1998), more educated workers get more employer-provided training as do employees working for larger employers, unionized workers and male workers. These results hold for the US and most European countries. Both Lynch (1994) and Bartel (2000) found that private-sector training seems to raise the productivity of employees significantly in cross-section analysis. The results become more ambiguous when attempts to control for self-selection in training are taken into account. There are at least two factors that may bias estimates on the returns to training. First, it may be the most able workers who receive training and so part of the return to training is just unmeasured ability. Second, better employers may be more likely to provide training so what appears to be a return to training may just be a reflection of a better-run organization. If training were extended to all workers and all firms, we might not expect to see the same large returns to training if this self-selection bias is large.

These findings have been used by some legislators to justify proposals to provide permanent tax relief to employers who train their workers or to provide additional tax relief for small employers who train. In some countries it has been used as a justification for ‘pay or play’ training taxes. In the US, however, there has been little change in training policy in spite of numerous reports, commissions, employer organizations and unions that have called for policies to increase skills training. In addition, in Europe there is now systematic annual data collection on the amount of adult education and training that occurs, while in the US there is no annual survey of households or firms that would allow us to track how training investments by employers or workers have changed in response to supply and demand shocks – including technology and trade. This is a large deficit in our understanding of trends in this area.

If a worker has lost her job, then she needs to look for training elsewhere. In addition we know that employers are not investing in low-skilled workers, so the government becomes a critical source of skills training for employed but low-skilled workers and the unemployed. Here the academic research has been very informative and influential for policy makers (Heckman et al. 1999). In particular, the use of random assignment to evaluate the effectiveness of the US Job Training Partnership Act’s (JTPA) programs for disadvantaged adults and out-of-school young workers has been extremely important. Apart from the merits of using
random assignment to better evaluate these training programs, an advantage of this methodology is that it is easy to produce simple tables with two columns of results for treatments and controls. There is no need to talk about propensity scores, standard errors, selection bias and so on. This has made the random evaluation studies very accessible to a broad audience of non-economists.

In general, research has suggested that JTPA training for out-of-school youth was largely ineffective relative to JTPA adult training. The policy and budgetary response to this research finding was rapid and sharp. Congress enacted a significant shift of federal training funds away from youth and towards adults during the 1990s. At the same time, evaluation studies of the US Job Corps produced a more optimistic assessment of this type of youth intervention program, especially when outcome measures were broadened to income welfare receipt, arrest rates and jail time, along with the usual outcomes of employment probabilities and weekly earnings. Some researchers have interpreted the discrepancy in findings between the return to JTPA and Job Corps for youth as an indication that you get what you pay for – JTPA was a relatively inexpensive program, while Job Corps is much more expensive. However, in the policy world this interpretation of these studies has not translated into a massive expansion of Job Corps. It is always easier to cut than to add programs, especially in an era of tightening budget constraints for non-military discretionary spending.

For adult workers there is more promising evidence that government training programs work – especially certain types of programs and for specific demographic groups. In particular, work by Jacobson et al. (2005a, 2005b) showed that classroom training for displaced workers – especially in math/science and health vocational – has a significant impact on wages and employment. They argued that ‘old dogs can learn new tricks’ and these workers’ newly acquired skills do not seem to depreciate over time. In other studies (US Department of Labor (DOL) 1995), returns to training for displaced workers seem to be higher than those disadvantaged adults, especially males, experience in their training programs. In addition, on-the-job training for disadvantaged women is cost-effective along with classroom training.

There seem to be some common features in what makes some government training programs more effective than others. For example, smaller programs work better than larger programs because they can better tailor program content to specific needs of participants (US DOL 1995). Working with training providers who are well connected with local employers improves the training outcomes (US DOL 1995).

The evaluation evidence on displaced workers programs relative to training for disadvantaged adults in the US has had a significant impact
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on policy makers’ funding priorities. Federal government funding for adult training in the United States (this also includes out-of-school youth in the JTPA years) has declined steadily since 1985 (Lynch 2005b). It fell most sharply in the mid-1990s, driven by the evaluation results on youth JTPA training programs. However, since 1994 the share of training funding for displaced workers has risen sharply. Again, this was influenced by more positive findings on the returns to training of displaced workers and a growing need to help permanently displaced experienced workers find employment in expanding sectors of the economy.

4 Policy responses: a general framework

Given the possibility of a market failure in the provision of human capital to workers, governments have formulated policies to increase investments in worker training. However, there is little consensus on how to share training policy responsibility across levels of government, and what roles training providers, employers and workers themselves should play in decision-making about job training. One of the biggest issues is where policy making authority and financial responsibility for worker training should be concentrated – the national, regional, sectoral or local level. In theory, there are arguments for and against almost any imaginable degree of centralization in who pays and who decides. For example, in the US during the 1950s and 1960s, federal manpower programs proliferated to produce a confusing array of training efforts run by different agencies, for different clients, with different permutations of federal, state and local funding and authority. The norm, however, was substantial federal funding but state or local implementation.

Whether nations, regions, sectors or local interests take the lead on the public side, workforce investment involves at least four other players: training providers, employers, organized labor and individual workers. Defining their respective roles and responsibilities is a perennial issue in training policy and a workforce development system that ignores any one of these players would rapidly and dramatically fail. In practice, debates on the focus and structure of training programs always turn on questions of balance – how much, and how, to incorporate the interest of and the information commanded by each party (Lynch 1994).

To better understand these practical debates, consider for a moment the impractical extremes as described in Donahue et al. (2000). Assume a simple-minded training system that relied only on the judgment and motives of individual trainees, with no role for employers or training providers, and one which only provided vouchers or individual tax incentives for training. An advantage of this model is that the trainee would have to choose the training that is right for her. She would presumably avoid training
in obsolete skills or training providers that are ineffective or (unless her voucher is unlimited) wasteful. But an individual trainee might not know what skills are in demand or she may have too little information to distinguish between effective and ineffective providers. So to the extent that workforce policy puts individuals in control, the role of government becomes one of defining eligibility and assuring access to reliable information about the market for skills and the performance of training providers.

Now assume that government-supported training is limited to providing grants or tax incentives to subsidize workforce investments chosen exclusively by the private sector. A clear advantage to this strategy is that employers have better knowledge about the demand for skills. They may also be able to provide training more efficiently by integrating it with their other operations or procure training cheaply through hard bargaining with providers in ways that an individual cannot. In addition, some skills such as the ability to function as part of a workplace team may be hard to deliver outside the workplace. Unfortunately, the problem with this government-funded training strategy is that employers may be tempted to use public resources to train workers in firm-specific skills rather than more general skills training. In this case, the role of government would be to try to ensure that public resources supplement rather than substitute for private resources.

Finally, imagine that the government promotes workforce investments by sending resources to schools, community-based organizations and other sources of training (excluding employers) and counts on them to do useful things with the money. This could be a simple and direct way to get training done, but it also has some fairly fundamental defects. For example, providers may do a poor job at developing appropriate skills, especially if they are not familiar with rapid innovations such as we have seen in information and communication technologies. They make decisions about which trainees to accept, which skills to concentrate on, and how long training should last based on their own convenience rather than the needs of employers or the interests of workers. So to the extent providers are at the center of workforce policy, government needs to have the data and the analytical capacity to distinguish between efficient and inefficient providers and some way to ensure that training content is appropriate for current market needs.

While the goals of publicly funded and privately funded training programs are not always the same, there are some common features in the best practices for delivering training across the public and private sectors. First, there should be a detailed needs analysis completed before any training intervention occurs. In the public sector, this needs analysis would examine at the local, regional or national level specific labor market needs and gaps
to ensure that training is targeted at those jobs with the greatest potential to expand and provide career advancement. One of the better ways to ensure this is the establishment of partnerships between local employers, community-based organizations, and training and education providers so that the training programs are responsive to the increasing rate of change in technology and demand. For the private sector, this needs analysis would identify the skills currently lacking in the firm and the best way to meet those needs – hire new skilled workers or retrain current employees in specific areas of deficiency.

The second step in the successful delivery of training is the design of the training program. The public sector needs to determine how much of the design it should do itself versus allowing more competition among public and private vendors to design the program. One risk with only relying on the private sector to design training programs is that the programs will be designed to meet areas of expertise of the private vendor rather than the specific needs of the targeted training group.

The next step is implementation of the training program. The public sector needs to decide to what degree it will rely on the private sector to bid on training programs that the government sector may have designed. In the private sector, employers need to decide to what degree they will conduct training in-house, on-the-job, off-the-job, or using outside vendors, and how to time the training to minimize disruption to production.

Finally the establishment of a set of performance measures is critical for the success of any training system. Without better measurement of the amount and quality of training being provided in an economy, it is difficult to evaluate the effectiveness of training. With poor data, public policy can end up being driven by what is easy to measure rather than what is needed to be measured. It also makes it much more difficult to create a training system that is sufficiently flexible to adapt to changes in the workplace so that it continues to meet the needs of workers and employers.

Innovation in information and communication technologies could, in principle, be a powerful tool to help workers acquire the skills to keep up with changes in technology. For small firms, the development of distance learning may go some way to lowering the marginal costs of training workers. Computer-based learning can also potentially address a second deficit that many unskilled workers face – the time deficit. In the face of falling hourly wages, many unskilled workers have taken second jobs or increased their hours of work to try to maintain standards of living. What this means though is that they have little time outside of work to engage in new learning activities. For women, this can be especially difficult as many finish the paid work day and return home to start the ‘second shift’. But a pressing policy issue seems to be how to get unskilled workers who are
not computer literate sufficiently ‘skilled’ so that they can take advantage of additional training through the Internet. At the moment information technology is more likely to play a role in skills development along the skill ladder rather than in basic skill development, which still remains more person-to-person intensive.

5 Policy responses: specific examples
Countries have tried a wide range of policies to influence the amount of training provided to different types of workers – economically disadvantaged, workers displaced by trade and technology, and specific demographic workers that have been historically under provided. In the US most federal training monies have gone to those out of employment, while in Europe an increasing amount of assistance to support training has gone to those at risk of losing their jobs and for apprenticeship training. While the need to retrain a worker who has become unemployed and does not have sufficient skills to find new employment at a decent wage is compelling, restricting government subsidies to those out of work does a poor job of raising the skills levels of an aging workforce. At the same time, governments need to ensure that providing training support to workers in employment does not end up just funding training that employers would have undertaken anyway. The following discussion outlines some specific mechanisms by which governments have attempted to raise the amount of money invested in post-school training.

Training levies A training levy or tax is an approach that has been used in France, Korea, Australia, Singapore and Hungary. Training levies are potentially useful in that they can set a level playing field across employers in terms of the investment that they make in their employees. This would overcome concerns about the poaching of trained workers and, in theory, raise the overall level of training. However, if the rate is set too high, employers may protest by calling it an ‘unfunded mandate’ and a burden, especially on smaller employers who are struggling to establish their businesses. At the same time, if the rate is set too low, then it will do little to affect the overall level of workforce development investments. In practice, the tax can be manipulated and quickly revert to an exercise in creative accounting. In France, employer-provided training, even after the training levy, was found to be still more likely to be acquired by skilled workers in large firms rather than unskilled workers in smaller firms (Lynch 1994).

Training funds Another strategy that some unions have pursued at the national level in Europe (for example, in Denmark and the Netherlands) and at the sectoral level in the US (in telecommunications and auto) is to
establish training funds through the collective bargaining process. This has had a positive impact on the training of workers, especially those covered by collective bargaining agreements (Bassanini et al. 2007). But in those countries with a substantial informal sector or low union coverage this strategy will have a limited impact.

In the US much of federal training policy has devolved to the state and local level. During the economic expansion of the 1990s states increased their spending on workforce development dramatically, with many establishing training funds financed by a training tax associated with employers’ unemployment insurance tax payments. The California Employment Training Panel established in 1982 and the Massachusetts Workforce Training Fund established in 1998 are examples. Employers and other appropriate groups can apply to these funds for training targeted at employed but at-risk workers. At the same time many states have encouraged greater collaboration between employers and community colleges to develop training modules and educational options for workers (Parker 2007).

**Paid training leave** ILO Convention 140 calls for countries to provide paid educational and training leave. While only 32 countries have ratified this Convention to date, we do see in some European countries legislation that provides workers with the right to paid training leave or support for training leave that is part of collective bargaining agreements. The advantage of this approach is that workers can choose to take the leave and select the courses they feel would be most relevant for their skill development. However, such leave is usually relatively short in duration. In addition, if a firm needs to raise skills for a group of workers (for example, introduce a new technology or improve team skills including problem solving), a training leave policy may not be the most appropriate mechanism for ensuring that this training happens.

**Tax rebates and deductions** Many industrialized economies allow for immediate and full tax deductibility of training expenses incurred by firms. But firms’ financial statements provide little or no indication of the value of these knowledge investments for the bottom line of the company (O’Connor 1998). Some countries have tried using targeted tax incentives directed at smaller firms or specific categories of workers to stimulate more training. Depending on the way in which the tax incentive is structured, firms may or may not take advantage of it. This type of incentive to train is particularly problematic for smaller and new firms since they are more likely to face cash flow problems. Receiving a tax rebate 12 months after incurring an expense may be too little, too late. If a company is not making any taxable profit, the benefit of a tax deduction is again limited.
An interesting example of how tax policy can be applied to stimulate employer-provided training, especially of older workers, can be found in the Netherlands. As detailed in Leuven and Oosterbeek (2004), in 1998 the Dutch government introduced changes in its tax law that included an extra deduction of 20 percent of employers’ training expenditures from their taxable profits (training costs are already expensed), a second deduction for training expenditures meant to stimulate training by small and medium-sized employers, and a third deduction of 40 percent for training costs made for workers aged 40 years or older. The training costs that can be deducted have to be relevant to the current job function of the trainee. This is a common feature of tax rebates and can be limiting if the purpose of the training is to place an employee in a different function or occupation. Leuven and Oosterbeek (2004) found little evidence that these tax changes stimulated additional training, even for older workers, although the period over which they followed changes in employer-provided training was relatively short. As Holzer et al. (1993) have discussed, these types of rebates can often just be a windfall gain to employers and a subsidy on the part of the government to the private sector for training that would have occurred anyway.

Alternatively, one can attempt to stimulate the demand for training and education by allowing for individual tax deductions. For example, in the US there is a wide range of tax exclusion of scholarships, fellowships and the value of reduced tuition; education tax credits; deduction of student loan interest; tax-advantaged education saving accounts; and deductibility and exclusion of employer-provided education expenses. There have been almost no evaluations of how these types of policies stimulate training investments, with the important exception of Leuven and Oosterbeek (2004). They showed how changes in Dutch tax law that allowed workers to deduct training costs from their income taxes resulted in significantly larger investments in education and training. How such policies interact with training leave policies has not been examined empirically.

**Individual training accounts** A number of countries have experimented with providing training subsidies in the form of vouchers or training accounts to individual workers. As discussed in Bassanini et al. (2007), training vouchers have been made available in Austria, Italy and Switzerland, while individual learning accounts, consisting of saving accounts that can be opened by individuals to fund training activities with contributions from third parties (government and employer), have been tried in Canada, the Netherlands, the Basque region of Spain, the United Kingdom and the United States. The experience with these types of vouchers or training accounts has been mixed. For example, Bassanini et al.
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(2007) reported that the training vouchers in Italy and Switzerland were used primarily by the most skilled workers and rarely used by lower-skilled individuals.

As part of the US Workforce Investment Act (WIA), individuals who were deemed eligible for training support under WIA were given individual training accounts so that they could purchase training directly from approved training providers. By giving workers more discretion over where and what kind of training they acquire, the hope was that the returns to training would rise. Local workforce boards, of which there are more than 600 in the United States, in partnership with their states, compile a list of names of approved training providers. In principle, local workforce boards should monitor the quality of training provided so that workers have better information on which training programs work best. However, a recent study by the US General Accounting Office (now the Government Accountability Office) (US General Accounting Office 2003) indicated that there are some difficulties in administering these individual training accounts. In particular, many boards complain about a lack of good performance data on training providers. For more remote locations there may a limited number of training providers. In addition, if local workforce boards rely on educational institutions with a fixed academic calendar to provide classroom training, there may be some significant timing constraints on when training is provided relative to workers’ needs and availability. While vouchers and training accounts that pay for the direct costs of training provide much more choice to workers, they do not cover the income lost by individuals enrolling full time in training and education programs. For older workers seeking training, this opportunity cost of training is likely to be very large and a more significant determinant of whether or not they avail themselves of these training subsidies.

6 Conclusion

Training is not a magic elixir that can address all the challenges of wage inequality and productivity growth. However, there is a growing body of literature suggesting that post-school investments have a significant impact on wages and productivity. Unfortunately, while there is now systematic and coordinated data collection on the incidence of adult education and training in the European Union, there is no such effort in the US. But even the statistics gathered in the European Union make it difficult to evaluate the effectiveness of training programs, since the measures are usually on the incidence of training rather than the intensity and type of training program. As governments choose between various mechanisms to stimulate training for their aging workforces, it will be critical to improve the state of information on what works and what does not in lifelong learning.
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