

Federal Reserve Bank of Cleveland

# Government-Subsidized Training: A Plan for Prosperity?

by Charles T. Carlstrom and Christy D. Rollow

Should the United States do more to increase its workers' skills? Many say it should, arguing that subsidized training helps countries maintain flexible, productive workforces in the face of technological change and global competition. As Commerce Secretary William Daley has noted, "We must ensure our nation has a highly trained workforce to capture the vast potential of information technologies."<sup>1</sup> Industry trade organizations bolster this position by claiming that labor shortages in high-tech industries are critical.

This apparent shortcoming has led the Clinton Administration to propose several initiatives. The 1997 Balanced Budget Act established the HOPE scholarship fund, giving most working families a tuition tax credit of up to \$1,500 per student for postsecondary education and training. Its purpose is to give workers an opportunity to develop new skills and to retrain.

President Clinton has also proposed creating the "best information technology workforce in the world" by financing computer-related and retraining programs to meet the "exponentially increasing demand for information technology experts."<sup>2</sup> He also hopes to increase education by continuing to exclude from income the value of employer-provided educational benefits through the year 2000 and by providing a new tax credit for small firms that give such assistance. But is the present level of training really insufficient?

## Investment and Training

It's hard to say whether there is already enough training, since the answer depends on how much future benefit more training is likely to yield. For example, if it costs \$100 to give a worker training that improves his productivity by \$10 each year thereafter, then the rate of return to training is about 10 percent.<sup>3</sup> If the firm's cost of borrowing is less than 10 percent, then it should provide training, since only part of the training proceeds will go to pay off the \$100 loan.

A rate of return higher than the cost of borrowing is a sign that training may be underprovided. Unfortunately, actual rates of return are hard to obtain because they depend on estimates of training costs and benefits. Expenditures on formal training, which is believed to yield the greatest benefits in terms of higher productivity, ranged from \$30 to \$55 billion in 1989.<sup>4</sup> Estimates of the rate of return for formal training were more precise, ranging from 16 to 36 percent annually.<sup>5</sup>

Estimated returns at both ends of this range substantially exceed the cost of borrowing, which suggests that the training level is inadequate. These estimates assume that workers remain with the same employer, but what about those who don't? If the skills they are taught are not firm-specific but portable across firms, then workers who leave right after they finish training would produce a zero rate of return for the firm. Accordingly, these estimates are meaningful only if a worker's increased productivity is the same whether he remains with the firm or transfers to another.<sup>6</sup>

**Analysts often maintain that without government subsidies, worker training in the United States is insufficient. But is it possible that firms' incentives are already in synch with the social costs and benefits of training?**

Human capital theory separates worker education and training into two broad categories: firm-specific and general. General training can be applied to a wide variety of jobs and industries, but firm-specific skills cannot. If half the workforce leaves after firm-specific training, then the actual rate of return is half the estimated one. The impossibility of distinguishing clearly between firm-specific and general training makes calculating the rate of return even more problematic.

This *Economic Commentary* takes a different route, examining whether economic theory's projections about the optimal training level are in obvious disagreement with the facts. The answer boils down to whether firms' incentives to train workers align with the social costs and benefits.

They certainly wouldn't align if training yielded benefits not captured by the firm. For example, society subsidizes general education, partly because of its alleged externalities. In other words, although a person gains from receiving an education, society also gains if that person becomes a "better citizen" in the process. Are similar externalities associated with on-the-job training? It may be a stretch to

**TABLE 1 TRAINING PER WORKER**

	Hours of training		
	Total	Formal	Informal
<b>Establishment size</b>			
50–99 workers	40.1	8.2	31.9
100–499 workers	48.0	13.5	34.5
500 or more workers	42.6	16.6	26.0
<b>Turnover rate</b>			
Low	46.3	27.3	19.0
Medium	45.9	15.6	30.4
High	41.8	7.6	34.2

**TABLE 2 WORKERS WHO RECEIVED TRAINING FROM CURRENT EMPLOYER (Percent)**

	Formal	Informal
<b>Job skills</b>		
Management	28.4	32.3
Professional and technical	30.9	27.7
Computer procedures, programming, and software	38.4	54.3
Clerical and administrative support	18.7	30.1
Sales and customer relations	26.6	30.9
Service related	12.5	14.7
Production and construction related	21.0	34.1
	<b>Formal</b>	<b>Informal</b>
<b>General skills</b>		
Basic	6.7	2.9
Occupational safety	58.0	47.7
Communications, employee development, and quality training	40.2	32.6
Other	3.4	0.8

**NOTE:** Workers in firms employing 50 or more, surveyed May–October 1995.

**SOURCE:** U.S. Department of Labor, Bureau of Labor Statistics, *1995 Survey of Employer-Provided Training*, USDL 96–515, December 1996.

argue that training creates a better citizen, but it almost certainly creates a more productive worker. On-the-job training differs from general education in that its benefits are internal to the firm and directly influence its decision to train workers. Thus, with all the benefits internalized, neither under- nor overinvestment in training will necessarily follow.

### ■ Firm Size, Turnover, and Training

Many believe labor mobility keeps firms from providing enough training. After all, firms cannot recoup training costs if workers change jobs (see table 1). This perceived problem is particularly acute for high-turnover firms, which spent 7.6 hours per employee providing formal training over a recent six-month period versus 27.4 hours for low-turnover firms.<sup>7</sup> The difference is remarkable given that, on average, new hires need extensive training—6.1 hours in the first month and 21 weeks to train fully. This difference is even greater in small firms (50–99 employees), which tend to have

higher turnover than large ones. As a result, small firms provide less than half as many hours of formal training as large firms over a six-month period: 5.7 hours compared to 12.1 hours.

The fear that high-turnover firms train too little has prompted many countries to subsidize worker training in such businesses. (Japan, for example, pays half the cost of hiring teachers and purchasing course materials for small firms.) Although high-turnover firms provide less training overall, it is unclear whether this amount is socially inefficient. To decide if additional training would be beneficial, it is therefore important to understand whether a firm's incentive to train aligns with society's. The answer depends on the relationship between wages and training.

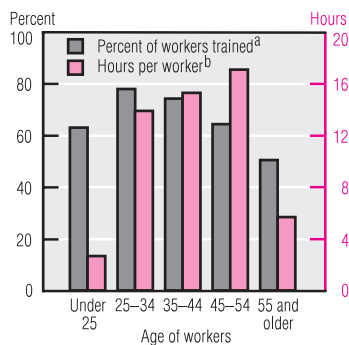
According to basic economic theory, competition guarantees that a worker will be paid the value of his marginal productivity—that is, the amount produced in the last hour worked. This means that during training, a worker's

wage will equal his marginal productivity less the training costs. When a worker's wage is reduced by the costs of training, he is said to be paying for training costs. If a worker's wage does not fall by the amount of these costs, then the employer is paying at least some of them. But to say that "a firm pays for the costs of training" is inaccurate. Initially it may, but over time workers pay back the "loans" by earning less than their marginal productivity.

Because general training is portable, workers must pay for it; otherwise they could quit without repaying the firm for the implicit loan. After all, the increased productivity and wages due to general training would also occur in alternative jobs. If workers did indeed pay for their training, then they would effectively decide whether—and how much—training they receive; the firm would be indifferent to providing general training. A worker's desire for training would depend on its costs compared to its future benefits, and there is no reason to suspect that the amount of training would not be socially efficient. There also should be no relationship between turnover and training.

Unlike general training, firm-specific skills are not easily transferred across firms. Because a worker's productivity in his current job is greater than it would be elsewhere, competition no longer guarantees that employees will pay training costs. In fact, because workers prefer a constant wage to one that varies over time, employers will tend to pay for firm-specific training. That is, workers take out implicit loans from firms, which they repay in terms of lower wages while they work there. If loan markets were perfect, these loans would be made through banks, and workers would still choose the optimal amount of training. Financing the loans through firms rather than banks does not change this basic equation.<sup>8</sup> The employer bears the training cost, while the benefits to the firm (by way of implicit loan repayments) and to society (by way of increased productivity) accrue as long as the worker remains with the firm. Although high-turnover businesses will provide less firm-specific training for their employees, this is efficient because the productivity benefits to employees cease once they leave.<sup>9</sup> It also explains why high-turnover firms give their workers less training.

**FIGURE 1 FORMAL JOB TRAINING**



a. In the 12 months prior to the survey.  
b. May–October 1995.

**SOURCE:** U.S. Department of Labor, Bureau of Labor Statistics (see footnote 7).

So far, our analysis has found no reason to believe that training is suboptimal, but this conclusion depends heavily on economic theory and its predictions. Studies indicate that employers tend to pay for firm-specific training. Contrary to theory, however, they typically pick up the costs of general training as well, since jobs with large initial general training requirements do not have lower starting wages.<sup>10</sup> If they are indeed helping to pay for general training, then the amount of training provided by firms—particularly high-turnover ones—may be suboptimal. This is because firms reap the benefits of training only while the worker is employed there, but benefits for the worker and society continue after separation.<sup>11</sup>

While the amount of general training may be insufficient, human capital theory and supporting data suggest that firm-specific training is probably being optimally provided. So, should society provide blanket training subsidies? The problem is that doing so would encourage both types of training, particularly an excess of firm-specific training.

One alternative is to support only general instruction, but its distinction from firm-specific training is often unclear. Therefore, even the conclusion that firms are paying for part of general training may be suspect. Economists often assume that training conducted on company premises is firm-specific, while company-sponsored training delivered outside the work environment is general. This distinction is somewhat arbitrary, as is that between general and firm-specific training. Most training is probably a mixture of the two.

We go on to examine the argument that training subsidies are necessary in a society undergoing rapid technological change which requires up-to-date skill levels. Technological change is often cited as a reason for training levels' inadequacy, which is essentially the Clinton administration's view. To analyze it, we assume that all other training is being optimally provided.

### ■ Age, Technology, and Training

The Administration's argument has it that, without government assistance, the U.S. workforce will lack the technical skills to move the country forward economically. According to this argument, the absence of on-the-job training in an environment of rapidly advancing technology would result in very slow improvement of workers' skills, which would be updated only as young, freshly trained workers entered the labor market. This view, however, assumes implicitly that workers are not learning new skills after they leave school.

While our data don't show that firms fail to provide the optimal level of technological training, they do suggest that, in order to accommodate the demand for new skills and technologies, formal training is often delivered in the workplace (see table 2). Some 38 percent of employees received formal computer-related training and 54 percent received informal training during their tenure with their current employers.<sup>12</sup> Occupational safety was the only skill area with a higher incidence of training, but it was of short duration—for formal training, only 0.6 hour per employee between May and October 1995. At 5.1 hours, computer training clearly dominates.

A related argument is that computer training is provided primarily to younger workers, who need it the least because they've been prepared by recent schooling. In contrast, students a generation ago received little or no such education, and it is argued that today's older workers rarely receive the computer instruction they need.

The lack of data makes it hard to say how computer training is allocated among different age groups. Given the importance of computer training, however, we consider instead the total amount of training being provided to older workers, who receive the least employer training of any age group (figure 1). The proportion of workers who get formal training during a

12-month period declines with age—from 79 percent of those aged 25–34 to just 51 percent of those 55 and older. The only exception is for workers under 25, who get less training than their slightly older counterparts.

These data fuel the argument that older workers seldom receive the training they need to update their skills, a conviction shared by many throughout the world. Japan is among the countries that provide subsidies to encourage firms to train workers over 45.<sup>13</sup>

The lower training level for older workers may seem inconsistent with the notion that most training results from technological change. It is, however, consistent with human capital theory, which suggests that younger workers invest more heavily in general education and training early in their careers, to maximize the time available for enjoying the benefits. However, additional training and education are needed as a worker's skills depreciate over time.

### ■ Conclusion

One of the most important questions about employer-provided training is whether government should subsidize it. The issue is especially germane in light of the increasing demand for highly skilled workers, the aging of the population, and recent proposals urging government involvement.

Unfortunately, without supporting evidence it is hard to say conclusively whether the optimal amount of training is being provided. Economic theory suggests that the usual arguments for subsidies do not apply, but opponents argue that this theory may not be correct. Plainly, more work—especially empirical work—needs to be done, but where does this leave policymakers? Without clear evidence, the answer depends largely on faith in economic theory. Had we started by assuming that more training is necessary, we would not have done much to change anyone's opinion. Having taken a purely agnostic approach, however, our best (though imperfect) guess is that training is being optimally provided.

### Footnotes

1. See "Office of Technology Policy," <http://www.ta.doc.gov/PRel/pr01121998.htm>, 1998.

2. See "Press Release of Vice President Al Gore's Announcement," <http://www.policy.com/issuewk/98/0126/012698f.html>.

3. This figure is approximate because the \$10-per-year benefits are for a finite period.

4. See U.S. Congress, Office of Technology Assessment, *Worker Training: Competing in the New International Economy*, OTA-ITE-457. Washington, D.C.: U.S. Government Printing Office, September 1990, chapter 3; or see <http://www.wws.princeton.edu/cgi.bin/byteserv.prl~ota/disk2/1990/9045/904505.pdf>.

5. See Ann P. Bartel, "Training, Wage Growth, and Job Performance: Evidence from a Company Database," *Journal of Labor Economics*, vol. 13, no. 3 (July 1995), pp. 401–25.

6. Another problem is that estimated rates of return apply to a group of workers. The question of whether more training should take place depends on the rate of return for the next worker trained. Since the first workers trained are the ones likely to have the highest productivity gains, this rate of return is likely to be substantially less than the estimated one.

7. Unless otherwise noted, the data we cite are based on U.S. Department of Labor, Bureau of Labor Statistics, *1995 Survey of Employer-Provided Training*, USDL 96–515. Washington, D.C.: U.S. Department of Labor, Bureau of Labor Statistics, December 1996. This survey of establishments with 50 or more workers was conducted from May to October 1995.

8. The statement that training is optimally provided is for a given amount of turnover. Since there is an excess of turnover, more training would be optimal only if turnover decreased. Training subsidies, however, would have little effect on turnover.

9. The firm can pay the entire training cost if the worker's wage (his productivity after training minus the "loan payback") exceeds his productivity if he changed jobs.

10. See Jonathan R. Veum, "Training, Wages, and the Human Capital Model," National Longitudinal Surveys Discussion Paper, Report No. NLS 96–31. Washington, D.C.: U.S. Department of Labor, Bureau of Labor Statistics, November, 1995.

11. Workers naturally would prefer even more training if the employer paid all costs. However, when they share costs, the firm and the worker must agree on whether the training should be provided. Because firms are paying some of the costs and may not enjoy the benefits, less training would be provided than if workers paid all of the costs. Of course, workers would have an incentive to bribe firms to allow such training, that is, to pay for the training themselves. Why this does not occur is unclear. Without understanding these reasons, we should be cautious in concluding that too little general training is being provided.

12. We concentrated on computer training because data on broader definitions of technical training are not available.

13. See footnote 4.

*Charles T. Carlstrom is an economist at the Federal Reserve Bank of Cleveland, and Christy D. Rollow is a research associate at the Federal Reserve Bank of Richmond. The views stated herein are those of the authors and not necessarily those of the Federal Reserve Banks of Cleveland or Richmond, or of the Board of Governors of the Federal Reserve System.*

*Economic Commentary is available electronically through the Cleveland Fed's site on the World Wide Web: <http://www.clev.frb.org>. We also offer a free online subscription service to notify readers of additions to our Web site. To subscribe, please send an e-mail message to [econpubs-on@clev.frb.org](mailto:econpubs-on@clev.frb.org).*

**Federal Reserve Bank of Cleveland  
Research Department  
P.O. Box 6387  
Cleveland, OH 44101**

**Return Service Requested:**  
Please send corrected mailing label to the above address.

Material may be reprinted provided that the source is credited. Please send copies of reprinted materials to the editor.

**BULK RATE  
U.S. Postage Paid  
Cleveland, OH  
Permit No. 385**