

CHAPTER 7

Employer-Led Training: Extensive and Intensive Approaches

ROBERT I. LERMAN
American University

Week
5

Skills are central to achieving robust economic growth and to reducing economic inequality. When assessing these relationships, researchers usually focus on a narrow range of skill indicators that are easily measured, such as years of schooling completed and test scores. Some of these indicators have been closely linked to economic growth and to the distribution of earnings. In one study, for example, Hanushek and Woessmann (2009) find that variations in math and science test scores across countries have a substantial association with variations in economic growth, but years of schooling have no significant association, once test scores are taken into account. Researchers analyzing inequality generally emphasize the increasingly positive association between years of schooling and earnings, often highlighting the rising earnings gap between college graduates and high school graduates (for example, Goldin and Katz 2005).

Despite the extensive literature linking worker skills to economic growth, few studies measure skills in a comprehensive manner or examine how skills generate the added productivity and economic rewards associated with human capital. Rarely do studies describe exactly how added years of schooling and/or test scores translate into more productive workers who are able to increase value. To perform valuable tasks in the workplace, workers have to become knowledgeable and proficient with the tools and technologies of their occupations and be able to work with other people in their organizations. Several competencies are required to do so. General academic competencies are necessary but often insufficient. Workers typically require occupational skills as well as communication, problem-solving, and teamwork skills. Often they need skills specific to the firm to achieve high productivity.

Schooling, job training, and work experience help workers attain these skills. Vastly more resources are spent in the education sector than

on job training. In the United States, expenditures on all levels of education reached nearly \$1.1 trillion in 2009 (National Center for Education Statistics 2009; see Table 27), while annual public spending on job training is less than \$10 billion (Mikelson and Nightingale 2004).

Government spending on job training in the United States is relatively low in comparison to other countries in the Organisation for Economic Co-operation and Development (OECD). As of 2000, government dollars for training as a percentage of GDP was only 0.04% in the United States, compared with 0.28% in France, 0.34% in Germany, and 0.30% in the Netherlands (O'Leary, Straits, and Wandner 2004). Of course, spending by private (and public) employers on job training may narrow these differentials. Japan, a country with a strong emphasis on training, spends only 0.03% of GDP when one includes only government training dollars. Another comparative study of participation in employer-led training indicates that the United States had participation rates in training above those in Switzerland, the Netherlands, and Canada (Leuven and Oosterbeek 1999). On the other hand, intensity was lowest in the United States.

Employer-led training, both formal and informal, helps workers achieve a variety of skills. High-level worker training such as formal apprenticeships helps firms as well, partly by allowing them to delegate authority to a well-trained workforce. Between the late 1940s and the late 1990s, job training programs among U.S. employers proliferated, rising from less than 20% to more than 70% of organizations (Yang 2006). Although a body of research has documented high returns to workers and employers from employer-led training (Bartel 1995, 2000; Bishop 1997; Parent 2000; Organisation for Economic Co-operation and Development 2004), the data on employer-led training are limited, and the findings have attracted little interest from policy makers.

The nation spends about \$400 billion on postsecondary education, some of which goes toward career-oriented coursework. At the same time, the size of employer-led training investments is highly uncertain because of the paucity of reliable data based on well-structured samples. According to a 1990 study by the Congressional Office of Technology Assessment, "human resource practices in most American firms place a low value on training" (U.S. Congress 1990:13). The study suggests that large firms that might be expected to offer training choose instead to use extensive screening and above-average wages to attract skilled workers. Small firms are said to use training provided by the equipment vendor to help workers adjust to new technologies.

Still
conside
though
the Am
volunta
was abo
2007 to
data fro
representa
sity of f
(Lerma

An
to worl
benefit
Bishop
quent
networ
minica
for the
worker

Giv
benefi
determ
emplo
ing pr
directe
ments
private
for sk
system
emple

De
emple
led tr
surve
train
wher
emple
ing th
mal t

levels of education for Education on job training (4). The United States is relatively low on job training for Economic. As of 2000, only 0.04% of the workforce in Germany and Switzerland were employed on job training with a strong emphasis on one-to-one training. The study of participation in training in the United States had participated in the Netherlands, on the other hand, intensive

helps workers such as formal training to delegate. In the 1940s and the 1950s, training proliferated. Organizations (Yang 1995, 2000) high returns to training. Operation and maintenance are limited, and workers. Secondary education. At the same time, highly uncertain future samples. The Department of Technology and Innovation in firms place a high value on training. It suggests that instead of using skilled workers, the government vendor to

Still, evidence from a variety of available data sources shows that considerable employer-led training takes place in the United States, though often in very short spurts. According to survey data published by the American Society for Training and Development (2009) based on voluntary participation of larger firms, the scale of employer-led training was about \$130 billion per year and about 2.4% of payroll for the years 2007 to 2009. Unfortunately, the federal government no longer collects data from employers on their training activities. The last nationally representative employer survey providing data on the incidence and intensity of formal employer-led training took place in 1997, over 13 years ago (Lerman, McKernan, and Riegg 2004).

An extensive body of research documents the high economic returns to workers resulting from employer-led training (Bishop 1997). Training benefits not only workers and firms, but other external parties as well. Bishop highlights several external benefits, including gains for subsequent employers and for the public in avoidance of disasters as well as network externalities (as more are training in a common means of communication). Moreover, the government generally gains by paying little for the training while reaping tax benefits from the increased earnings of workers.

Given the high returns to workers and firms as well as the external benefits, it is puzzling that policy makers do not place a high priority on determining the size and effects of employer-led training.¹ Spending on employer-led training is much higher than outlays on government training programs, yet far more research and policy attention has been directed toward government programs. One reason may be that governments in the United States have little influence on training efforts by private firms. Another may be that the public role in preparing workers for skilled careers is assumed to fall under the authority of the school system and postsecondary education institutions. A third reason is that employer-led training is difficult to measure.

Despite the absence of nationally representative data drawn from employers, this chapter reviews recent trends and patterns of employer-led training on the basis of data drawn from nationally representative surveys of workers. I begin with a brief look at why employers might train their workers, especially with skills that can be productive elsewhere, then go on to consider prior research on the incidence of employer-led training. The next sections examine new evidence concerning the types of workers who participate in and do not participate in formal training, the intensity and duration of training, and whether

employer-led training has been increasing or decreasing. I pay close attention to one distinctive form of employer-led training—apprenticeship training. Although apprenticeships cover a very small share of all workers, they involve intensive, long-term, and economically rewarding employer-led training. I present evidence of the effectiveness of apprenticeship training from the employer and worker perspectives. In the final section I discuss policy implications and recommendations for enhancing the role of employer-led training in expanding the skills and earnings of American workers.

Why Should Employers Fund Training?

Nearly all discussions of training begin with the work on human capital put forward by Mincer (1958) and Becker (1964). In considering the incentives for workers and firms to pay for training, Becker distinguishes between general training (defined as training that enhances skills that are valuable outside the firm) and specific training (training that adds to the worker's productivity within but not outside the firm). According to Becker's theory, firms have no incentive to finance general training. Since the added productivity makes the worker more valuable both inside and outside the firm, firms financing the training will be unable to recoup their investment by paying the newly trained worker a wage less than his or her newly enhanced level of productivity. If firms tried to pay the worker less, as a way of recouping some part of their investment, competitors would hire the worker or bid up the trained worker's wage to the new productivity level.

This theoretical argument notwithstanding, researchers have found a large body of evidence that employers offer and pay for general training. One possibility is that employers pay more for training but less for workers, as workers receiving training accept a lower-than-normal wage in return for the compensating benefit of training. However, most of the empirical evidence rejects this implication—trainees show little wage sacrifice when obtaining general training. Acemoglu and Pischke (1999) show that imperfect information and other market imperfections can allow employers to pay trained workers less than the gain in their productivity without losing them to other firms. One reason is that the employers providing the training are in a better position to judge the worker's productivity than are outside employers. An employer knows only a modest amount about workers when they enter the firm. One way of learning more is to observe how they learn, especially on the job. Another possibility is that general skills complement specific skills. As a result, increasing general skills raises workers' ability to use their specific skills.

Still
imperf
difficul
when t
learning
are mor
have m
(2004)
tuition
observe

Oth
strategie
be high
that are
within i
Knoke
mote fr
worker
offs bet
ously de
flat hier
sion ma
increase

How Mu the Uni

Com
employe
safety, c
dures. A
organiza
tional str
that the
2010). A
depth tr
includes
ing that
support f
lation an
workers.
tially ove
used to r

I pay close apprenticeship of all workers, and employer-apprenticeship in the final section enhancing the earnings of

human capital considering the distinguishes es skills that g that adds to According to eral training, aluable both be unable to r a wage less is tried to pay r investment. vorker's wage

have found a eral training, less for work- rmal wage in t most of the w little wage ischke (1999) rfections can in their pro- n is that the to judge the ployer knows irm. One way y on the job, fic skills. As a their specific

Still another rationale comes from Cappelli (2004), who argues that imperfect information might be a reason to offer tuition benefits. It is difficult to sort workers whose qualifications are similar on paper. But when tuition benefits are offered, the applicants with more interest in learning relative to other applicants with the same paper qualifications are more likely to apply and use the general training. These workers may have more motivation and an unmeasured skills advantage. Cappelli (2004) finds evidence to support the notion that workers who take up tuition benefits are more effective than other workers with the same observed characteristics.

Other studies highlight the impacts of organizational attributes and strategies on worker training. For example, the incentive to train should be higher for those organizations that have to delegate decision making, that are large and have high monitoring costs, and that promote from within instead of hiring from the labor market for high-level positions. Knoke and Kalleberg (1994) find that organizations that are large, promote from within, and have formalized job structures provide more worker training. Osterman (1995) shows that organizations make trade-offs between training existing workers and hiring workers with previously developed skills and that organizations train more when they use flat hierarchies, worker involvement, and teamwork and devolve decision making to the line level. Surprisingly, his estimates reveal no increase in training related to job ladders.

How Much Employer-Led Training Takes Place in the United States?

Companies engage in training for a variety of purposes. Nearly all employers provide new workers with an orientation and training about safety, company procedures, compensation policies, and other procedures. Another common form of employer-led training takes place when organizations implement new technologies or change their organizational structure. A recent story highlights the six-week training program that the United Parcel Service (UPS) provides to its drivers (Levitz 2010). Many companies go well beyond these measures and offer in-depth training that can substantially improve career outcomes. This includes registered apprenticeships, other long-term occupational training that involves certification, special courses at work sites, and tuition support for degree or nondegree programs. With the aging of the population and the retirement of a large number of experienced, skilled workers, the demand for effective training is likely to increase substantially over the next decades. On the other hand, major employers that used to rely on internal labor markets and complementary training are

said to have less interest in the long-term relationships with workers that would justify heavy investments in training.

National Data Sources on Employer-Led Training

Several nationally representative data sets are available to document employer-led training in the 1990s, including two employer-based surveys (Lerman, McKernan, and Riegg 2004). The 1997 National Employer Survey (NES), administered by the U.S. Bureau of the Census, involved telephone interviews with 3,000 establishments representing more than 5,400 private establishments with 20 or more employees. The 1995 Survey of Employer-Provided Training (SEPT) collected information about formal and informal training from about 1,000 private establishments with 50 or more employees. The SEPT is distinctive in that it includes interviews with about 1,000 employees at these establishments. SEPT also collected information about a broad measure of informal training. Neither of these employer surveys has been repeated since 1997.

Other nationally representative data on employer-led training come from household surveys. These include the National Household Education Survey (NHES), the Survey of Income and Program Participation (SIPP), and the National Assessment of Adult Literacy (NAAL). The adult education components of the NHES surveys involve interviews with about 20,000 adults who are 16 and over and not enrolled in elementary or secondary school. Although NHES focuses on education and training courses, it covers employer-provided instruction as well as employer-supported training. NHES data are available for 1995, 1999, and 2005. The SIPP, a longitudinal national survey of about 36,000 households per panel, collects data mostly on employment, incomes, assets, and program participation. In addition, the SIPP includes topical modules on a variety of topics, including information on work-related training that helps persons search for or be trained in a new job and/or helps workers improve their skills in their current jobs. The main NAAL surveys nearly 18,000 adults 16 and over to determine the prose, document, and quantitative literacy of American adults. It also includes information on an array of personal characteristics, including educational background, labor force participation, and job training and skills.

Various other data sets have been used to examine training for subgroups of individuals. These include the National Longitudinal Survey of Youth (NLSY, especially the 1979 panel), the 1982 Employment Opportunity Pilot Project survey (EOPP), and the 1993 National Assessment of Vocational Education (NAVE).² In addition to reviewing reported training estimates from other studies, this chapter offers a set of new tabulations based on three years of SIPP data (the 1996, 2001, and 2004

panels), two years of NAAL. These receive employment

The survey training, while for credit course. Rarely do they get into new technologies. The major ratio

One of the timeship training investigate this programs offer registered apprenticeship. Nearly 1 million about 140 million of an age cohort draw here on a type of training

Indicators of the

Employers' views. About 93% of formal training in the rate is low. More workers are getting some form of informal safety training. Indicated that on-the-job training reported in 1998. Training, 59 hours of training by employers (Bishop since 1992, the

Between the show gradual increase. For example, the percentage of SIPP rose from non definition increased from

workers that

o document
used surveys
Employer
us, involved
g more than
e 1995 Sur-
ation about
blishments
it includes
ents, SEPT
al training,
97.
ining come
old Educa-
'articipation
AAL). The
interviews
lled in ele-
cation and
as well as
1995, 1999,
out 36,000
t, incomes,
ides topical
ork-related
job and/or
ain NAAL
rose, docu-
cludes infor-
educational
lls.
ng for sub-
il Survey of
ent Oppor-
essment of
orted train-
iew tabula-
and 2004

panels), two years of NHES data (1999 and 2005 surveys), and the 2003 NAAL. These data sets offer a profile of workers who may or may not receive employer-led training.

The surveys vary in terms of coverage. Some do not include informal training, while others provide little data on employer support to workers for credit courses that may or may not be related to their current jobs. Rarely do the surveys offer information on the role of training in adapting to new technologies or firm reorganization operations, though these are major rationales for company-provided training.

One of the most intensive forms of employer-led training is apprenticeship training. While national data sets rarely have sufficient cases to investigate this form of training, over 25,000 employers or union-employer programs offer apprenticeship training to at least 480,000 workers in the registered apprenticeship system and probably a similar number in unregistered programs (Lerman, Eyster, and Chambers 2009). Although nearly 1 million apprentices constitute a small share of the workforce of about 140 million and each year's completers represent less than 10% of an age cohort, this training is quite intensive and of long duration. I draw here on a survey of apprenticeship sponsors to shed light on this type of training.

Indicators of the Employer-Led Training Based on Selected Studies

Employers generally offer some training, especially for new employees. About 93% of establishments with 50 or more workers provided formal training in 1994 (Lerman, McKernan, and Riegg 2004). Although the rate is lower for smaller establishments, 72% of those with 20 or more workers offer formal training. An even higher share (97%) provide some form of informal training. Much of the training is orientation and safety training that takes place when workers start their jobs. One survey indicated that over 90% of recently hired workers receive at least some on-the-job training (Barron, Berger, and Black 1999). Employers reported in 1992 that their most recent hire averaged 19 hours of formal training, 59 hours of informal training by managers, 34 hours of informal training by co-workers, and 41 hours of informal training by watching others (Bishop 1997). Although training for new hires may have declined since 1992, these results highlight the importance of informal training.

Between the 1980s and mid-1990s, surveys of employer-led training show gradual increases in the incidence of employer-led training. For example, the percentage of workers reporting receiving training in the SIPP rose from about 6% in 1984 to about 20% in 1996. Using a common definition for training, the incidence of training in the NHES increased from 19% to 27%. Training incidence as measured by the

NHES was consistently higher than that in the SIPP. However, the highest figure comes from the SEPT, where 70% of workers in establishments with 50 or more workers reported receiving training. Although the incidence of training appeared substantially higher in the SEPT than in other data sets, the SEPT recorded mean hours of training per worker that were much lower than in the NHES, though about the same as in the SIPP (Lerman, McKernan, and Riegg 2004).

For all data sets, the incidence of training was lowest for the least educated workers and highest for workers with a BA degree or more. But in the case of the NHES, workers with some college but no BA degree averaged 56 hours of training in the prior six months, compared to only 34 hours for college graduates.

The most common form of employer-provided training involves occupational safety training. Employer surveys (NES and SEPT) report about 70% of workers obtaining this form of training, much of which is specific to the firm. At the same time, only a small share of firms provide basic skills training. Lynch and Black (1995) find that about 75% of employers provide specific training but only 25% offer remedial skills training.

While some have argued that U.S. firms place a low value on training, the incidence of training is not particularly low among American workers. Using data from the 1994-95 International Adult Literacy Survey (IALS), Kletzer and Koch (2004) report that the incidence of career- or job-related training among 25- to 54-year-old workers is 49% in the United States, 38% in Canada, 20% in Germany, and 58% in the United Kingdom. In terms of career- or job-related training with some indication of employer support, the United States ranks second out of 11 OECD countries. Only the United Kingdom showed a higher proportion.

These figures take no account of the variations in employer training for the under-25 workforce. Certainly, Germany's dual system of workplace and school-based training for youth is far more extensive and lengthy than any comparable training in the United States. Although few U.S. firms offer anything comparable to the intensity and duration of German apprenticeship programs, a strikingly high share of employers do offer tuition assistance for postsecondary courses. Employers interviewed in the 1997 NES were asked if they reimburse the cost of tuition for an approved course. Over 80% reported doing so for managers, supervisors, and administrators; in 69% of firms, tuition subsidies were available for front-line workers. Although only a minority of workers use tuition subsidies in a given year, 53% of adults enrolled in postsecondary degree programs received employer support from a tuition subsidy or paid leave (Lerman, McKernan, and Riegg 2004).

The
ican Soc
firms pro
workers
private s
necessari
untary sa
training
profits, s
ing hours
2003 to c
training
ten time
through
courses
ment has

Recent Adult W

To u
workers
panels, t
data yiel
sive info
surveys
these dif
question
have rec
have rec
wording
tion, the
last ten y

The
apprenti
the prio
reminds
nars, tra
them." I
which i
Employ
includin
training

The ASTD surveys capture the extent of training in large firms (American Society for Training and Development 2009). As of 2008, the 301 firms providing data on their training expenditures averaged over 15,000 workers per firm, and their payrolls accounted for just below 10% of the private sector wage and salary outlays. Although these data are not even necessarily representative of large firms, since the results come from a voluntary sample, their training patterns are still of interest. Spending on training for these firms consistently exceeds 2% of payroll; as a share of profits, spending has ranged from 12.5% in 2003 to 6.9% in 2006. Learning hours per employee have increased a good deal from the 25.5 figure in 2003 to over 36 in 2008. While workers on average use about 36 hours for training, the amount of hours of training opportunities available is about ten times higher. These options include hours available for employees through such mechanisms as live classes, workshops, seminars, online courses, and video and print materials. Spending on tuition reimbursement has remained fairly steady, at about 12% of all training expenditures.

Recent Patterns of Employer-Led Training Among Adult Workers

To update the information on employer-led training for all adult workers, I tabulated data drawn from the 1996, 2001, and 2004 SIPP panels, the 2003 NAAL, and the 1999 and 2004–05 NHES. The recent data yield information on formal training but do not capture the extensive informal training documented in other studies (Bishop 1997). The surveys differ somewhat between surveys, though it is not clear why these differences should account for differences in the trends. The SIPP questions ask respondents two questions, one dealing with whether they have received training to look for a new job and the other whether they have received training to improve skills in the job they already have. The wording changed slightly between 2001 and 2004 in the SIPP. In addition, the SIPP asks a general question about training experiences in the last ten years.

The main NHES questions ask about any work-related course, apprenticeship program, or vocational degree/diploma program taken in the prior 12 months. Unlike the SIPP, the NHES survey instrument reminds workers by mentioning “work or career-related courses, seminars, training, or workshops whether or not you had a job when you took them.” By far the most frequent participation was work-related courses, which involved 40% of all full-time workers in the 2004–05 survey. Employers provided financial support for nearly all of these courses, including tuition and materials (86% of cases), worker salaries during the training (51%), and programs offered at workplaces.

The NAAL survey questions are these: "During the past year, did you participate in any training or education, including courses, workshops, formal on-the-job training or apprenticeships to: A. Help you do your job better? B. Help you get a promotion? C. [Asked only of those not employed the past year] Help you get a job?" One might think that the NAAL questions would yield less training frequencies among workers than the SIPP, since the SIPP asks workers about training for a new job. However, the NAAL also might jog the memory of workers by mentioning the list of possible training outlets. The SIPP data include much larger samples than the NHES and the NAAL. However, the SIPP questions on training do not include examples, as do the other surveys. In any event, the NAAL responses are substantially higher than even the NHES figures.

As shown in Table 1, both the levels and trends in the incidence of training (within a one-year period) vary by data set. The differences are striking. According to the SIPP, the share of 25- to 64-year-old workers receiving employer-led training in the prior 12 months fell sharply, from

TABLE 1
Incidence of Training (in Percentages) in the Prior 12 Months of
Employed 25- to 64-Year-Olds, by Survey, Year, Sex, and Education.

	Survey of Income and Program Participation			National Assessment of Adult Literacy	National Household Education Survey	
	1996	2001	2004	2003	1999	2005
Total	32.8	27.9	21.8	56.9	31.0	42.1
Male	30.4	25.3	19.7	53.6	29.4	31.8
Female	35.7	31.0	24.2	60.6	32.8	46.0
Males by education group						
Less than high school	10.1	6.9	4.8	20.0	7.2	5.5
High school graduate	20.7	15.4	11.3	40.8	20.6	18.7
Some college	34.8	27.1	22.9	60.2	29.5	36.1
Bachelor's degree	41.8	35.5	26.5	70.6	42.7	50.3
Females by education group						
Less than high school	11.2	9.3	7.7	25.2	7.3	8.4
High school graduate	26.0	19.9	14.7	47.7	22.3	31.5
Some college	35.7	26.2	24.5	64.2	34.3	49.6
Bachelor's degree	46.8	42.3	31.5	76.6	47.3	65.1

Source: Tabulations by author from the Education and Training History Modules of the 1996, 2001, and 2004 panels of the Survey of Income and Program Participation, from the National Assessment of Adult Literacy, and from the National Household Education Survey.

33% in 1996 to 11% in 2005, from the NHES training, from 29.4% in 1999 to 31.8% in 2005, falls between the two. The SIPP indicates a substantial increase of 56.9% in 2003.

The reason for these differences in instruments and data is representative of the difficulty to produce any formal training data that is decreasing. The data indicates that well-related training is

Types of Training

While the training are quite different, training at slightly higher levels is in the 2005 the incidence of training. The NHES showed vs. 29.4%, which

Education show much lower educated group than 10% of the total. In contrast, in the 2005 reported participation in high school graduates. Note that participation in Workers with higher levels of education is higher for co-workers between the NAAL showing participating in training is more than is reported in the data receives between 1996

ist year, did
urses, work-
Help you do
only of those
it think that
mong work-
ig for a new
ters by men-
clude much
SIPP ques-
veys. In any
n even the

incidence of
ferences are
-old workers
harply, from

is of
ation.

National
Household
Education
Survey
1999 2005
31.0 42.4

29.4 31.8
32.8 46.0

7.2 5.8
20.6 15.7
29.5 36.1
42.7 50.3

7.3 8.4
22.3 31.5
34.3 49.6
47.3 65.1

modules of the
pation, from
old Education

33% in 1996 to 28% in 2001 to 22% by 2004. On the other hand, data from the NHES show upward trends in the share of workers receiving training, from 31% in 1999 to 42% in 2005. The NHES figure for 1999 falls between the 1996 and 2001 SIPP percentages. However, the 2004 SIPP indicates a sharp decrease in training, while the 2005 NHES shows a substantial increase. Further complicating the picture is an overall figure of 56.9% observed in the 2003 NAAL.

The reasons for these patterns are unclear. Although the survey instruments and the sample sizes vary, all three data sets are nationally representative of the workforce. Given the differences in estimates, it is difficult to provide a definitive figure for the share of workers engaged in any formal training over the prior year. The SIPP figures are low and decreasing. The NHES estimates show increases, and the NAAL indicates that well over half of all workers take part in some employment-related training, financed mainly by employers.

Types of Trainee and Training

While the magnitude of training differs across surveys, the patterns of training are qualitatively similar. In all the surveys, women workers receive training at slightly higher rates than men (Table 1). The largest differential is in the 2005 NHES, where the gap is about 14 percentage points, with the incidence of training at 46% for women and 32% for men. The 1999 NHES showed a female-male gap of only about 3 percentage points (32.8 vs. 29.4), which is in the same range as the other surveys.

Educational differences show up largely as expected. All the data sets show much lower rates of participation in job training among the lowest educated groups. According to the recent SIPP and NHES surveys, less than 10% of high school dropouts participated in any training. By contrast, in the NAAL, 28% of those with less than a high school degree reported participating in some training. Training is markedly higher for high school graduates, especially in the NHES and NAAL and among women. Note that in 2004, 32% of female high-school-graduate workers participated in training, as compared to 19% of similarly educated men. Workers with some college, both male and female, see significantly higher levels of training in all the data sets. Rates of training are much higher for college graduates than for other groups. However, the gap between the NAAL and the SIPP is largest in this category, with the NAAL showing about 71% of male workers with a college education participating in some training, a figure over 40 percentage points higher than is reported in the SIPP. In addition, the proportion of college graduates receiving training in the last 12 months dropped dramatically between 1996 and 2004, according to the SIPP.

Companies might prefer to upgrade those with weaker skills or to give preference to trainees with a solid set of prose and math literacy skills. In the NAAL, data are available on literacy levels linked to data on training, but the literacy tests are applied after individuals experience the training. Thus, while higher test scores among trainees than non-trainees probably means that employers are more likely to train more skilled workers, it might mean that training increases test scores. The NAAL does indeed reveal about 11% higher literacy levels for workers receiving training than for other workers at the same level of formal education. Among individuals who did not complete high school, those who received training have mean skill levels that were 13% higher than those not receiving training. At higher levels of education, differences in literacy levels between trainees and others were only about 6% to 8%.

The occupational patterns are similar across data sets, with managers and professionals receiving training at a substantially higher rate than among other broad occupations. Sales workers and those in office and administrative support are the groups next most likely to receive training. Workers in construction, installation, and production are least likely to have received any training in the prior year. The gaps across surveys are quite large in all occupational categories but are largest by far among managers and professionals. While only 20% of managers and professionals report receiving training in the 2004 SIPP, the incidence of training for these two occupational categories reached 43% in the 2005 NHES and 58% in the NAAL.

Training levels vary surprisingly little by age through age 55. In the 2004 NHES, for example, 38% of 45- to 54-year-olds participated in work-related courses or apprenticeship, just above the 35% participation rate of 25- to 34-year-olds. However, the percentage falls to 27% among 55- to 64-year-olds. The other surveys indicate a mild reduction in training participation as workers age.

The SIPP divides training into several categories, ranging from basic skills to preparing for a job outside the organization. The first distinction lies in timing: whether the training took place within the last 12 months or the last 10 years. A second distinction is whether the training is to help prepare for a new job or to improve skills for one's current job. A third deals with ways of improving on one's current job. As Table 2 reveals, a significant share of workers have not received any training for the last 10 years, especially as of 2004. Low training levels are especially common among high school dropouts. Most of the training within the last 12 months is for upgrading skills. Within this broad category, the highest share is for training to teach new specific work skills, such as how to use equipment, machinery, or technical processes (not shown in

Incidence
in theWorker characteristics
and year of survey

2004, total

Male

Female

Highest schooling

Less than high school

High school graduate

Some college credit

1 year of college

Associate's degree

Bachelor's degree

Advanced degree

1996, total

Male

Female

Highest schooling

Less than high school

High school graduate

Some college credit

1 year of college

Associate's degree

Bachelor's degree

Advanced degree

Source: Tabulation
of the Survey of Training

the table). About 35% reported receiving training in the last 12 months. These are about 25 million

In the 2004 SIPP, 95% of workers reported receiving training in the last 12 months or to learn new skills. Only 19% took training to get a different employment or training partic

TABLE 2
Incidence of Training (in Percentages) Based on Responses
in the 2004 Surveys of Income and Program Participation

Worker characteristics and year of survey	No training	Training in last 10 years but not last 12 months	Training in the last 12 months		
			Training for a new job	Improve skills on current job	Both types of training
2004, total	60.5	17.4	2.1	18.8	1.0
Male	62.6	17.5	1.7	17.4	0.8
Female	58.7	17.2	2.5	20.4	1.2
Highest schooling					
Less than high school	85.0	6.5	1.5	3.6	0.3
High school graduate	72.2	14.6	1.8	10.5	0.6
Some college credit	57.1	19.3	2.6	19.9	1.2
1 year of college	61.0	18.9	2.3	16.9	0.9
Associate's degree	51.4	19.8	2.4	25.2	1.3
Bachelor's degree	49.8	21.1	2.3	25.7	1.2
Advanced degree	48.4	18.2	1.3	30.5	1.6
1996, total	48.6	18.4	2.6	28.4	2.1
Male	50.7	18.8	2.2	26.4	1.9
Female	46.2	18.0	2.9	30.7	2.3
Highest schooling					
Less than high school	59.3	17.5	2.7	19.1	1.5
High school graduate	43.6	21.4	3.0	29.2	2.8
Some college credit	39.0	21.3	2.6	34.3	2.9
1 year of college	40.4	17.9	3.1	36.2	2.4
Associate's degree	34.6	21.4	2.3	38.9	2.9
Bachelor's degree	35.7	20.0	2.4	39.3	2.6
Advanced degree	32.8	18.4	1.6	45.1	2.1

Source: Tabulations by author from the Survey of Income and Program Participation, Education and Training Modules, 1996 and 2004 panels.

the table). About 54% of trainees obtained this type of training. Another 35% reported receiving other training to upgrade their skills and knowledge. These are the types of training reported in the SIPP by the more than 25 million adult workers who participated in some form of training.

In the 2004 NHES, of the 57 million adults in formal work-related courses or training, nearly all were trying to maintain or improve skills (95%) or to learn new skills and methods (83%). Over 40% took up training to get or keep a state, industry, or company certificate or license. Only 19% took the training to get a raise and only 10% to get a job with a different employer. Well over half (63%) of adults in this work-related training participated because they were required to do so by their

er skills or to
math literacy
ed to data on
ls experience
es than non-
to train more
it scores. The
ls for workers
of formal edu-
ol, those who
her than those
ences in liter-
to 8%.
with managers
gher rate than
e in office and
o receive train-
are least likely
across surveys
st by far among
ers and profes-
idence of train-
% in the 2005

age 55. In the
participated in
3% participation
s to 27% among
duction in train-

aging from basic
e first distinction
e last 12 months
he training is to
s current job. A
job. As Table 2
l any training for
els are especially
ining within the
ad category, the
rk skills, such as
ses (not shown in

employer. This figure for employer-required training is similar to the 57% level reported in the NAAL.

The workers most likely to take these courses were in professional and managerial occupations: over 56% of these workers reported taking formal work-related courses, and 70% took part in some formal adult education. Participation in work-related courses was much lower for sales, service, and clerical workers but still engaged about a third of workers; nearly a fourth of trade and labor workers participated in training of one form or another.

Sector differences in training vary with the data set. In the 2004 SIPP, workers in public sector or nonprofit private sector jobs were much more likely to report participating in job training. Local government workers—a group that includes teachers—had a 38% rate of participation in training, 20 percentage points higher than workers in for-profit firms. The nonprofit private sector workers were almost as likely as government workers to obtain training. In contrast, the NAAL data indicate that private employees were more likely to take part in training than government employees (53% to 42%).

Employer Financing of Postsecondary Education Programs

Employers frequently offer tuition assistance to their workers for postsecondary education courses. Evidence from a range of employer surveys taken in the 1990s reveals that over 80% of employers offer tuition assistance, at least for approved courses (Cappelli 2004). A 2002 survey by the firm Eduventures of human resource professionals in over 500 firms finds that over 70% offer tuition reimbursement benefits (Flaherty 2007). Many provide tuition help even for courses that are not directly tied to the worker's job. Recent data on the share of students and workers who receive this form of assistance are available from the SIPP interviews conducted during June–September 2005 and from the 2005 NHES. The estimates of students with employer subsidies range from about 2.1 million (SIPP) to nearly 3 million (NHES).

Although these numbers are large in absolute terms, they represent only about 2% of the workforce. On the other hand, employer subsidies extend to a significant share of degree seekers. Among students pursuing a master's degree, between 25% (SIPP) and 31% (NHES) received employer subsidies. The SIPP reports that employers subsidized over 13% of those pursuing a certificate or license program or taking college courses without a degree objective. A lower percentage of BA seekers—from 5% to 7%—take advantage of employer subsidies. However, the absolute numbers subsidized toward a BA range from about 500,000 to 800,000 students.

edu
link
as a
For
mer
ing
thes
the
the
wor
stay
com
skill
(
that
tuiti
that
a wr
pens
tion.
S
turn
lear
tially
men
work
muel
took
woul
detai
some
partly
Capp
attra

Dura
A
day a
instr
more
time

imilar to the
professional
orted taking
ormal adult
h lower for
t a third of
ted in train-

n the 2004
e jobs were
ical govern-
rate of par-
workers in
e almost as
the NAAL
ake part in

grams

orkers for
f employer
overs offer
04). A 2002
nals in over
nt benefits
that are not
of students
le from the
id from the
udies range

y represent
er subsidies
its pursuing
5) received
idized over
ing college
A seekers—
wever, the
300,000 to

For half the students receiving employer support for postsecondary education, employers provided the assistance without any requirements linked to the job. About one in four assisted students took the courses as an employer requirement for maintaining skills on their current job. For over 20% of cases, the employer-assisted courses were a requirement for gaining higher pay. The data clearly show employers were willing to spend money to enhance general skills. But how did they recoup these investments? One possibility is that workers had to remain with the employer in return for the subsidy. In about a third of cases in which the courses were not required, employers did impose a requirement that workers remain for a period after the training. Yet the requirement to stay with the employer after training was not more frequent when the courses looked general than when the courses were linked to improving skills on a current job or to improving one's salary.

One requirement common to tuition reimbursement programs is that participants earn at least a "C" or have to repay the firm for the tuition costs (Flaherty 2007). To qualify for beneficial tax treatment so that the tuition reimbursements are not taxable income, firms must have a written plan, meet nondiscrimination clauses, and not offer other compensation for those who do not take up tuition reimbursement. In addition, the courses must be job-related.

Some employers view tuition reimbursements as helping to reduce turnover. But theoretically, the provision of general training of the type learned in courses should increase the worker's market value and potentially increase turnover. A case study of the impact of tuition reimbursement in a nonprofit organization found convincing evidence that workers' use of tuition reimbursement led to sharply lower turnover, as much as a 50% reduction over five years (Flaherty 2007). The analysis took account of the possibility that workers taking up the tuition benefit would have naturally stayed longer with the organization. Although the detailed results covered only one firm, the in-depth analysis shows that some organizations are right to view tuition reimbursement as at least partly offset by cost saving through lower turnover. Also, as noted above, Cappelli (2004) finds tuition benefits may act as a screening device to attract workers with higher-than-average skills.

Duration of Training and Employer Involvement

Most workers receiving job-related training undertook at least a full day of instruction. In the 2004 NHES, only a third of trainees had 10 instructional hours or less. Over 40% had at least 26 hours and 22% had more than 50 hours of classroom instruction. According to the SIPP, the time spent in training among trainees is considerably less than reported

in the NHES. Like the NHES, two thirds had training durations of more than one day, but no more than 10% of trainees (or about 2% of workers) reported more than a week of training.

Nearly all workers in formal work-related courses or training (in the 2004 NHES) received some employer support. The most common form (at 86%) was financial support from employers in the form of tuition, books, and/or materials. In addition, 80% of trainees were allowed to take the training during regular work hours and were paid for the time spent in training. In over half of the training cases (57%), employers provided the programs at the workplace. In the NAAL, employers fund 91% of the training they require of their employees. In addition, employers also pay for 62% of job-related training not required by the employer. The training for less educated workers is more likely to be required by employers than the training for the highly educated. For workers with less than a high school degree, over 80% of employer-funded training is required by the employer. For college grads, only 58% is required.

Intensive Employer-Led Training

Although tens of millions of workers obtain some employer-led training every year, the scale of long-term, intensive training is modest. The best example of intensive training is occupational training that leads to certification, often through formal apprenticeships. Apprenticeships are programs through which individuals achieve the skills of a fully skilled worker in an occupation primarily through supervised, work-based learning along with related academic instruction. Employers, joint union-employer agreements, government agencies, and the military all sponsor apprenticeship programs. Apprentices are employees at the firms and organizations where they are training; productive work is combined with learning experiences that lead to demonstrated proficiency in a significant array of tasks. The programs usually last three to four years and require students to complete coursework that includes math, verbal, and occupation-specific content. The coursework is generally equivalent to at least one year of community college.

The U.S. apprenticeship system is decentralized, although many programs are governed by state and federal regulations under the registered apprenticeship system. Programs that are part of the registered apprenticeship system operate under the supervision of the U.S. Labor Department's Office of Apprenticeship (OA) and state apprenticeship agencies. The responsibilities of the OA include issuing certificates of completion to apprentices, protecting the safety and welfare of apprentices, providing guidance and technical assistance to program sponsors, monitoring

program
women
employe

As c
ated tra
about 1
2009). T
bined n
sponsor
Act's Ac
program
other se
program
which p
fits to v
2004).

Reg
energy,
adminis
tion occ
fastest g
in recen
the worl
ing each
workforce

In ac
of worke
sored by
with the
about all
The spec
were voi
in a skill
who repe
ure is 1.1
are not r
apprenti
estimate

Appri
part of c
uncovere
based on

urations of more
out 2% of work-

or training (in the
ost common form
form of tuition,
were allowed to
paid for the time
, employers pro-
employers fund
es. In addition,
t required by the
more likely to be
ly educated. For
0% of employer-
e grads, only 55%

mployer-led train-
ing is modest. The
ning that leads to
prenticeships are
of a fully skilled
sed, work-based
Employers, joint
id the military all
employees at the
ative work is com-
ted proficiency in
three to four years
ides math, verbal,
nerally equivalent

though many pro-
der the registered
egistered appren-
S. Labor Depart-
ticeship agencies.
tes of completion
prentices, provid-
nsors, monitoring

program equal opportunity plans to prevent discrimination against women and minorities, and expanding the use of apprenticeship by employers.

As of 2008, about 28,000 registered apprenticeship sponsors operated training for about 465,000 apprentices, implying an average of about 18 apprentices per sponsor (Lerman, Eyster, and Chambers 2009). The number of registered apprentices is comparable to the combined number of individuals receiving training through three federally sponsored Department of Labor programs: the Workforce Investment Act's Adult and Dislocated Worker programs, a formula-funded federal program that provides local workforce boards with funds for training and other services; the Job Corps, which is an intensive residential training program for the most at-risk youth; and the Trade Adjustment Act, which provides training dollars in addition to unemployment cash benefits to workers displaced because of trade (Mikelson and Nightingale 2004).

Registered apprentices are highly concentrated in construction, energy, manufacturing, transportation and communication, and public administration occupations. However, transportation and communication occupations jumped nearly fivefold between 2003 and 2007, the fastest growth in percentage terms of any occupation. Despite increases in recent years, registered apprentices still make up only about 0.3% of the workforce; the number of registered apprentices exiting their training each year is about 4% of a typical cohort's annual entrants to the workforce.⁴

In addition to the registered apprentices, a large but unknown number of workers receive intensive and long-term occupational training sponsored by employers who do not register their apprenticeship programs with the U.S. Department of Labor. One of the few data sources that ask about all U.S. apprenticeships (including the unregistered) is the NHES. The specific question asked in the NHES is, "During the past 12 months, were you in a formal apprenticeship program leading to journeyman status in a skilled trade or craft?" Although the absolute number of individuals who reported having been in an apprenticeship is small, the weighted figure is 1.5 million workers. If this figure is accurate, apprenticeships that are not registered would be about three times the number of registered apprenticeships. Unfortunately, it is difficult to know how accurate this estimate is, since the total NHES sample is only about 9,000 individuals.

Apprenticeships involve a considerable upfront investment on the part of employers. Although no cost study in the United States has uncovered the incremental costs of training apprentices, the amounts based on other cost estimates are probably on the order of at least

\$10,000 per apprentice. Assuming a conservative estimate of the costs at \$5,000 per year per apprentice, employer investment in this intensive type of training would reach over \$5 billion.

Benefits of Intensive Apprenticeship Training to Workers and Employers

Evidence is accumulating that demonstrates the value of intensive, occupational-based training, especially in the context of apprenticeships. The gains for the workers are showing up in research comparing alternative modes of training. In a careful study that compared matched groups of workers entering job centers in Washington state, Hollenbeck (2008) found that the returns to apprenticeship training far exceed the returns to other types of training, including community college programs. For apprentices, the present value of their post-program increases in earnings, net of any earnings foregone during the training period itself, amounted to over \$50,000 for the first 2.5 years after exiting their program. In contrast, estimates using the same approach for workers entering community college occupational programs indicated gains of only about \$8,000 or less in the short term. Although community college occupational programs yield much higher long-run returns (\$104,000 to \$130,000 for workers through age 65), the projection for the present value of long-term gains to apprenticeship training is about \$266,000. The public costs of community college were about \$5,000 more than the public costs of apprenticeship. Of course, as in the case of any postsecondary education and training, the net gains are likely to vary, depending on the occupation and geographic area. Moreover, more research is certainly necessary to determine the variability in earnings gains across occupations and other dimensions of apprenticeship training.

From the perspective of employer sponsors, apprenticeship training is a sound approach to skill development. One body of evidence comes from a 2007 survey of sponsors of registered apprenticeship programs conducted for the U.S. Department of Labor's Employment and Training Administration (ETA; Lerman, Eyster, and Chambers 2009). The survey obtained data from 947 sponsors concerning the sponsor's program characteristics, benefits of registered apprenticeship, drawbacks or costs of registered apprenticeship, views on the apprenticeship system, interactions with the larger workforce investment system, and related instruction. The results showed strikingly positive attitudes by sponsors. Nearly all reported they would recommend the program to others, with 86% stating they would "strongly" recommend it and 11% indicating they would recommend it with reservations, due primarily to problems with accessing related instruction.

The program major be workers as very morale a also rep licensing

One training because ers. The after the a major the producers view sponsors sponsors strongly

Spon Sixty-three problem, major preceded while 34

Occupational

Apprenticeship training th apprenticeship 95% rep skills to an apperification s to a licen wages in restrictin are willin licenses 2 fession's 1 learn skill

the costs at
s intensive

f intensive,
nticeships,
ing alterna-
hed groups
eck (2008)
the returns
grams. For
ies in earn-
riod itself,
g their pro-
kers enter-
ins of only
ity college
\$104,000 to
he present
t \$266,000.
re than the
ny postsec-
, depending
arch is cer-
ains across

hip training
ence comes
p programs
and Train-
2009). The
onsor's pro-
rawbacks or
hip system,
and related
y sponsors,
others, with
indicating
o problems

The benefit cited by over 50% of sponsors was the apprenticeship program's role in meeting the demand for skilled workers. Another major benefit was that the apprenticeship programs show reliably which workers have the skills needed. Other benefits, cited by 65% of sponsors as very important, were raising productivity, strengthening worker morale and pride, and improving worker safety. A majority of sponsors also reported benefits in worker recruitment and retention and in meeting licensing requirements.

One common concern about encouraging intensive, employer-led training is that firms will be unable to recoup the costs of training because others firms will drive up the wages of the newly skilled workers. The process by which competitor firms bid away trained workers after their apprenticeship is commonly called "poaching"; it is viewed as a major disincentive to employer involvement in any training that raises the productivity of workers outside the firm. Some apprenticeship sponsors viewed poaching as a significant problem, but surprisingly, 46% of sponsors did not perceive it as a problem at all. Moreover, even among sponsors who perceived poaching as a problem, about 85% would still strongly recommend apprenticeship to others.

Sponsors generally did not find costs to be a significant problem. Sixty-three percent of sponsors said related instruction costs were not a problem, although 30% viewed costs as a minor problem and 6% as a major problem. Similarly, only 7% of respondents saw the cost of experienced workers' time to instruct apprentices as a significant problem, while 34% indicated it was a minor problem.

Occupational Certification

Apprenticeships document to employers that employees have mastered the occupational skills employers demand. In the survey of apprenticeship sponsors (employers and union-employer programs), 95% report that apprenticeships reliably show which workers have the skills to do the job (Lerman, Eyster, and Chambers 2009). Completing an apprenticeship generally is sufficient to meet state licensing and certification standards in the field. Other employer-led training can also lead to a license or certification. Obtaining a license or certification may raise wages in one of three ways: Licenses limit entry into a profession, restricting the supply and driving up wages; employers and other buyers are willing to pay more for licensed and/or certified workers because the licenses give buyers the assurance that the worker has mastered the profession's relevant skills; and passing the licensure test requires workers to learn skills that upgrade their performance in their profession.

Although the literature on returns to occupational certification and licensure is modest, one study based on a national poll indicates about 29% of workers were licensed and 35% were either licensed or certified by a government entity (Kleiner and Krueger 2009). In addition, the authors find that the wage gains to licensure are significant, about a 14% increase. The wage impacts on certification were much smaller and not statistically significant in some specifications.

The NAAL data reveal high percentages of workers with some form of certification. About 14% of workers reported information technology (IT) skill certification that was "sponsored by a hardware or software manufacturer or an industry or professional association." Nearly three out of four had to pass a test to earn the IT certification. Over one in three workers had a job-related skill certification that was "recognized by a licensing board or an industry or professional association." About 90% of these certifications required passing a test. The share with either form or both forms of certification reached 42%, somewhat higher than but not enormously different from the 35% figure reported by Kleiner and Krueger (2009). Having a vocational degree or some college raised the chances of having a certification by 36%, an increase similar to the increased probability of college graduates.

Workers reporting skill certifications in the NAAL generally earned much more than other workers, after controlling for educational attainment. The only exception was among college graduates, for whom an IT certification was associated with modestly higher wages but for whom non-IT certifications showed no association with weekly earnings. On the other hand, those with a high school degree or less earned considerably higher wages if they had either type of certification. Consider those with only a high school equivalency or GED. Those with a non-IT skills certificate were much less likely to earn under \$500 per week than those without a non-IT skills certificate (26% versus 51%) and much more likely to earn over \$1,150 per month (27% versus 17%). The gains were generally even higher for those with IT certificates relative to those without IT certificates at the same level of educational attainment. For both types of certification, the earnings advantage showed up in all education groups: the lower the level of education, the higher was the gain.

Taken together, the two sets of results about certifications reinforce the findings concerning apprenticeship training that achieving a recognized credential raises earnings. Because some certifications are not as in-depth as apprenticeship training, one would not expect the same jump in earnings. Still, the evidence strongly suggests that earnings gains result from recognized occupational skills, whether obtained in an employer-led training program or through some other mechanism.

Accounting

Managers in their companies admit that the deductive investment as current cost. When comparing the present value of the remaining sheet. In contrast to the current value from these ex

According to the overall increase in income and output from 2000. However, the Labor Statistics Bureau reports that employer investments on training and development spending on informal training

For tax purposes, firms that invest in training save money. However, this accounting treatment of investments in training is not closely in line with the measured increase in skill. Firms that invest in training increase skill, which increases the returns to skill. This could raise the productivity of businesses and increase the added investment per year, or the total added to all community accounting added training

One potential capability

Accounting Practices and Employer-Led Training

Managers often cite the skills and commitment of their employees as their companies' most precious assets. But at the same time, they also admit that they can only manage what they can measure. Currently, productive investments in building the skills of a company's workforce count as current costs to firms, though they are in fact intangible investments. When companies invest in capital goods and plants, only a modest portion of the purchase counts as current-year costs in determining profits. The remaining value is counted as an asset on the company's balance sheet. In contrast, all of the spending on skill development is a cost in the current year, despite the reality that the company will gain benefits from these expenses over a period of years.⁵

According to Corrado, Hulten, and Sichel (2006), the magnitude of the overall intangible investment component of firm spending on training and organizational change was about \$365 billion in the period 1998 to 2000. However, for the training component alone, they use Bureau of Labor Statistics figures to suggest that the annual training component of employer investments is about \$116 billion, counting direct firm expenditures on trainers, tuition, and outside training contracts as well as firm spending on wages during the time workers are undergoing formal and informal training.

For tax purposes, expensing training costs in the year they are borne saves money relative to treating training costs as an investment. However, this accounting treatment distorts the profitability of training investments relative to investments in capital equipment that firms depreciate over time. If investments in training were treated more closely in line with economic reality for measuring profits and assets (but not for tax purposes), the contributions of training investments might be measured more precisely and the benefits would become more apparent. Firms might then undertake considerably more training and increase skills of their workforce. Employer training appears to yield high returns to workers as well as to firms. Thus, any measure that increases the incentive for companies to increase spending on training could raise the useful skills of the U.S. workforce substantially. If businesses increased their training outlays by 1% of wages and salaries, the added investments in human capital would amount to nearly \$80 billion per year, or about double the entire education-related expenditures by all community colleges in the United States. Of course, the impact of accounting changes might be much smaller, but it is plausible to expect added training outlays in the billions of dollars.

One problem is how to measure the benefit to firms of added worker capabilities and the duration of the benefits. Another worry is that

companies will overstate their training outlays relative to other labor costs. Such actions could cause an inappropriate reduction in current costs. Of course, similar judgments are required for allocating the costs of physical capital as well, especially the length of the depreciation period. A major distinction between physical and human capital is that firms have no property rights in the added human capital, as they have with added physical capital. Workers may leave if the added human capital is not rewarded with wage increases. Thus, training investments should count as assets to the company only to the extent that the company can benefit from the increased human capital. Certainly, the very fact that companies now finance lots of training indicates their ability to capture some of the gains. Hankanson, Johanson, and Mellander (2003) provide a more detailed treatment of these issues.

Valuation problems are real, but approximations are better than ignoring the reality that training constitutes an investment that should not be treated like other services used up in the current year. After all, the idea of counting the cost to the firm of providing financial options to employees was initially greeted with skepticism about the theory and the feasibility of calculating an appropriate dollar amount. In fact, some measures of the costs of options depend on assumptions about longevity with the firm. Moreover, some firms already amortize some training expenses when workers are learning how to operate new equipment.

It will take time to develop a consensus in the United States that accounting for the firm's human capital assets makes sense and to agree on a practical method for doing so. But the increase in the importance of human capital to the firm and not just to the worker should stimulate action.

Conclusions and Implications for Policy and Research

High levels of worker productivity and wages generally require high levels of skills. Employer-led training plays a significant role in developing and upgrading the skills of American workers. Involving employers in training can lead to high returns, to skill development that is relevant to the workplace, and to high levels of worker engagement. Yet research on employer-led training remains modest, especially in light of the more than \$70 billion to \$100 billion that employers spend every year. There is far more research available on public sector job training programs that spend under \$5 billion per year. In a sense, employer-led training is a hidden part of the nation's human capital development system. Given its potential benefits and large scale, policy makers should place a high priority on learning more about the employer-led system.

Using training training the late related increases reporting to 57% detailed the Un

And which increases lar indi to defin the trai Blair. C gests t (2006),

Of What a Although ing (He employ siderati compan studies with re employ higher topic is could i shifting led tra Develo appren

To levels l Certain ing, suc yields l

Using current data on the incidence and trends of employer-led training, we are not sure about the scale or the trends in employer-led training. Data from one major national survey show a decline between the late 1990s and 2004–05 in the share of workers who took part in job-related training in the prior year, while another survey indicates increases in the same period. Moreover, the proportion of workers reporting training varies from about 20% in the SIPP to a range of 42% to 57% in the other surveys. None of the recent national surveys offer detailed information on the widespread amount of informal training in the United States.

Another important gap in descriptive information is the extent to which employers collaborate with each other. The workforce field is increasingly looking into sectoral approaches, whereby all firms in similar industries and in the same local or regional job market come together to define skills and training needs. Although a third party often provides the training, employers also participate in the training process (Conway, Blair, Conway, and Dworak-Muñoz 2007). Evidence from Britain suggests that interfirm collaborations bear fruit (Gospel and Foreman 2006), but there is little hard data on this issue in the U.S. context.

Other open questions deal with the returns to employer-led training. What are the gains for workers and firms from employer-led training? Although a few studies show high rates of return to apprenticeship training (Hollenbeck 2008), few *recent* studies have analyzed the impacts of employer-led training on workers and employers. Another important consideration is how the returns of employer-led training in the workplace compare with learning skills in a school-based context. Only Hollenbeck's studies of training in Washington state provide this comparative analysis, with results showing apprenticeship training—which has the highest employer involvement and workplace learning—yielding substantially higher returns than community college training.⁶ More research on this topic is important: if this finding has general validity, the United States could increase substantially the cost effectiveness of training dollars by shifting dollars toward encouraging apprenticeship and other employer-led training. Already, the Organisation for Economic Co-operation and Development (2009) has concluded that the United States should expand apprenticeship training substantially, especially for young workers.

To many, the provision of employer-led training falls short of optimal levels because of positive externalities (Bishop 1997; Greenhalgh 1999). Certainly, available evidence indicates that in-depth employer-led training, such as apprenticeship training, improves outcomes for workers and yields benefits for employers. For these reasons, policy makers may want

to encourage the expansion of employer-led training. But what are the best tools for expanding training?

One tool would be to expand apprenticeship training through a combination of increased marketing, technical assistance, and subsidies to employers. Currently, the federal budget for the Office of Apprenticeship (OA)—the agency charged with regulating and managing registered apprenticeship programs in the United States—is only about \$22 million per year. This sum is tiny in comparison with federal dollars spent on training in other programs for a far smaller number of workers. For example, funding for the Job Corps is over \$1 billion for 60,000 workers, while over 480,000 workers participate in registered apprenticeship programs. Tripling the current budget for OA would cost \$40 million per year, but the increase could more than pay for itself if employers increased their apprenticeships by even a very modest amount. Combining the added marketing with tax credits for expanding apprenticeships would no doubt increase a very productive form of employer-led training. A recent effort in South Carolina (Apprenticeship Carolina) demonstrates the potential of an approach combining marketing and tax credits. With a budget of \$1 million per year and tax credits of \$1,000 per apprenticeship, Apprenticeship Carolina managed to develop at least one new apprenticeship program per week over a year-and-a-half period. Moreover, once employers build apprenticeship training into their training and recruitment strategies, they are likely to continue to finance serious and productive worker training.

Another appropriate tool to expand apprenticeship would be for state and federal governments to share in the costs of the academic-instruction component of apprenticeship training. Already some states do so by providing discounts for community college courses. The effort should be expanded. Apprenticeships are growing in many European countries and play a major role in developing skills for a wide range of careers (Steedman 2005). For example, the Leitch Review of Skills (Leitch Commission 2006) in the United Kingdom recommended expanding the number of apprenticeships to 500,000. In the U.S. context, meeting this target would require about a fourfold increase in apprenticeships, to about 2.3 million.

Another promising tool is to expand sectoral programs, which involve the collaboration of firms in the same industry with training providers and community-based organizations. Employers work with local intermediary organizations to specify their skill requirements and to provide openings for those gaining skills. These programs have achieved some success in ensuring that the training is linked to careers and real jobs.

Upgrading
cific skill levels
parliamentary
nongovernmental
tion of emplo
accreditation fo
context (House
Committee 20
along with tech
tive employer-

One eleme
effectiveness c
assistance is a
closely linked t
workers who c
ing the produc
a sharp increa
demonstration
up rates, the p
ductivity impro
of the strategi
assistance and
standards and
productive and
and more firm
earlier (House
Committee 20
upgrading wor

Altering a
human capital
training. The c
sheets that tra
fits. Although
struct, the re
operations and
long-term prof
employer-spon
sponsored train
skills and quali

Overall, en
ings, skills, and

5. But what are the
ing through a com-
e, and subsidies to
fice of Apprentice-
managing registered
y about \$22 million
al dollars spent on
er of workers. For
for 60,000 workers,
apprenticeship pro-
st \$40 million per
tself if employers
t amount. Combin-
ing apprenticeships
employer-led train-
o Carolina) demon-
marketing and tax
x credits of \$1,000
to develop at least
-and a-half period.
ng into their train-
ue to finance seri-
ship would be for
of the academic-
ready some states
ourses. The effort
a many European
or a wide range of
Review of Skills
in recommended
In the U.S. con-
fold increase in
ms, which involve
training providers
with local inter-
its and to provide
e achieved some
and real jobs.

Upgrading the capacity of employers to deliver training toward specific skill levels is another potential tool for expanding training. A recent parliamentary report in the United Kingdom calls for government and nongovernment groups to strengthen the capacity of the training function of employers, with the goal of helping workers attain a formal accreditation for the skills they have learned and demonstrated in a work context (House of Commons Innovation, Universities, Science and Skills Committee 2009). Certifying the capacity of training organizations, along with technical assistance to small firms, encourages more productive employer-led training.

One element of this approach could be to increase the utilization and effectiveness of employer tuition assistance programs. Often, current assistance is a stand-alone offer viewed as an employee benefit but not closely linked to employers' skill objectives. Because of the large share of workers who can access tuition reimbursement from employers, improving the productivity and wage gains of these investments could generate a sharp increase in employer-led training. At this point, research and demonstrations are appropriate to answer questions about the low take-up rates, the match between the uses of tuition assistance and the productivity improvements of workers and firms, and the cost effectiveness of the strategies. International experience suggests that linking tuition assistance and other training initiatives to the attainment of recognized standards and qualifications would make existing training dollars more productive and would encourage more workers to participate in training and more firms to offer training. The House of Commons report cited earlier (House of Commons Innovation, Universities, Science and Skills Committee 2009) offers one example of a training initiative aimed at upgrading workers to a particular standard.

Altering accounting procedures to recognize the asset value of human capital is another low-cost intervention to encourage employer training. The change would recognize in income statements and balance sheets that training investments generate assets that yield future benefits. Although the modification in practice would not be easy to construct, the result would be to make accounts better reflect current operations and company assets. Managers focusing on short-term or long-term profits would have more incentive to invest in training. Since employer-sponsored training yields a high return, additional employer-sponsored training is likely to increase productivity by improving worker skills and qualifications.

Overall, employer-led training contributes substantially to the earnings, skills, and productivity of millions of American workers. It is time

for policy makers to recognize its importance by strengthening policies that promote employer-led training and by sponsoring additional research and data collection about the scope, impacts, and strategies for improving outcomes for workers and employers.

Acknowledgment

I thank Joanna Stork for excellent research assistance.

Endnotes

¹ For a noteworthy exception, see the report on worker training produced by the U.S. Congress, Office of Technology Assessment in 1990.

² See Barron, Berger, and Black (1999) for a description of these sources.

³ The data from this paragraph come from the SIPP.

⁴ According to the website of the U.S. Bureau of Labor Statistics, the U.S. labor force stood at 153.6 million at the end of 2007. Dividing the 465,000 apprentices by the 153.6 million in the labor force equals 0.3%. A cohort of 22-year-olds entering the labor force is about 3.4 million. Since apprenticeships usually last about 3.5 years, the number of apprentices per single year of age is 134,000. Dividing 134,000 by 3.4 million equals 3.9%.

⁵ Thanks to Laurie Bassi for alerting me to this point.

⁶ A study in France also demonstrates that gains to apprenticeship training exceed the returns to school-based vocational education, especially for men (Mendes and Sofer 2002).

References

- Acemoglu, Daron, and Jörn-Steffen Pischke. 1999. "Beyond Becker: Training in Imperfect Labour Markets." *The Economic Journal*, Vol. 109, no. 453, Features (Feb.), pp. F112-42.
- American Society for Training and Development. 2009. *2009 State of the Industry Report: ASTD's Annual Review of Trends in Workforce Learning and Performance*. Alexandria, VA: American Society for Training and Development.
- Barron, John, Mark Berger, and Dan Black. 1999. "Replacing General with Specific Training: Why Restricting Alternatives Makes Sense." In Solomon Polachek and John Rust, eds., *Research in Labor Economics*, Vol. 15, Stamford, CT: JAI Press, pp. 251-302.
- Bartel, Ann. 1995. "Training, Wage Growth, and Job Performance: Evidence from a Company Database." *Journal of Labor Economics*, Vol. 13, no. 3, pp. 401-25.
- Bartel, Ann. 2000. "Measuring the Return on Employer Investments in Training: Evidence from the Literature." *Industrial Relations*, Vol. 39, no. 3, pp. 502-24.
- Becker, Gary. 1964. *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education*. Chicago, IL: University of Chicago Press.
- Bishop, John. 1997. "What We Know About Employer-Provided Training: A Review of the Literature." In Solomon Polachek, ed., *Research in Labor Economics*, Vol. 16, Greenwich, CT and London: JAI Press, pp. 19-57.
- Cappelli, Peter. 2004. "Why Do Employers Pay for College?" *Journal of Econometrics*, Vol. 121, nos. 1-2, pp. 213-41.

Conway, N
toral
DC: 2
Corrado, C
Econ
Feder
Flaherty, C
Study
of Eco
Goldin, Cl
nology
Gospel, T
Britai
Greenhale
Britai
Hankausc
Spous
Paper
Hannshok
Grow
Paper
Hollenbee
Rates
agem
House of
"Re-s
Polici
Kleiner, N
Lien
Natio
Kletzer, T
Lesso
Steph
Uppol
Knoke, D
ican
Leitch, C
Econ
nation
05120
Lerman, J
Emp
Robe
State
Lerman
lenge
DC
regist
Leitch, T
Relat
Bosco

- Conway, Maureen, Amy Blair, Steven Conway, and Linda Dworak-Muñoz. 2007. *Sectoral Strategies for Low-Income Workers: Lessons from the Field*. Washington, DC: Aspen Institute.
- Corrado, Carol, Charles Hulten, and Daniel Sichel. 2006. *Intangible Capital and Economic Growth*. Finance and Economics Discussion Series. Washington, DC: Federal Reserve Board.
- Flaherty, Coleen. 2007. *The Effect of Tuition Reimbursement on Turnover: A Case Study Analysis*. NBER Working Paper 12975. Cambridge, MA: National Bureau of Economic Research.
- Goldin, Claudia, and Lawrence Katz. 2008. *The Race Between Education and Technology*. Cambridge, MA: Belknap Press of Harvard University Press.
- Gospel, Howard, and Jim Foreman. 2006. "Inter-firm Training Coordination in Britain." *British Journal of Industrial Relations*. Vol. 44, no. 2, pp. 191-214.
- Greenhalgh, Christine. 1999. "Adult Vocational Training and Government Policy in Britain and France." *Oxford Papers on Economic Policy*. Vol. 15, pp. 97-113.
- Haukanson, Christina, Saku Johanson, and Erik Mellander. 2003. *Employer-Sponsored Training, Stabilisation, and Growth: Policy Perspectives*. Working Paper 9-2003. Uppsala, Sweden: Institute for Labour Market Policy Evaluation.
- Hanushek, Eric, and Ludger Woessmann. 2009. *Do Better Schools Lead to More Growth? Cognitive Skills, Economic Outcomes, and Causation*. NBER Working Paper 14633. Cambridge, MA: National Bureau of Economic Research.
- Hollenbeck, Kevin. 2008. *State Use of Workforce System Net Impact Estimates and Rates of Return*. Paper presented at the Association for Public Policy and Management, Los Angeles, CA, November 6-8.
- House of Commons Innovation, Universities, Science and Skills Committee. 2009. "Re-skilling for Recovery: After Leitch. Implementing Skills and Training Policies." London: House of Commons.
- Kleiner, Morris, and Alan Krueger. 2009. *Analyzing the Influence of Occupational Licensing on the Labor Market*. NBER Working Paper 14979. Cambridge, MA: National Bureau of Economic Research.
- Kletzer, Lori, and William Koch. 2004. "International Experience with Job Training: Lessons for the United States." In Christopher O'Leary, Robert Straits, and Stephen Wandner, eds., *Job Training Policy in the United States*. Kalamazoo, MI: Upjohn Institute, pp. 245-55.
- Kuoke, David, and Arne Kalleberg. 1994. "Job Training in U.S. Organizations." *American Sociological Review*. Vol. 59 (August), pp. 537-46.
- Leitch Commission. 2006. *Leitch Review of Skills: Prosperity for All in the Global Economy—World Class Skills*. London: Her Majesty's Treasury. <http://webarchive.nationalarchives.gov.uk/+/http://www.hm-treasury.gov.uk/media/6/4/leitch_finalreport_051206.pdf>. [July 6, 2010].
- Lerman, Robert, Signe-Mary McKernan, and Stephanie Riegg. 2004. "The Scope of Employer-Provided Training in the United States." In Christopher O'Leary, Robert Straits, and Stephen Wandner, eds., *Job Training Policy in the United States*. Kalamazoo, MI: Upjohn Institute, pp. 211-44.
- Lerman, Robert, Lauren Eyster, and Kate Chambers. 2009. *The Benefits and Challenges of Registered Apprenticeships: The Sponsors' Perspective*. Washington, DC: Urban Institute. <http://www.urban.org/UploadedPDF/411907_registered_apprenticeship.pdf>. [July 6, 2010].
- Leuven, Edwin, and Hessel Oosterbeek. 1999. "The Demand and Supply of Work-Related Training: Evidence from Four Countries." In Solomon W. Polachek, ed., *Research in Labor Economics*. Vol. 15. Stamford, CT: JAI Press, pp. 303-30.

- Levitz, Carol. 2010. "UPS Thinks Out of the Box on Driver Training." *Wall Street Journal*, April 6, p. B-1.
- Lynch, Lisa, and Sandra Black. 1995. "Beyond the Incidence of Employer-Provided Training." *Industrial and Labor Relations Review*, Vol. 52, no. 1 (October), pp. 64-81.
- Mendes, Sylvie, and Catherine Sofer. 2002. "Apprenticeship vs. Vocational School: A Comparison of Performances." In Catherine Sofer, ed., *Human Capital Over the Life Cycle: A European Perspective*. Northampton, MA: Edward Elgar Publishing, pp. 115-36.
- Mikelson, Kelly, and Demetra Nightingale. 2004. *Estimating Public and Private Expenditures on Occupational Training in the United States*. Report to the U.S. Department of Labor, Employment and Training Administration.
- Mincer, Jacob. 1958. "Investment in Human Capital and Personal Income Distribution." *Journal of Political Economy*, Vol. 66, no. 4 (August), pp. 281-302.
- National Center for Education Statistics. 2009. *Digest of Educational Statistics*. Washington, DC: U.S. Department of Education. <http://nces.ed.gov/ipeds/data/digest/tables/dt09_027.asp>. [July 6, 2010].
- O'Leary, Christopher, Robert Straits, and Stephen Wandner. 2004. "U.S. Job Training: Types, Participants, and History." In Christopher O'Leary, Robert Straits, and Stephen Wandner, eds., *Job Training Policy in the United States*. Kalamazoo, MI: Upjohn Institute, pp. 1-22.
- Organisation for Economic Co-operation and Development. 2004. "Improving Skills for More and Better Jobs: Does Training Make a Difference?" *Employment Outlook: 2004*, Chapter 4, pp. 183-224. Paris: Organisation for Economic Co-operation and Development.
- Organisation for Economic Co-operation and Development. 2009. *Jobs for Youth: United States*. Paris: Organisation for Economic Co-operation and Development.
- Osterman, Paul. 1995. "Skill, Training, and Work Organization in American Establishments." *Industrial Relations*, Vol. 34, no. 2, pp. 125-46.
- Parent, Daniel. 2000. "Wages and Mobility: The Impact of Employer-Provided Training." *Journal of Labor Economics*, Vol. 17, no. 2, pp. 295-316.
- Steedman, Hilary. 2005. *Apprenticeship in Europe: "Fading" or Flourishing?* Centre for Economic Performance Discussion Paper no. 710. London: London School of Economics.
- U.S. Congress, Office of Technology Assessment. 1990. *Worker Training: Competing in the New International Economy*. OTA-TTE-457. Washington, DC: U.S. Government Printing Office.
- Yang, Song. 2006. "Organizational Sectors and the Institutionalization of Job-Training Programs: Evidence from a Longitudinal National Organizations Study." *Sociological Perspectives*, Vol. 49, no. 3, pp. 325-42.

CHAIR

D

Al
Oban
the de
effort
needs
force-
rization
to her
from
lunge
time-
cracy
needs
stimu
deep
the n
since
G.
public
false p
during
the A
ment
indiv
retrai
befor
dema
lift all