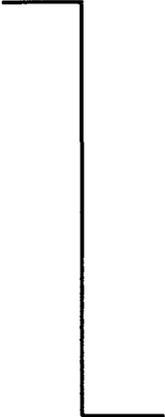


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## ***Do Most Employers and Workers Underinvest in Training and Learning On the Job?***

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*Many economists question the need for social intervention in training, arguing that the benefits accruing to employers and employees create sufficient incentive for private financing. Research findings indicate that in practice this means depending on employers because it is they who pay for the bulk of employee training, even when the skills being taught are useful at other firms. Yet in practice, private incentives for on-the-job learning and training do not currently generate broader results that are in the public interest. This chapter looks at the theoretical and empirical evidence of market failure in training provisions. It argues that the training market in the United States is failing to provide a socially optimal quantity and quality of employer training. Specifically, it examines four potential sources of market failure: real externalities, tax-induced distortions, liquidity constraints, and government regulatory interventions that discourage training. Each of them are found to operate to some degree in some training markets.*

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## REAL EXTERNALITIES

Public control and subsidy of schooling and public involvement in other forms of education and training is justified because the individual who gets the education and training receives only part of its benefits. There are social benefits as well. When deciding on the type and amount of education and training to undertake and how hard to study while at school, most individuals are taking only private benefits—the higher after-tax income and the prestige and consumption benefits of having an education—into account. These private benefits account for only part of the total benefits to society of education and training, however. People who have received more or better education and training or who achieved more during the experience benefit others in society by paying higher taxes, by making discoveries or artistic contributions that benefit others in the society, by being more likely to give time and money to charity, by being less likely to experience long periods of hospitalization that are paid for by insurance or government, and in many other ways (Haveman & Wolfe, 1984). Economists call social benefits such as these *spillovers* or *externalities*. Private decisions will lead to an insufficient quantity and quality of education and training and insufficient achievement by students, unless public agencies intervene and partially subsidize the cost or add to the rewards. The appropriate amount of public subsidy is closely related to the size of the spillover or the externality benefits of education and training. Two kinds of real externalities produced by training are discussed next.

### Discoveries and Disasters Attributable to Training

High-quality training benefits customers and the public as well as the trainer and the trainee. When, for example, the dancers of the New York City Ballet receive excellent training, the company benefits through greater ticket revenue, but the audience benefits as well because they derive a larger consumer surplus from the performance. The COMSAT employee who figured out how to double the lifetime of communication satellites by judicious use of the rocket fuel remaining on board benefited customers and competitors at least as much as he benefited COMSAT. The Aloha airlines pilot who landed the plane after an explosive decompression and the loss of a major section of the plane certainly raised the lifetime earnings of the passengers. On-the-job training (OJT) and experience were critical to the COMSAT discovery and the safe landing of the Aloha plane.

When a worker makes mistakes because of poor training, the

customers and the general public often lose as much as the worker and the company. Examples of disasters caused or contributed to by poor training are legion: Chernoble, Three Mile Island, Exxon Valdez, the shoot-down of the Korean Airlines 747 flight (pilot error caused the plane to be off course), and Greyhound bus crashes in New York State. Tort law internalizes some but not all of these costs. A study of egregious physician errors in New York State found that only one-eighth of them resulted in a malpractice claim. Damage awards are typically paid by insurance funds that are imperfectly experience rated. Where the public interest in insuring top quality training is manifest to all, training is often regulated or subsidized by government. The Federal Aviation Administration, the Department of Transportation, and the Nuclear Regulatory Commission, for example, engage in such regulation.

However, for every big discovery or disaster that gets media attention and generates a political response, there are millions of little discoveries, unrewarded services, or unanticipated product failures that directly effect consumers that do not generate political responses. Because customers lack low-cost access to accurate information on the quality of what they are buying, the prices paid do not fully reflect quality differentials between different providers. As a consequence, training that enhances quality and reliability often generates benefits to customers that are not recognized or rewarded by the market.

### **Poor Signaling of General Skills to Other Employers**

The training provided by one employer benefits other employers and consumers, not just the trainee and his or her employer (Bishop, 1991). The worker is more productive in future jobs, but these employers do not perceive accurately the quality of the general OJT received by the worker and, as a result, do not fully compensate the trained worker for their higher productivity. Bishop's (1994) study of the relative productivity and profitability of new hires obtained results that are consistent with this hypothesis. New hires who had received formal off-the-job training sponsored by a previous employer made significantly more suggestions designed to improve productivity, were more productive, and profitable and were less likely to be fired. If one accepts these findings as valid, the implication is a market failure that reduces the payoff to worker investments in OJT. The ultimate cause of this problem is the lack of effective signals of the quantity and quality of training.

*Institutions for signaling occupational competence—a comparison.* In the U.S. labor market, hiring decision makers have a very difficult time assessing the quality of the general human capital obtained from OJT.

Such assessment difficulties increase turnover, lower wages, and lower productivity. Because part of the reason for getting general training is to improve the worker's marketability with other employers, not recognizing the benefits of training reduces the incentive to invest in general OJT.<sup>1</sup> Doing an especially good job of training employees will benefit the trained workers when they leave the firm, only if the firm develops a reputation for being a good trainer.<sup>2</sup> Past experience with the former employees of a firm is probably the primary determinant of a firm's reputation as a trainer. Large firms that turn over a reasonable share of their trainees are likely to develop a reputation (good or bad) for the training that they provide. It is well known, for instance, that IBM and General

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<sup>1</sup>Lack of information about the quality of general OJT received can increase investment in general OJT only under the very unlikely circumstances of very high retention rates and large differentials between the rates at which employers and employees trade off present before-tax income for future before-tax income. Under these circumstances the employer's desire to invest in general training may be stronger than the worker's desire. Because the wage will have to be increased by an equivalent amount, employers cannot benefit from (and therefore do not pay for) general training that is visible to other employers. Consequently, as such training becomes more visible to other calculus that determines the amount of training shifts to give greater weight to the very high discount rates faced by the worker, possibly reducing investment in general training. The condition that would have to be satisfied is that the retention rate would have to be equal to or greater than the ratio of the firm and worker discount factors. Even if the worker were to face yearly interest rates that were double the firm's rate (e.g., 30% rather than 15%), the yearly retention rate would have to be above 85%. Retention rates for the first year at a job are seldom above 50% and average yearly retention rates for all employees new and old seldom exceed 85%. Yearly retention rates of employees who have been at the firm for many years may exceed 85%, but these more mature workers will typically have better access to capital markets than younger workers and face a tax regime that is neutral to OJT. This discussion has been based on the theoretical analysis of the training decision presented in Bishop and Kang (1984, 1988).

<sup>2</sup>Well-trained employees who leave the firm that provided the training may benefit if their new employer eventually learns of their greater-than anticipated productivity and makes later adjustments to their wage or bases a promotion on it. In the model presented in Bishop and Kang (1984, 1988), high renegotiation costs prevent such adjustments from occurring at the first employer. If a third period was added to the model and retention in the second job modeled, the same assumption of high renegotiation costs would prevent the worker from benefiting from better-than-expected training in the second job. If one were to relax the assumption that post-training wage rates are prespecified and analyze a multiperiod model, the size of the distortion to training investment decisions would be reduced, but it would not disappear. Productivity is measured with error so one could never expect the new employer to perceive the full value of the worker's greater-than-anticipated training. Furthermore, other employers remain ignorant of greater-than-anticipated productivity. For all intents and purposes this greater productivity is specific to the firm, so the worker will only receive a small share of this greater productivity in higher wage rates.

Electric provide excellent training to their newly recruited junior executives. The positive reputation helps the separating employees find better jobs, and, in turn, helps the firm recruit the best possible candidates when it is hiring. Even though a good reputation as a trainer forces them to pay higher wages in the posttraining period, most firms have a strong interest in establishing such a reputation. The armed forces are aware of the positive training reputation and consequently spend millions of dollars advertising the quality and civilian usefulness of their training.

Most young workers without a baccalaureate degree, however, do not obtain jobs at the large firms with established training reputations. The smaller lesser known firms in which they find their first job typically have unknown reputations when it comes to the quality and general usefulness of their training.

The lack of full reward for improvements in general skills if one leaves the current employer affects the incentives for the trainer and trainee to devote time and energy to learning general skills. The higher the worker's likelihood of leaving the firm, the lower is that worker's incentive to devote him- or herself to learning general (or specific) skills that are not immediately visible to other employers. As a result, the underinvestment in general OJT is greatest for temporary and seasonal employees and for young people as a group.

The poor quality of the information about a job candidate's general skills and the resulting underinvestment in general training (both on the job and in schools) is a major institutional flaw in U.S. labor markets. Formal systems for certifying the competencies gained through OJT exist in the United States, but they have not achieved the widespread usage they deserve. The apprenticeship systems of Switzerland, Austria, and Germany are probably the best examples in the world of widespread and effective systems of OJT and competency certification. One of the most important features of these apprenticeship systems is the requirement that the apprentice pass written and practical examinations covering the occupation's curriculum. If an employer cannot provide training in all the skills included in the curriculum, it must arrange for its apprentices to receive instruction at another firm or at a special employer-run school. The examinations are set and scored by a local committee of masters (skilled workers) and employers, so the quality of the training provided by the master and the firm is put to a public test. Passing the apprenticeship exam is of benefit not only to the trainee, but it is important to the masters as well. Their reputations among their peers and their abilities to recruit high-quality apprentices depend on it. As a result, 90% of German apprentices remain at one employer for the full 3-year apprenticeship period, and 90% of these apprentices pass the test (on the first or second try). The apprenticeship systems of the

English-speaking nations are based on *time served* rather than on *competencies achieved* and are considerably less successful in standardizing and upgrading the training that occurs.

The examination at the end of the training process is the key to maintaining quality control. In the late 19th century, the Swiss educational/training system went through a period of crisis and self-examination not unlike what is now happening in the United States and the United Kingdom. The nation had to export to survive, but the quality of workmanship was low and deteriorating. The Swiss assigned blame to their apprenticeship system and proceeded to reform it by ending apprenticeship based on time served, establishing a standardized curriculum, and instituting written and practical examinations set by local committees of employers and workers. The high standards of workmanship for which Swiss workers are renowned are not an inherent trait of national character, but rather are the consequence of the institutions that teach, test, certify, and publicize the workmanship.

The standardized curricula and the proficiency exam at the end of the apprenticeship mean that the quality and nature of the training is well signaled to employers in Germany, Switzerland, and Austria. The result is that the worker can count on benefiting from doing a good job in his or her apprenticeship, even if the training employer does not retain them. Because the future payoff is certain, German apprentices are willing to start out at a wage that is only about one-quarter of the wage they will be able to command at the end of the apprenticeship. If the apprentices were adults, they could not afford to accept so low a wage. They are, however, teenagers living at home who are heavily subsidized by their parents. Consequently, the liquidity constraint that is such a barrier to heavy investments in general training in the United States is much less of a problem in Germany.

## TAX-INDUCED DISTORTIONS OF THE TRAINING MARKET

### The Nondeductibility of Some Training Expenses

The benefits of training are taxed, but not all of the costs are deductible.<sup>3</sup> Some of the time that trainees devote to employer-sponsored training comes from reducing leisure time. Employees taking job-related college

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<sup>3</sup>If training an employee causes a reduction in output or necessitates an increase in hours paid, profits, and thus taxes, are reduced. If workers pay for training by accepting lower wage jobs, individual income tax payments are reduced. In both of these cases, training costs are effectively deductible in the year they are incurred. If all individuals pay taxes every year at the same marginal tax rate,

courses typically attend classes and do their homework on their own time. Japanese workers frequently take correspondence courses related to their job and, when they are rotated to a new job, the meticulous description of how the job is done, written by its previous occupant, is studied at home. Japanese supervisors are expected to fill slack time with training. When Ronald Dore presented his passport at an out-of-the-way port of entry that seldom sees British passports, the supervisor called his younger colleagues over and taught them about its intricacies while Dore looked on (Dore & Sako, 1989). Such a training session delayed passengers somewhat and necessitated a sacrifice of on-the-job leisure, but output—the number of passengers processed—did not change. Incentives to undertake training are distorted if government does not share in the costs of training to the same degree it shares in its rewards.

### **The Progressive Income Tax**

The second tax-induced distortion arises from the fact that investments in OJT are typically made at a time when the individual has no tax liability or a lower-than-normal marginal tax rate, and the benefits are received when earnings and marginal tax rates are higher. As a result, the after-tax benefits of an OJT investment are reduced more than the after-tax costs, and such investments are discouraged. Firms, on the other hand, train continuously, so the marginal tax rates faced when the costs of training are incurred and deducted are no different from those faced during the payoff period.

### **HIGH BORROWING COSTS AND LIQUIDITY CONSTRAINTS**

The third reason why society subsidizes schooling is the failure of the free market (in the absence of publicly funded loan guarantee programs) to offer loans to young persons seeking to invest in their education. The government recognized long ago that people going to school needed access to low-interest, government-guaranteed loans. Workers investing in general OJT have a similar need but are not eligible for such loans unless they happen to be part of a training program run by an accredited educational institution. Because of the fear of turnover, employers are reluctant to pay for general training that is visible and useful in other

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the tax system would not distort decisions to invest in OJT. In fact, however, some training costs are not deductible and tax rates are generally higher when benefits are being received than when costs are being incurred, so the tax system discourages training investments.

firms. If the employer is not willing to pay for general training, it will be offered only to those workers who pay for it by accepting a lower wage during the training period than could be obtained elsewhere. The more intensive the training, the greater the required reduction in wages will have to be. Many workers are unwilling to accept a large reduction in their current standard of living, and because they are unable to borrow at reasonable interest rates, they forego the investments in general OJT.<sup>4</sup> If they fund such investments, they do so only if extremely high rates of return can be obtained.

Most young workers are liquidity constrained, that is, they are unable to shift as much consumption from the future into the present as they would like because they have neither assets that can be depleted nor access to credit at reasonable terms. Half of the households headed by someone under 25 years old have less than \$746 in financial assets, and 19% have no financial assets at all. Half of the households headed by someone between 25 and 34 years old have less than \$1514 in financial assets, and 13% have none (Survey of Consumer Finances, 1984). Subsidized or guaranteed student loans are not available to finance OJT, and banks will not lend money for training purposes without collateral. Borrowing against the equity in one's home is a possibility for some, but only 34% of the households with heads under 35 years old own a home, and many of the houses have been owned for only a short while, so that the equity that can be borrowed against is small. Even with collateral, the loans available to individuals usually carry higher interest rates than those charged businesses. Studies of the willingness of consumers to substitute consumption over time have all concluded that the intertemporal elasticity of substitution is no higher than 1, and most studies conclude it is .5 or below (Friend & Blume, 1975; Hall, 1988; Hubbard & Judd, 1986). A substitution elasticity of .5 implies that reducing a liquidity that constrained a worker's wages by one-half (in order to pay for general training) roughly quadruples the worker's marginal utility of consumption. Such a worker would be willing to give up \$4.00 of future income in return for \$1.00 of current income. The liquidity constraint phenomenon has little effect on the wage profile of jobs requiring no general training

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<sup>4</sup>Becker clearly recognized the existence of liquidity constraints in his 1962 article. "Since employer specific skills are part of the intangible assets or good will of firms and can be offered as collateral along with tangible assets, capital would be more readily available for specific than for general investments" (p. 42). He did not, however, explicitly how such constraints might influence the tenure profile of wages and thus induce employers to share the costs of general training. Parsons (1972) points out that "The worker's . . . discount rate will affect the firm's choice of wage policies. . . . It can be shown that firms will decrease the worker's share of specific investment as the workers discount the future more heavily" (p. 1129).

and which, therefore, have a flat productivity profile. Where significant general training is occurring, however, it comes into play and may result in an employment contract in which the employer shares the costs of general training (Feuer, Glick, & Desai, 1987; Glick & Feuer, 1984).

Firms are thus more willing than workers to trade future earnings for present earnings. The compensation packages that result from the asymmetric access to capital markets and the progressive tax structure reflect the worker's strong preference for compensation now rather than later. In effect, firms offer new hires a loan that will be canceled if a separation occurs. Firms do not require repayment of the loan when separations occur for the same reasons that banks do not offer large unsecured loans without a government guarantee of payment. The administrative costs of obtaining repayment are extremely high, and bankruptcy is a real option for someone with zero assets. Firms, however, undertake to finance some of the costs of general OJT only when their investment yields a return sufficient to pay for the cost of capital and the risk of turnover. Such justifications reduce employer investments in general OJT below the level that would have prevailed if workers were able to borrow at the same interest rates as employers.

## **REPAIRING GOVERNMENT-CREATED DISTORTIONS**

A fourth justification of public efforts to encourage greater OJT is to undo the damage done by other government interventions in the labor market that discourage it. With respect to investments in OJT, the two most significant of such interventions are the minimum wage and barriers to employer use of basic skills tests and high school grades as devices for selecting new workers.

### **Minimum Wage**

The minimum wage prevents unskilled American workers from offering to pay for general training by accepting a subminimum wage during the training period. Providing training to a new employee is costly. The new employee is not very productive at first, and other workers must take time away from their regular activities to give instruction to the new hire. Many of the skills that the new employee learns have application in other firms as well. To avoid losing the worker to another firm, the employer providing the training must raise the wage as the trainee's productivity increases. Jobs that offer training and the prospect of future wage increases are more attractive than those that do not. The competi-

tion for these jobs will enable employers offering general training to obtain workers at lower wage rates.

Minimum wage legislation, however, prevents wage rates from falling below the legislated monetary figure. Lacking the ability to get new employees to pay a major share of the costs of general training (by accepting a low wage during the training period), employers will adopt production technologies that minimize the skill requirements of the job. The evolution of the diner and the small, family-operated restaurant into franchised fast-food operations using specially designed machines and prepackaged food is an example of how this is accomplished. By reducing the skills required to do the job, the employer shortens the time it takes for new employees to reach maximum productivity. The same people may have the job, but they are taught less, and what is taught is useful only in that firm, not elsewhere. Opportunities for promotion are minimal, and wage increases are small or nonexistent.

A second impact of the minimum wage is that the forced increase in the starting wage is partially compensated by a fall in wage rates during the posttraining period. The fall in wages increases the quit rate, which in turn reduces the payoffs that employers receive from formal training and, therefore, their willingness to make such investments or to hire individuals who require substantial training investments. The predictions of theory have been confirmed by at least two studies (Hashimoto, 1982; Leighton & Mincer, 1981).

### **Barriers to Careful Selection of Entry Level Workers**

In the United States, governmental institutions and regulations are an important reason why American employers do a poor job of selecting entry-level workers and experience very high rates of turnover. Employers are not able to obtain good information on the skills and competencies of young job applicants. Employers believe that school performance is a good predictor of job performance<sup>5</sup>, but they have great difficulty getting such information. If a student or graduate has given written permission for a transcript to be sent to an employer, the Federal Education Rights and Privacy Act obligates the school to respond. Many high schools are not, however, responding to such requests. In Columbus, OH, for example, Nationwide Insurance sent over 1,200 requests for transcripts signed by job applicants to high schools in 1982 and received only 93 responses.

An additional barrier to the use of high school transcripts in

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<sup>5</sup>Policy capturing experiments have found that employers give substantially higher ratings to job applicants with high grade point averages (Hollenbeck & Smith, 1984).

selecting new employees is that when high schools do respond, it takes a great deal of time. In most high schools, the system for responding to transcript requests has been designed to meet the needs of college-bound students rather than the students who seek jobs immediately after graduation. A 1987 survey of a stratified random sample of small- and medium-sized employers who were members of the National Federation of Independent Business (NFIB) found that transcripts had been obtained prior to the selection decision for only 14.2% of the high school graduates hired.<sup>6</sup> Only 15% had asked high school graduates to report their grade-point average. The absence of questions about grades from most job applications reflects the low reliability of self-reported data, the difficulties of verifying it, and the fear of Equal Employment Opportunity Commission (EEOC) challenges to such questions.

Hiring on the basis of recommendations by high school teachers is also uncommon. In the NFIB survey, when a high school graduate was hired, the new hire had been referred or recommended by vocational teachers in only 5.2% of the cases and referred by someone else in the high school in only 2.7% of the cases.

Tests are available for measuring competency in reading, writing, mathematics, science, and by EEOC guidelines, which made it prohibitively costly to demonstrate the validity of tests assessing competence in English and mathematics.<sup>7</sup> Before such a test could be used, the firm had to conduct a very expensive validity study of the proposed test and alternative tests at their own work sites. Separate studies had to be done for men and women, blacks, Hispanics, and whites. Most firms did not have enough workers in each category to do a reliable study (Friedman & Williams, 1982). Litigation costs and the potential liability are substantial. Using an event study methodology, Hersch (1991) found that corporations that were the target of a class-action discrimination suit which was important enough to appear in the *Wall Street Journal* experienced a 15% decline in their market value during the 61-day peri-

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<sup>6</sup>The survey was of a stratified random sample of the NFIB membership. Larger firms had a significantly higher probability of being selected for the study. The response rate to the mail survey was 20%, and the number of usable responses was 2,014.

<sup>7</sup>The Supreme Court's decision in the *Wards Cove Packing Case* has made it easier for employers to defend the use of selection methods that produce adverse impact and has therefore opened the door for increased use of employment tests. It appears that employers will be able to justify the use of employment tests without having to undertake costly validity studies in their own firm by citing validity research done for similar jobs in other firms. Congress is considering legislation that would reverse *Wards Cove* and make it even harder to defend the use of selection procedures that have adverse impact than under the *Griggs* precedent. If this legislation passes, the ability of firms to make wise hiring decisions will deteriorate even more.

od surrounding the announcement of the suit. Companies became extremely cautious about testing, and the result was to greatly diminish the use of tests for employee selection. A 1987 survey of the membership of the National Federation of Independent Business found that basic skills tests had been given in only 2.9% of the hiring decisions studied.

Other countries handle the signaling of high school accomplishments to prospective employers much more effectively and have much lower turnover rates as a result.

## CONCLUSION

Turnover affects the stock of trained workers in three ways. First, high turnover necessarily implies that a given rate of investment in firm specific skills yields a smaller stock of workers with such skills. Many of those trained have moved on to other firms at which the firm specific components of training wield no benefits.

Second, turnover has a powerful effect on employer decisions to provide training to employees. Employers, not workers, finance most of the training that is undertaken in U.S. firms (see above). Employers will not invest in training unless they believe it will generate a monthly return that exceeds the sum of the monthly turnover rate (generally above 2% per month in the United States and sometimes greater than 8% per month) and the cost of capital (which is about 1.5% per month or 18% per year). Monthly turnover rates are typically much larger than the cost of capital and are also much more variable. If turnover is 5% per month and the cost of capital is 1.5% per month, the cash flow yield of the training investment rate of return must exceed 78% per year if the investment is to make economic sense. Even when turnover is very low—2% per month—required cash flow yield is still quite high—42% per year. Training thus becomes a sensible investment for an American employer only when it yields very rapid and very large returns. The amount of training employers are willing to finance is negatively related to the projected turnover rate of the trainees.

The third reason why turnover is so critical is its impact on the process of teaching and learning. Turnover disrupts learning regardless of whether the skills being learned are generic or firm specific. Schools teach general skills and follow a common curriculum, yet have great difficulty when students transfer from one school to another during the school year. Teaching must be adjusted to the special needs of the learner, and it takes time for the teacher to learn of those special needs. Learning occurs best when instructor and learner have a close personal relationship, and it takes time to build such relationships.

The high rates of turnover in America, then, help explain why investments in OJT are lower in this country than in Japan and Germany.