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*Is There a Role for Public Support of Incumbent Worker
On-the-Job Training?*

Upjohn Institute Staff Working Paper No. 08-138

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ABSTRACT

States have begun to use training subsidies as a policy tool for employment retention and business competitiveness. This paper summarizes a survey of states concerning their investments in incumbent worker training. Altogether, states are investing about \$550 to \$800 million, which is perhaps one percent or less of total private sector training costs.

The paper further discusses a study conducted for one state in which we found significant fiscal returns implying that underinvestment of public funds for incumbent worker training may be occurring. In this state, primary sector jobs were created or retained at a public cost of less than \$9,000 per job; a cost that rivals or bests most economic development initiatives.

JEL Classification: J24, J28, I28

An earlier version of the paper was presented at the annual meetings of the Association for Public Policy Analysis and Management (APPAM) in Washington, DC. I would like to thank my discussant, Harry Holzer, for several insightful comments about the paper. This paper builds on work that was done under contract to Commonwealth Corporation, Boston MA, an administrative entity for the Massachusetts Department of Workforce Development, and work that was done under contract to the Indiana Department of Workforce Development. The contractual support of the Commonwealth of Massachusetts and the State of Indiana as well as the resources and support of the Upjohn Institute are gratefully acknowledged. Lauren Migliore provided invaluable research assistance. The usual caveat applies.

INTRODUCTION

At a small firm that manufactures plastic tubing for medical procedures, a trainer provided a team of production workers with a video camera. The team's homework assignment as part of a training course was to videotape their procedure for switching the production of tubing with one diameter to tubing with a different diameter. The team formally diagnosed the procedure that had been video-taped during a subsequent training session and derived a list of over 20 ways they could make the shut-down and set-up more efficient. It was easy for an outsider to picture the productivity improvements that were going to immediately occur with those team members as soon as they returned to the production floor.

At a large automotive Tier 1 supplier, John was a dependable, hard worker, but he lacked the communication and problem-solving skills to progress in his career. After 10 years on the job, he still was in the same entry-level position into which he was hired. After an 80-hour general, basic skills class, John blossomed. His supervisor marveled at the change and indicated that John has recently contributed several useful suggestions for improving the work flow of his line.

These are two anecdotes from the qualitative portion of evaluations, undertaken by the author, of two state-funded training initiatives for incumbent workers. A more thorough quantitative evaluation of the program administered by one of the states demonstrated quite handsome returns for the worker, firm, and state. This evidence has led to the hypothesis that there is a reservoir of productive skills in incumbent workers, especially frontline, low-wage workers, that, if tapped, could produce substantial economic benefits for both the workers and the employers.

In the events described above, state funding had been the catalyst for tapping into the workers' skills. The question might be asked of whether state governments should engage in private-sector training such as that exemplified by these anecdotes in order to tap the embedded productivity. On the one hand, the programs are creating value added for the firms and workers who are subsidized. On the other hand, the government may be propping up poorly performing or more poorly managed companies. After all, general training to relatively low-skilled workers is fairly inexpensive and quite accessible. So, if there is a substantial payoff to be had, why hadn't the companies invested in the training themselves?

The purpose of this paper is to consider the rationale for public support of incumbent worker training, to document some very recent data on the extent of subsidized training that is occurring in the United States, to summarize the findings from a study of such training in one state where quite significant fiscal returns were estimated, and to suggest a specific public policy aimed at increasing its incidence and effectiveness.

WHY PUBLIC SUPPORT MAY BE WARRANTED

For the most part, publicly supported skill training for adults is provided to nonemployed individuals. The Workforce Investment Act (WIA), as with its predecessors the Job Training Partnership Act and Comprehensive Employment and Training Act, targets public training funds on individuals having difficulties becoming employed or facing worker dislocation. The reasons for this targeting are transparent. Shortening spells of nonemployment is likely to reduce public employment-conditioned transfer payments and increase the efficiency of the labor market. Furthermore, public subsidies overcome human capital investment borrowing constraints that may be especially severe for nonemployed individuals.

However, in addition to investments in job training for nonemployed individuals, it should be noted that the public does provide job training support for employed workers and has done so for decades. This type of support for incumbent workers is probably less well-recognized and is certainly of a reduced scale compared to programs for nonemployed individuals. One example of public support for employed workers is economic development initiatives such as job training grants aimed at business attraction or expansion. These often take the form of customized training contracts with community or technical colleges for training workers who will be employed in expanded or newly opened facilities.

More recently states have turned to the subsidization of incumbent worker training for retention and competitiveness reasons. The dynamics of economic change, especially the relative shift away from manufacturing and toward services, are leaving some states with obsolete manufacturing capacity and, often, relatively highly paid dislocated workers who lack skills or have high mobility costs that impede their employment prospects. In response to these problems, states are investing public funds in training activities for existing workers to try to retain businesses.

Why are states spending scarce resources to subsidize training investments, the beneficiaries of which usually are the workers who get trained and their employers? There are at least four key rationales. First, states are using incumbent worker training programs to avert the social costs of unemployment. These costs include income losses that are not insured by the Unemployment Insurance system; for example, lost productivity because of involuntary unemployment, external costs such as the deleterious effects on physical or mental health that may occur because of unemployment, loss of tax receipts and possible expenditure increases, and general deterioration of the state's productive capital stock.

The second rationale for public funding is the notion that employers tend to avoid offering training that imparts general skills because of potential "poaching" by other employers. The classical Mincer/Becker model of training implies that if workers gain skills that are general, i.e., useful in other firms, then those workers will become recruitment targets for other firms that may need workers with those skills. With frontline workers, typically the training that is most needed tends to be very general in nature. Note that Bassi (1992) and Hollenbeck (1993) suggest that this factor did not seem to affect employer training behavior, at least in workplace literacy efforts.

A third justification for public intervention in the market for training is that capital markets do not readily fund investments in human capital. Human capital accumulations are not valued on a company's financial statements. Human capital can not be collateralized, and business financing has a short-term payoff bias that militates against the funding of training.

A final rationale is an equity argument. Many studies have documented the low incidence of corporate training that goes to low-wage, entry-level employees. (See, for example, Relave [2003].) In a thorough analysis of training using three different national surveys, Barron, Berger, and Black (1997, p. 81) note, "Even after controlling for other factors, college graduates receive between 56 to 60 percent more training than high school graduates in the first three months of employment." Frazis et al. (1998, p. 11) note, "A smaller proportion of those in the bottom quartile [of weekly earnings] receive formal training than do higher earners . . . Hours of training also are lower for those in the bottom quartile: these individuals received an average of 4 hours of formal training, as opposed to 23 hours for those in the top quartile."

STATE INVESTMENTS IN INCUMBENT WORKER TRAINING

There do seem to be reasonable justifications for public support of training. So the question becomes, what is the socially optimal level of that support? Estimates suggest that the private sector invests approximately \$50–\$60 billion a year in training (*Training* 2006). Extant and newly collected data from states suggest that only a small fraction of this amount (perhaps about one percent) is publicly subsidized. Moore et al. (2003) document a total of 36 states that funded incumbent worker training in 1998–99 with a total budget of about \$317.8 million. The U.S. General Accounting Office (2004) surveyed all 50 states plus the District of Columbia and found that 23 states used employer tax revenues to fund “employment placement and training programs” in 2002. These states reported spending \$278 million on these activities, of which \$202 million was on training. Note that these two sources are not directly comparable because the Moore et al. study refers to customized training expenditures that may come from any source of revenue, whereas the U.S. General Accounting Office study focuses exclusively on employer tax revenues.

Duscha and Graves (2007) document a thorough study of state-financing of customized training. They report that in FY 2006, states subsidized the training of about one million individuals at a cost of \$571 million. They further report that this level of spending was down from a peak of \$721 million in FY 2000.

Upjohn Institute staff members have recently completed a structured data collection effort to update information that we had previously collected in 2005. Hollenbeck and Klerk (2007) present findings from the earlier survey of states conducted in summer 2005. This survey received responses from individuals in 30 states. Only 22 of these 30 states provided expenditure information. They reported spending \$324.3 million on incumbent worker training in FY 2004. An extrapolation of this figure on a population basis yielded a national estimate of approximately \$591 million. Similar to the Duscha and Graves (2007) findings, our 2005 survey indicates that total spending had decreased every year for the prior four years. Between 2001 and 2004, there had been a 30 percent decline in nominal dollars according to this survey.

In our more recent effort, we have tried to carefully specify the definition of and types of incumbent worker training for which we are collecting data so that we have comparable information across states. In particular, we included WIA incumbent worker training that is funded out of the state’s 15 percent administrative allocation or from local allocations in states

that have received a local waiver to use funding for such training. We included customized training for economic development purposes, state tax credits for training investments, programs that are funded by special taxes imposed by the state such as surcharges on employer unemployment insurance (UI) tax liabilities, and incumbent training programs funded by state general appropriations or bonds. We excluded on-the-job training (OJT) contracts funded by WIA, vocational rehabilitation funded training, veterans' programs, apprenticeships, retention and advancement programs funded through TANF, the President's High Growth Initiative, sectoral programs, and state- or federal-funded demonstration programs. In general, we were trying to include state-funded (or state-administered) efforts that are strategically targeted on firms, and to exclude programs that were primarily aimed at training individuals (WIA OJT's, vocational rehabilitation, or apprenticeships). Furthermore, we excluded sectoral collaborations or intermediary efforts like the High Growth Initiative because we believed it was impossible to determine how much funding actually got invested in incumbent workers.¹

The data collection involved two phases. We first conducted a Web-based document search to determine the incumbent worker training programs that each state was offering. This task was not at all straightforward because 1) some states bundle together different sources of revenue, 2) programs are administered by different state agencies (and sometimes non-governmental agencies), and 3) states may have christened their programs with unique names intended to help market them. We examined documents but sometimes had to download legislation or make phone calls to determine exactly what the programs were intended to accomplish. The document National Governors Association (1999) was helpful to us in the identification phase of our data collection effort.

The second phase of the project involved obtaining data about FY 2006 expenditure levels, number of firms assisted, and number of employees trained with public funding. We did this phase mainly by telephone and E-mail. The appendix provides a complete listing of results from this data collection. The following paragraphs summarize our results by type of funding.

WIA Statewide Incumbent Worker Training (IWT). States may reserve up to 15 percent of their Workforce Investment Act funding for state administrative purposes. An allowable

¹ Hollenbeck and Eberts (2006) find that the Michigan Regional Skills Alliances program offered virtually no training; rather, the effort primarily facilitated capacity building and informational flows between partners. Trutko et al. (2007) report that only a minority (6 out of 20) of the High Growth Job Training Initiative Grants examined in their study targeted incumbent workers, and not all of them got to the point of actual training delivery.

expense from these funds is incumbent worker training. A majority of states—30 all together—indicated that they were funding IWT with their 15 percent funding. We were able to get detailed data on expenditures, firms subsidized, and trainees from 24 of the states. These 24 states reported that they had used WIA statewide funds to subsidize training at 2,686 firms at a cost of about \$63.81 million in FY 2006. At these firms, a total of 122,229 workers were trained. Thus for these 24 states, the average firm received a grant of about \$23,750, and the average expenditure per worker was about \$522.

Economic Development Customized Training. Of the 51 states, 30 indicated that they are funding customized training for economic development, and we received detailed data from 27 of the states. These states reported that they spent about \$170.07 million in FY 2006 for training at 9,974 firms. The states reported a total of 385,775 workers trained. Thus for these 27 states, the average firm received about \$17,050 in funding, and the average expenditure per worker was about \$440.

State Training Funds from General Appropriations. Only 18 states indicated that they had job training funds that may be used for existing workers that are funded with general state appropriations. These 18 states spent about \$176.70 million in FY 2006 for training at 8,132 firms. Altogether, they reported that a total of 263,605 workers had been trained with these funds. Thus for these 18 states, the average firm received about \$21,730, and the average expenditure per worker was about \$670.

State Training Funds from Unemployment Insurance Taxes. The largest sources of funds for subsidized training are training funds that are financed with surcharges on firms' or employees' unemployment insurance tax liabilities or from interest accrued on state UI trust funds. A total of 19 states indicated that they are funding training with revenues from the unemployment insurance system. We were able to get detailed expenditure, firm, and employee data from 17 of the 19 states that offer these funds. The 17 states spent about \$243.62 million of these funds in FY 2006 for training at 6,420 firms; they also reported a total of 421,326 workers trained. Thus for these 17 states, the average firm received about \$38,650, and the average expenditure per worker was about \$580.

Tax credits. As shown in the appendix, seven states indicated that they had training tax credits for firms. Only five of the states provided data about take-up of these credits. These

states provided credits to about 500 firms in FY 2006 for training activities that were undertaken by about 100,000 workers.

Total. If we extrapolate by population for the handful of states with incomplete data, then we estimate total incumbent worker training funds in the United States to have been about \$719.14 million in FY 2006. This is in line with other estimates. Hollenbeck and Klerk (2007) estimated total expenditures for FY 2001 through FY 2004 (nominal dollars) at \$815.2 million, \$661.5 million, \$613.6 million, and \$590.9 million, respectively. Duscha and Graves (2007) provide the following estimates for FY 2001 to FY 2006 (nominal dollars): \$633.5 million, \$607.5 million, \$584.4 million, \$513.2 million, \$552.0 million, and \$571.3 million, respectively. In short, we can have a fair degree of confidence that total investments in incumbent worker training total around \$550 to \$800 million. Our extrapolation estimates that in FY 2006, approximately 1.33 million workers were trained with public subsidies to approximately 30,300 firms. Thus the “typical” subsidy was about \$23,700 per firm and \$540 per worker.

EVIDENCE ABOUT RETURN ON INVESTMENT FROM ONE STATE’S PROGRAM

In 1999, Massachusetts initiated a competitive grant program to support incumbent worker training. This section of the paper provides some background on the Massachusetts program, which we evaluated in a study conducted over the past 18 months (Hollenbeck 2007). The Massachusetts Workforce Training Fund (WTF) program is funded by a (mandatory) contribution by Massachusetts employers that accompanies their state unemployment insurance tax liabilities. The calendar year 2006 flat rate contribution for the Workforce Training Fund was 0.06 percent of unemployment insurance taxable wages. The maximum of those taxable wages was \$14,000, so the maximum annual contribution per employee was \$8.40. This contribution raises about \$21 million a year for the Fund.

According to its most recent annual report (Massachusetts Department of Workforce Development 2005), the WTF program has awarded more than \$107 million to 2,258 companies to train more than 157,000 employees since its inception in 1999. In FY 2005, the General Program awarded \$21.2 million to 209 companies to train 25,669 employees. By regulation, the grants require a 100 percent match (may be in-kind) from companies and may not exceed two

years. In the descriptive data below, we show a mean length of 18.1 months, with a range from 0.6 to 38 months.²

Descriptive Data

The evaluation that the Upjohn Institute conducted was overseen by the Commonwealth Corporation (CommCorp), which is the administrative entity for the state’s workforce development board. To support the study, CommCorp staff developed a WTF analytical database by merging automated application data and evaluation report administrative data.³ It is our understanding that these data represent the universe of companies that received training grants, completed the training, and filed evaluation reports since the inception of the program in 1999.⁴ Altogether, the database had information on 822 grants awarded to 781 companies/organizations.⁵ The grants comprising this database totaled \$52.480 million to subsidize training for 80,798 workers. The actual expenditures from the grants totaled \$48.736 million and covered 81,625 workers.⁶

Table 1 provides general descriptive information about the grants that are in the database. The average grant was just under \$60,000, trained about 100 workers, and lasted about 18

months. Of course, there was considerable variation. For example, the grants ranged from \$250 to \$474,000; the number of employees trained ranged from 1 to over 3,000. The average grant per trainee averaged about \$1,284, but it ranged from \$30 to almost \$25,000.

Table 1 Characteristics of Massachusetts Workforce Training Grants			
Characteristic	Average	Minimum	Maximum
Size of grant	\$ 59,294	\$ 250	\$ 474,000
Employees trained	99.9	1	3,032
Grant length	549 days	18	1,352
Cost/trainee	\$ 1,284	\$ 30	\$ 24,980

² Only six grants reported a duration exceeding two years. Extensions of the two-year contract period are apparently granted on rare occasions when extenuating circumstances delay the actual start-up of training.

³To receive closeout funding, companies are required to submit a fairly detailed evaluation report about their training grant activities and results.

⁴ The format of some of the evaluation reports from the earliest grants did not align with the format of these reports for later years, and so these reports/grants did not get automated and are missing from the analytical database.

⁵ Twenty-nine companies have application and evaluation information from two grants, and six companies have information from three grants.

⁶ About 80 percent of the firms reported actual expenditures that exactly matched their grant funds. About 15 percent spent 90 percent or less. On the other hand, just under 60 percent of the firms reported training the same number of employees as they had planned in their application. About 15 percent of the firms trained 90 percent or less of their planned number, and another 15 percent trained 110 percent or more. The other 10 percent of firms trained a number of employees that was within ±10 percent of their plans.

What kinds of firms received these grants? Table 2 provides descriptive statistics. Relative to the number of employers in the private sector economy, manufacturing employers were considerably overrepresented. Over 65 percent of the grants had been awarded to manufacturing firms, whereas only 14 percent of the state’s private sector firms were in manufacturing.⁷ Firms in the retail trade sector received about 7 percent of the grants, but they comprised about 20 percent of private sector employers in the state. Similarly, services received 14 percent of the grants, but they comprised 43 percent of the employers. Finance, insurance, and real estate firms, which comprised approximately 8 percent of the state’s firms, received about 5 percent of the grants.

The average employment size of the firms was about 309, but it ranged from 2 to over 11,250. About one-third of the grant recipients had less than 50 employees, whereas only about 12 percent had more than 500. The median employment size was 115. Just under 10 percent of the firms with training grants were nonprofit organizations, and about 9 percent were unionized. Workforce training fund grants may not be used for salaries or wages of workers while in training. Consequently grants tended to fund training provided by

Characteristic	Percentage
Industry	
Food, textiles, apparel	4.0%
Wood, paper, chemicals, plastic	12.7
Metal products, machines, electrical	48.5
Manufacturing, subtotal	65.2%
Retail: Books, music, general	7.2%
Finance and insurance	5.2
Other services, except public admin.	14.3
All other	8.1
Nonmanufacturing, subtotal	34.8%
Union status	
Unionized	8.7%
Nonunion	91.3
Region	
Central	15.1%
Greater Boston	28.3
Northeast	15.6
Southeast	21.1
West	19.9
Profit status	
Nonprofit	9.4%
For profit	90.6
Ownership	
Private	79.1%
Public	20.9
Employment size, mean	
	309.4
Minimum	2
Maximum	11,283

external parties. Some of these were (profit-making or nonprofit) management consultants, and some were community colleges. From the database of 822 completed grant applications, there

⁷ Statewide percentages of private sector firms are from the Workforce Training Fund 2005 Annual Report.

were a total of 1,243 trainers proposed.⁸ (Many applications propose several trainers since the companies were proposing several types of training.) Of the 1,243 trainers proposed, there were 610 unique providers.

According to the self-reported evaluation data, the training grants had quite positive impacts on the firms (Table 3). The percentages of firms that reported productivity improvements, that reported competitiveness improvements, and that reported other positive benefits were all over 90 percent. Among the 15 productivity improvement items to which the firm representatives were asked to check, over 50 percent of the firms indicated that the training resulted in improved efficiency. About 40 percent indicated that they had improved quality/accuracy, and about 25 percent noted improved throughput.

Table 3 Training Grant Impacts on Firm	
Impact	Percentage/Categories of Improvements or Benefits
Productivity Improvement (III, q.1) ^a	
Yes	90.8%
No	9.2
Improvements noted most often:	Improved efficiency Improved quality/accuracy Improved throughput
Competitiveness Improvement (III, q.2) ^a	
Yes	91.8%
No	8.2
Improvements noted most often:	Increased employee skills Increased employee knowledge Better customer/client services
Other benefits (III, q.8) ^a	
Yes	91.2%
No	8.8
Benefits noted most often:	More teamwork Improved communications Better understanding of the “big picture”
^a Question number on the WTF close-out evaluation report.	

Among the 16 competitiveness improvement indicators, almost half of the firms indicated that the training had resulted in increased employee skills and increased employee knowledge. Almost 30 percent of the firms felt that the training had resulted in better customer/client service. The administrative report gives the respondents 13 indicators of other benefits that might have accrued to the firm as a result of the training. Over half indicated that the training had resulted in

⁸ Of the 822 records in the database, 669 have information about one or more training providers.

more teamwork and improved communications. About one-third of the firms reported that the training resulted in better understanding of the “big picture.”

The evaluation reports also provided self-reported impacts on workers. Summaries of these data are displayed in Table 4. About two-fifths of the firms reported that they promoted workers as a direct result of the training. On average, a little over nine workers were promoted in the firms that indicated that promotions had occurred. About 30 percent of the firms reported that they hired new workers as a direct result of the training. On average, about 12 workers were hired in these firms. In a little over one-fifth of firms, the respondent indicated that layoffs had been prevented because of the training. On average, these firms refrained from laying off about 12 workers. Finally, about half of the firms responded that they gave workers increased wages because of the training. These increases averaged 8.9 percent.

Table 4 Training Grant Impacts on Workers		
Impact	Percentage	Size of Impact
Promotion as result of training? (III q.3, 3a) ^a		
Yes	40.7%	
No	54.3	
If yes, average no. of promoted workers:		9.3 workers
New hires as result of training? (III q.4, 4a) ^a		
Yes	28.9%	
No	71.1	
If yes, average number of new hires:		11.7 new hires
Layoffs prevented as result of training? (III q.5, 5a) ^a		
Yes	22.6%	
No	77.4	
If yes, average number of prevented layoffs:		12.4 layoffs prevented
Increased wages as result of grant? (III q.6, 6a) ^a		
Yes	47.6%	
No	52.4	
If yes, average wage increase:		8.9%
^a Question number on the WTF close-out evaluation report.		

Return on Investment

The Workforce Training Fund grants involve three entities, and each bears costs and receives benefits. We now turn to estimates of the returns received by workers who receive the training, firms that provide the training, and the Commonwealth, which is acting in the interest of its taxpayers.

To workers and firms. Business firms are the decision makers about the design of the training proposed for funding by the Workforce Training Fund grant program. Firms apply for a grant if they believe that the training subsidy together with their investment in matching costs will yield a monetary benefit that exceeds the firm's investment. The training may result in payoffs to workers, but the underlying motivation is for the firm to reap a benefit.

Precise calculation of the return on investment to training for a firm is impossible because it requires observing the firm in two different states of the world: one having the training take place, and an imaginary counterfactual state of the world in which the firm did not offer the training. If one could observe these two states of the world simultaneously, then the benefit to the training program would be the discounted value of all future profits net of training costs for the firm less the discounted value of all future profits for the firm had it not offered the training.⁹ That benefit minus the cost borne by the firm as a percentage of the training investment would be the return on investment of the training.

Given the data that were available to us from the application and evaluation reports, we have used some extrapolative assumptions to generate estimates of the returns. That is, the evaluation reports provide information about impacts, and we use state-level ratios to calculate the information needed to convert this information into formal estimates of the return on investment. This is equivalent to the assumption that the firms that received grants and their employees are similar, on average, to all of the firms and employees in the state.

To estimate the rates of return on the workforce training, we hypothesize that the training grants might have two types of impacts: 1) a wage/productivity impact, and 2) an employment impact. The wage/productivity impact refers to the increase in productivity that occurs for workers who were trained. The skills that trainees acquire will, in general, increase their productivity. Economic theory suggests that because the workers are more productive, their wages should increase, which is called the return to training for the workers. Of course, firms also retain a share of the increased productivity, in general. This constitutes part of the return on investment to firms. The remaining portion of the return on investment to firms comes from the employment impact, which refers to the fact that in some instances the training either created new jobs or saved jobs from being eliminated.

⁹ This discussion is phrased as though the firm is a profit-making enterprise. If the firm is nonprofit, then the discussion would be similar, except that the profit concept would be replaced by revenue or budget, which are assumed to be equal.

The textbook model of the returns to training has a trainee's productivity and earnings while he or she is in training being less than an otherwise identical worker not being trained. This assumes that the trainee is less than fully productive while they are spending time in training, and it assumes that the employer can reduce the level of earnings to training participants while they are being trained. It is likely that productivity is lower than earnings during the training period to reflect a cost sharing between the employer and employee. The difference between an untrained worker's earnings and the trainee's earnings is the worker's share of the cost. The difference between the trainee's earnings and productivity is the employer's share.

After the training is over, the trainee's productivity and earnings grow substantially faster than the productivity and earnings growth rate for the untrained worker. This is the payoff (or benefit) to training. Again, this is shared between the worker and firm.¹⁰ It is assumed that the trainee's productivity will grow faster than earnings. The difference between the trainee's earnings profile and the earnings profile of the untrained worker is the worker's payoff, and the difference between the trainee's productivity and earnings profiles is the firm's payoff. As long as the discounted value of the firm's payoff is greater than its share of the training cost, the firm will have an incentive to train.

Questions on the employer evaluation report provide information about employee wage increases resulting from the training. Specifically, the questions are phrased as follows:

- | | | |
|-----|---|-----------|
| 6. | Have you increased (or, within the next six months do you expect to increase) wages as a direct result of this grant? | Yes or No |
| 6a. | If yes, what was the average wage increase? | _____ |
| 7. | Did other employees, not trained through the grant, also receive a wage increase during the same period? | Yes or No |
| 7a. | If yes, what was the average increase? | _____ |

In the database, 46.7 percent of the respondents indicated yes to question 6. The average wage increase for the firms that responded to question 6a was 8.9 percent. 36.5 percent of the respondents indicated yes to question 7, and the average wage increase for the firms that responded to 7a was 3.4 percent. We constructed a variable to represent the difference between the wage increment to trainees and to other employees not trained through the grant.

¹⁰ The extent of cost and benefit sharing between worker and firm has traditionally been thought of as a function of the specific or general nature of the training. As developed by Becker (1964), the theory suggests that workers receive the full benefit of the training and bear the full cost of the training if it is general in nature (skills developed are useful in other firms). However, much of the empirical training literature has shown that most training is general, and yet employers "pay" for and receive benefits from general training.

Altogether, we were able to calculate a wage differential for about 35 percent of the sample, and the mean of it was 8.0 percent. For those firms, the average return to training for the workers was 8.0 percent. For the other 65 percent of the sample, we don't know if the individual completing the report 1) did not know or chose not to answer the questions, 2) felt that the productivity benefit of the training was zero, or 3) felt that the firm received the full share of the training benefit. In the latter two cases—no productivity benefit or the firm appropriates the full share of the training benefit—then the workers' return is 0. That means that the return to training for the workers is in the range of 2.8 to 8.0 percent¹¹ assuming that the worker bears no costs, i.e., wages are not reduced during the training period. Since by assumption the workers are not investing in the training, this estimate is not a return on investment, but rather an (average) immediate raise in wages. But of course, over time, the differential may increase or depreciate in size.

The return on investment for firms builds on the productivity/wage impact of the training, but also includes what we have referred to as an employment impact. Estimating a firm's return on investment requires estimating the impacts on total firm productivity over and above wage gains. However, there are no quantitative measures of productivity in the data, so we need to make some assumptions about these gains. One approach would be to find estimates in the literature. Unfortunately, very few data sets have reasonable data to estimate the productivity profiles. The most reliable empirical estimates may be found in Barron, Berger, and Black (1997) and Lowenstein and Spletzer (1999). These studies both find that the growth rates of productivity that result from training far exceed the growth rates in wages—on the order of 10 times faster. Firms apparently gain far more from training than do workers.

To develop an estimate, we make a far more conservative assumption—that the ratio of the additional value added at firms that have trained their workers to the wage gains of those workers is equivalent to the statewide average of value added (gross state product) to compensation of employees. In 2004,¹² the gross state domestic product for Massachusetts was

¹¹ The 2.8 percent estimate was derived by computing 35 percent * 8.0 + 65 percent * 0.0 percent. Note that Barron, Berger, and Black (1997) estimate the worker return to training to be 2.0–2.8 percent. Lowenstein and Spletzer (1999) estimate it to be 4.4–4.6 percent.

¹²The state-level macroeconomic and population data used to derive rate or return estimates are from 2004. There are several reasons to use these data. First, it is the approximate time period when many of the grants and much of the training ended. Second, it is the most recent year for which full data are available. Finally, it is a year in the middle of an economic cycle—neither peak nor trough. Furthermore, the dollar figures are all nominal, i.e., not adjusted for inflation, even though some grants may have ended well prior to 2004. The reason for this is that

\$312.7 billion and employee compensation was \$196.1 billion, (equivalent to the compensation share being 62.7 percent). Total employment (on a jobs basis) in Massachusetts in 2004 was 4.057 million, so total value added and total employee compensation on a per job basis were about \$77,100 and \$48,300, respectively. The completed grants in the database were used to train 81,625 workers, so the estimated increase in state value added and total compensation resulting from the training using the estimated return to workers of 2.8–8.0 percent would be \$176.2–\$503.4 million and \$110.4–\$315.4 million, respectively.

Firms accrue a second benefit to the training that we refer to as the employment impact. In these cases, the training creates additional economic activity because it expands employment or prevents layoffs. Questions on the Employer Evaluation report provide information about new hires or prevented layoffs as a result of the training program. Specifically, the questions are phrased as follows:

- 4. Were there any new hires as a direct result of the training program?
Yes or No
- 4.a. If yes, how many? _____
- 5. Were any layoffs prevented as a direct result of the training program?
Yes or No
- 5.a. If yes, how many? _____

A total of 28.9 percent of the respondents indicated yes to question 4, and the average number of new hires for the firms that responded to question 4a was 11.7. 22.6 percent of the respondents indicated yes to question 5, and the average number of layoffs prevented for the firms that responded to 5a was 12.4.

Altogether, the grants at the 822 firms in our database resulted in 3,995 new hires or layoffs prevented. By the wording of the questions, we can assume that without the training grants, employment in these firms would have contracted by these 3,995 new hires or prevented layoffs. Total employment at the firms that reported employment size (n=754) was 233,278. Thus, employment rose, on average, by about 1.7 percent as a result of the grants. If we assume constant returns to scale,¹³ then value added in these 754 firms rose by 1.7 percent.

To derive a return on investment for employers who, unlike workers, do invest in the training, we need to estimate the additional profits that firms accrue from the productivity and

the assumptions used to generate the estimates are very strong, so that any refinements made by adjusting to real dollars would be marginal, at best.

¹³ A conservative assumption because most expanding new firms are operating with economies of scale.

employment impacts. Using the above-mentioned state value added per job of \$77,100 means that the 754 firms that reported total employment generated about \$18.0 billion in value added. The employment impact of 1.7 percent implies that that impact increased value added by approximately \$305.8 million. Adding the approximate wage/productivity impact of \$176.2—\$503.4 million yields a total estimated impact on state value added of \$482.0—\$809.2 million. According to the Bureau of Economic Analysis (2006, Table 13), the average U.S. corporate profit rate in 2004 was 11.0 percent of gross value added. Thus our estimate of additional profits generated by the training is \$53.0–\$89.0 million.

The investment that firms made was the matching expenditures required by the grant. The match that is required of firms receiving a grant is 100 percent, but in case studies and anecdotes, we learned that firms tend to invest more than the 100 percent required. So to be conservative in our estimate of return on investment, we will assume that firms can account for matching expenditures that total 150 percent of their grant awards. However, we were told that workers are often, if not usually, fully productive during their training (they make sure that their workloads get handled by working extra hours without pay, for example), so 150 percent overestimates the firms' net investments in the training. We will conservatively estimate that firms invest 125 percent of the grant (± 25 percent), on average. The total grant expenditures by the firms in the database add up to \$48.736 million. So, the firms' investments are \$48.7–\$73.1 million.

The first year return on investment for firms is then a payoff of \$53.0–\$89.0 million on investments of \$48.7–\$73.1 million. At the midpoints of these ranges, this is a 16.6 percent return. Of course, there is a huge uncertainty band around this return, and the return may grow significantly over time if the positive impacts do not depreciate rapidly.

To the Commonwealth. In addition to private returns to workers and firms, the Workforce Training Fund grants have fiscal returns to the state. Altogether, the firms' evaluation reports document 3,995 new jobs (either new jobs created or layoffs prevented.) However, if the job is in a service industry that mainly serves local customers, then the job increase in the firm that received the training grant may simply be a reallocation from another firm, and there is no net increase in employment for the state as a whole. However, if the job creation occurs in an export-based sector, then the state has new employment generated directly

and indirectly through a multiplier effect. Export in this context refers to sales outside of the state, either domestically to other states or internationally.¹⁴

A total of 2,784 jobs were created in the export-based industries by the training grants. If we assume a multiplier of 2.0,¹⁵ then the total number of “new” jobs created in the state was 5,568. A total of \$48.7 million in grants was given out, so the subsidized cost per job created was \$8,750, which is a fraction of the cost of job creation in many state economic development activities.

Determining the rate of return for the Commonwealth requires assumptions about the fiscal benefits and costs of additional jobs and additional earnings in the state. New jobs and economic activity will generate revenues in the form of taxes and service fees, but new jobs and economic activity may also increase services provided by the state, and thus may increase state expenditures. Our “model” is to assume that state revenues (or more accurately, a subset of state revenues) depend on state personal income and that state expenditures depend on population.

To estimate the potential fiscal payoff, we used data from the state’s budget revenues and expenditures. On the revenue side, in 2004, general revenue from own sources (\$37.11 billion) plus utility revenue (\$2.45 billion) added up to be \$39.56 billion, which was 14.77 percent of state personal income (\$267.82 billion). In other words, we have assumed that the new personal income from wage increases and from export-based job creation will increase the state’s own sources of revenue and utility revenue, but not intergovernmental revenue nor insurance trust revenue. The ratio of personal income to employment (on a jobs basis) in 2004 was \$66,014. Thus the 5,568 “new” jobs in the state would have raised personal income by \$367.6 million. The ratio of personal income to total worker compensation in 2004 was 1.366, so the wage/productivity impact of the training would have raised personal income by \$150.8—\$430.8

¹⁴ The following sectors were assumed to be mainly export based:

<u>Industry</u>	<u>Description</u>
3025	Manufacturing: Food, textiles, apparel
3026	Manufacturing: Wood products, petroleum, chemical products, plastics
3027	Manufacturing: Metal products, electronics, electrical equipment
3031	Transportation
3032	Mail, Delivery, and Warehousing
3036	Professional, Scientific, and Technical Services
3037	Management of Companies and Enterprises
3041	Arts, Entertainment, and Recreation

¹⁵ Bartik (2006) cites a study of economic development programs that reports a median multiplier of 1.98.

million. The combination would have raised state personal income by \$518.4 – \$798.4 million and state revenues by \$76.6 – \$117.9 million.

On the state governmental expenditure side, we assume that the services provided by the state associated with new economic activity will include all direct general expenditures (\$48.45 billion) plus utility expenditures (\$4.01 billion) minus capital outlays (\$5.87 billion), public welfare (\$10.31 billion), governmental administration (\$1.82 billion), interest on debt (\$3.13 billion), and other and unallocable expenditures (\$4.35 billion). That is, we assume that the persons moving into the state (or not moving out of the state) will receive all of the services provided by the state government except for those items listed above—capital outlay, welfare (public assistance), governmental administration, interest, or other and unallocable expenses. On a per capita basis, these expenditures are \$4,211.

The question is, for how many people will the state make these expenditures? The literature suggests that when a state creates a new job, the likelihood that it is taken by, or the job chain that is created by that new job is filled by, an individual from another state is 0.8, and the likelihood that it is taken by a nonemployed state resident is 0.2 (Bartik 1993). The overall growth in jobs of 5,568 is 0.137 percent of total jobs in the state. We then assume that the state's population grows by 0.11 percent (0.137×0.80). The population of the state was 6.407 million in 2004, so we assume that the employment impact will result in an increase in population of 7,022. This population increase will result in an increase in state expenditures of \$29.6 million. So the net payoff to the commonwealth is \$47.0 – \$88.3 million. At the midpoint of this range, the state's fiscal return on its investment of \$48.7 million is 38.9 percent in one year.

In summary, the point estimates of the rates of return for the first year following training are as follows:

Worker	5.4 percent (midpoint of range)
Firm	16.6 percent
Commonwealth	38.9 percent.

The reader is reminded that each of these estimates has considerable uncertainty associated with it because rather broad assumptions were made in developing the estimates. However, we attempted to be conservative in these assumptions.

IMPLICATIONS FOR PUBLIC POLICY

A large segment of the population is being excluded from our nation's education and training "policy." That policy prescribes formal elementary or secondary education for young persons between the ages of 6 and 18. A substantial share of individuals who complete secondary education continue their formal education at a college or university. Recent public policy initiatives are calling for substantially increasing the number of individuals who participate in formal postsecondary education and to broaden the share of youngsters who attend preschool. In the workplace, individuals in professional and technical occupations are expected to participate in training. However, literally tens of millions of individuals who might be characterized as holding frontline or production jobs are generally not even expected to participate in training or work-related education. Anecdotal observation and analyses of training programs in one state suggest that we as a nation may be foregoing substantial economic and productivity growth by these low expectations and underinvestments in training.

Serious barriers exist to boldly moving the amount of training given to low-wage/frontline/production workers up to scale. The issues include funding, but perhaps more perplexing is the design and development of appropriate materials and training capacity. Osterman (2006) has proposed an innovative federally administered "Low Wage Challenge Fund." He proposes using the community college system as the infrastructure for educating and training low-wage workers because that system's resources already exist. However, in our experience, most employers and employees prefer on-site training.

Notwithstanding Osterman's suggestion, serious, careful planning needs to be invested in the problem of how to deliver substantially more training to frontline/production workers in the United States. This planning activity would seem to be a legitimate activity for the federal government (i.e., U.S. Department of Labor) to tackle, but it is also a topic that foundations may wish to and be able to fund.

One way to infuse resources into the issue, and potentially to move the level of training up to scale, would be for the federal government to match state UI-based training funds by using its Federal Unemployment Tax Act (FUTA) tax receipts, or imposing a small surcharge on the tax, to fund incumbent worker training. The current effective annual tax rate for the federal portion of the UI system is 0.8 percent on a base of \$7,000 per worker, which works out to \$56 per employee. With over 120 million wage and salary workers, this tax raises approximately

\$6.7 billion, which is allocated to the administration of the UI and employment service systems, the funding of extended benefits, and support of the trust fund. Using our estimate of about \$250 million for the states' UI-based training funds, it would take about four percent of the FUTA receipts, or alternatively a 0.04 percent surcharge rate (total tax rate of 0.84 percent) to match the states.

Given the need for the U.S. to compete globally and given the reservoir of productivity that can be drawn upon from front-line or production workers, it would seem reasonable to begin to move in the direction of raising our expectations about the education and training of the American workforce.

SUMMARY

The conventional wisdom seems to be that as technological change accelerates and product cycles become shorter and shorter, the flexibility and adaptability of human capital will make it a resource whose relative value has and will continue to significantly increase. On-the-job-training is an important investment in human capital for individuals in the workforce, i.e., the majority of adults. Since the returns to training mostly accrue to workers and firms, it is appropriate for them to shoulder most of the costs. Widescale public subsidy of such training would likely not be efficient.

However, states (and by extension, citizens) realize external benefits from worker training, and they have begun to use training subsidies as a policy tool for employment retention and competitiveness. The share of the nation's overall training investment that is subsidized by states, however, is minute—perhaps one percent. Evidence from one state suggests that public subsidy of training may have significant fiscal returns implying that underinvestment of public funds may be occurring. This state funds, on a competitive basis, grants for worker training that are submitted by businesses. Self-reported data by the firms that conducted training exhibited a significant expansion or retention of employment due to the training activities. Primary sector jobs were created or retained at a public cost of less than \$9,000 per job—a cost that rivals or bests most economic development initiatives.

The evidence presented here implies the following:

- Public subsidy of incumbent worker training, especially in export-based firms, may be an effective economic development tool for states.

- The rates of return that accrue to states for their training subsidies are substantial and may be indicative of underinvestment.
- Despite reaping substantial rates of return, our survey of states suggests very modest levels of funding for such training.

Table A1. Incumbent Worker Training Expenditures, Employers, and Trainees in FY2006, by State (Expenditures in \$ millions)

STATE	WIA				Economic Development Customized Training			General Appropriation Training Funds			Unemployment Insurance-based Training Funds			Tax Credit Programs		
	Expenditures	Employers	Employees	Local waivers?	Expenditures	Employers	Employees	Expenditures	Employers	Employees	Expenditures	Employers	Employees	Yes/No	Employers	Employees
Alabama ^a	\$1.58	40	2,906	no	no			\$20.43	117	11,685	no			no		
Alaska	\$0.01	1	2	no	no			no			\$4.61 ^b	nr	1,888 ^c	no		
Arizona	no			no	no			no			\$14.50	136	11,678	no		
Arkansas	\$1.51	76	4,629 ^d	no	\$1.85	174 ^e	14,854	no			no			no		
California	\$1.49 ^f	5 ^f	144 ^f	no	no			no			\$86.00	1,778	79,106	no		
Colorado	\$1.33 ^g	49 ^g	1,035 ^g	yes	\$4.41	72	6,171	no			no			no		
Connecticut	\$0.87	86	2,625	no	nr ^h	nr	nr	no			no			no		
Delaware	no			no	no			\$0.01	1	17	\$1.00	40	2,310	no		
DC	no			no ⁱ	no			no			no			no		
Florida	\$1.76	139	11,725	yes	no			\$5.00	39	6,928	no			no		
Georgia ^j	nr	4	254	nr	no			\$12.22	1,640	120,760	no			yes	nr	nr
Hawaii	no			no	no			no			\$1.02	405	1,271	no		
Idaho	\$0.11	30	85	no ⁱ	no			no			\$3.49	23	1,545	no		
Illinois	\$0.63	23	1,222	no	\$16.90	3,560	69,997	no			no			no		
Indiana	no			no	no			\$12.69	304	9,220	\$13.23	154	11,543	no		
Iowa	no			no	no			\$38.18	352	12,778	no			no		
Kansas	no			no	\$2.68	68	8,432	\$26.69	11	8,661	no			no		
Kentucky	\$0.29	21 ^k	391 ^k	no	\$3.84	138	18,352	\$0.52	35	4,018	no			yes	32	5,898
Louisiana	no			no	\$3.47	5	1,354	no			43.89 ^l	362	42,135	no		
Maine	no			no	no			\$3.43	71	5,624	no			no		
Maryland	\$1.03 ^m	238	3,003	no	\$1.63	122	4,840	no			no			no		
Massachusetts	no			no	no			\$1.77	7	1,662	\$21.20	941	24,550	no		
Michigan	\$3.00	400	6,925	yes	\$9.25	181	19,250	no			no			no		
Minnesota	no			no ⁿ	\$8.60	45	9,707	no			no			no		
Mississippi	no			no	no			no			\$13.82	665	147,167	yes	5 ^o	nr
Missouri	\$0.44 ^p	1 ^p	350 ^p	yes	\$10.12	387	36,520	\$8.48	15	6,255	no			no		
Montana	\$0.39	5	79	no	\$0.53	3	106	no			no			no		
Nebraska	\$0.30	112	4,168	no	\$5.12	27	3,015	no			\$1.48	1,015	18,450	no		
Nevada	no ^q			no	\$0.40	11	412	no			\$1.00	5	389	no		
New Hampshire	\$0.09	18	407	no	no			no			no			no		
New Jersey	no			no	no			no			\$25.08	267	55,232	no		
New Mexico	\$0.07	nr	nr	nr	\$15.60	66	3,549	no			no			no		
New York	\$28.34	704	36,164	no	nr	nr	nr	\$2.79	8 ^r	905 ^r	no			no		
North Carolina	\$2.99	116 ^s	1,571 ^s	no	\$12.24	832	34,653	no			no			no		
North Dakota	no			no	\$0.62 ^t	114 ^t	1,156 ^t	no			no			yes	23	1,420
Ohio	nr ^u	0	0	yes	\$17.20	323	53,953	\$7.20	472	25,515	no			yes	390 ^v	87,500 ^v
Oklahoma	no ^w			no	\$6.34	325	14,033	no			no			no		
Oregon	\$3.90	162	10,557	no	nr ^x	nr	nr	no			no			no		
Pennsylvania	nr	nr	nr	no	\$30 ^y	2,500 ^y	116,500 ^y	\$20.00	3,805	15,301	no			no		
Rhode Island	no			no	no			no			\$3.33	189	5,785	yes	42	4,347
South Carolina	\$2.00	165	10,274	no	no			\$8.00 ^z	130 ^z	5,000 ^z	no			no		
South Dakota	no			no	no			no			\$1.79	59	2,518	no		
Tennessee	\$3.30	142	15,000	no	\$8.62	112	14,397	no			nr	nr	nr	no		
Texas	\$7.57 ^{aa}	16 ^{aa}	8,000 ^{aa}	yes	no			no			\$10.38	125	14,090	no		
Utah	\$0.18	1	0 ^{bb}	no	no			\$3.41	989	19,003	no			no		
Vermont	no ^{cc}			no	\$1.35	158	4,115	\$0.25	50	150	no			no		
Virginia	\$2.36	na	na	no	7.65 ^{dd}	575	13,252	no			no			yes	5 ^{ee}	50 ^{ee}
Washington	\$0.70	132	713	no	no			no			\$0.90	8	1,044	no		
West Virginia	nr	nr	nr	yes	\$0.58	146	3,812	\$4.63	86	10,121	no			no		
Wisconsin	no			no	\$1.07	30	1,331	no			no			no		
Wyoming	no			no	no			no			\$1.61	243	2,513	no		

Table A1. (Continued)

Notes:

nr means state did not report data.

no means no state program.

^aFY2006: October 1, 200–September 30, 2006

^bData for FY2005; taken from annual report and includes only grants to vendors that served more than 10 participants.

^cData for FY2005; FY2006 four employers did not report number of workers.

^dDoes not include employers participating in consortia in the Existing Worker Training Program.

^eExpenditures estimated by adding together projects detailed in yearly grant summaries. Sparse data on specific businesses, so number of employers underestimated.

^fData estimated by summing separate projects/grants in PY2005 WIA Annual Report. Some expenditures, employers, and employees excluded. May include some layoff aversion projects.

^gRespondents not aware of information regarding this program and its history; some doubt that it even existed in FY2006.

^hJust recently received a waiver to use local funds for IWT.

ⁱState refused to disclose FY2006 data out of competitiveness concerns. WIA data from PY2005 WIA Annual Report; general appropriations training fund data for FY2005.

^jEmployers and employees underestimated because data not reported for \$216,895 of expenditures.

^kState Department of Labor noted that funding was slightly less than normal because of Hurricanes Katrina and Rita.

^lFor Business Works program, expenditures determined from reported employee count and average funds per employee.

^mLocal waiver program started in October 2006 using part of Rapid Response PY2005 funding; but no training during PY2005.

ⁿEstimated. State does not report unless more than 5 filers claim; so number of employers must have been < 5.

^oNo statewide data that totals local boards' use of WIA funds for IWT, so numbers may be understated.

^pNot for PY2005, but they have used WIA funds for IWT in past years.

^qData specific to FY2006 no available; estimated from number of employers and employees served divided by time span.

^rEstimated as annual average of PY2003--PY2006.

^sEstimated as annual average of July 2005 to June 2007 data.

^tState received waiver, but did not use funds because it was a transition, planning year.

^uEstimate for CY2006.

^vPY2004 was last year state used WIA funds for IWT.

^xSome lottery funds used for IWT as part of a flexible, business incentive program; but program not targeted on incumbent workers or tracked in that regard.

^yCustomized Job Training and Guaranteed Free Training programs combined.

^zNow called Ready SC, and all trainees are new hires.

^{aa}State would only provide FY2006 data upon purchase; these data are estimated from WIA Annual Report.

^{bb}PY2005 funds used for developing curriculum and similar activities for this company's IWT program that would be continued in ensuing years.

^{cc}State considers OJT and apprenticeship as IWT.

^{dd}Calculated by using reported average funding per worker (\$577).

^{ee}Data only available for FY2005.

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