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AUTHOR	Moore, Richard W.; Blake, Daniel
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ABSTRACT

Earnings and unemployment data from the California Employment Development Department and the California Employment Training Panel (ETP) Program records were used to analyze the effects of ETP. Earnings, weeks of unemployment, and unemployment insurance payments were measured in the year before and after training of ETP trainees who enrolled between January 1983 and December 1985. The experiences of both dropouts and completers were compared to assess the impact of ETP training and earnings while controlling for demographic and programmatic differences. Estimated effects of ETP on earnings were used to project impact of the ETP program on the California economy for 1 year and for longer periods. Findings indicated the following: (1) ETP training had a significant impact on the earnings of and reduced the likelihood of unemployment for both new hires and retraining completers; (2) ETP appeared to have a larger impact on earnings than traditional postsecondary vocational training offered in community colleges and proprietary institutions, Greater Avenues to Independence (GAIN) services, Job Training Partnership Act Title IIA, or other state displaced workers programs; and (3) the program had a substantial impact on California's economy beyond the increased earnings of participants. Stringent performance standards, policies to increase completion rates, targeting strategies, and impact studies were recommended. (Appendixes include 21 references, regression analysis of unadjusted earnings, and multipliers.) (YLB)

The California State University

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Daniel Blake, Ph.D.

California State University, Northridge
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Northridge, CA 91330

Submitted To:
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Sacramento, CA

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Executive Summary

It is almost impossible to overstate the magnitude of change taking place in the U.S. economy. The globalization of business, rapid changes in technology, and shifts in the demographics of the labor force have triggered a blizzard of books, reports and articles all focused on a similar theme: America's workforce must be retrained and upgraded to meet increasing international competition. The Commission on the Skills of the American Workforce put it bluntly in titling its report: America's Choice: high skills or low wages!.

America's current training effort seems enormous on the surface, but closer examination reveals a glaring gap in the system. Analysis shows that private employers invest their training resources in the most highly educated workers, while public efforts focus on the most disadvantaged Americans, many of whom are presently out of the labor market. Neglected in this hodgepodge of public and private programs are established workers on whom the nation must rely to cope with changing technology and international challenges.

The California Employment Training Panel (ETP) Program fills this unique niche. Specifically, ETP focuses on established workers who have recently been displaced or who are in danger of being displaced. The question for policy makers is: Does this program work? Does it make a difference in the earnings and employment of the Californians it serves? What impact does the program have on the state's economy as a whole? This study's objective is to answer these pressing questions by examining the performance of the ETP program.

Does Training Work?

The civil disturbances in Los Angeles, the worst in this century, have focused the general public's attention on job training. A recent article in the Los Angeles Times noted that "When asked the best way to prevent urban unrest, both whites and blacks chose job-training programs over strengthening the police by overwhelming margins."

An assumption about job training underlies this renewed interest. The assumption is that training works, and that people who are trained find jobs related to their training, earn more and are employed more than if they were not trained. Unfortunately, twenty years of research on vocational training in a host of institutions does not uniformly support this assumption.

In fact, the most recent research on JTPA finds modest, about $500, increases in income for adult female participants and no significant increases for male participants.

Two recent studies of displaced workers programs in Texas and New Jersey report that job search services alone or in combination with training yielded increased annual earnings of between $200 and $1,200. Its important to note that these programs did yield significant decreases in Unemployment Insurance payments to displaced workers.

Recent research on GAIN participants in California revealed similarly modest impacts of between $200 and $400 in the first year after receiving services.

Research on the impact of ETP training is limited to single study which examined the experiences of an early group ETP trainees who enrolled between January 1, 1983 and December 31, 1985. The study compared the before and after training earnings of participants, who were unemployed when they enrolled (called "new hires"), and trainees who were in danger of being displaced but were still employed (called "retrainees"). The study concluded that ETP training did have a significant impact on the earnings of trainees. The impact on new hires was estimated to be $5,976 after controlling for background and programmatic variables. The impact for retrainees was not statistically significant, after controlling for background variables, but estimated to be $2,003.

While the study provided valuable insights into the impact of the program at that time, the ETP program has changed significantly since then. Most obviously, ETP has grown substantially in size. Rather than training three thousand people in several years, it now trains over 49,000 in a single year. During the previous period studied, 60% of ETP trainees were new hires, with only 40% being retrainees. Today less than 15% of ETP trainees are new hires.

Also the macro-economic context in which ETP trains has changed. During the previous study the California economy was moving out of a recession and into a period of rapid expansion. Today the opposite is true. The economy is in a period of declining growth after a long expansionary period.

Overview of Approach

Essentially this study used earnings and unemployment data from the California Employment Development Department and ETP program records to analyze the effects of ETP. The study measured earnings, weeks of unemployment and unemployment insurance payments in the year before and after training. The experience of both dropouts and completers were compared to assess the impact of ETP training and earnings while controlling for demographic and programmatic differences. Next it used the estimated effects of ETP on earnings to project the impact of the ETP program on the California Economy for one year and for longer periods.

Conclusions

1. ETP training has a significant impact on the earnings of both new hire and retrainee completers.

The results of this study clearly show that both new hires and retrainees who completed their program had significant increases in earnings that go beyond the rate of inflation. Looking at simple differences adjusted for inflation new hire completers earned over $10,900 more than dropouts, and retrainee completers earned over $3,500 more than dropouts.

When a multiple regression analysis was used to measure the impact of completing training after controlling for demographic and programmatic differences the impact of completing ETP training was still highly significant. The estimated impact of completing training for new hires was over $7,700 and for retrainees over $4,000.

We also calculated the simple average increase in adjusted earnings for people who completed ETP training. For new hires the increase was $7,400 and for retrainees it was $1,600. Anyway we cut it, completing ETP training had a significant and positive effect on real earnings.

Economic theory leads us to conclude that these increased earning represent increased productivity for the individuals trained, and in the case of retrainees, increased productivity for the company that employs them.

2. ETP training reduces the likelihood of unemployment for both new hires and retrainee completers.

Trainees who completed the program experienced significantly less unemployment after training than participants who dropped out of training. Retrainees who completed experienced about half the unemployment of dropouts, and new hires had only a third as much unemployment as dropouts. These dramatic differences may not be caused solely by ETP training; they may be due to other differences between dropouts and completers such as motivation and other characteristics. But the fact remains that the thousands of ETP trainees who completed training had significantly less unemployment than those who dropped out.

3. ETP appears to have a larger impact on earnings than traditional post-secondary vocational training offered in community colleges and proprietary institutions, GAIN services, JTPA Title II-A or other state displaced workers programs.

As part of our analysis we reviewed a wide range of studies that analyzed the impact of public training programs on participants earnings. These studies employed a range of research approaches in a variety of time periods, so their results are not exactly comparable to our analysis on a dollar for dollar basis. But the comparison of the impact of ETP training, as we measured it, with other studies shows that ETP's impact is substantially larger. While the exact size of the difference is unclear, we believe the direction of the difference is significant and reliable. Studies of CETA and JTPA, and other state displaced worker programs show a consistent improvement in annual earning of only several hundred dollars, while both this study and a similar previous study show the impact of ETP training to be several thousand dollars.

Part of this gap is no doubt due to the fact that ETP trains established workers who have the background and skills to benefit from training, while many public programs serve more disadvantaged participants. But even when compared to other programs that train displaced workers, ETP showed a substantially larger impact. However, we do not believe that this difference alone can account for the significant increases in earnings reported here. Our analysis convinces us that ETP's model of employer based training with stringent performance standards is powerful training model that produces consistent significant impacts on both earnings and the productivity of workers who complete the program.

4. ETP has a substantial impact on California's economy, beyond the increased earnings of participants.

Our analysis shows that the ETP training program included in this study had an impact on the state's economy that goes far beyond the increased earnings of participants. Depending on the assumptions used this impact ranged from $71 million to possibly over $1.1 billion in the first year after training. ETP has an impact on the economy through four mechanisms. First, it reduces UI payments by about $5 million dollars in the first year. Second, increased productivity, as measured by changes in earnings, accounts for an additional impact of over $66 million. Third, the increased productivity produces other economic activity within the state's economy which we estimate to be between $33 million and $51 million. Fourth, assuming that the retrainees' jobs would have been temporarily lost, we estimate the value of saving the jobs form temporary loss is between $172 million and $257 million. If retrainee jobs were to be permanently lost, the value of saving them is over $940 million a year. These results are particularly dramatic in light of the cost of these programs which was $64.8 million.

From this analysis it appears the ETP training has a significant impact not only on the productivity of individuals but also on the productivity of companies. It seems logical to infer that if individual productivity increases so dramatically, it is likely that the overall productivity of the company increases, which in turn increases the competitiveness of the firm, and generates a multiplier effect on the economy.

This analysis points out that ETP is not just a training program but rather a powerful tool for economic development. The issue for future ETP policy is can ETP training become a more effective tool by targeting its services on particular industries and companies. This analysis provides a first step towards understanding how ETP training affects companies differently.

5. **Additional research is needed to understand the dynamics of ETP training's impact on companies and individuals.**

This research and the previous impact study provide a broad outline of the impact of ETP training. As the economy changes and ETP policy shifts, the impact of ETP training will also change. It is critical that ETP monitor its impacts empirically, so that the consequences of the new policies and the effects of shifting economic conditions can be accurately monitored.

In addition, this study suggests the impact of training is not uniform across industries or company type. It's important that the panel understand how the impact of training varies so that it can eventually target training where it will have the biggest impact.

Recommendations

1. **ETP should maintain stringent performance standards for its contracts to insure that training is tied to employment.**

The substantial impact of ETP on earnings and thus the overall economy are probably due to the powerful incentives created by the performance contracting standards. We believe maintaining these standards is a key to insuring the continued impact of the program.

2. **Develop policies to increase completion rates.**

While ETP has high completion rates (78% for retrainee and 69% for new hires) in comparison with similar public programs, ETP may be able to increase its completion rates. Since the bulk of benefits to both the individual and the economy as whole come from completing the program, increasing the proportion of completers will enhance the impact of the program.

3. **Develop targeting strategies that will lead to the greatest impact on California's economy.**

Previous research and reports have suggested methods for targeting ETP training that are based on the characteristics of firms and the need for training, or the likelihood

that jobs will be saved. The results of this study suggest that the economic impact of ETP training will vary significantly depending on the company's industry and the ability of training to generate productivity increases. Our analysis suggests that ETP could develop targeting strategies that would maximize the economic impact of ETP training.

4. Improve scope and quality of data collection of participant and program characteristics.

A serious limit to this analysis was the fact that about 40% of the individual trainee records did not have the minimal demographic data currently collected by ETP. Policies that insure the collection of basic participant information are necessary for effective research in the future.

5. Track the impact of ETP training annually.

ETP is under a mandate to evaluate the outcomes of ETP training. This makes sense because, as noted before, the impact of ETP training is likely to change as the economy changes and ETP policies are modified. This study shows that it is relatively easy to track the impact of ETP training by tracking the earnings and employment patterns of participants. We recommend that this study be replicated annually to provide policy makers and the public with an objective assessment of the programs impact.

6. Study the impact of ETP training over time.

Research suggests the impact of training lasts for 12 years. Whether this holds true for ETP training is unknown. It is important for ETP to analyze its impact on participants and companies over time. It may be that effects are stronger and last longer in certain industries for certain types of participants. This type of analysis would provide the panel with sound data for targeting training to create long term economic benefits.

7. Conduct case studies of projects with exceptionally high and low changes in individual productivity.

Case studies of projects where participants experienced large gains in earnings and thus productivity, and projects with minimal increases in earnings should be conducted to uncover the factors that underlie the impact of training. Again, a detailed study of a few projects would identify the characteristics of projects that produce the most powerful impact on earnings and productivity. It may also identify the characteristics of projects that tend to diminish the impact of training. These cases would provide insights into how ETP funds could be targeted most effectively, to provide the maximum economic impact for funds spent.

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I Introduction

> We are living through a transformation that will rearrange the politics and economics of the coming century. There will be no national products or technologies, no national corporations, no national industries. There will no longer be national economies, at least as we have come to understand that concept. All that will remain rooted within national borders are the people who comprise a nation. Each nation's primary assets will be its citizens' skills and insights. (Reich,1991 pg.3)

It is almost impossible to overstate the magnitude of change taking place in the U.S. economy. The globalization of business, rapid changes in technology, and shifts in the demographics of the labor market have triggered a blizzard of books, reports and articles all focused on a similar theme: America's workforce must be retrained and upgraded to meet increasing international competition. The Commission on the Skills of the American Workforce put it bluntly in titling its report: America's Choice: high skills or low wages!. The reports have much less agreement on how training should be done, and who should provide it. Many of the authors and commissions fall back on recommending expansion and reform proposals for traditional high school and post-secondary vocational programs. Others focus on reforming or expanding JTPA. A few note the lack of training for lower level workers in industry and propose various tax incentive schemes to encourage more employer based training.

America's current training effort seems enormous on the surface, but closer examination reveals a glaring gap in the system. Analysis shows that private employers invest their training resources in the most highly educated workers, while public efforts focus on the most disadvantaged Americans, many of whom are presently out of work. Neglected in this

hodgepodge of public and private programs are established workers on whom the nation must rely to cope with changing technology and international challenges. The American Society for Training and Development estimates that private employers spend over $30 billion a year on training. But the training is limited in key ways. First, about $27 Billion of the $30 billion is spent by large firms who make up only .5% of all employers (Carnavale, 1986). Second, other recent studies (National Center on Education and the Economy, 1992, Lillard and Tan, 1986) have found that the bulk of private corporation's training funds go to workers who already have high levels for education. For example, of the $30 billion spent on training each year, two-thirds goes to training workers with a college degree (National Center for Education and the Economy, 1992, pg.49).

At the other end of the spectrum the federal Job Training Partnership Act (JTPA) focuses its efforts on the most disadvantaged workers. For example in California the 1991-92 JTPA budget for Title II, which serves disadvantaged adults and youth, is $264 million: the budget for Title III, which serves established workers displaced from jobs, is only $46 million.

Thus, California's Employment Training Panel (ETP) Program fills a unique niche that is usually overlooked by both public programs and private training efforts. That is the training needs of established workers, the backbone of America's productive capacity. Specifically, ETP focuses on established workers who have recently been displaced or who are in danger of being displaced. The question for policy makers is: Does this program work? Does it make a difference in the earnings and employment of the Californians it serves? What impact does the program have on the state's economy as a whole? The objective of this study is to answer these pressing questions by examining the performance of the ETP program.

We begin with a discussion of previous research on the impact of other public training programs.

Does Training Work?

The civil disturbances in Los Angeles, the worst in this century, have focused the general public's attention on job training. A recent article in the Los Angeles Times noted that "When asked the best way to prevent urban unrest, both whites and blacks chose job-training programs over strengthening the police by overwhelming margins." (Schneider, May , 1992, pg. m1)

An assumption about job training underlies this renewed interest. The assumption is that training, or vocational education more broadly, works, and that people who are trained find jobs related to their training, earn more and are employed more than if they were not trained. Unfortunately twenty years of research on vocational training in a host of institutions does not uniformly support this assumption.

Starting in the 1970's, researchers began to examine the impact of publicly sponsored training on participants' earnings and employment. Early studies, (for example Grasso and Shea, 1979, Wilms, 1980), found that publicly funded vocational programs had little impact on participants' earnings or employment. More recent studies in California of high school level vocational education found that, with few exceptions, students in vocational programs did no better in the labor market than similar students in the general education program (Stern, Hoachlander, Choy and Benson, 1986).

In the most recent in-depth study of effects on earnings of attending public and private postsecondary vocational programs, Grubb (1991) found small effects even for individuals who

completed vocational Associates degrees, programs that often take two years. For example, his data show that after controlling for high school and demographic variables vocational Associate degree holders earned only $2,431 (in 1985 dollars) more than high school graduates. Reviewing his entire analysis, he concludes that:

> Above all, these results indicate that the returns within the sub-baccalaureate labor market are quite varied: certificates for men never have a return, certain fields of study have no effects on earnings, and those individuals with credentials from technical institutes and proprietary schools may earn no more than high school graduates. The simple faith that more school automatically leads to higher earnings -- the lure of postsecondary education in general, and postsecondary vocational education in particular -- is evidently not always justified. (Grubb, 1992, p. 18)

Similarly, in 1973 the federal government began tracking the impact of CETA training on participants through the Continuous Longitudinal Manpower Survey. Samples of CETA participants were selected by the Bureau of the Census and interviewed periodically. These data were merged with Social Security records to form a longitudinal earnings record. A comparison group was formed with a sample from the current population survey. Barnow (1986) reviewed eleven major studies done with this data base. The studies examined the impact of CETA programs on various clients' earnings. Like the studies of post-secondary training, they found a wide variation in the impact, ranging from small negative effects to positive effects, ranging from $200 to $2,000 annually. Reviewing all the evidence, Barnow concluded that:

> "...a reasonable assessment of the impact of the CETA programs studied is that the programs probably had a modest impact of several hundred dollars on earnings for men, and a somewhat greater effect on women." (Barnow, 1987 pg.190)

More recent research on JTPA programs is limited. A study measuring the impact of JTPA training on disadvantaged adults and youth, served by Title II-A has just been published by the federal Department of Labor (Bloom, et.al. 1992), but significant research on the impact of JTPA displaced worker training remains to be done. However, Bloom, et.al. (1986) using an experimental design again found only small impacts for adults assigned to JTPA training. The study found that women assigned to JTPA earned $539 more than women in the control group, during the first 18 months after training, a small but statistically significant margin. Men assigned to JTPA earned $550 more than men in the control group, during the first 18 months after training, however, this difference was not statistically significant. When the study looked only at those people who actually received services, as opposed to all assigned to JTPA, the gap between those served and the control group rose to $873 for women and $935 for men.

Two recent studies have examined the impact of job service programs and training on displaced workers in Texas (Bloom, 1990) and New Jersey (Corson, et.al., 1989 and (Anderson, Corson and Decker, 1990). These studies employed an experimental design found impacts of only several hundred dollars in the first year after receiving services. The New Jersey study (Corson, et.al., 1989) examined three different types of services, job search, job search with a cash bonus for finding a job, and job search with training. Interestingly the treatment that involved training had the smallest impact on earnings, about $200, of all the services tested. In a longer term followup of these workers (Anderson, Corson, and Decker, 1990) found that none of the three groups had any real increase earning. That is increases that exceeded inflation. The Texas study (Bloom, 1990), found substantially larger impacts ranging from $673 for men to $1,148 for women, who received a mixture of job search and short term skill training services.

Training and employment programs focused on welfare participants had similar modest impacts. For example, a just released study of the California GAIN (Greater Avenues for Independence) welfare reform program (Riccio and Friedlander, 1992) evaluated the impact of GAIN services on participants' earnings and welfare payments in the year after being served. The study used a careful experimental design with randomly selected participants and control groups. The study found only small impacts on earnings. The results found that GAIN single parent households earned an average of $271 more than a similar control groups. Participants from two parent households had larger gains of $375. In addition both groups experienced decreases in welfare payments, $281 dollars for single parent households and $420 for two parent households.

Research on the impact of ETP training is limited to single study (Moore, Wilms, and Bolus, 1988). This study examined the experiences for an early group of 3,913 ETP trainees who enrolled in ETP programs between January 1, 1983 and December 31, 1985. The study compared the before and after training earnings of participants, who were unemployed when they enrolled (called "new hires"), and trainees who were in danger of being displaced but were still employed (called "retrainees"). The study concluded that ETP training did have a significant impact on the earnings of trainees. The impact on new hires was estimated to be $5,976 after controlling for background and programmatic variables. The impact for retrainees was not statistically significant, after controlling for background variables, but estimated to be $2,003.

While the study provided valuable insights into the impact of the program at that time, the ETP program has changed significantly since then. Most obviously, ETP has grown substantially in size. Rather than training three thousand people in several years, it now trains

over 49,000 in a single year. During the previous period studied, 60% of ETP trainees were new hires, with only 40% being retrainees. Today less than 15% of ETP trainees are new hires.

Also the macro-economic context in which ETP trains has changed. During the previous study the California economy was moving out of a recession and into a period of rapid expansion. Today the opposite is true. The economy is in a period of declining growth after a long expansionary period.

ETP Today

The Employment Training Panel was created by the state legislature in 1982 as part of several reforms within the California unemployment insurance system. The ETP program was unique in that it did not set up another set of training institutions, but instead relied on contracting with existing training institutions and most importantly private companies to provide training. ETP training was also unique in that it was set up to be 100% performance based. This means that ETP only pays training providers for participants who complete training and are retained on a related job for 90 days. At the time this was a radical departure from most public training programs which paid training providers for the participants they enrolled, but seldom linked payment to outcomes. Since that time other training programs, notably JTPA, have moved to a more performance driven model.

The primary original objective of ETP was to use its training fund to prevent or limit unemployment, by moving the unemployed quickly into new jobs or by saving the jobs of workers threatened with displacement. Since then the mission of ETP has been broadened.

In 1989, Assembly Bill 28 expanded the focus of ETP. Besides reducing and preventing unemployment, ETP is also charged with improving the competitiveness of California by improving the productivity of its workers. The bill calls for increased focus on the needs of small businesses, those with less than 250 employees. The bill also requires that ETP improve its coordination with other training agencies.

ETP is supported by contributions to the Employment Training Fund. Each private, for-profit California Employer contributes .01% of wages subject to unemployment insurance tax to the fund. This generated over $80 million for ETP in fiscal year 1991-92. In addition, funds and interest were carried over from previous years to create a total fund of over $167 million. In the last year ETP programs have been expanding. From July 1, 1991 to April 30, 1992, ETP approved 209 projects, budgeted at over $73 million, a 113% increase over the previous year (Employment Training Panel, 1992).

Objectives of the Study

ETP is an innovative training model that has attracted substantial attention from other states. Yet, empirical evidence about its performance is limited. A recent review of the Employment Training Panel noted that the panel's experience is "replete with logical but untested theories and practices." It further observes that the panel is "mandated by statute to establish a system to compare earnings of trainees before and after training". The report goes on to suggest that the panel should get lists of projects with substantial increases, decreases or no change in earnings, and should compare the characteristics of these projects. (National Center for Research on Vocational Education and The Center for Labor Research and Education, 1991)

The objective of this study is to go beyond this recommendation and attempt to measure the impact of ETP training on both the individual and the state's economy as a whole. More specifically this study attempts to answer the following research questions.

1. ***To what degree did ETP participants' earnings increase or decrease after training?***

2. ***To what degree did unemployment among ETP participants increase or decrease after training?***

3. ***How did earnings and employment outcomes vary by project?***

4. ***What demographic and project characteristics are systematically related to changes in earnings?***

5. ***What is the unique impact of completing ETP training on changes in earnings after controlling for differences in demographic and project characteristics?***

6. ***What was the economic impact of ETP training on the states' economy, in terms of both increased productivity and unemployment insurance savings?***

II Methods

Overview of Approach

The methods used in the study build on an earlier study (Moore, Wilms, Bolus, 1988) that evaluated the employment and earning outcomes of an earlier group of ETP participants. Essentially this study used earnings and unemployment data from the California Employment Development Department and ETP program records to analyze the effects of ETP. This study measured earnings, weeks of unemployment and unemployment insurance payments in the year

before and after training. The experience of both dropouts and completers were compared to assess the impact of ETP training and earnings while controlling for demographic and programmatic differences. Next it used the estimated effects of ETP on earnings to project the impact of the ETP program on the California Economy for one year and for longer periods.

Study Population

To avoid sampling error, the study attempted to include the universe of ETP participants who were enrolled in the 187 ETP programs that ended between July 1, 1989 and June 30, 1990. A review of ETP data bases found 46,946 cases that met this criteria, and for whom EDD could find records of earnings or unemployment insurance claims. We were able to include all these cases in some steps of the analysis. However a further search of the records found that a substantial number of these records were missing basic demographic data needed for more sophisticated analysis.

As a result of the missing data problem, the final results of this analysis are based on a subgroup of 27,738 out of an initial population of 46,946. The reason the final analysis is restricted to this smaller group is that in order to conduct a complete analysis and create the multiple regression model described in the results section, we could only use cases which had complete data on variables included in the analysis. Since many cases were missing data on key demographic variables, this meant that a substantial number of cases had to be excluded from the final analysis. These data were unavailable because ETP contractors had not collected them on the required enrollment forms. Table 1 shows that 53.9% of the new hire cases and 59.3% of the retrainee cases were included in the final model.

Table 1

Total Study Population and Final Population for Modeling

	Retrain	New Hire	Overall
Total Population	45,023	1,923	46,946
Final Population	26,705	1,036	27,738
Final Population as % of total	59.3%	53.9%	59.1%

Dropping so many cases raises the issue of whether or not the remaining cases are representative of the entire population. To assess the representativeness of the cases in the final model, we compared the included and excluded cases on type of industry and the employment and earnings outcomes on which we collected data. This analysis is presented in Appendix A. The results show that excluded cases were more likely to come from the durable manufacturing and finance sectors, and less likely to come from the retail and wholesale trade sector. In terms of outcomes excluded cases were similar to included cases. For example, average post training earnings for included cases was $27,413, for excluded cases $27,205 a difference of less than 1%. From this analysis we concluded that the remaining cases can reasonably be judged to represent the entire study population.

Data Sources

Four data sources were tapped to create a complete data set for each subject:

- ETP trainee files which contained demographic data, enrollment and termination dates for each participant;
- ETP project files, which contain additional data on each project;
- Unemployment Insurance (UI) records, from the California Employment Development Department (EDD), which contained the number of UI claims and the amount of UI payments made to each participant; and
- Quarterly earnings records, from EDD, which contain payroll tax reports with the quarterly earnings of each participant.

In addition, we used descriptions of each project included in the study and programmatic data to identify the Standard Industrial Classification (SIC) code of the employers served by the project, and to identify the training objective and type of skill of each project.

Analysis

Data from these sources were merged to create a data base for analysis. Four measures of employment and earnings were calculated for each case:

Annual earnings before training (unadjusted, adjusted and normalized): trainees' total earnings in dollars for the four complete quarters prior to enrolling in ETP training. These earning were "adjusted" for inflation using the Consumer Price Index for California, into 1990 dollars so that changes in real earnings could be measured. The "adjusted" earnings were then normalized using the average California manufacturing wage to take into account changes in the demand for labor. All measures of earnings are reported separately.

Annual earnings after training (unadjusted, adjusted, and normalized): trainees' total earnings in dollars for the four complete quarters after leaving ETP training. These earning were "adjusted" for inflation using the Consumer Price Index for California, into 1990 dollars so that changes in real earnings could be measured. The "adjusted" earnings were then normalized using the average California manufacturing wage to take into account changes in the demand for labor. All measures of earnings are reported separately.

Unemployment insurance claims and unemployment insurance payments before training: trainees' total number of weeks receiving unemployment insurance, and total dollar value of unemployment insurance payments in the four complete quarters before enrolling in ETP training.

Unemployment insurance claims and unemployment insurance payments after training: trainees' total number of weeks receiving unemployment insurance, and total dollar value of unemployment insurance payments in the four complete quarters after leaving ETP training.

The analysis presented here moves from the simple to the complex. We begin with a simple univariate comparison of new hires and retrainees to describe and compare the two populations. Next we analyze the employment and earnings records of dropouts and completers from both groups, by calculating the changes from the year before training to the year after training.

Next we estimate the impact of training on changes in earnings by constructing multiple regression models for both new hires and retrainees. The objective of the models is to measure the unique impact of training on changes in earnings after controlling for demographic and programmatic variation among the trainees. A discussion of the technical aspects of the model is included with the model.

Finally we estimate the economic impact of the entire ETP program on the California economy, under five different scenarios with differing assumptions. Again, the technical aspects of the economic impact analysis are included with the results.

An analysis of the changes in income, UI claims and UI payments was also conducted for each project studied and delivered to ETP under a separate cover.

Limits Of The Study

While this study is rigorous and employs research methods commonly accepted in the social sciences, it has limits which the reader must consider while interpreting the results.

First, like other quasi-experimental studies of this type, it lacks a randomly selected control group -- that is a group of individuals who are exactly like those trained by ETP programs, but who did not receive training. Instead this study compares participants who

completed training with dropouts. Beyond their measured background characteristics, which are controlled for statistically in the model, the degree to which dropouts and completers may differ is unknown. Completers may differ systematically from dropouts in their personal characteristics. Completers, for example, may be more motivated, or better adjusted to the training experience. Moreover, we do not know how much training dropouts may have received. They may have only attended a day of training, or they may have completed training but failed to complete the 90 day retention period on the job. The fact the dropouts may have received substantial benefit from training may minimize the measured impact of training.

Second, as noted earlier a large proportion of ETP trainees could not be included in the regression models because ETP records lacked data on the participants backgrounds. While the available data indicates that these trainees were not radically different than those included, they may still differ in some systematic manner which may skew the results.

A third limit may lie in the period in which earnings were measured. In his review of CETA studies, Barnow (1986) noted that earnings tended to drop before training, thus raising the question of whether taking income for the year before training accurately measures trainees' real labor market value. This issue is confounded in our study by the way we measured earnings and employment. Earning and employment were measured for the four full quarters before enrolling, thus we did not capture some period of unemployment for each new hire, since we did not include partial quarters. For example, if a new hire enrolled in a program in February, we went back to December 31 and then took the four previous quarters, thus missing the period of unemployment in January and February.

A final caveat must be applied to all multiple regression models like those used here. The models are capable of measuring unique relationships between variables as correlations, however these relationships are not necessarily evidence of cause-and-effect relationships. Also these models are subject to shrinkage, which simply means that when applied to other populations, such as trainees from 1992, they may have less predictive power.

III Results

This section begins by describing the characteristics of ETP trainees and comparing the characteristics of new hires and retrainees. It then compares the program outcomes for these two groups in terms of whether or not they completed their program. Next the economic outcomes of training are examined by comparing the before and after training earnings and unemployment insurance claims of dropouts and completers within each group.

After this basic analysis we estimate the impact of training by developing regression models for retrainees and new hires that measure the impact of completing training on changes in earnings after controlling for demographic and programmatic differences.

Finally, based on the earnings and employment outcomes for the individual trainees, we estimate the economic impact of ETP training on the state's economy.

Comparison of Retrainees and New Hires

The typical ETP trainee was a retrainee who completed his program. Demographically he was a 35 year old, married, white, male who had completed high school and about a year of

college. He was trained in the durable manufacturing or wholesale and retail trade industries.

When we compared retrainees and new hires on the available demographic and programmatic data, we found many differences between the two groups. Retrainees, by far the larger group, tend to be more advantaged than new hires. For example, they are more likely than new hires to be female, married, and white. Retrainees also tend to be slightly younger, have a bit more education, and are less likely to be veterans. Conversely, new hires are more likely to be male, single, and from a minority groups. They are also slightly older, have less education and are more likely to be veterans.

In terms of program characteristics, retrainees are more likely to be in the construction industry, non-durable manufacturing, wholesale and retail trades, and finance. New hires are more likely to be in durable manufacturing, transportation, service and the mixed industry group, indicating they were in a project that served a number of different industries.

Projects were classified by the type of skills they trained in and by the overall objective of the project. Retrainees were more likely to be in projects that offered transferable skills (meaning that the skills can be used in other firms such as statistical process control), or in unique skills (skills that can only be used at one firm, such as training on a customized inventory system). New hires were more likely to be in projects that offered training for entry into a particular occupation such as nursing or word processing.

There were also differences in the objective of the projects. Retrainees were more likely to be in projects that focused on improving the productivity of an entire system, such as learning to master new inventory software, or projects that focused on improving the quality of a system, such as total quality management training. New hires tended to be in projects that focused on

raising personal productivity, such as projects that taught specific skills like word processing or numerical control machining.

Retrainees had lower per participant costs than new hires. The average per participant costs for retrainees was $1,749 compared to $3,405 for new hires.

Table 2

Profile of Retrainees and New Hires (Sample Trainees n=27,741)

	New Hires N=1036	Retrainees N=26,705	Chi Sq. Sig.
Gender			.000
Male	56.0%	50.2%	
Female	44.0	49.8	
Marital Status			.000
Married	43.8	56.6	
Single	56.2	43.4	
Ethnicity			.000
Asian	14.7	11.8	
Black	17.6	5.8	
Hispanic	21.4	18.7	
Indian	1.5	0.06	
White	42.4	61.1	
Other	2.4	2.0	
Age:			
Average	36.8	35.3	.000
Years of Educ.	12.7	13.4	
Veteran	15.4%	10.8%	.000

Table 2 (Continued)

Profile of Retrainees and New Hires (Sample Trainees n=27,741)

	New Hires N=1036	Retrainees N=26,705	Chi Sq. Sig.
Industry			.000
Agriculture	3.1	0	
Construction	1.6	2.5	
Durable Manufacturing	37.2	25.9	
Non-Durable Manufacturing	1.5	3.9	
Transportation	1.3	0.02	
Wholesale/ Retail	0.06	28.5	
Finance	0.01	16.6	
Services	10.8	9.8	
Unidentified or Mixed Industry	43.9	13.8	

Table 2 (Continued)

Profile of Retrainees and New Hires (Sample Trainees n=27,741)

	New Hires N=1036	Retrainees N=26,705	Chi Sq. Sig.
Type of skill			.000
Basic Skills	0	0.01	
Transferable skill	18.7	27.1	
Unique skill	1.0	37.7	
Occupation	80.3	34.8	
Mixed	0	0.02	
Project Objective			.000
Personal Productivity	53.3	18.9	
System Productivity	45.0	65.6	
Quality System	1.7	15.3	
Mixed	0	0.02	
Outcome			.000
Dropout	32.9	20.3	
Complete	67.1	79.7	
Cost per Participant	$3,405	$1,749	.000

Program Outcomes

The first step in assessing the outcomes of ETP training is simply to look at the proportion of trainees who completed their programs and were retained on a related job for 90 days. Overall 78% of the 46,946 ETP participants in our study completed their training and were retained on the job 90 days. Table 3, which includes data on all 46,946 participants, shows that retrainees were much more likely to complete their program (78.4%) than new hires (69.2%).

Table 3

All Trainees by Eligibility Category and Outcome

	Retrain	New Hire	Total
Complete	78.4% (35,278)	69.2% (1,330)	78.0 (36,608)
Dropout	21.6 (9,745)	30.8 (593)	22.0 (10,338)
Total	100.0 (45,023)	100.0 (1,923)	100.0 (46,946)

Employment Outcomes

The second outcome we examined was the number of unemployment insurance claims made by all 46,946 trainees before and after training, and how the pattern varied for trainees who completed and dropped out of training. Each claim represents one week for which trainees collected unemployment insurance.

As Table 4 indicates, retrainees experienced very little unemployment before and after training. Both retrainee completers and dropouts experienced, on the average, less than a week of unemployment before training. After training both completers and dropouts experienced a slight increase in unemployment after training, although, as expected, the increase was almost three times as large for dropouts. The increase in unemployment after training is probably due to the overall increase in unemployment throughout the state and nation during the period studied.

The pattern for new hires was dramatically different. Both dropouts and completers experienced nine to ten weeks of unemployment before training. After training, unemployment declined for both groups. But it fell only slightly, 1.62 weeks, for dropouts and much more dramatically, 7.44 weeks, for completers. These data indicate that both dropouts and completers received some benefits from training.

It should be noted that these figures probably underestimate the number of weeks unemployed prior to training for all groups. These data are based on the four full quarters prior to entering training. Thus if a trainee was enrolled in the middle of three month quarter while unemployed, the six weeks he or she collected unemployment during that quarter would not be counted.

The amount Unemployment Insurance payment money actually received by trainees reflect the pattern described above. For retrainees payments increased slightly after training for both completers and dropouts. But, the average increase was far more dramatic for dropouts, over $180 compared to less than $80 for completers.

Conversely, payments for new hires fell for both completers and dropouts. Completers had an average decline in Unemployment Insurance payments of over $900, compared to only $139 for dropouts.

Table 4
Unemployment Payments and Claims by Dropouts and Completers (All Trainees N=46,946)

	Avg. UI claims before training	Avg.UI Claims after training	Change in UI claims
Retrainees			
Completers	.32	.77	+.45
Dropouts	.60	1.73	+1.13
New Hires			
Completers	9.79	2.34	-7.44
Dropouts	9.28	7.65	-1.62

	Avg. UI Payments before training	Avg. UI Payments after training	Change in UI Payments
Retrainees			
Completers	$40.58	$117.86	+77.28
Dropouts	77.66	265.61	+187.95
New Hires			
Completers	1,236.78	310.65	-926.13
Dropouts	1,121.71	982.55	-139.16

Earnings Outcomes

A third key outcome we analyzed was the change in earnings from the year before training to the year after training. In this section we examine the earnings outcomes for two groups of participants. First we look at the earnings of all 46,946 trainees. Next we examine the earnings of the 27,741 trainees for whom complete data were available, called "sampled trainees". In each case we will break down the average earning of trainees before and after training for both retrainees and new hires, and within those groups, for those who completed and who dropped out.

All Trainees

Among retrainees both completers and dropouts experienced an increase in earnings, but with a dramatic difference in the size of the average increase. Completers had an average increase ten times as great as the increase for dropouts. Completers experienced a gain of $3,897, a 15.8% increase over pre-training earnings. Dropouts had a gain of only $360, an increase of only 1.5% over pre-training earnings.

The pattern for new hires was more dramatic. Completers experienced a gain of $8,263, an increase of 74.5% over pre-training earnings. Dropouts, on the other hand, had a loss of $1,265, a decrease of 11.0%.

Table 5
Earnings Year Before and Year After Training for Dropouts and Completers (All Trainees N=46,946)

	Pre-Training Earnings	Post-Training Earnings	Change in Earnings	% Change in Earnings
Unadjusted				
Retrainees (N=45,023)				
Completers	$24,641	$28,538	+$3,897	+15.8%
Dropouts	24,263	24,623	+360	+1.5%
New Hires (N=1,923)				
Completers	11,095	19,358	+8,263	+74.5%
Dropouts	11,483	10,218	-1,265	-11.0%
Adjusted				
Retrainees (N=45,023)				
Completers	26,706	28,321	1,615	+6.0%
Dropouts	26,369	24,223	-2,146	-8.1%
New Hires (N=1,923)				
Completers	12,057	19,456	+7,399	+61.4%
Dropouts	12,442	10,153	-2,289	-18.4%

Part of the change in earnings reported above is due to inflation and thus does not represent a change in real earnings. To account for the impact of inflation we took the earnings for all participants and adjusted the earnings for inflation into 1990 dollars, using the Consumer Price Index for California (CPI), and then recalculated the average change in earnings.

As Table 5 indicates inflation did account for part of the increase. For example, the increase for retrainees completers fell from 15.8% to 6.0%, and the change for retrainee dropouts went from a slight gain to a substantial loss -8.1%. New hires followed a similar pattern.

It is important to note that the gains shown in adjusted earnings represent increases in earnings that go beyond inflation. This is particularly remarkable given that in California average wages adjusted for inflation were actually falling during this period.

The key question is what do these substantial increases in earnings for completers represent. Economists reason that increases in earnings are caused by two factors: either workers are working more hours or they are being rewarded for increased productivity. We know from Table 4 that retrainee completers actually experienced a slight average increase in unemployment so in this case it is logical to assume that the increase represents a substantial increase in the productivity of these workers. In the case of new hires, who we know experience a significant decrease in unemployment, we calculate that 23.8 percent of the increase in earnings was due to working more hours and 76.2 percent was due to increased productivity.

Sampled Trainees

The results for the sampled trainees, the group for whom we have complete data files, were very similar to the entire population, indicating only small differences between the groups. The only area in which this group diverges from the all trainees by more than a couple percentage points is in the case of new hires who dropped out. These trainees experienced a substantially larger decline (19.0%) in unadjusted earnings than the larger group of all new trainee dropouts (11.0%).

Table 6 presents the same information as Table 5 except that it is for the sampled trainees. Comparisons between the unadjusted and adjusted earnings in Tables 5 and 6 reveal the very minor differences between the population and the "sample" in earnings. In Table 6, though, we make one more calculation just to exclude the possibility that the increase in earnings observed for the trainees are part of a general trend in earnings. To test for this possibility we normalized the earnings, using the average manufacturing wage for California with 1985-87 as the index base. Table 6 shows how these adjustments affected the change in earnings experienced by the 27,738 sampled trainees.

Normalizing the adjusted earnings using the average manufacturing wage for California changed the earning figures slightly but had no impact on the size of the increase or decrease experienced by trainees.

Table 6

Unadjusted, Adjusted, and Normalized Before and After Training Annual Earnings (Sample Trainees N=27,738)

	Pre-training Annual Earnings	Post-training Annual Earnings	Change In Annual Earnings	% Change
UnAdjusted				
Retrainees (N=26,702)				
Completers	$24,629	$28,758	+$4,129	+16.8%
Dropouts	23,600	24,138	+ 538	+23%
New Hires (N=1,036)				
Completers	11,733	20,570	+8,837	+75.3%
Dropouts	11,881	9,628	-2,253	-19.0%
Adjusted				
Retrainees (N=26,702)				
Completers	26,408	28,119	+1,711	+6.5%
Dropouts	25,371	23,576	-1,795	-7.1%
New Hires (N=1,036)				
Completers	12,606	20,211	+7,605	+60.3%
Dropouts	12,711	9,492	-3,329	-26.2%

Table 6 (Continued)

Unadjusted, Adjusted, and Normalized Before and After Training Annual Earnings (Sample Trainees N=27,738)

	Pre-training Annual Earnings	Post-training Annual Earnings	Change In Annual Earnings	% Change
Normalized				
Retrainees (N=26,702)				
Completers	27,307	29,078	1,771	+6.5%
Dropouts	26,179	24,323	-1,856	-7.1%
New Hires (N=1,036)				
Completers	13,016	20,902	7,886	+60.6%
Dropouts	13,158	9,823	-3,335	-25.3%

Another way to portray the different experiences of dropouts and completers is to examine the gap between their earnings. Table 7 shows this gap for unadjusted, adjusted and normalized wages. The data show a consistent gap of about $3,500 between retrainee dropouts and completers. A much larger gap exists between new hire dropouts and completers, of between $10,000 and $11,000.

Table 7

Difference Between Dropouts and Completers In Change In Annual Earnings (Sampled Trainees N=27,738)

	Difference In Change In Earnings
Unadjusted	
Retrainees	$3,591
New Hires	11,090
Adjusted	
Retrainees	$3,506
New Hires	10,934
Normalized	
Retrainees	$3,627
New Hires	11,221

Again, as noted earlier, changes in earnings represented a substantial increase in the productivity of these workers, particularly among the retrainees. To a lesser degree it represents an increase in the hours worked for new hire trainees.

Multiple Regression Analysis

Overview

The earlier analysis showed that completers of ETP training earned significantly more than dropouts. A question remains, however: was this difference in earnings due to training, or is it due to differences in the characteristics of completers and dropouts and the programs that served them? Perhaps completers were more highly educated than dropouts, or maybe completers worked in industries with higher wages.

Multiple-regression analysis provides tool for measuring the unique relationship between changes in earnings and completing ETP training while controlling for differences in demographic and project characteristics. The multiple-regression analysis presented here has two objectives:

- to identify the unique impact of completing training on changes in earnings;
- to identify the unique relationship of demographic and program variables on changes in earnings.

The variables examined in this analysis are listed in Figure 1.

Figure 1
Variables Included In Multiple-Regression Analysis

Completing Training

Demographic Variables:
- age
- gender
- marital status
- education level
- military service (veteran)
- ethnic group

Program Variables:
- cost of the training (per completing trainee)
- number of trainees in the program
- industry for which they are trained
- type of training
  - basic skills (language, math, writing, etc.)
  - transferable skills (skills useful in various jobs)
  - unique skills (useful mainly in a particular job)
- training objective
  - personal productivity enhancement
  - system productivity enhancement
  - product quality enhancement
  - qualifying trainee for a new occupation

Method

The specific dependent variable which the regression model attempts to predict is the adjusted change in earnings. Recall that this variable is adjusted to eliminate any effects of inflation on earnings. This adjusted earnings variable is obtained by dividing the reported earnings by the Consumer Price Index for California wage earners; it is sometimes called "real earnings" but here it is called adjusted earnings.

The change in adjusted earnings was regressed on the variables listed before to determine the direction and magnitude of each variable's influence on adjusted earnings.

Two separate regression analyses were run, one for the "new hires" and one for the "retrainees". This allowed for the possibility that some of the variables above would affect the group of new hire trainees differently than they affected the retrainees, which was the case in several instances.

The analysis produced three key statistics which are reported here. First, the R^2 statistic indicates the percent of the total variation in adjusted change of earnings which is explained by the variables in the model. This statistic gives an overall indication of the power of the analysis.

Next is a regression coefficient, expressed in dollars. This statistic indicates the unique contribution of each unit of the variable to adjusted changes in earnings. This measure may be positive or negative. Thus, a coefficient of -$149 for age, in the new hire analysis, indicates that for every year older a person is, their change in earnings would decline $149. Similarly, the $7,487 coefficient for being a high school graduate indicates that the unique effect for completing high school, as the highest level of education attained, was an increase in earnings of $7,847.

Finally, in parentheses under the regression coefficient is the confidence interval. This figure, also in dollars, indicates that two-thirds of cases fell within this range of the coefficient. For example, in the case of age for new hires, the confidence interval indicates that for two-thirds of the cases the actual coefficient was between -110 and -188.

For each coefficient we indicated the statistical significance of the relationship with a series of asterisks. Statistical significance indicates the probability that the estimated regression coefficient is not equal to zero. Specifically, the regression analysis uses the "confidence intervals", described before, and the estimated coefficient to calculate levels of probability. The

probability indicates the likelihood that the "true coefficient" lies within a specific confidence interval around the estimated coefficient. If that confidence interval does not contain zero, then the coefficient is said to be significantly different from zero at the level of probability indicated. Most studies use a five and/or a one percent confidence interval, indicating there is a one or five in a hundred chance that zero is contained in the confidence interval. To minimize the possibility of identifying a coefficient as not equal to zero when it really is, this regression analysis uses a confidence interval which corresponds to one percent or less; this means that the coefficient is considered to be significant only if the probability is 99 percent or greater that the coefficient is not equal to zero.

Table 8 contains the results of the regression analysis. The coefficients marked with an asterisk are highly significant, with the probability of 99 percent or greater that the coefficient is not equal to zero. The coefficients without asterisks can be considered essentially zero -- indicating that the identified variable has no statistical relationship with the adjusted change in earnings.

Regression Results: Power of the Analysis

Table 8 reports the estimated coefficients for the regression analysis (with the standard errors of the estimates in parentheses below). The number of observations (N) and the R^2 (the observed variation explained by the analysis) are shown for the new hires and the retrainees.

As the table 8 indicates, the new hire model explained about 29% of the variance in the adjusted change in earnings, while the retrainee analysis explained 5% of the variance. Both these amounts are highly statistically significant and it is unlikely they are due to chance. What it does indicate is that a large proportion of the variance may be related to factors not measured

by this study, such as the personality characteristics of participants or the type of trainer, or may be simply random variation. Additional data would have probably added to the explanatory power of this analysis. For example, a more refined classification of the industry in which training occurred or the occupational classification for which the people were trained might have increased the explanatory power. Training results may vary systematically by the type of trainer or by other parameters that were not measured. The amount of variation explained also would have been higher if complete data were available for all trainees.

The percent of variation explained for the retrainee equation is well within the range of similar studies, (see for example Grubb (1991)), and the new hire regression has a much higher explained variation (R^2) than most similar studies. This is probably do to the more homogeneous experience of the new hires relative to the retrainees. The new hires were all unemployed at the initiation of training, and self selected to participate, whereas the retrainees were all currently employed but in a variety of industries and occupations. Bear in mind, though, that the lower explained variation of the retrainee equation in no way detracts from the significant influence that the examined variables had on the change in adjusted earnings.

For now, the highly significant influence of some variables on change in adjusted earnings is reported and account is taken of the low explained variation of the regression in the application of these results to determine the impact of ETP on the California economy.

Impact of Completing

The key question this analysis addresses is, what was the impact of completing ETP training on changes in adjusted earnings?

Our analysis indicates that the value of completing ETP training for new hires, independent of all other variables, was $7,705 of increased earnings adjusted for inflation. For retrainees the increase was $4,037. In both cases the coefficient is highly significant, with narrow confidence intervals, indicating that these differences are not due to chance.

In interpreting these coefficients we also need to consider the value of the intercept. The intercept value at the top of table 8 can be carefully interpreted as revealing the influence of enrolling in training (without completing) when evaluated at the zero level of the other independent variables. The intercept for new hire regression is not significantly different from zero, but the coefficient for completing training is large and very significant. This means that enrolling in training probably had no significant influence on the earnings of new hires but that completing training was to be expected to boost a new hire's earnings by $7,700 in the first complete year after training.

In contrast, the retrainee regression shows that both enrolling in training (as indicated by the significant intercept) and completing training had significant impacts on earnings. Completing training added $4,000 to retrainee earnings. Enrolling in training (the intercept) contributed about $2,100 to first year earnings for the retrainees (after adjustment for the average age and program size). These effects may be viewed as additive, generating an expected $6,100 for the retrainee who completes training.

We hypothesize that new hire trainees and retrainees had different outcomes because they had different post-training experiences on the job. A retrainee who enrolls and completes training becomes more productive by virtue of the training itself and the upgraded job. A retrainee who does not complete training may still end up working with the other retrained people and be more

productive (and higher paid) as a result. The new hire who does not complete training is unlikely to end up working with others who are newly trained or retrained. Therefore the entire effect of training for the new hire depends upon the successful completion of the training.

Regression Results: Demographic Variables

Several demographic variables proved to have a significant relationship with changes in earnings. Table 8 provides data for each variable in the new hire and retrainee analysis.

The age of the trainee had a significant influence on the change in earnings for both new hires and retrainees. For both new hires and retrainees, the change in adjusted earnings fell about $150 for every year older (over 18) the trainee was. This indicates that training is slightly more productive for younger workers.

The gender of the trainee was a significant influence only for retrainees, where being male was associated with about $675 more in the change in earnings. Gender had no influence on the change in earnings for new hires.

The marital status of new hires likewise had no effect on their change in earnings. However, for retrainees, being married reduced the expected change in earnings by about $500.

The education level of the trainees had similar directional effects for new hires and retrainees but the effects were very different in magnitude. In both cases, a high school degree or less had no influence on the change in earnings, but having some college or a college degree had a significant and positive impact. Either some college or a college degree added around $7,500 to the change in first year earnings for new hires. Retrainees experienced a $1400 to $1,900 increase in earnings for some college or a college degree.

Ethnicity had no significant impact on the change in earnings for either new hires or retrainees. This result held for all ethnic groups. It is interesting to note that none of these coefficients met even a 5 percent level test for significance. Under a 10 percent level test, which is virtually never accepted in the research literature, being Hispanic would have added to the change in earnings for new hires, and being Asian would have contributed positively to the change in earnings for retrainees.

Military service status -- being a veteran -- had no significant effect on the change in earnings for new hires, but was associated with about $900 less in the change in earnings for retrainees.

Regression Results: Program Variables

The cost of the program per participant had no significant influence on the change in adjusted earnings for either group. This mean that more cost was not a significant factor in determining the change in earnings for either group. This does not mean that in any individual case, a lower cost program would have produced the same adjusted earnings change as the program that was run. It simply means that the variations in costs between the programs that were run produced no systematic differences in the change in earnings.

The size of the program did produce a significant difference in earnings for the retrainee group. The negative and significant coefficient for this group means that the retrainees experienced $0.44 less in the change in adjusted earning for every additional person in the program. For retrainees, smaller programs produced a larger increase in adjusted earnings. At this point, with out more specific project data, it is difficult to explain why this relationship would exist.

The industry in which the people were trained had a large and positive impact on new hires if they were in the transportation and utilities industry group. While the coefficient for this industry at $17,500 is very large, it is interesting to note that the size of its standard deviation indicates that this coefficient is significantly different from zero, but is not significantly different from $1500. Retrainees experienced significantly lower changes in earnings if they were in durable manufacturing ($-1300), wholesale and retail trade ($-2100), or services ($-1400). These are probably not unexpected results given the declining demand for workers in durable manufacturing, and the relatively low pay levels in trade and services.

The type of training provided had a significant influence on the change in earnings in only one case. Among the new hires, training people with transferable skills resulted in a significantly lower change in earnings. This is a somewhat puzzling result. Transferable skills are supposed to be skills, such as numerical machining, that would be valuable to other potential employers, so one would expect the change in earnings to be greater (if anything) in this case. Preliminary analysis shows, however, that there were only 194 new hires enrolled in transferable skill programs, and that about one half of them dropped out before completing training. It is possible that this variable picked up the influence on earnings of some particular projects, rather than the influence of transferable skills training as such. This suggestion is reinforced by the absence of a significant effect of transferable skills training for retrainees.

Finally, the training objective had a slightly negative effect on the change in earnings of retrainees in the cases of personal productivity or system productivity objectives relative to the objective of product quality. This simply means that retrainees in programs designed to enhance product quality experience about $800 more change in earnings relative to other retrainees.

Table 8

Regression Models For Predicting Change In Adjusted Annual Earnings

	New Hire (N=1035) Adjusted R2=.289	Retrain (N=26,701) Adjusted R2=.048
Intercept	-$14,397 (6,959)	$5,130* (1,735)
Complete Training	$7,705*** (829)	$4,037*** (179)
Age	-149*** (39)	-167*** (7.6)
Gender (Male)	356 (957)	657*** (162)
Marital Status (Married)	-318 (726)	-495** (149)
Education		
< H.S.	4,232 (2,839)	578 (588)
H.S. Grad	7,847* (2,648)	868 (508)
Some Coll.	7,419* (2,694)	1,400* (514)
Coll. Grad.	7,860* (2,825)	1,920** (522)

Table 8 (Continued)

Regression Models For Predicting Change In Adjusted Annual Earnings

	New Hire (N=1035) Adjusted R2=.289	Retrain (N=26,701) Adjusted R2=.048
Ethnicity		
Black	1,358 (1,037)	-68 (309)
Hispanic	1,757 (974)	68 (197)
Indian	3,234 (2,939)	-360 (918)
Asian	1,652 (1,135)	447 (233)
Other	2,028 (2,331)	514 (516)
Veteran	-461 (1,065)	-929** (256)
Program Characteristics		
Cost Per Trainee	1.43 (.69)	-.21 (.16)
Number in Program	.32 (.39)	-.44*** (.07)

Table 8 (Continued)

Regression Models For Predicting Change In Adjusted Annual Earnings

	New Hire (N=1035) Adjusted R2=.289	Retrain (N=26,701) Adjusted R2=.048
Industry		
Agriculture	6,372 (6,051)	NA
Construction	12,418 (6,714)	-721 (555)
Durable Manuf.	13,880 (5,751)	-1,344*** (343)
Non-Durable Manuf.	13,612 (6,511)	-509 (483)
Transportation, Utilities	17,507* (6,612)	-72 (1,580)
Wholesale/Retail	7,692 (5,396)	-2,052 (293)***
Finance,Insurance Real Estate	8,856 (15,711)	-19 (316)
Service	7,032 (5,871)	-1,358*** (342)

Table 8 (Continued)

Regression Models For Predicting Change In Adjusted Annual Earnings

	New Hire (N=1035) Adjusted R2=.289	Retrain (N=26,701) Adjusted R2=.048
Type of Skill		
Basic	NA	-2,946 (2,509)
Transferable	-8,348*** (1,153)	-249 (1,557)
Unique	-8,100 (5,928)	-341 (1,568)
Occupational	NA	334 (1571)
Training Objective		
Personal Prod.	-1,754 (3,028)	-888* (308)
System Prod.	2,739 (5,874)	-804* (269)

* = Significant at .01
** = Significant at .001
*** =Significant at .0001

Estimating the Impact of Training on the California Economy

The impact of ETP training on the California economy is the difference between what did occur in the California economy with ETP training programs and what would have occurred in their absence. Depending on the assumptions used, the estimates of ETP's impact range from about $70 million to over $ 1.1 billion in the first year after training.

Our analysis of ETP's economic impact has two steps. First, we analyze the economic dynamics of ETP training to identify the components through which ETP training programs can affect economic activity. Next, we estimate the impact of ETP training on each of the components and aggregate the effects, to get the overall impact of ETP on the state's economy.

The Economic Components

The economic impact of ETP training has four components.

Component 1:	Unemployment Insurance Savings
Component 2:	Increased productivity of trainees (measured in earnings)
Component 3:	Multiplier effects of increased productivity
Component 4:	Value of jobs saved.

Using these four components we estimate the economic impact of ETP training on the California economy for the first year after training. In the following section we explain how ETP training affects each component and how we arrived at our estimate of the impact.

First Year Economic Impact Of ETP Training Conceptual Model

		Component 1:		Component 2:		Component 3:		Component 4:
State-wide Economic Impact	=	UI Cost Savings Savings	+	Productivity Increase (Earnings)	+	Multiplier Effect of Increased Productivity	+	Value of Jobs Saved

Component 1: Unemployment Insurance Savings

One goal of ETP training is to reduce unemployment among participants. To the degree that ETP succeeds in reducing unemployment, it saves the state money by reducing unemployment insurance claims. The new hires are unemployed at the time of training and presumably their unemployment would continue for some period of time if they were not trained and placed by an ETP program. The retrainees may also be saved from suffering substantial unemployment by ETP retraining, since ETP requires that retrainees be in jeopardy of losing their jobs. Presumably, ETP training saves the retrainees from this near certain unemployment and therefore lowers unemployment insurance outlays.

We have developed two estimates of the UI savings attributable to training. Our first measure of the impact of ETP training on Unemployment Insurance (UI) claims is the difference between the post-program UI claims of completers and the post-program claims of dropouts. The assumption here is that without ETP training (including placement), completers would experience the same level of UI claims as dropouts. Thus the difference between the UI claims of completers and the dropouts times the number of completers is our estimate of the UI savings attributable to ETP training. This calculation is made for both retrainees and new hires to obtain the estimate of UI savings, shown in Table 9.

Our second estimate for UI savings makes the reasonable assumption that the retrainees would experience some average period of unemployment if they had not received training. This alternative assumption derives from the ETP program requirement that the retrainees be in jeopardy of losing their jobs if training is not provided. If this criterion is accurately applied, one would expect the retrainees to have become unemployed if ETP training had not been provided.

An estimate for the dollar value of UI claims in this case can be calculated by multiplying the average weekly claims times the average period of unemployment.

We have three slightly different estimates of the average period of unemployment (as shown in Scenarios 4A, B and C in Table 9). Estimate A is based on our study population and assumes that the retrainees would have had the average number of weeks of UI claims experienced by the new hires either for the year before training, or by new hire dropouts in the year after training: these two estimates average 9.5 weeks. This average is likely to underestimate the true period of unemployment for these workers since our data only include the last complete quarter before entry into a training program, and also only include the first complete quarter after participation. Thus this estimate omits the UI claims in the quarter in which the unemployed person enrolled in training and the UI claims in the quarter the person dropped out of training. The 9.5 week estimate is used only because it represents the lowest available estimate of an average unemployment period.

Two other reasonable estimates of average unemployment periods are 10.6 weeks or 14.2 weeks. The 10.6 week average is the 1990 Bureau of Labor Statistics estimate, as determined in their monthly labor market survey for California and is shown in Scenario 4B. The 14.2 weeks is the actual average period for UI claims for 1990 in California and is shown in Scenario 4C.[1]

[1] The average length of unemployment from the household survey which covers all workers (scenario 4B) is shorter than the state-wide average number of weeks UI collected because workers covered by unemployment insurance tend to be out of work for longer periods than the average for all workers. These 1990 averages were obtained from the California Employment Development Department.

Component 2: Productivity Increase

The productivity of ETP trainees may increase because they either produce more per hour worked, or because they work more hours in a year. Any training program that increases the marketable skills of the participants creates additional economic capacity to produce. ETP programs may have an advantage over other training programs, though, because of the placement requirement in ETP contracts. Other training programs create the potential to produce more; that potential is realized when the newly trained workers are placed. ETP contracts require placement as a condition of training, so when ETP training is completed the economic potential of the enhanced productivity is realized. Thus, the impact of ETP training is realized immediately in increased output for the California economy due to the enhanced productivity of the trainees who complete the program. In addition, because trainees are now more skilled, they may have the opportunity to work more hours by avoiding unemployment.

Unfortunately, directly measuring an individual's change in productivity is difficult and expensive. Direct measurement of productivity requires accurate physical output and input data for the periods before and after training. Such data are generally not available, and ETP projects are no exception. Even if that data were available, direct measurement of individual productivity is complicated because newly trained workers typically work with different equipment, different materials, and differently skilled people than they did before training. It is difficult to separate a single worker's change in productivity from the contribution made by the new equipment, new materials, and differently skilled workers.

In this project, as in most studies, the change in earnings is used as an indicator of the change in worker productivity. Standard economic theory implies that workers are paid the value

of what they contribute to production (their marginal product). Accordingly, an increase in productivity should show up in an increase in workers' earnings. The advantage of using earnings as an indicator of productivity is that earnings data is much more available than physical output data and earnings data is reported on an individual basis. Because records of the physical change in production levels do not exist for ETP projects, we used the changes in earnings data as an indicator of changes in productivity.

The regression analysis produced estimates of the impact of completing ETP training for both new hires and retrainees. Those estimates are $7,700 change in adjusted earnings for new hires and $6,100 change for retrainees. While these estimates might be adjusted a little more to obtain the statistically estimated average for the population (by multiplying the estimated coefficients times the mean values of the variables), it seems unlikely that the regression analysis is going to produce an estimate of less than a $5,000 increase in adjusted earnings for those who complete training in either group. A minimum of around $5000 increase in adjusted earnings for completion of the training program is a large estimated impact, compared with other public training program and speaks well for the ETP program. However, the projection of overall program impact on the basis of a regression analysis that explains only 5 percent of the variation in the change in adjusted earnings (in the equation for of retrainees) would cause concern for some.

Consequently, the estimate for the overall impact of ETP training on earnings is taken from the actually observed average change in adjusted earnings for program completers. This change in earnings number was available for all of the 36,608 people who completed training in the sample period. The overall total was comprised of 35,278 retrainees and 1330 new hires who

completed training. The tabulated average increase in adjusted change in earnings for retrainees who completed was $1,615 while that of new hire completers was $7,399. For estimation purposes the $1,615 change for retrainees was rounded to $1600, while the change for new hires was rounded to $7,400.

The use of these numbers as a basis for estimating the overall impact of ETP on the California economy satisfies several objectives. First, since these averages are based on the full number of training completers in the sample period, there is no question of the representativeness of the smaller group (for whom there were complete demographic and program records) used in the regression analysis. Secondly, the use of the actual reported change in earnings for completers rather than a projected changed based on regression equations eliminates any question pertaining to the influence of the smaller explained variation on the estimated impact of ETP. Finally, since the actual reported average change in earnings is the smallest of the three available estimates[2] of the training on earnings, and using the smaller estimate is the more prudent approach. In Table 9 we simply multiplied the average adjusted change in earnings for completers times the number of completers, for new hires and retrainees, to get the total change in productivity for the trainees.[3]

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[2]The third estimate is the difference in the change in earnings between the completers and the dropouts. The differences in adjusted earnings is $3,506 for retrainees and $10,934 for new hires as reported in Table 7. This gap between completers and dropouts is larger than the estimates used in our projections because the dropouts actually experience some decrease in adjusted earnings. Some researchers advocate that this gap is the appropriate measure of the effects of training.

[3] Some researchers argue that changes in wages underestimates the increase in productivity because some common pay practices (see for example Bishop, 1985). If this is correct then these estimates understate the real impact of ETP training.

Component 3: Multiplier Effect On Increases Productivity

ETP also contributes to the California economy by enhancing the competitiveness of the businesses through upgraded jobs and worker skills in the retrainee programs. California has the largest economy in the nation and is a major trade center for the Pacific Rim. Consequently, businesses that produce, warehouse, transport, or sell nationally and internationally traded goods and services face rigorous domestic and international competition. ETP retraining programs upgrade both jobs and workers and this strengthens the competitive advantage of California businesses relative to their out-of-state or international competitors. An improved competitive advantage allows these California businesses to maintain or improve their market shares, this means increased sales for these businesses and increased activity for the California economy.

Standard regional economic analysis delineates economic "basic activities" from "service sector" activities. The businesses that operate in these competitive national and international markets are the "economic base" of the region's economy.

According to the regional theory, these "basic" activities generate the jobs in the "service sector" of the local economy. The "services sector" includes all the businesses that are suppliers to locally-situated industry and households, or put another way, businesses which respond to locally-generated demand for goods and services. The service sector is typically identified with the local retail trade, local business services, most personal services, and local government activities. In contrast, businesses that supply demands generated outside the local economy are part of the economic base. These include: the portion of local hotel, restaurant, entertainment and retail trade that services visitors; government activities funded by non-local sources; interregional financial, insurance, transportation, and utility networks; and along with all export-

oriented activity.[4] The multiplier effect accounts for the new economic activity created in the service sector as local suppliers respond to the higher demands from the basic sector. This suggests that ETP could be most effective in fostering growth in California by concentrating its training programs in the basic sector industries. Training in these industries would increase output both directly (the productivity effect) and indirectly (the multiplier effect).

Note that training among the "retrainees" is likely to generate these multiplier effects but training among the "new hires" is not. Retrainee programs involve an upgrading of the job as well as the workers' skills. By upgrading jobs, businesses gain the capacity to produce more and therefore will order more goods and services from its suppliers. In addition since retrainees become more productive they earn more and thus spend more in the local economy generating additional economic activity.

In contrast, ETP trains "new hires" because these people are currently unemployed and require training to qualify for a job that is already available. An important feature of new hire training is the presumption that the job is available, and that if the new hire trainee did not fill the job, someone else would. Thus, the consistent assumption for the new hire trainee is that the training increases the productivity of the newly-trained worker, but does not increase the level of production in the host firm. This assumption -- that no new or more productive jobs are created in training new hires -- limits the benefits of new hire training to the increase in productivity experienced by the worker. That is, the benefit of new hire training is only the increased productivity of our work force and the productivity of California businesses are not

[4] Basic industries in the California economy have been researched and identified by the Center for the Continuing Study of the California Economy (CCSCE) in Palo Alto.

enhanced through new hire training. This assumption is conservative but it is justified by the nature of most of the new hire training projects. This conservative assumption is maintained throughout the series of estimates. Multiplier effects are assumed only for the retraining programs where job upgrades are present.

The multipliers used in this study were developed from the IMPLAN system specifically for this impact analysis. The IMPLAN system can generate output, income, and employment multipliers, among others. A more complete description of the IMPLAN multipliers appears in Appendix C along with the multiplier values for the various industries. We used the set of output multipliers for California's basic industries which averaged about 1.9. This multiplier value indicates that for each dollar of new activity in the basic sector that 9/10 of an additional dollar of activity is created in the local economy.

It is common to apply the multipliers to changes in basic activity to determine the effect of that change on total activity. We used a list of industries that have been determined to be basic industries in California to determine the likely extent of retraining programs that are in basic industries. Our preliminary analysis of the ETP projects in terms of correspondence to the basic industry list suggests that about 65 percent of the retraining occurred in the basic industries[5]. We therefore applied the multiplier of 1.9 to 65 percent of the increase in earnings generated by retraining to obtain this estimated multiplier effect on the economy.

Job upgrading in the service sector retraining programs could also have multiplier effects. This would occur in the case of import substitution; when an increase in output takes place at

[5]See California Economic Growth, Center for Continuing Study of the California Economy, Palo Alto, Ca., 1991, pp. A1-A5, for the list of basic industries.

the expense of imported goods instead of locally-produced goods. If new local production replaces consumer or production goods and services that would have otherwise been imported from outside the region, then this new locally-oriented production generates additional local jobs. In short, this import-substitution type of service activity can have multiplier effects. If all of the service sector training done by ETP were in businesses which competed with non-California suppliers, then the productivity enhancement in those industries would also be subject to a multiplier effect on local jobs.[6]

If we assume that all of the service sector training done by ETP is in import substitution industries, the average multiplier of 1.9 would also be applied to the 35 percent of trainees estimated to work for service sector businesses. This is in addition to applying the multiplier to the 65 percent in the basic sector. Thus, the result of the import substitution assumption is that the multiplier is applied to all of the productivity increases generated by ETP retraining. This is clearly an optimistic assumption in terms of ETP's impact, but it does suggest a criterion that may be useful in considering future ETP proposals. That criterion would favor proposals from businesses in the service sector that have potential for import substitution over those which do not.

Component 4: Value of Jobs Saved

In theory, since ETP "retrainees" receive training because their jobs covered by the project are in jeopardy, these people should be in imminent danger of losing their jobs. The presumption

[6] The industry codes listed for the ETP projects studied here were not sufficiently refined to clearly identify whether the industry is export oriented or locally oriented.

here is that without upgrading the jobs and the workers' skills these jobs in these particular firms would be eliminated. The ETP training upgrades the jobs and the workers productivity sufficiently to enable the firm to maintain or enhance its competitive position.

Had ETP training not existed, the retraining and job upgrading, presumably, would not have occurred. These jobs could have been lost to the California economy temporarily or permanently. A temporary loss of these jobs to California could occur while the current companies restructure or, if those companies retrench, until other California businesses recognize the market opportunity and reestablish the lost jobs. The important variable in this component is the time period for which the jobs are lost.

If these jobs are saved there are two components to the value of the savings. First, the potentially unemployed workers will not draw Unemployment Insurance for some period of unemployment because they did not become unemployed. Second, the California economy will not lose the economic activity associated with those jobs for the period of time that they would have been lost in that case. These are savings that would not occur in the absence of ETP, assuming the retrainee's jobs were lost. These savings therefore are a benefit of the ETP program that should be added to the economic impact of ETP.

There are no data on the period of time it takes an eliminated job to be reestablished. The proxy variable used for that period of time is the average period of unemployment for California workers. These two variables ought to be very closely related if not mirror images of one-another because people have to fill reestablished jobs in order for them to have an economic impact.

To estimate the value of saving retrainee jobs from temporary loss to the California

economy, we multiplied the three estimates of how long workers are typically unemployed times the average adjusted weekly earnings before training for retrainees who completed. These estimates are presented in Scenario 4.

There is also a very real possibility of permanent job loss. The last decade has seen a number of California jobs disappear, a phenomenon especially visible in the last five years.

To estimate the value of saving retrainee jobs had permanent loss occurred, we multiplied the average adjusted annual earnings before training times the number of retrainees who completed. The results are presented in Scenario 5.

Estimating ETP's State-wide, First Year Economic Impact

As we noted earlier, the overall first year economic impact of ETP can be thought of as the sum of the four components described above. The estimates for the four components vary depending on the assumptions that go into each component. To represent the unique contribution of each component, we created five scenarios for estimating ETP's overall impact. The assumptions that went into each scenario are described below, and actual 1990 dollar estimates for each scenario are presented in Table 9.

Scenario 1:
This scenario assumes the ETP's impact is limited to the immediate savings in UI payments, and the increased productivity of trainees. UI payments saved are estimated by multiplying the average difference between UI payments to dropouts and completers times the number of completers. Productivity is simply measured by the actual increase in completers adjusted earnings.
Total Impact: $ 71,254,800

Scenario 2:
This scenario retains the assumptions about UI savings and increased productivity. It then adds the 1.9 multiplier effect to the 65% of increased productivity for retrainees that takes place in basic industries.
Total Impact: **$104,275,000**

Scenario 3:
This scenario retains the assumption about UI savings and increased productivity. It then adds the 1.9 multiplier effect to all increased productivity for retrainees.
Total Impact: **$122,055,100**

Scenario 4:
This scenario assumes three different periods of unemployment,as described before and recalculates UI savings. Adds the 1.9 multiplier effect to all the increased productivity for retrainees. It also assumes that all retrainees jobs would be saved from temporary loss, based on the three different estimates of unemployment.
Total Impact: **A: $332,125,700**
B: $356,971,700
C: $437,986,900

Scenario 5:
This scenario assumes retrainees will be unemployed for 14.2 weeks. Adds the 1.9 multiplier effect to all the increased productivity for retrainees. It also assumes that all retrainees jobs would be saved from permanent loss.
Total Impact: **$1,122,692,200**

Table 9
First Year Economic Impact of ETP Training
Estimated Results

Scenario	1st Year UI Savings	1st Year Increase In Productivity (Earnings)	Multiplier Effect on Increased Productivity 1st Year	1st Year Value of Jobs Saved	1st Year Impact of ETP Training on the California Economy
Scenario 1 New Hire Retrain Total	$1,064,000 3,904,000 4,968,000	$9,842,000 56,444,800 66,286,800			$10,906,000 60,348,800 71,254,800
Scenario 2 (.9 Mulitiplier applied to 65% Retrainees in basic industries.)	4,968,000	66,286,800	33,020,200		104,275,000
Scenario 3 (.9 Multiplier applied to all Retrainees)	4,968,000	66,286,800	50,800,300		122,055,100
Scenario 4 New Hires A. (9.5 Wks UI) B. (10.6 Wks UI) C. (14.2 Wks UI)	 1,064,000 41,892,600 46,743,400 62,618,500	66,286,800	50,800,300	 172,082,000 192,007,200 257,217,300	 332,125,700 356,971,700 437,986,900
Scenario 5 New Hires (All Retrainee Jobs Saved)	1,064,000 62,618,500	66,286,800	50,800,300	941,922,600	1,122,692,200

Long-term Impact of ETP Training

ETP training continues to have an impact on the economy beyond the year immediately after training. While we did not study the longer term impact of ETP training, recent research conducted by the Rand Corporation (Lillard and Tan, 1986) indicates that training continues to have an impact on productivity for about twelve years. Presumably the effect of training on productivity diminishes over the 12 year period and disappears at the end of it.

Assuming that this pattern would hold for ETP trainees we estimated the long-term impact of ETP training on earnings and productivity by applying a straight-line depreciation method to the measured increases in productivity reported[7], to estimate the effects for the following twelve years. This analysis assumes the impact of training will diminish 1/12 each year, and disappear after the twelfth year. We also adjusted these figures by discounting the estimated productivity to a 1990 base year through the use of a discount factor. The common practice for establishing a discount rate is to use a U.S. Treasury bond rate that corresponds to the period over which the benefits occur. Recent 12 year U.S. Treasury bond rates have been around 7.5%. So, we applied a discount factor of 8% to the stream of productivity increased generated by the ETP programs studied.

Table 10 shows that applying this technique yields an additional impact on productivity of $257.2 million for years 2 to 12, when added to the year one impact the total impact on productivity is $323.5 million.

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[7]The estimate increase in productivity was the increase in earnings for the retrainees plus 76.2 percent of the increase in earnings for the new hires. The remaining 23.8 percent of the first year increase in earnings for the new hires is due to increased weeks of employment rather than increased productivity (wages).

Table 10
Long Term Impact of Productivity Changes From ETP Training (8% Discount Rate)

Year	Impact (In Millions)
1	$66.3
2	54.3
3	45.7
4	38.0
5	31.3
6	25.4
7	20.2
8	15.5
9	11.5
10	8.0
11	5.0
12	2.3
Total Years 2-12	$257.2
Total Years 1-12	$323.5

IV Conclusions and Recommendations

Conclusions

1. ETP training has a significant impact on the earnings of both new hire and retrainee completers.

The results of this study clearly show that both new hires and retrainees who completed their program had significant increases in earnings that go beyond the rate inflation. Looking at simple differences adjusted for inflation new hire completers earned over $10,900 more than dropouts, and retrainee completers earned over $3,500 more than dropouts.

When a multiple regression analysis was used to measure the impact of completing training after controlling for demographic and programmatic differences the impact of completing ETP training was still highly significant. The estimated impact of completing training for new hires was over $7,700 and for retrainees over $4,000.

We also calculated the simple average increase in adjusted earnings for people who completed ETP training. For new hires the increase was $7,400 and for retrainees it was $1,600. Anyway we cut it, completing ETP training had a significant and positive effect on real earnings.

Economic theory leads us to conclude that these increased earning represent increased productivity for the individuals trained, and in the case of retrainees, increased productivity for the company that employs them.

2. **ETP training reduces likelihood of unemployment for both new hires and retrainee completers.**

Trainees who completed experienced significantly less unemployment after training than participants who dropped out of training. Retrainees who completed experienced about half the unemployment of dropouts, and new hires had on only a third as much unemployment as dropouts. These dramatic differences may not be caused solely by ETP training, they may be due to other differences between dropouts and completers such as motivation and other characteristics. But the fact remains that the thousands of ETP trainees who completed training had significantly less unemployment than those who dropped out.

3. **ETP appears to have a larger impact on earning than traditional post-secondary vocational training offered in community colleges and proprietary institutions, GAIN services, JTPA Title II-A, or other state level displaced workers programs.**

As part of our analysis we reviewed a wide range of studies that analyzed the impact of public training programs on participants' earnings. These studies employed a range of research approaches in variety of time periods, so their results are not exactly comparable to our analysis on a dollar for dollar basis. But, as we measured it, the impact of ETP training is substantially larger than comparable studies show for other training programs. While the exact size of the difference is unclear, we believe the direction of the difference is significant and reliable. Studies of CETA and recently JTPA show a consistent improvement in annual earning of only several hundred dollars, while both this study and a similar previous study shows the impact of ETP training to be several thousand dollars.

Part of this gap is no doubt due to the fact that ETP trains established workers who have the background and skills to benefit from training, while many public programs serve more disadvantaged participants. However we do not believe that this difference alone can account for the significant increases in earnings reported here. Our analysis convinces us that ETP's model of employer based training with stringent performance standards is powerful training model that consistently produces significant impacts on both earnings and the productivity of workers who complete the program.

4. ETP has a substantial impact on California's economy, beyond the increased earnings of participants.

Our analysis shows that ETP training had an impact on the states economy that goes far beyond the increased earnings of participants. Depending on the assumptions used this impact ranged from $71 million to possibly over $1.1 billion in the first year after training. ETP has an impact on the economy through four mechanisms. First it reduces UI payments by about $5 million dollars in the first year. Second, increased productivity, as measured by changes in earnings, accounts for an additional impact of over $66 million. Third, the increased productivity produces other economic activity within the states economy which we estimate to be between $33 million and $51 million. Finally, assuming that the retrainees' jobs would have been temporarily lost, we estimate the value of saving the jobs is between $172 million and $257 million. If retrainee jobs were to be permanently lost, the value of saving them is over $940 million a year.

From this analysis it appears the ETP training has a significant impact not only on the productivity of individuals but also on the productivity of companies. It seems logical to infer that if individual productivity increases so dramatically, it likely that the overall productivity of

the company increases, which increases the competitiveness of the firm, and generates a multiplier effect on the economy, in many cases.

This analysis points out that ETP is not just a training program, but, rather a powerful tool for economic development. The issue for future ETP policy is can ETP training become a more effective tool by targeting its services on particular industries and companies. This analysis provides a first step towards understanding how ETP training affects companies differently.

5. **Additional research is needed to understand the dynamics of ETP training's impact on companies and individuals.**

This research and the previous impact study provide a the broad outline of the impact of ETP training. As the economy changes and ETP policy shifts, the impact of ETP training will also change. It critical that ETP monitor its impacts empirically, so that the consequences of the new policies and the effects of shifting economic conditions can be accurately monitored.

In addition, this study suggests the impact of training is not uniform across industries or company type. It's important the panel understand how the impact of training varies so that it can eventually target training where it will have the biggest impact.

Recommendations

1. **ETP should maintain stringent performance standards for its contracts to insure that training is tied to employment.**

The powerful impact of ETP on earnings and thus the overall economy are probably due to the powerful incentives created by the performance contracting standards. We believe maintaining these standards is a key to insuring the continued impact of the program.

2. **Develop policies to increase completion rates.**

While ETP has high completion rates (78% for retrainee and 69% for new hires) in comparison with similar public programs, ETP may be able to increase its completion rates. Since the bulk of benefits to both the individual and the economy as whole come from completing the program, increasing the proportion of completers will enhance the impact of the program.

3. **Develop targeting strategies that will lead to the greatest impact on California's Economy.**

Previous research and reports such as Wilms (1991) and Creticos and Sheets (1990) have suggested methods for targeting ETP training that are based on the characteristics of firms and the need for training, or likelihood that jobs will be saved. The results of this study suggest that the economic impact of ETP training will vary significantly depending on the company's industry and the ability of training to generate productivity increases. Our analysis suggests that ETP could develop targeting strategies that would maximize the economic impact of ETP training.

Here are the issues we believe the panel needs to consider in developing a targeting strategy.

A major targeting issue for ETP is whether to target new hire training versus retraining programs. According to the research done here and the previous research on ETP, the new hire trainees who complete experience a change in earnings substantially higher than that of the retrainees. The average change in earnings for new hires was $7,400 compared to a $1600 average change for retrainees in this study. These numbers would seem to make a case for targeting new hire programs. Before adopting a new hire program target, however, a full

analysis of the relative costs and relative completion rates of the two programs would have to be undertaken. It may be that the substantially higher benefits only come at substantially higher costs. Furthermore, focusing on these numbers overlooks the nature of retraining programs relative to new hire programs. As we noted before, retraining programs upgrade the jobs as well as the workers' skills, unlike the new hire program. This means that the retraining program has a potentially much larger impact on the California economy for every dollar increase in earnings. The upgraded jobs mean more productive and competitive businesses and therefore may generate multiplier effects within the local economy. Before targeting either the retraining or the new hire program, more research should be conducted to substantiate the observed change in earnings difference, and particularly to see if and how these differences persist over time.

The Panel also may be tempted to de-emphasize retraining programs in durable manufacturing, wholesale and retail trade, and services because of the significant negative regression coefficients associated with these industries. Certainly a thorough comparison of the costs of the programs in these areas should precede such a conclusion. Its important to note, however that, durable manufacturing is a very important basic industry, and preserved or expanded jobs in durable manufacturing are very likely to have multiplier effects on the economy, the extent of which should be known in advance of any targeting. Conversely training in service and retail industries has minimal multiplier effects if it does not displace imported goods and services.

Our analysis and the other research point to several factors that should be considered in any targeting schemes:

- Tightly-focused and well-planned retraining programs that have clear productivity enhancing effects should be given priority. The retraining program proposal

  should have a clear focus with goals that are cast in terms or measurable changes in production rates, scrap rates, rework rates, customer returns, and the like.

- Programs that clearly enhance the competitiveness of California businesses relative to domestic and international competitors should be given priority. Training that serves businesses in the basic activity sector are likely to generate positive spillover effects. In these cases the relationship of the training program to the firm's competitive position should also be clear and measurable.

- New hire programs that train people for occupations in which the demand is growing at a relatively fast rate should be given priority. New hire training in these areas could alleviate some possible future labor market bottlenecks and such training has little chance of pushing people into occupations where there exists an adequate or excessive number of already skilled workers. Training in these latter areas would simply exacerbate unemployment rates that may be already rising in these occupations.

- Retraining programs that are likely to substantially reduce the probability of layoff and temporarily or permanently lost jobs in basic industries should be given priority.

4. Improve scope and quality of data collection of participant and program characteristics.

A serious limit to this analysis was the fact that about 40% of the individual trainee records did not have the minimal demographic data currently collected by ETP. Policies that insure the collection of basic participant information are necessary for effective research in the future.

In addition ETP needs collect and store electronically additional data. We particularly recommend that the following detail be kept:

- occupation of individuals trained as measured by a standard system such as the Dictionary of Occupational Titles,
- industry type by detailed SIC code (to at least three digits),
- company market position in terms of being internationally, nationally or regionally, or locally competitive,

- specific products or services produced by employers,
- goals of the project for productivity improvement, quality improvements or other desired change.

5. Track the impact of ETP Training Annually.

ETP is under a mandate to evaluate the outcomes of ETP training. This makes sense because, as noted before, the impact of ETP training is likely to change as the economy changes and ETP policies are modified. This study shows that it is relatively easy to track the impact of ETP training by tracking the earnings and employment patterns of participants. We recommend that this study be replicated annually to provide policy makers and the public with an objective assessment of the programs impact.

6. Study the impact of ETP training over time.

Research suggests the impact of training lasts for 12 years. Whether this holds true for ETP training is unknown. It is important for ETP to analyze its impact on participants and companies overtime. It maybe that effects are stronger and last longer in certain industries for certain types of participants. This type of analysis would provide the panel with sound data for targeting training to create long term economic benefits.

One approach to measuring ETP training overtime would be to use the earnings and employment records of the 4,000 individuals who were first tracked in 1988. The initial earnings and background data of these participants are still archived.

In addition the cohort of participants created for this study could be tracked annually to measure the continuing impact of training on individuals and the participant and program variables that influence that impact.

7. **Conduct case studies of projects with exceptionally high and low changes in individual productivity.**

Case studies of projects where participants experienced large gains in earnings and thus productivity, and projects with minimal increased in earnings should be conducted to uncover the factors that underlie the impact of training. Again a detailed study of few projects would identify the characteristics of projects that produce the most powerful impact on earnings and productivity. It may also identify the characteristics of projects that tend to diminish the impact of training. These cases would provide insights into how ETP funds could be targeted most effectively, to provide the maximum economic impact for funds spent.

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Appendix A:
Comparison of Included and Excluded Cases

Table A-1

Unadjusted Before and After Training Earnings for Included and Excluded Cases

	Before training	After training	Change
Included	$23,984	$27,413	$3,467
Excluded	24,109	27,205	3,097

Table A-2

Included and Excluded cases by Industry

	Included	Excluded
Agriculture	.1	<.1
Construction	2.4	2.5
Durable Manufacturing	25.3	34.3
Non-Durable Manufacturing	3.8	4.9
Transportation	.3	1.4
Retail & Wholesale	27.4	9.6
Finance	16.0	23.8
Services	9.8	9.6
Unidentified	14.9	13.9

Appendix B:
Regression Analysis of Unadjusted Earnings

Table B-1

Regression Models For Predicting Change In Unadjusted Annual Earnings

	New Hire (N=1,035) Adjusted R2=.303	Retrain (N=26,701) Adjusted R2=.045
Intercept	-$12,696 (6,768)	$4,717* (1,737)
Complete Training	$8,020*** (805)	4,102*** (179)
Age	-136*** (38)	-131*** (7.61)
Gender (Male)	409 (930)	1,402*** (163)
Marital Status (Married)	-175 (706)	-179 (150)
Education		
< H.S.	4,125 (2,760)	653 (588)
H.S. Grad	7,583* (2,576)	1,282* (508)
Some Coll	7,250* (2,620)	1,985*** (514)
Coll. Grad.	7,734* (2,747)	3,146*** (522)

Ethnicity		
Black	1,230 (1,008)	-417 (310)
Hispanic	1,700 (948)	-188 (197)
Indian	3032 (2,858)	-572 (919)
Asian	1,644 (1,104)	36 (233)
Other	1,626 (2,267)	196 (517)
Veteran	-590 (1,035)	-958** (257)
Program Characteristics		
Cost Per Trainee	1.46 (.68)	.24 (.16)
Number in Program	.27 (.38)	-.24* (.08)
Industry		
Agriculture	5,262	NA
Construction	12,556 (6,530)	737 (556)
Durable Manuf.	13,087 (5,593)	-1,230** (343)

Non-Durable Manuf.	12,504 (6,332)	-832 (483)
Transportation Utilities	16,434* (6,430)	366 (1,581)
Wholesale/ Retail	7,952 (5,248)	-2,118*** (293)
Finance, Insurance Real Estate	7,853 (15,279)	-62 (317)
Service	6,175 (5,709)	1,437*** (343)
Type of Skill		
Basic	NA	-3,322
Transferable	-8,394*** (1,122)	-763 (1,559)
Unique	-7,754 (5,764)	-516 (1,569)
Occupational	NA	-106 (1,572)
Training Objective		
Personal Prod.	-2,167 (2,945)	-1,049*** (308)
System Prod..	1,630 (5,712)	-1,109*** (269)
Quality System	NA	NA

*=Significant at .01
**=Significant at .001
***=Significant at .0001

APPENDIX C:
MULTIPLIERS

The multipliers were developed from the IMPLAN system which consists of a set of computer programs, a national model of industrial production, and a massive data base containing estimates of final demands, final payments, production, and employment for each industrial sector for every county in the United States. The IMPLAN system is based on 1985 data and can provide estimates of interindustry purchase coefficients and the implied multipliers for any set of industries (up to 528 industries) and any collection of counties in the U.S. The IMPLAN system has been developed over the last ten years by the USDA Forest Service as an aid in land and resource planing.

The multipliers reported here were developed from the IMPLAN system with the industries aggregated to the eight industries identified in the ETP programmatic records, and for the entire state of California. These multiplier are reported in TABLE C-1 for output, income, and employment multipliers. The output multipliers are ratios involving the dollar value of output; the income multipliers translate the output activity into income for California residents; and the employment multipliers translate the output into jobs through output-to-employment ratios.

We used the output multipliers in our projections of the impact of ETP on the California economy because these ratios relate changes output in one industry to aggregate output. That is, these multipliers show how much California output will change as a result of a change in output in a given industry. Our use of the output multipliers is also consistent with our decision to use the most conservative basis for our estimates of ETP impact (using 1.9 instead of 2.0 or 2.1).

We used a simple average of the output multipliers instead of applying the various industry multipliers to the various ETP projects because the multipliers are sufficiently close to one-another in value that the more complicated procedure would not add any additional accuracy to the economic impact projection.

TABLE C-1

Sector	TYPE OF MULTIPLIER Output	Income	Employment
Agriculture Forestry Fishing Mining	1.8980	1.8787	1.7392
Construction	1.8804	2.0465	2.1362
Durable Mfg	1.8951	2.1632	2.2153
Nondurable Mfg	1.8896	2.6499	2.7280
Transportation Utilities Communication	1.8329	1.8909	2.2754
Wholesale and Retail Trade	1.9827	1.9484	1.7914
Financial Insurance Real Estate	1.6816	1.6202	1.9953
Services	2.1026	2.0267	1.7399
Simple Average	1.9	2.0	2.1