



M A R Y L A N D

GOVERNOR'S WORKFORCE INVESTMENT BOARD

**OCCUPATIONAL SKILLS TRAINING IN
MARYLAND: A STUDY OF EARNINGS
TRENDS**

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Prepared for

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The author accepts sole responsibility for the content of this report. No attribution of agreement with this content should be made to any other person or organization, including the Board staff and other entity representatives who contributed to the design and conduct of this research.

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EXECUTIVE SUMMARY

Continuous investment in the creation and renewal of worker skills is essential if Maryland is to remain attractive to business owners and employees. This study, sponsored by the Governor's Workforce Investment Board, investigates two questions:

1. Do trainees completing occupational training in Maryland stay here to work? If so, the return on investment remains in Maryland.
 - More than 75 percent of the trainees covered in this study were still working in Maryland during the State fiscal year that ended in June 2002
2. After completing training, do these trainees have higher earnings than before completion of the training? If so, this is one indicator that the Maryland economy benefits from the investment in training.
 - During the first full year following completion of training, annual inflation-adjusted earnings of the trainees who were working in Maryland had increased between 16 and 200 percent over annual earnings in a pre training year, depending upon the type of training investment made. Median annual inflation-adjusted earnings more than doubled for six out of the fourteen sub-populations of trainees studied.

These highlights are drawn from twelve-year Maryland employment and earnings histories (July 1990-June 2002) that were prepared for 21,766 trainees completing one of the covered training programs between July 1994 and June 2000. The Maryland Department of Business and Economic Development (DBED), the Maryland Department of Labor, Licensing and Regulation (DLLR), and the Maryland Higher Education Commission (MHEC) provided the administrative records used in the study.

This study does not document:

1. The size of investment in each type of training.
2. The rate-of-return on these investments.
3. Trainee gender, age, race/ethnicity, child-care responsibilities, and other relevant considerations, such as local economic conditions, that are known to affect some employment opportunities and earnings levels.

The categories of training covered are:

- The Maryland Industrial Training Program (MITP), and Partnership for Workforce Quality (PWQ), using State funds overseen by the Department of Business and Economic Development. The MITP and PWQ investments are in high volume, short-term and low cost training geared to specific employer needs. These demand-side investments do not easily fit into the occupational classifications that are appropriate for some of the other categories of training.
- Federally funded Job Training Partnership Act (JTPA) occupational training completed between July 1994 and June 2000, overseen by the Department of Labor, Licensing and Regulation. JTPA training targeted economically disadvantaged adults and youth, and workers who lost jobs because of plant closings and other mass layoffs. The Workforce Investment Act of 1998 succeeded the JTPA in Maryland in July 2000. WIA activities are delivered through twelve local Workforce Investment Areas.
- Formal registered apprenticeship training in the Construction Trades, Machine Trades, and Services (including a large number of police, fire and emergency medical personnel), overseen by DLLR and made possible through cost sharing between sponsoring employers and apprentice employees.
- Occupational skills training programs in Business Careers, Information Technologies and Data Processing, Health Services, Mechanical and Engineering Technologies, Natural Science Technologies, and Public Safety Related Technologies, offered by sixteen Maryland community colleges, and overseen by the Maryland Higher Education Commission.

Additional conclusions based on this study include:

1. There is a diverse investment of Federal, State of Maryland and local government funds, and business and worker commitments to occupational skills training. This study, which relied on available administrative data sources, covers a limited part of the overall investment stream and trainee flows.
2. The pre-training earnings of trainees covered in this study are starkly different. The trainees included arrived for training with different work histories, needs and short-term goals. Similarly, the training activities that welcomed these participants had different missions, eligibility criteria and resource capacities.

3. By June 2002, when these trainees were three years beyond the reference training activities, 72 percent had completed training in the categories with a median annual earnings level higher than \$27,794. This figure was adopted for comparison purposes because it is the July 2001-June 2002 median annual earnings figure for the 1,832,615 workers who are known to have been working in Maryland in both this year and in the July 1997-June 1998 pre-training reference year.
4. More than 77 percent of the trainees had completed training in categories with a July 2001-June 2002 Maryland UI wage record appearance rate higher than the 68 percent 'retention' rate for all 2,683,376 workers found in the July 1997-June 1998 Maryland UI wage records file.
5. Median annual earnings more than doubled in this brief time for six out of the fourteen sub-populations of occupational skill trainees.

Future Research Considerations

This study establishes a foundation of historical information about a subset of occupational training within Maryland's overall investment in workforce development. The employer, community college and other provider pipelines of training opportunities and services described here remain open for business. Federal, State and local government funding streams for investment in occupational skills training are under pressure and further research is needed before information contained here could be used as the criteria for allocating authorized funds among competing pipelines. The Board recognizes that more in-depth research can and should be conducted to support the development of the needed case statements:

- More intensive study of the training activities, employment and earnings already covered here should be supported. Such analyses should include demographic descriptors such as gender, ethnicity and age, and additional descriptors of previous work history, educational attainment, the content of skills training provided, and local economies.
- The Maryland UI wage records were used in this study to prepare basic work histories and earnings profiles. These data can be used in more intensive research to identify job retention patterns and, when combined with other administrative data maintained by DLLR, to reveal inter-industry mobility profiles and the association of these moves with earnings gain or loss.
- Return-on-investment estimates can be calculated if reliable and appropriately detailed cost information is provided.
- More components of the overall investment in workforce development in Maryland could be covered in future research including the University System of Maryland and training funded by the Department of Human Resources.

- Biannual updates should be conducted to offer the Governor, members of the General Assembly, other government officials, and the public a clear understanding of how progress is occurring in the continuous effort to maintain the productivity of the workforce.
- More detailed analysis of individual programs is needed to determine effective training strategies for the vastly different populations served.
 - Using UI wage records it would be possible to track whether a worker moves from one Maryland employer to another Maryland employer. Earnings trends can then be investigated including a descriptor of whether trainees changed employer affiliation soon after exit from training.
- Progress in expanding opportunities for new entrants and reentrants to the workforce, and for those who make the effort to qualify for advancement, should be documented.
- The importance of human capital investments in probationers and incarcerated prisoners with predictable release dates is known, but much more should be done to document the link between earnings and recidivism.

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1.0 INTRODUCTION

1.1 Sustained Creation and Renewal of Workforce Skills

Sustained investment in the creation and renewal of worker skills is essential if Maryland is to remain attractive to business owners and workers. Reliable availability of needed skills in the workforce has replaced location as the main criterion in many business start-up, continuation and expansion decisions.

Federal, State and local government investments in workforce development are subject to annual appropriation of funds decisions and periodic recasting of enabling legislation. These public sector decisions interact with business management and employee decisions that also affect the full inventory of available skills.

1.2 Purpose of This Study

Using selected training completion data and Maryland employment and earnings information, this study, sponsored by the Governor's Workforce Investment Board, investigates two questions:

1. Do trainees stay here to work? If so, the return on investment remains in Maryland.
2. After completion of occupational training in Maryland, do the trainees have higher earnings than before completion of the training? If so, this is one indicator that the Maryland economy benefits from the investment in training. A higher earning amount is assumed to reflect higher productivity.

1.3 Sequence of Topics Covered in Remaining Sections

Sections 1.4 (Cautions) through 1.8 (Training Coverage, and all of Section 2 (Study Design and Data Sources) and Section 3 (Additional Training Benefits Other Than Increased Earnings), contain background information. These sections are needed to understand the Findings that appear in Section 4. Section 2 describes the study design and data sources relied upon. This is followed in Section 3 by acknowledgment of training outcomes that are not covered here. Section 4 presents and analyzes findings that resulted from this study. This coverage includes program-specific results for each of the categories of training covered. The approach taken in Section 4 is straightforward—calculate before and after average earnings amounts for clients who exited from different training activities in the same reference year (July 1998-June 1999). Maryland Department of Labor, Licensing and Regulation employment and earnings data, commonly known as UI wage records, are used. Section 5 concludes with suggestions for further research that can strengthen our understanding of the performance of the public components of Maryland's workforce development system. An Appendix contains earnings trend profiles for sub-populations of training clients in Maryland's 12 local workforce investment areas and 16 community colleges.

1.4 Cautions

Some readers will be disappointed after reading this report because related topics of intense interest and substantial importance are not covered. These unexamined topics include:

- Nothing is said here about the explicit public and private, or business and worker sharing of training costs or receipt of the benefits that flow from these investments (e.g., lower costs of production, higher earnings, and reduced spending on welfare, food stamps and subsidized child-care).
- Funding agency, training provider and student differences in training goals are described, but not analyzed, here. Trainee demographics, living circumstances, prior work histories and other pertinent aspects of the complex lives of the trainees remain unknown. These are known to be important for understanding employment and earnings trend differences.
- The use of earnings as an acceptable measure of a worker's human capital and the contribution of this productive capacity in the workplace is not universally accepted. Many market conditions must be satisfied for this 'signal of value' to be reliable.

- Some interested parties express concern that employment and earnings information alone, particularly Maryland employment and earnings amounts described using only Maryland UI wage record information, offers an incomplete accounting of the multi-faceted contributions of the entities covered. The Appendix includes additional information about the training activities and other outcomes achieved by the programs included in the study.

1.5 Limitations

Accurate warnings about some limitations of this study should accompany any use of the findings presented and analyzed in Section 4. Three of these limitations arise from reliance on Maryland UI wage records for documentation of employment status and earnings amount:

1. Employment status is defined by the presence of quarterly earnings in the Maryland UI wage records file. No distinction between earnings for full-time or part-time employment is included because this information is not available.
2. The Maryland UI wage record file does not include an occupational descriptor. Nothing can be said about a former trainee's use of newly acquired skill.
3. Some types of employment are not included in the Maryland UI wage records. The most important examples of omitted categories of employment are: Federal government civilian employees and military personnel; self-employed individuals and other independent contractors; workers who receive only commission or piece-rate compensation (i.e., no wage or salary); and out-of-state jobs held by Maryland residents.. The Federal government civilian and military employment and out-of-state employment affiliations can be added from other available data sources.
4. A fourth limitation of this study results from decisions that were made to concentrate on a one year cohort of trainees and to analyze earnings trends based on a five-year time horizon. Different timeframes would have unknown effects on the findings reported here.

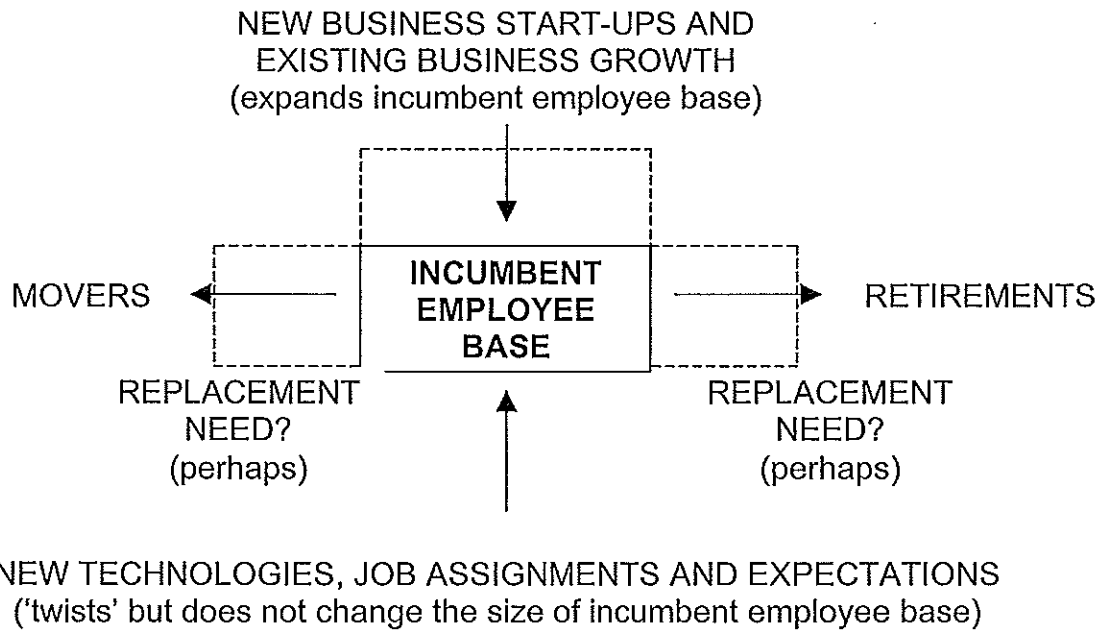
These limitations are highlighted to encourage proper interpretation and use of the findings that appear in Section 4. This statement of 'boundaries' is not a disavowal of the accuracy or importance of these findings.

1.6 The Need for Sustained Creation and Renewal of Workforce Skills

Figure 1 shows why sustained creation and renewal of skills is important to the Maryland economy.

FIGURE 1

THE NEED FOR SUSTAINED CREATION AND RENEWAL OF WORKFORCE SKILLS



- New businesses need to recruit qualified employees or train recruits after they are hired. Some existing businesses expand, thus increasing the demand for workforce skills.
- Over time, unless renewed, incumbent employee skills fall out of alignment with demand. New technologies and new ideas about best-practice uses of personnel are adopted. Again, this increases the demand for higher level or different skills.

- Even, or particularly when skills are kept in alignment with best-practice use, highly qualified employees become targets for raiding by competitors seeking quick access to needed skills. Employers must decide whether to 'make or buy' needed skills. An employer's selection of an optimal combination of recruitment and training costs depends upon many considerations that are not explored further here.
- Senior employees retire, usually taking valuable human capital with them.

Net growth in demand for skills, obsolescence of employee skills, and departure combine to require sustained creation and renewal of skills.

1.7 Responses to the Need for Creation and Renewal of Skills

Business, worker and public responses to the need for creation and renewal of skills are not isolated from each other. The responses interact.

- Continued learning of new skills is a routine expectation in many businesses. Larger businesses often have their own training unit. More often, large and small businesses hire vendors to offer specialized on- and off-site training modules.
- Concurrent with these internal training activities, with and without employer support, many employees return to a public community college, university or private training entity to learn new skills. Internet learning is a growing component of this renewal activity.
- All workers are not fortunate enough to be able to upgrade their skills while still employed. Displaced workers often invest in renewal of skills to improve their prospects of finding a new job consistent with their goals.
- Others have never worked, or have not worked recently, and know that continued learning is a necessity if they are to find and keep a new job.

Figure 2 shows the basic ways creation or renewal of skills happens.

FIGURE 2

**RESPONSES TO THE NEED FOR SUSTAINED
CREATION AND RENEWAL OF SKILLS**

<u>BUSINESS RESPONSE</u>	<u>WORKER RESPONSE</u>	<u>PUBLIC RESPONSE</u>
On-site on-the-job training	Incumbent employees return to school	Public university offerings
Off-site upgrading	Employees change employer affiliation to gain access to new skills	Public community college offerings
Hiring from local sources	Displaced workers, new first-time workers and returning workers return to school or accept a new job with continued learning opportunities	Other Federal, State and local government purchases of training services from public and private providers
Out-of-state recruitment		
Relocation		Payments to private providers, businesses and other training entities

Together, Figure 1 and Figure 2 show there is a need for sustained creation and renewal of employee skills in Maryland, and there are multiple channels of current and potential public and private response to this need.

1.8 Training Coverage

This study covers 28 categories of training in Maryland:

- Training offered through two Maryland Department of Business and Economic Development (DBED) programs—the Industrial Training Program (MITP) and the Partnership for Workforce Quality (PWQ) (see Sections 4.2.1 and 4.2.2 for additional details). All trainees who participated in each program are included. No minimal exposure or completion criteria were imposed.

- Seventeen categories of on-the-job and classroom skills training managed by the Maryland Department of Labor, Licensing and Regulation (DLLR) using Job Training Partnership Act (JTPA) funds on behalf of Title 2a Adults, Title 2c Youths, and Title 3 Dislocated Workers (see Sections 4.2.3, 4.2.4 and 4.2.5 for additional details). In Fiscal Year 1999, JTPA Title 2a served 6,754 adults, 5,403 (80%) of whom received training of some type. The participants in this study represent 27.1% (1,465) of the total adults trained under Title 2a. In the same fiscal year, JTPA Title 2c served 2,663 youths, 2,290 (86%) of whom received training. The youth in this study represent 6.3% (143) of the total youth trained under Title 2c. JTPA Title 3, in fiscal year 2000, served 11,028 adults, 7,168 (65%) of whom received training. The adults in this study represent 39% (2,797) of the total adults trained under Title 3. The Workforce Investment Act of 1998 (WIA) replaced the JTPA program, effective July 1, 2000 in Maryland.
- Three types of formal registered apprenticeship training administered by the Maryland Apprenticeship and Training Program in the Department of Labor, Licensing and Regulation—construction trades, machine trades, and services (see Section 4.2.6 for additional details).
- Six occupational programs offered by Maryland public community colleges—business, information technologies and data processing, health services, mechanical and engineering technologies, natural science technologies, and public safety related technologies (see Section 4.2.7 for additional details).

2.0 STUDY DESIGN AND DATA SOURCES

2.1 Overview

Interested parties convened in January 2002 to begin the study design process. State agency affiliations represented included the Board, the Maryland Higher Education Commission (MHEC), the Department of Business and Economic Development (DBED), and the Department of Labor, Licensing and Regulation (DLLR). Other participants included a community college institutional researcher, a local workforce investment area evaluation staff person, and the principal investigator from The Jacob France Institute at the University of Baltimore.

Questions addressed at the outset included:

- What categories of training should be included?
- What sub-populations of former trainees and students should be included?

- What time coverage of employment and earnings histories should be included?
- Having answered these questions, how should the employment and earnings profiles be summarized for public release?

The answers to each of these questions are described next. This is followed by a brief description of the data sources used in the study.

2.2 Categories of Training Included

What categories of training are covered? Issues that had to be resolved include:

- Expected cell-sizes that would be required to satisfy legal non-disclosure of identity stipulations in Federal and State laws and a practical relevance criterion.
- Adoption of a minimum threshold of trainee exposure to content. The JTPA definition adopted was “at least 30 days of elapsed time between the entry date and exit date associated with the training activity”, recognizing that this is not a direct measure of exposure to content. The community colleges definition adopted was “one year course content equivalent” coupled with the completion definition defined in the next bullet.
- Selection of a practical definition of training completion. The community colleges definition adopted was “award of a certificate or degree” coupled with the minimum threshold of content criterion defined in the previous bullet. The JTPA data file contains a ‘completion’ data element.
- The State agency and local partners in the conduct of this study each decided how *occupational skills training* would be defined for the selection of the sub-populations to be included in the analysis. Training content varies among some of the categories of training studied. .

2.3 Placing the Categories of Training in the Context of the Continuous Flow of Workforce Development Activities in Maryland

Together, the investments covered in this study constitute an unknown part of the total investment in workforce development in Maryland. Continuous investment in workforce development occurs in the workplace, without direct public subsidy. Each year, the State’s public and private universities, colleges and community colleges add substantial value to the stock of human capital that is available to Maryland employers.

2.4 Trainee Time Coverage

The original specification of trainee time coverage developed by Board staff was six State fiscal years: July 1994-June 1995 through July 1999-June 2000. The advantages gained by adopting the State fiscal year as the unit of observation and analysis include:

- MHEC collects administrative information from community colleges on a July-June school-year cycle, so no other 'cutting' of the community colleges data would have been practical.
- State funding of the PWQ and MITP activities is on a State fiscal year basis.
- Federal JTPA funding was on a July-June Program Year basis.

The July 1999-June 2000 cutoff was chosen to ensure that at least several years of post-training employment and earnings history would be available for this most recent of the annual sub-populations. It also conveniently defined the end of the JTPA era in Maryland and the beginning of its Workforce Investment Act (WIA) successor.

2.5 Employment and Earnings Profile Time Coverage

The study design team agreed from the outset that:

- The intent in collecting pre-training and post-training employment and earnings information is not to estimate the net impact or value-added of each category of occupational skills training covered. However, the consistent increase in income can be considered a change in productivity of employees as measured by earnings.
- There is no consensus definition of the optimal length of time to be included for either pre-training or post-training coverage.

There is no practical definition of a common date of entry into training that could be used for all categories of training covered. The response to the issue of date of entry differences was to adopt a one-year definition of pre-training, dated from the reference year of exit from training for the PWQ, MITP, JTPA and community colleges training activities. Apprentices pre-training year was defined as the year prior to entry into the apprenticeship. From a practical perspective, this definitional distinction is more symbolic than real. Many of the PWQ, MITP and JTPA training activities, and some of the one-year certificate programs offered through community colleges, involve occupational skills training that begins and ends in the same July -June cycle, which means they are actually treated the same as the apprentices.

Three years of post-training earnings history was agreed upon as a common observation period for the findings to be reported in Section 4. This means that the trainees with exit dates between July 1998 and June 1999 fall in the most recent time segment that could be included. The common three-year post-training time horizon is defined as July 1999-June 2002.

2.6 Inflation Adjusted Earnings

All earnings amounts that appear in Section 4 have been inflation-adjusted. This means that annual earnings amounts have been indexed to 2001 equivalent purchasing power. An inflation-adjusted 2000 earnings amount will be higher than the nominal, or actual, 2000 earnings amount because it has been 'inflated' to reflect purchasing power at the 2001 cost-of-living. This step is designed to focus attention on 'real' changes in earnings levels, having removed annual increments associated with persistent increases in the cost of living over time.

2.7 Data Sources

Six data sources were used in this study:

1. Partnership for Workforce Quality (PWQ) administrative records, provided by the Maryland Department of Business and Economic Development.
2. Maryland Industrial Training Program (MITP) administrative records, provided by the Maryland Department of Business and Economic Development.
3. Job Training Partnership Act (JTPA) administrative records for twelve local investment areas, provided by the Maryland Department of Labor, Licensing and Regulation.
4. Apprenticeship administrative records, provided by the Maryland Apprenticeship and Training Program in the Maryland Department of Labor, Licensing and Regulation.
5. Certificate and degree recipient administrative records for sixteen community colleges, provided by the Maryland Higher Education Commission.
6. Maryland Unemployment Insurance Program administrative records (UI Wage Records), provided by the Maryland Department of Labor, Licensing and Regulation.

The next brief section highlights the fact that only two performance indicators are included here—employment in Maryland and changes in Maryland earnings from a pre year, through the exit-from-training year, to three post years. The participating entities want readers to know that their activities are multi-faceted. The occupational training activities covered here represent incomplete coverage of the overall flow of customers served by each State and local agency.

3.0 ADDITIONAL TRAINING BENEFITS OTHER THAN INCREASED EARNINGS

An overlooked aspect of participation in the acquisition and renewal of skills is that these are often needed to retain a job. Figure 1 shows that technologies evolve and new job assignments and expectations are announced. MITP and PWQ show earning gains, but job creation and retention are the core goals of these programs.

A hypothetical finding of no change in earnings following an investment in training can be consistent with success, if the training was needed to keep a job. A displaced worker who has invested in training typically receives lower earnings immediately following the training than had been received prior to displacement. This is not a signal of failure.

Another overlooked return on an investment in training is that it provides an 'option' value—it broadens the range of employment opportunities available for trainee consideration. If the trainee does not immediately act to take advantage of this option value there will be no observed change in earnings, but the trainee is comforted by the fact that "I could change jobs now if I wanted to". Both the individual and society benefit from this new flexibility.

Unlike targeted short-term training activities, such as those typically associated with the PWQ and MITP investments, and unlike targeted long-term training activities like formal registered apprenticeships, community colleges offer broad bundles of academic and occupational enhancement. Community colleges take pride in a broad portfolio of student, employer and social impacts, including understanding the importance of a continued investment in learning, awareness and acceptance of diversity beyond one's immediate neighborhood and workplace, and a deeper understanding of civic responsibilities.

Table 1: *Summary of Occupational Skills Training Earnings Profiles*, is presented next in Section 4. There is much to be enthusiastic about the findings summarized there, but this remains a narrow window through which to view the overall contribution of the entities covered.

4.0 FINDINGS

4.1 Statewide Findings

There are 16 public community colleges, 12 local workforce investment areas, and many individual PWQ, MITP and registered apprenticeship agreements represented in the data that have been assembled to describe occupational skills training in Maryland. Brief statements about the MITP, PWQ, JTPA, Apprenticeship and community college sub-populations appear in sections 4.2.1 through 4.2.7.

4.1.1 The Training Mix

Table 1 includes information about 21,766 individuals with training exit dates between July 1998 and June 1999. Each row represents a category of training—MITP, PWQ, JTPA Titles 2A, 2C, and 3, registered apprenticeships in services, machine trades, and construction trades categories, and community college certificate or degree recipients in Business, IT, Health, Mechanical and Engineering Technologies, Natural Science Technologies, and Public Safety Technologies.

Treating PWQ and MITP as independent activities, the respective shares of July 1998-June 1999 reference year exits covered here are:

PWQ (31%)

MITP (27%)

JTPA (20%)

Community colleges (19%)

Apprentices (3%)

Conclusion: There is a diverse investment in occupational training in Maryland.

TABLE 1

Summary Of Maryland Statewide Median Inflation Adjusted Annual Earnings Profiles

July 1998 - June 1999 Exiters From Training

	N=	PERCENT OF TOTAL	PRE- YEAR	EXIT YEAR	POST Yr ONE	POST Yr \$ Change Pre-Post	% Change Pre-Post	POST Yr		2001-2002 HIT RATE
								TWO	THREE	
DBED		57.3	\$17,185 *						\$27,794 *	68%
PWQ	6,681	30.7	\$32,000	\$34,000	\$37,000	\$5,000	15.6	\$36,500	\$36,500	79%
MITP	5,784	26.6	\$26,750	\$32,750	\$35,000	\$8,250	30.8	\$37,750	\$38,750	79%
DLLR		23.5								
JTPA										
Adults	1,465	6.7	\$5,000	\$6,000	\$11,500	\$6,500	130.0	\$12,250	\$13,500	73%
Youth	143	0.7	\$3,250	\$5,250	\$9,750	\$6,500	200.0	\$8,250	\$9,250	75%
Dislocated Worker	2,797	12.8	\$15,000	\$11,000	\$17,750	\$2,750	18.3	\$20,500	\$21,500	66%
APPRENTICES										
Services	276	1.3	\$19,000	\$38,000	\$41,250	\$22,250	117.1	\$43,500	\$49,750	96%
Mchn Trds	34	0.2	\$26,000	\$36,000	\$35,500	\$9,500	36.5	\$41,500	\$40,750	88%
Const Trds	390	1.8	\$14,000	\$32,500	\$37,750	\$23,750	169.6	\$39,500	\$40,250	90%
MHEC		19.2								
COMM COLLEGES										
Business	1,001	4.6	\$15,750	\$16,250	\$19,750	\$4,000	25.4	\$23,500	\$25,000	64%
IT	507	2.3	\$17,750	\$18,250	\$24,000	\$6,250	35.2	\$28,500	\$32,500	61%
Health	1,565	7.2	\$9,500	\$11,500	\$26,750	\$17,250	181.6	\$34,000	\$38,250	77%
Mech-Eng	375	1.7	\$22,500	\$25,500	\$30,750	\$8,250	36.7	\$35,000	\$36,250	70%
Natural Sciences	85	0.4	\$9,500	\$12,000	\$19,500	\$10,000	105.3	\$22,750	\$24,500	73%
Public Safety	663	3.0	\$11,500	\$14,000	\$17,500	\$6,000	52.2	\$20,000	\$22,000	66%
TOTAL N	21,766	100.0								

Refer to Section 4.2.1 through 4.2.7 for brief descriptions of program and trainee sub-population differences. Awareness of these differences discourages comparison of earnings amounts between rows in this table.

- The 2001-2002 'hit' rate is the percent of the row N that had reported earnings of any amount in the Maryland UI wage records file in any one, two, three or four quarters between July 2001 and June 2002.
- The 'pre-' year for each of the Apprentice dollar amounts is the July-June year prior to the year of entry into the apprenticeship.

SOURCES: The Jacob France Institute, University of Baltimore; Maryland Department of Business and Economic Development; Maryland Department of Labor, Licensing and Regulation; Maryland Higher Education Commission.

* The \$17,185 pre year figure is the July 1997 - June 1998 median inflation adjusted annual earnings amount for all workers appearing in the Maryland UI wage records file during that reference year. The \$27,794 post year three amount is the comparable July 2001 - June 2002 figure for the 68 percent of these workers who also appears in the Maryland UI wage records file for that reference year.

4.1.2 Pre Year Earnings

Median pre year inflation adjusted earnings range from a low of just over \$3,000 for the JTPA Title 2c youths, who typically do not have high school diplomas and possess a limited work history, to \$32,000 for the Partnership for Workforce Quality trainees. Again, the pre year was July 1997-June 1998 for the 21,066 non-apprenticeship trainees. Each of the 700 apprenticeship trainees has a pre year defined by their individual date of entry into the reference apprenticeship.

Conclusion: The documented prior earning capacities of the trainees are starkly different. Caution is urged in interpreting this statement. Our only evidence of prior earning capacity is what the trainees earned, documented using Maryland UI wage record information. Nothing is known about the full-time or part-time, seasonal or year-round employment circumstances that produced these recorded earnings amounts. Nothing can be said about what the trainees were capable of earning during this observation year, only what they actually earned.

4.1.3 Exit Year Earnings

Exit year median earnings amounts appear in Table 1. The exit year should be interpreted as a 'bridge' between pre and post earnings. Individuals in the 14 categories of occupational skills training included in Table 1 may have exited at any time between July 1, 1998 and June 30, 1999. Engagement in some of the occupational skills training activities was a barrier to working, while in other cases it was concurrent with, and even dependent upon working.

Conclusion: Exit year earnings amounts are included in Table 1 as a separator between meaningful pre- and post- earnings figures. This cell in each row of Table 1 is intended to remind readers that there is not always an 'abrupt' change in earnings level coincident with the timing of exit from training.

4.1.4 Post Year One Earnings

What is called 'post year one' here actually begins between one day and twelve months after a particular trainee's exit date. A trainee who exited from occupational skills training on July 1, 1998 would have a post year one beginning date of July 1, 1999, a full year later, consistent with the desire to place a reference year between the pre and post observation periods. However, a trainee who exited from occupational skills training on June 30, 1999 would also have a post year one beginning date of July 1, 1999, just one day later.

Eight out of fourteen median earnings amounts during the pre year had been less than \$17,185 (the statewide median annual inflation adjusted earnings amount for all workers found in the July 1997-June 1998 Maryland UI wage records file). Now, during the first year following exit from training, only two of the fourteen median earnings amounts are that low.

Again, all earnings amounts in Table 1 are inflation adjusted, so this improvement is 'real'. The median annual earnings amounts for economically disadvantaged JTPA Title 2a Adults and Title 2c Youths that fall below \$17,185, (, were still more than double their respective pre year median annual earnings amounts. So, while earnings were still low compared with the other sub-populations of occupational skill trainees, substantial earnings growth was evident after training.

Conclusion: Recall the phrasing used in Section 1.2--"a higher earning amount is assumed to reflect higher productivity." The former trainees who exited from covered training activities between July 1998 and June 1999 had clearly contributed more to the Maryland economy during this first year following exit. Here, 'higher productivity' reflects an unknown combination of being more productive each hour worked, working more hours per pay period, and working more consistently year-'round.

4.1.5 Median Earnings Change Pre Year to Post Year One

Unfortunately, nothing can be done to overcome the barrier to understanding posed by the fact that 'higher productivity' reflects an unknown combination of being more productive each hour worked, and working more hours. Having said that, the percentage increase of median earnings amounts between the pre and first post years, which appear in Table 1, is impressive across the board. The percentage increases range between 16 percent and 200 percent. Median annual earnings more than doubled in this brief time for six out of the fourteen sub-populations of occupational skill trainees.

Conclusion: The rates of increase in inflation adjusted median annual earnings between the pre and first post years are substantial, ranging from a low of 16 percent to a high of 200 percent.

4.1.6 Median Earnings in Post Years Two and Three

Average annual inflation adjusted earnings continued to increase through mid-2002. Table 1 shows that eight of the fourteen July 2001-June 2002 sub-population inflation adjusted median annual earnings amounts were now higher than \$27,794. This benchmark is the July 2001-June 2002 median annual inflation adjusted earnings amount for all workers found in the Maryland UI wage records file in both the July 1997-June 1998 and July 2001-June 2002 reference years. Section 4.1.4 showed that these workers had a median annual inflation adjusted earnings amount of \$17,185 in the pre year, July 1997-June 1998.

Conclusion: Median annual earnings continued to rise through the middle of 2002, despite several years of a 'softer' State economy than had been enjoyed through mid-2000. More than half of the sub-populations covered had already achieved a median annual inflation adjusted earnings level higher than the statewide median for workers known to have been working in Maryland in both 1997-1998 and 2001-2002.

There is no reason to expect all of the trainee sub-populations studied to have achieved this level of average annual earnings. The demographics of the trainee sub-populations are different. The previous work histories of the trainees are different. The goals of the training activities offered are different.

4.1.7 The Post Year Three 'Hit' Rate

Perhaps most satisfying of all to Maryland taxpayers is the July 2001-June 2002 'hit' rate column in Table 1—the percent of each sub-population of trainees appearing in the Maryland UI wage record file in the most recent reference year. More than 75 percent of the former trainees were employed in Maryland in the past year (documented by reported earnings appearing in the Maryland UI wage record file). This does not include Federal government civilian employees, military personnel, independent contractors and commission-only agents.

Conclusion: The Maryland economy is 'open' because of the ease of commuting to concentrations of employment opportunity in Delaware, the District of Columbia, Pennsylvania, Virginia and West Virginia. Workers have faced 'soft' economic conditions in Maryland since mid-2000. Despite these forces that combine to 'push' some former trainees toward out-of-state opportunities, **more than 75 percent of the recipients of Federal, State and local investments in training in Maryland continue to work here.** This 75 percent 'retention' level compares favorably with the 68 percent 'retention' level for all workers found in the July 1997-June 1998 Maryland UI wage records file and in the July 2001-July 2002 reference quarters.

4.2 Program-Specific Earnings Trend Charts

Table 1 presents more than 100 numbers for readers to interpret. This section transforms 70 of these numbers—five median annual inflation adjusted earnings amounts for each of the categories of training—into 14 earnings trend charts with accompanying interpretation.

The 14 charts are presented in the following sequence:

- The Department of Business and Economic Development MITP and PWQ charts appear on pages 18 and 19 respectively (see Appendix Section A.1 for additional information about these programs).
- The Department of Labor, Licensing and Regulation JTPA Title 2a Adult, Title 2c Youth, and Title 3 Dislocated Worker program charts appear on pages 20, 21 and 22. Occupational detail, including Table 2, appears on pages 23, 24 and 25. (Also see Appendix Section A.2 for additional information about these programs statewide and by local workforce investment area).
- The Department of Labor, Licensing and Regulation Apprenticeship program charts appear on pages 26 and 27 (see Appendix Section A.3 for additional information about this program).
- The community college occupational program charts appear on pages 28, 29 and 30 (see Appendix Section A.4 for additional information about these programs at both the statewide and individual college levels).

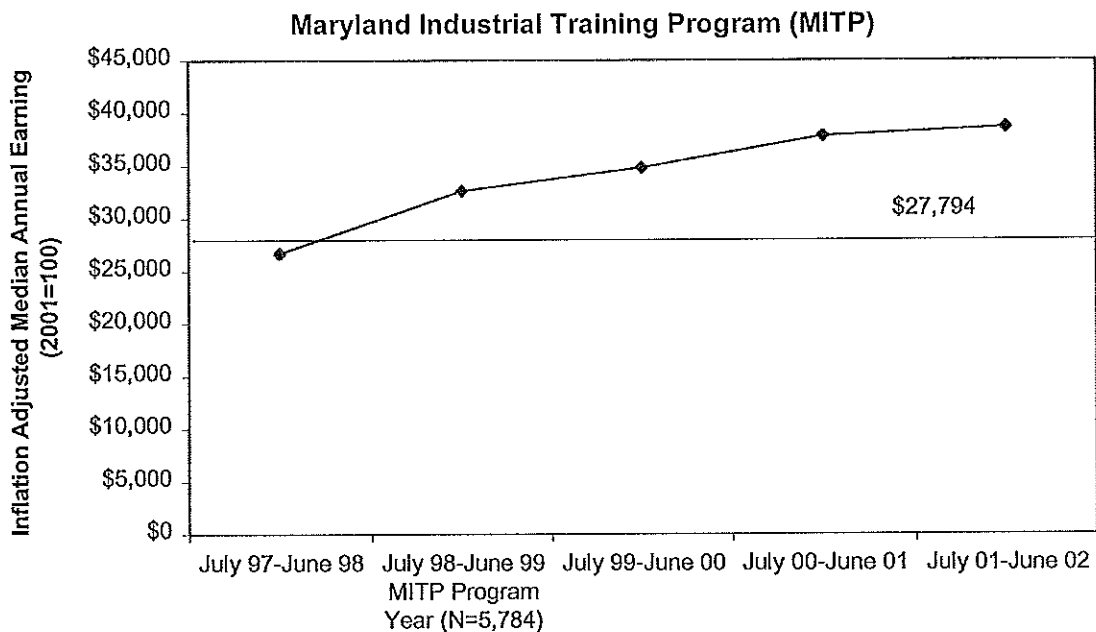
The 14 charts contain only information already included in Table 1. Each was prepared from the median annual inflation adjusted earnings amounts presented in Table 1. However, the brief interpretive text is new.

4.2.1 The Maryland Industrial Training Program (MITP)

The Maryland Department of Business and Economic Development uses two indicators of MITP performance:

1. The net increase in number of workers employed by a business that has received MITP State funds, measured over a mutually agreed upon pre-post time interval.
2. The retention rate of employees by a business that has received MITP State funds, also measured over a mutually agreed upon pre-post time interval.

The return expected from the investment of State economic development funds in the MITP is net growth in Maryland jobs and targeted encouragement of employment stability. MITP is a demand-side investment of State economic development funds. The funded activity is training, but each business decides who participates in the State-sponsored training.

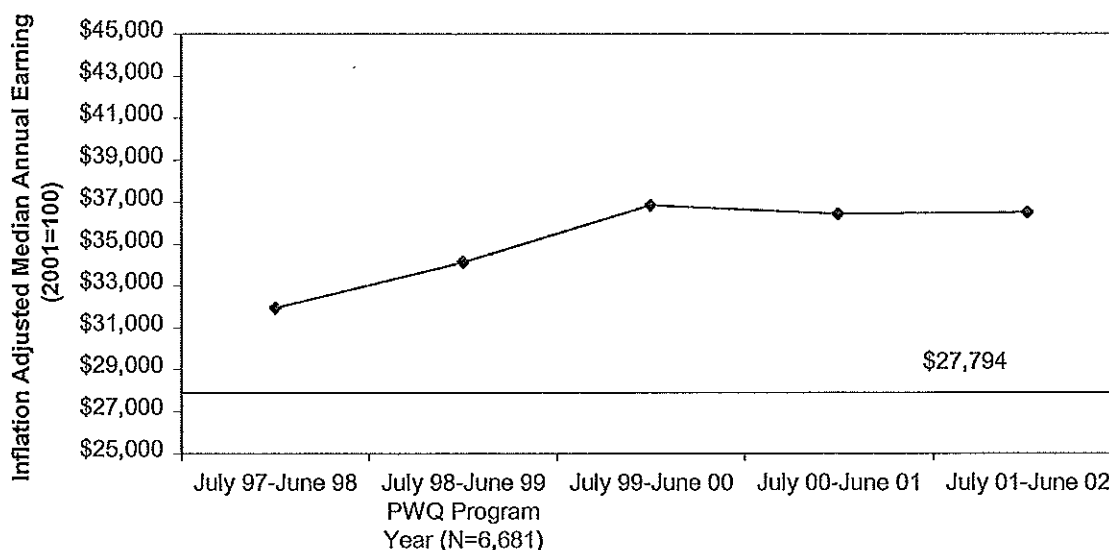


4.2.2 The Partnership for Workforce Quality (PWQ)

The PWQ, also managed by the Maryland Department of Business and Economic Development, targets small and medium-size manufacturing and technology businesses. Unlike the MITP, which focuses on job creation, the PWQ concentrates on targeted investments in employee upgrading designed to stabilize and improve the competitiveness of a sponsored business. Like the MITP, the PWQ is a demand-side investment carried out through employee training. Higher employee earning, *per se*, is not a PWQ performance measure.

Participants in both MITP and PWQ experienced higher earnings after training even though increasing employees' earnings is not a planned outcome for the programs. Further the 'hit rate' (percent of trainees with earnings in Maryland 3 years after exiting training) of 79% is higher than the average of 68%.

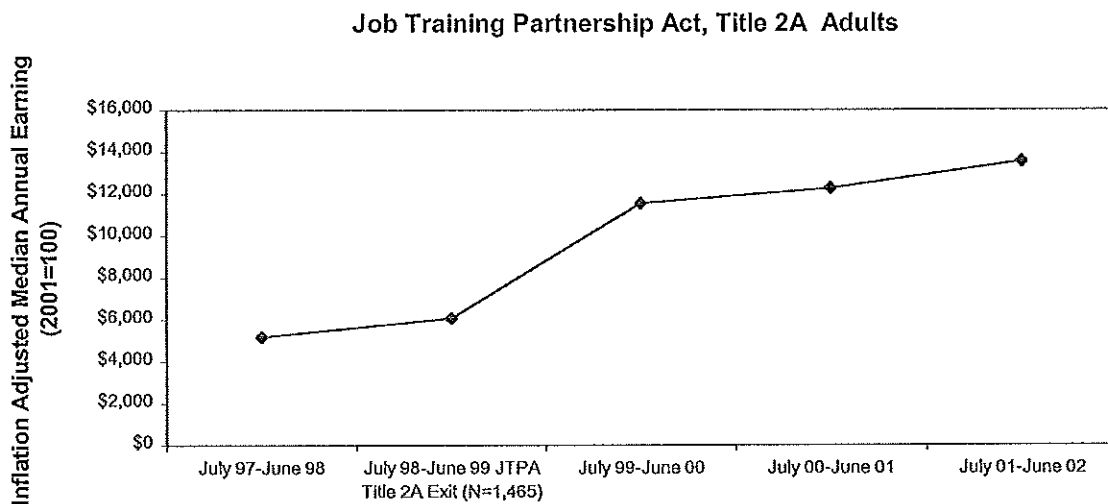
Partnership for Workforce Quality (PWQ)



4.2.3 The Job Training Partnership Act (JTPA) Title 2a Adults

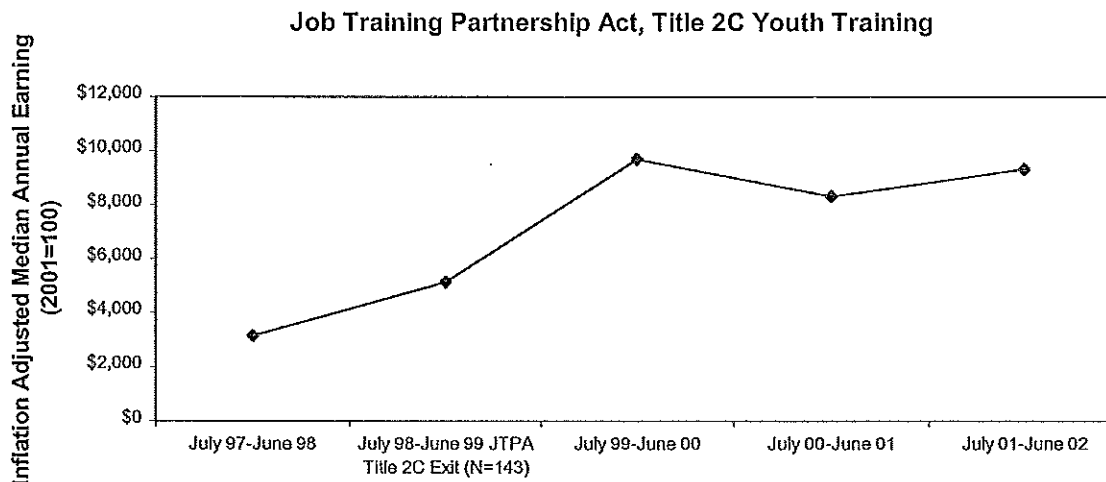
The Federally funded JTPA Title 2a program, managed by the Maryland Department of Labor, Licensing and Regulation, ended in June 2000. The successor Federal program is the Workforce Investment Act (WIA). The JTPA Title 2a targeted hard-to-serve or most-in-need customers. The 12 local workforce investment area earnings trend charts (in the Appendix) clearly reflect different choices made and challenges confronted. However, the difficult-to-serve criterion applied to all.

The Federal JTPA Title 2a Adults funds were a supply-side investment, intended to provide customers having limited or no work history, often welfare recipients, with enough entry-level skills to get a job. Once on the job, just like other coworkers, opportunities for further learning and promotion would be available to these newly hired employees.



4.2.4 The Job Training Partnership Act (JTPA) Title 2c Youth

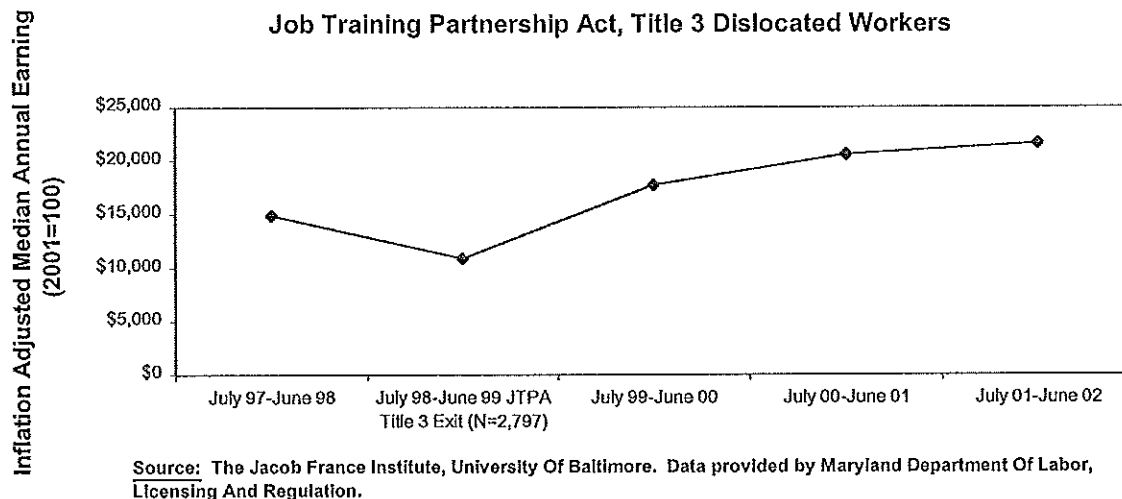
The targeted youth population under the JTPA was out-of-school young people, all without a high school diploma and/or limited prior work history. Like the adults targeted with Federal JTPA funds, these youths had not succeeded in establishing an employment affiliation consistent with immediate self-sufficiency and future retention and promotion. The limited supply-side investment of Federal funds in these youths leaves them with the lowest post- year three median earnings level in Table 1, despite the fact that their average inflation adjusted earnings had almost tripled over the five years covered. Only 143 Title 2C youths remained in the analytical database after imposing the minimum 30 days length of training filter. The transition destinations other than employment covered in the Maryland UI wage records file (e.g., military enlistment and continued education) further reduced the numbers included in each year's median earnings calculation.



4.2.5 The Job Training Partnership Act (JTPA) Title 3 Dislocated Workers

This sub-population helps us to recognize why comparisons of earnings trends among the categories of training in Table 1 should be approached with care. Unlike the JTPA Title 2a and Title 2c sub-populations, each targeted because of weak or non-existent work histories, the Title 3 customers usually had solid prior employment records. But were unemployed, for reasons largely beyond employee control, such as a business closed or moved, or a particular product or service component within a continuing business was terminated.

Local workforce investment area charts in the Appendix show a consistent 'dip' pattern in the five-year earnings trend, reflecting a substantial loss of prior earnings capacity. Table 1 shows the consequence of this loss—the post year three median inflation adjusted earnings level was 43 percent higher than the pre- year median, but these dislocated workers had still lost ground relative to the other training categories. The relevant difference between the sub-populations is that the dislocated workers had lost human capital (i.e., productive capacity), while many of the other trainees stayed employed, often with the same employer, while gaining new skills. Recovery of the previous earnings level, rather than earnings gain, was the immediate objective of JTPA Title 3 investments in training.



JTPA training activities, like MITP and PWQ training, are not concentrated in easily defined categories as specific as the apprentice and community colleges classifications. Table 2 describes the JTPA sub-population earnings trends and July 2001-June 2002 'hit' rates by one-digit *Dictionary of Occupational Titles* (DOT) descriptors of the training activities.

The one-digit DOT descriptors are inclusive:

- 0/1 Professional, Technical and Managerial Occupations
- 2 Clerical and Sales Occupations
- 3 Service Occupations
- 4 Agricultural, Fishery, Forestry, and Related Occupations
- 5 Processing Occupations
- 6 Machine Trades Occupations
- 7 Benchwork Occupations
- 8 Structural Work Occupations
- 9 Miscellaneous Occupations

A minimum cell size of 25 was adopted in the preparation of Table 2 for non-disclosure compliance and practical interpretation reasons. This resulted in the following mix of one-digit DOT categories appearing in Table 2 by JTPA title:

- JTPA Title 2a Adults—DOT codes 0, 1, 2, 3, 6, 8 and 9.
- JTPA Title 2c Youths—DOT codes 2 and 3.
- JTPA Title 3 Dislocated Workers—DOT codes 0, 1, 2, 3, 6, 7, 8 and 9.

Table 2 presents median annual inflation adjusted pre earnings amounts for the 17 pairings of JTPA Title and one-digit DOT codes. The pre year earnings amounts range from \$2,882 for the Title 2c Youths who received 'Service Occupations' training to \$17,121 for the Title 3 Dislocated Workers who received 'Professional, Technical, and Managerial Occupations' training.

**Summary Of Maryland Statewide Occupational Skills Training Median Earnings Profiles
By JTPA Title and Type of Occupational Training Activity
July 1998 - June 1999 Exiters**

<u>JTPA Title</u>	<u>One Digit DOT Code</u>	<u>DOT Title</u>	<u>N=</u>	<u>PRE-YEAR</u>	<u>EXIT YEAR</u>	<u>POST Yr ONE</u>	<u>% Change Pre-Post</u>	<u>POST Yr TWO</u>	<u>POST Yr THREE</u>	<u>2001-2002 HIT RATE</u>
Adults	0	Prof. Tech, Mgr	166	\$6,610	\$6,295	\$13,317	101.5	\$17,802	\$17,653	79%
Adults	1		81	\$7,095	\$9,031	\$12,439	75.3	\$12,578	\$15,233	68%
Adults	2	Clerical /Sales	491	\$4,931	\$5,852	\$12,008	143.5	\$13,882	\$14,244	73%
Adults	3	Service	339	\$3,803	\$5,868	\$9,528	150.5	\$9,840	\$10,900	79%
Adults	6	Machine Trades	50	\$5,619	\$10,254	\$14,001	149.2	\$17,223	\$16,224	68%
Adults	8	Structural Work	71	\$6,132	\$5,248	\$9,634	57.1	\$11,810	\$11,636	51%
Adults	9	Misc.	141	\$6,623	\$6,022	\$14,356	116.8	\$13,820	\$17,462	70%
Youth	2	Clerical/Sales	40	\$3,258	\$4,070	\$8,865	172.1	\$8,325	\$8,082	80%
Youth	3	Service	33	\$2,882	\$6,725	\$13,520	369.1	\$11,603	\$11,394	82%
Dislocated Worker	0	Prof. Tech, Mgr	480	\$15,884	\$13,018	\$20,927	31.7	\$22,907	\$25,440	67%
Dislocated Worker	1		576	\$17,121	\$11,352	\$18,970	10.8	\$21,559	\$23,577	62%
Dislocated Worker	2	Clerical/Sales	887	\$15,324	\$10,795	\$17,266	12.7	\$20,820	\$20,636	69%
Dislocated Worker	3	Service	151	\$7,974	\$8,615	\$12,285	54.1	\$16,870	\$15,547	70%
Dislocated Worker	6	Machine Trades	67	\$15,047	\$12,157	\$18,209	21.0	\$25,934	\$25,652	75%
Dislocated Worker	7	Benchwork	28	\$12,977	\$10,621	\$12,213	-5.9	\$18,749	\$10,895	75%
Dislocated Worker	8	Structural Work	56	\$11,419	\$7,812	\$17,510	53.3	\$16,991	\$20,060	73%
Dislocated Worker	9	Misc.	189	\$16,834	\$10,337	\$19,599	16.4	\$22,044	\$21,558	73%

TOTAL N

3,846 (lower than Table 1 N=4,405 because 559 DOT codes were not available)

NOTES: The 2001-2002 'hit' rate is the percent of the row N that had reported earnings of any amount in the Maryland UI wage records file in any one, two, three or four quarters between July 2001 and June 2002.

SOURCES: The Jacob France Institute, University of Baltimore; Maryland Department of Business and Economic Development; Maryland Department of Labor, Licensing and Regulation; Maryland Higher Education Commission.

Eleven of the seventeen median annual inflation adjusted earnings amounts shown in Table 2 for the pre year are less than \$12,000. Only three of the seventeen post year one median amounts are this low—Title 2a Adult training for ‘Service Occupations’, Title 2a Adult training for ‘Structural Work Occupations’, and Title 2c Youth training for ‘Clerical and Sales Occupations’.

Table 2 shows percentage changes in median annual inflation adjusted earnings amounts between the pre year and post year one. These percentage change figures range from minus 5.9 percent for the Title 3 Dislocated Workers receiving training in ‘Benchwork Occupations’ to plus 369.1 percent for the Title 2c Youth receiving training in ‘Service Occupations’. The latter is an example of why percentage change figures and earnings amounts should usually be interpreted together. The percentage change in this case is the highest among the 17 occupational categories of JTPA occupational training by title, but the end-year earnings level is lower than all but two other pairings of occupational training classification and JTPA title.

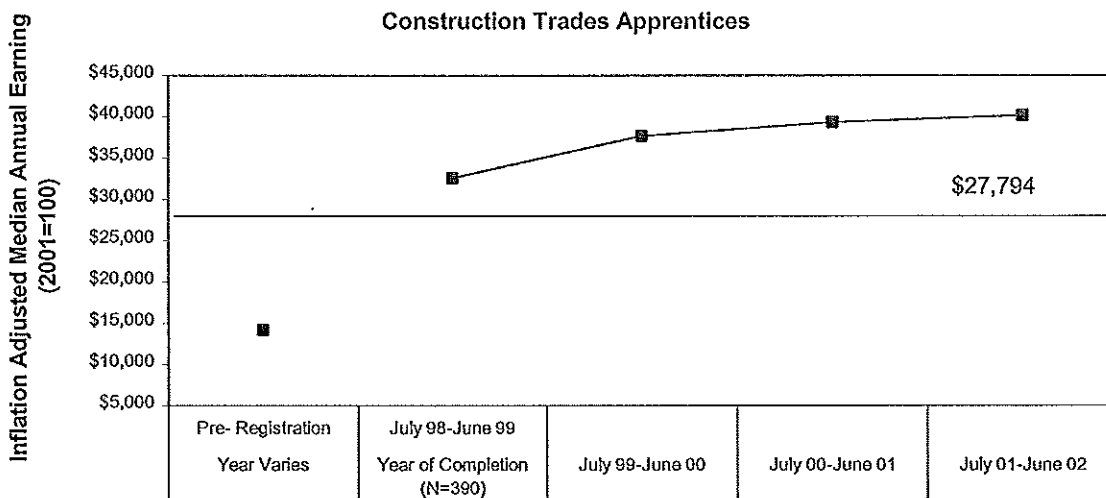
The July 2001-June 2002 ‘hit’ rates, or percentage of each sub-population in Table 2 that had reported Maryland UI wage record earnings in the most recent reference year available, are consistent with the favorable ‘hit’ rates found in Table 1. Only one of the sub-populations in Table 2, JTPA Title 2a Adults who received training in ‘Structural Work Occupations’, exhibits a ‘hit’ rate of lower than 60 percent.

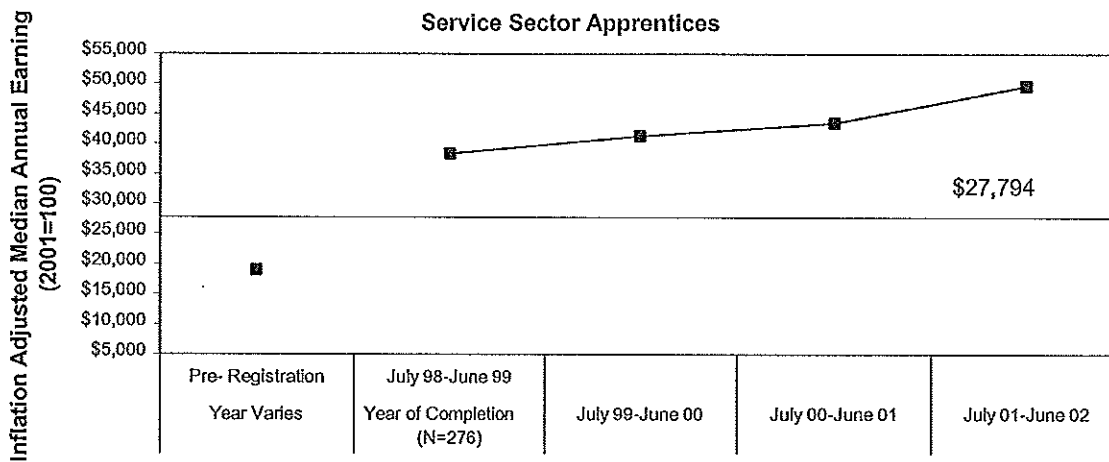
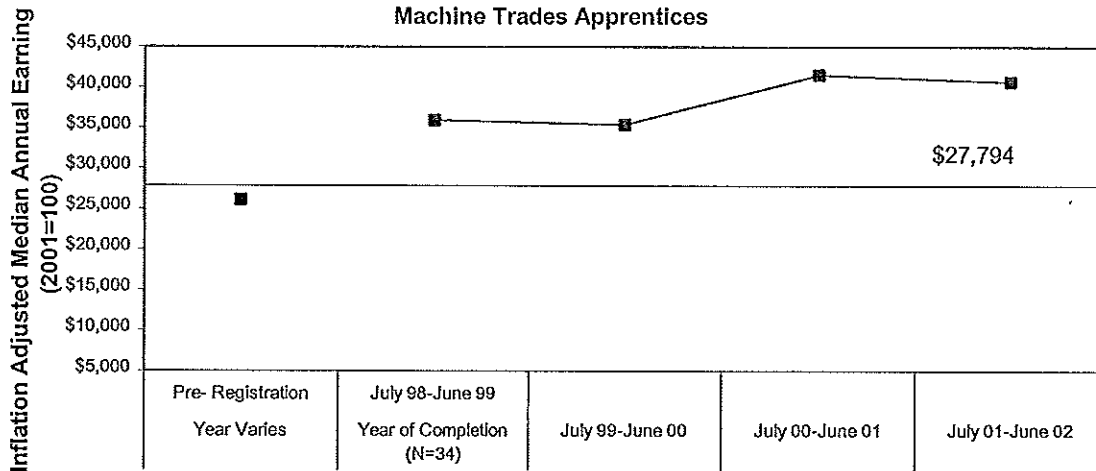
4.2.6 Certificate of Completion of Apprenticeship Recipients

Table 1 shows that the three categories of registered apprenticeships included—Services, Machine Trades, and Construction Trades, were ranked one, two and three respectively in post year three median inflation adjusted earnings. Only 700 (3.3 percent) of the 21,766 trainees included in Table 1 received a Certificate of Completion of Apprenticeship, but those who did so achieved the highest levels of average earnings. The results showed that participants in apprenticeships in these occupations increased earnings beyond the median in the first year after completion and those earnings were greater yet 3 years after the year of completion.

The investment reflected in these high earnings is fundamentally different from the MITP, PWQ and JTPA investments of public funds:

- The total cost of training is shared between the employer and apprentice, no State funds are used. A typical apprentice starts at 50 percent of the journey-person wage and receives increments throughout the apprenticeship.
- A minimum of one year of on-the-job training is required, but most apprenticeships have more demanding three, four and five year requirements.
- A minimum of 144 hours of related classroom training is required during each year of the apprenticeship—the equivalent of more than 3 three-credit hour community college courses.
- There are an increasing number of articulation agreements that pair the award of a Certificate of Completion of Apprenticeship with completion of a community college degree program.





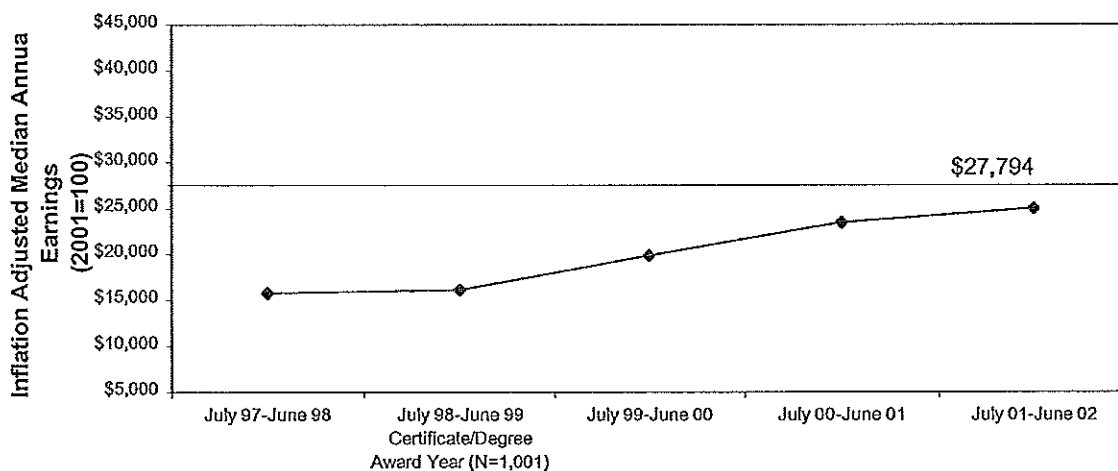
4.2.7 Community College Occupational Skills Training Programs

The mixture of five-year earnings trends that appear for these community college sub-populations in Table 1 is a clear example of the interpretive limitations imposed by not including demographic, curriculum content, and previous work history and local economy descriptors in the analysis:

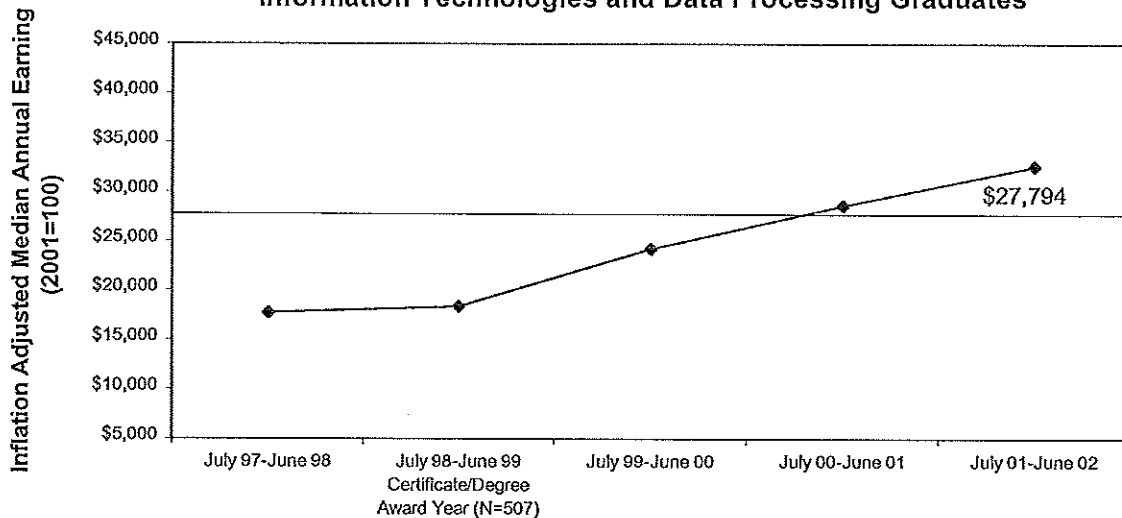
Statewide, the median career program graduate salary increased 25 percent between the first and third years after graduation. The charts below indicate that earnings after graduation increased for each of the six program areas with the largest increase overall being in the year immediately after graduation. The career area with the greatest impact on pre and post graduation earnings was health sciences where a community college degree and a licensing credential can open the doors to significant employment opportunities. Maryland community colleges are leaders in preparing nursing professionals.

Many additional insights about the community college programs and former student earning profiles are included in the statewide summary and individual community college profiles found in the Appendix. Readers are strongly encouraged to take advantage of this detailed information.

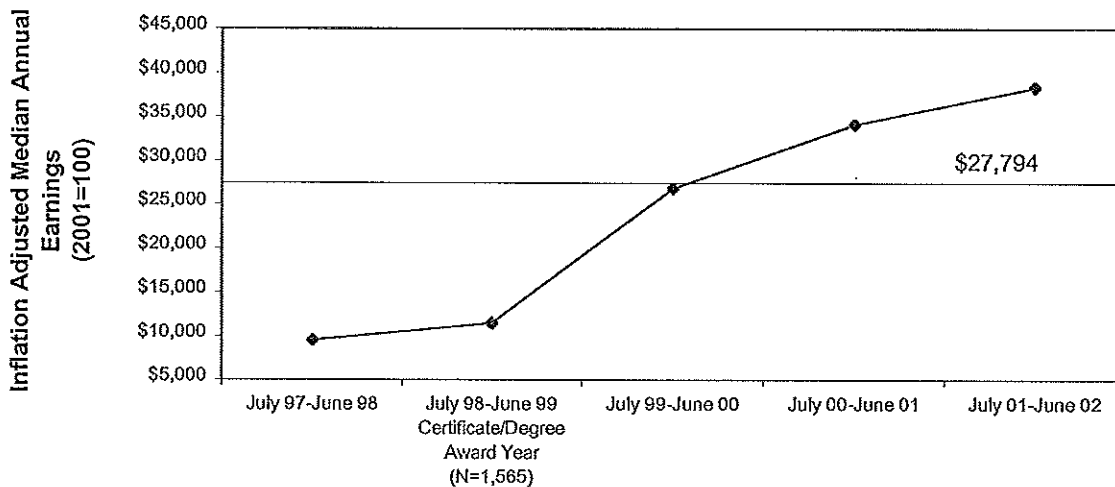
**MARYLAND COMMUNITY COLLEGES
Business Career Graduates**



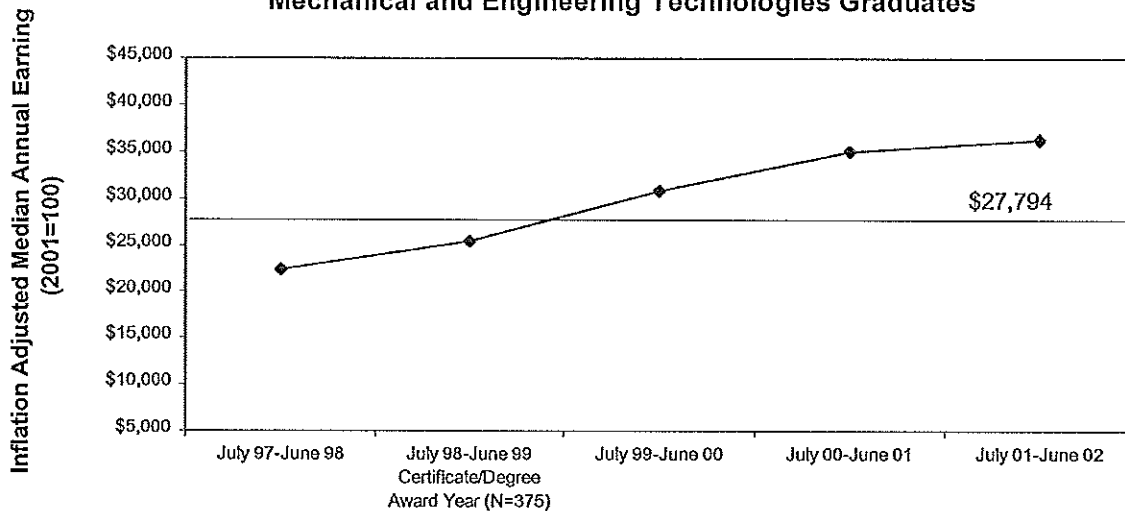
Information Technologies and Data Processing Graduates



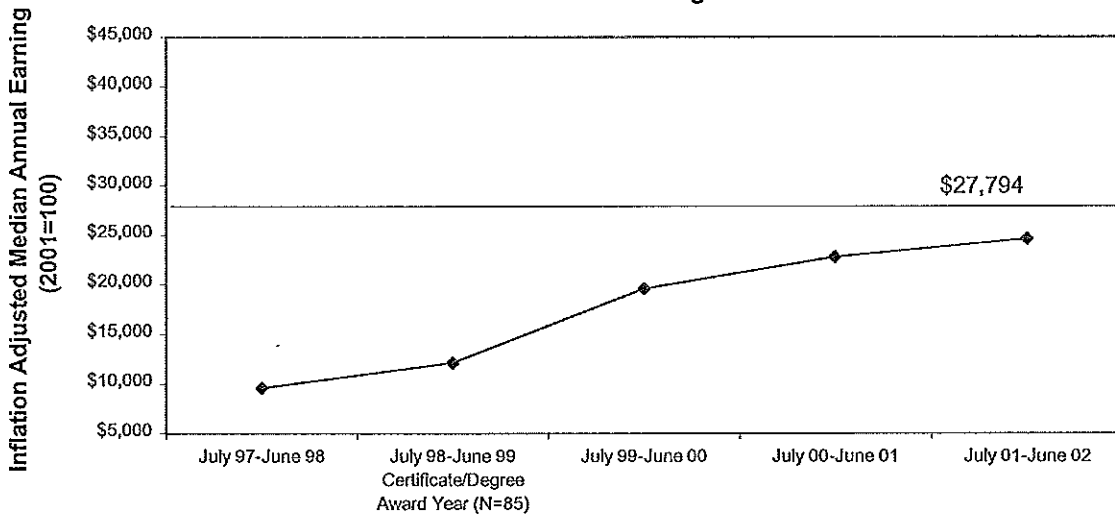
Health Services Graduates



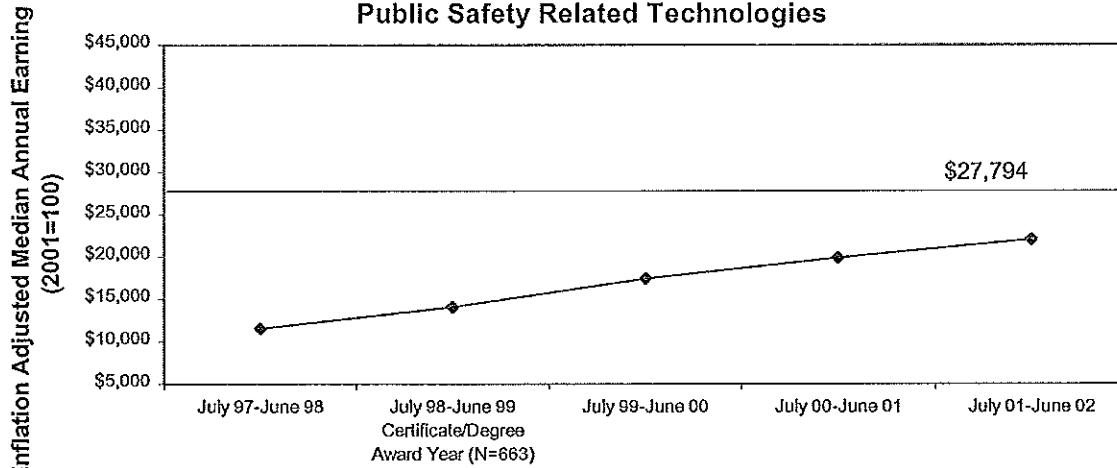
Mechanical and Engineering Technologies Graduates



Natural Science Technologies Graduates



Public Safety Related Technologies



Source: The Jacob France Institute, University Of Baltimore. Data provided by Maryland Higher Education Commission and Maryland Department Of Labor, Licensing And Regulation.

Section 5 addresses some of these issues as topics for further research that can be undertaken with available data sources.

5.0 FUTURE RESEARCH OPPORTUNITIES AND PRIORITIES

This study establishes a foundation of historical information about a subset of occupational training within Maryland's overall investment in workforce development. The employer, community college and other provider pipelines of training opportunities and services described here remain open for business. Federal, State and local government funding streams for investment in occupational skills training are under pressure and further research is needed before information contained here could be used as the criteria for allocating authorized funds among competing pipelines.

The Board recognizes that more in-depth research can and should be conducted to support the development of the needed case statements:

- More intensive study of the training activities, employment and earnings already covered here should be supported. Such analyses should include demographic descriptors such as gender, ethnicity and age, and additional descriptors of previous work history, educational attainment, the content of skills training provided, and local economies.
- The Maryland UI wage records were used in this study to prepare basic work histories and earnings profiles. These data can be used in more intensive research to identify job retention patterns and, when combined with other administrative data maintained by DLLR, to reveal inter-industry mobility profiles and the association of these moves with earnings gain or loss.
- Return-on-investment estimates can be calculated if reliable and appropriately detailed cost information is provided.
- More components of the overall investment in workforce development in Maryland should be covered in future research, particularly the University System of Maryland.
- Biannual updates should be conducted to offer the Governor, members of the General Assembly, other government officials and the public a clear understanding of whether and how progress is occurring in the continuous effort to maintain the productivity of the workforce.
- Progress in expanding opportunities for new entrants and reentrants to the workforce, and for those who make the effort to qualify for advancement, should be documented.

- The importance of human capital investments in probationers and incarcerated prisoners with predictable release dates is known. Much more should be done to document the connection between earnings and incarceration, particularly the link between earnings following parole and subsequent return to prison.

APPENDIX

A.1 MITP and PWQ statewide summaries

A.2 Job Training Partnership Act

A.2.1 JTPA statewide summary

A.2.2 Local workforce investment area charts and descriptive summaries

A.3 Apprenticeship statewide descriptive summary

A.4 Community Colleges

A.4.1 Community colleges statewide descriptive summary

A.4.2 Individual community college descriptive summaries

