DOCUMENT RESUME

ED 110 820 CE 004 640

TITLE	The Use of Social Security Earnings Data for Assessing the Impact of Manpower Training Programs: Final Report of the Panel on Manpower Training Evaluation.
INSTITUTION	National Academy of Sciences - National Research Council, Washington, D.C. Assembly of Behavioral and Social Sciences.
PUB DATE	Jan 74
NOTE	48p.
EDRS PRICE	MF-$0.76 HC-$1.95 Plus Postage
DESCRIPTORS	Data Analysis; *Data Collection; *Evaluation Methods; Information Needs; *Manpower Development; *Manpower Utilization; *Program Evaluation; Tables (Data)
IDENTIFIERS	*Social Security

ABSTRACT

The Panel on Manpower Training Evaluation has recommended that Social Security earnings data be more widely used in evaluating manpower programs, especially those that tend to serve prime-age males, such as the MDTA (Manpower Development Training Act) or NAB-JOBS (National Association of Businessmen-Job Opportunities in the Business Sector) programs. In spite of some limitations, earnings data provide very accurate and inexpensive longitudinal information that can be efficiently analyzed and provide as adequate a source of comparison groups as tailor-made sample survey studies, with the additional potentiality for matching pairs of observations on selected characteristics such as prior earnings patterns. The panel recognizes the issue of confidentiality and expects adherence to standards set for public use of government data. The panel has stressed that evaluation is limited by the quality of information available on the population of manpower program participants. A suggested approach was to develop accurate samples rather than attempt to gather information on all trainees; however, this precludes development of accurate trainee lists for each project. A concluding recommendation was the undertaking of a study comparing the outcomes of a true experimental design to evaluate a manpower program with outcomes as measured by Social Security data. (Author/EA)

FINAL REPORT of the PANEL ON MANPOWER TRAINING EVALUATION

The Use of Social Security Earnings Data for Assessing the Impact of Manpower Training Programs

Assembly of Behavioral and Social Sciences
National Research Council
National Academy of Sciences

Washington, D. C. January 1974

This is a report of work on Contract #L-73-32
between the Department of Labor
and the National Academy of Sciences.

FINAL REPORT
of the
PANEL ON MANPOWER TRAINING EVALUATION

The Use of Social Security Earnings Data for Assessing the Impact of Manpower Training Programs

Assembly of Behavioral and Social Sciences
National Research Council
National Academy of Sciences

Washington, D. C. January 1974

NOTICE

The project which is the subject of this report was approved by the Governing Board of the National Research Council, acting in behalf of the National Academy of Sciences. Such approval reflects the Board's judgment that the project is of national importance and appropriate with respect to both the purposes and resources of the National Research Council.

The members of the committee selected to undertake this project and prepare this report were chosen for recognized scholarly competence and with due consideration for the balance of disciplines appropriate to the project. Responsibility for the detailed aspects of this report rests with that committee.

Each report issuing from a study committee of the National Research Council is reviewed by an independent group of qualified individuals according to procedures established and monitored by the Report Review Committee of the National Academy of Sciences. Distribution of the report is approved, by the President of the Academy, upon satisfactory completion of the review process.

PREFACE

The task set by the Department of Labor in its inquiry to the National Academy of Sciences involves a series of technical scientific assessments of the usefulness of Social Security data in the evaluation of manpower programs. The Department of Labor has been investigating the possibility of using economic and socio-demographic data from the earnings and tax records of the Social Security Administration. It is clear that Social Security data files are reliable and inexpensive sources of data.

This report presents the strong points and weaknesses of the Social Security data and, where appropriate, compares the advantages and problems of these data with other sources in the area of manpower evaluation. A positive recommendation is given for the program of analysis.

The Panel met three times in completing its task. The Department of Labor was fully cooperative in the exchange of information and opinion. A special recognition is owed to Ernst W. Stromsdorfer (Indiana University), who served as Consultant, and who drafted this report, and to Orley Ashenfelter, Department of Labor (now at Princeton University), who provided direct, effective, and continuous collaboration, greatly expediting the work of the Panel.

Sherwin Rosen
University of Rochester
Chairman, Panel on Manpower
Training Evaluation

PANEL ON MANPOWER TRAINING EVALUATION

The Panel on Manpower Training Evaluation was established in the Assembly of Behavioral and Social Sciences at the request of the Department of Labor to carry out a study and analysis of the use of Social Security earnings data to assess the effects of manpower training programs. The specific tasks were (1) to review and examine the technical adequacy of earnings data for assessment of manpower training programs, (2) to suggest improvements in the methodology, and priorities for further analysis, (3) to comment on the appropriateness of these data for policy and program decisions, and (4) to compare the relative merits of this technique with others.

The members of the Panel were: Sherwin Rosen (University of Rochester), Chairman, Nathan Caplan (University of Michigan), Stanley Lebergott (Wesleyan University), Henry M. Levin (Stanford University), Robert A. Levine (RAND Corporation), Richard Light (Harvard University), and Finis Welch (University of California-Los Angeles). Ernst W. Stromsdorfer (Indiana University) served as a consultant to the Panel throughout its tenure. Sherman Ross was the Executive Secretary for the Panel, and Ms. Barbara Arenson served as secretary.

FINDINGS AND RECOMMENDATIONS

(1) The Panel recommends that Social Security data, including the Continuous Work History Sample (CWHS), be more widely used in the evaluation of manpower programs. For some programs, the evaluations will be particularly useful and reliable. Failure to use these data will result in excessive evaluation costs to the federal government, with no corresponding gain in quality of evaluation. The reasons for the Panel's position are as follows:

(a) Accuracy of Social Security earnings data is considerably higher than comparable data other retrospective sample surveys offer. There are no problems of recall and interviewer or interviewee bias. Non-response bias, the bane of sample surveys, is not a problem.

(b) Social Security data can complement the results of carefully designed field evaluation studies at very low cost.

(c) Social Security data are considerably cheaper to acquire than data derived from sample surveys; a few cents per observation for Social Security data compared with tens of dollars per observation for sample survey data.

(d) Use of Social Security data for comparing earnings performance of trainees and non-trainees is more reliable than comparisons based on data used in most sample survey evaluations of manpower programs.

(e) Appropriate econometric methods exist to analyze the Social Security data efficiently.

(2) The Panel recognizes that the issue of confidentiality of the data contained in Social Security records is a difficult one. It

is inappropriate for the federal government to release information which has been entrusted to it in good faith as confidential to private citizens or to other agencies in government. Therefore, given that these data are to be more widely used, as the Panel recommends they be, strict controls and sanctions on public use must be applied to prevent illegal use by private individuals and government agencies, whether they be federal, state, or local. We expect that the standards set for public use of other data collected by the federal government, such as the census of population, will be adhered to in manpower evaluation studies. We see no reason why such standards cannot be met, nor have we found any evidence that the standards have been violated.

(3) The Panel stresses that opportunities for evaluation are seriously constrained by the quality of information available on the population of manpower program participants. Current files of data which identify characteristics of trainee populations (MA-101, MA-102 and Manpower Automated Reporting System (MARS) files) apparently contain serious non-reporting biases. The exact nature of these biases is not known with any certainty. Therefore, the Panel recommends initiation by the Department of Labor of an evaluation of the MARS file, addressing the following questions:

(a) Why is there error in reporting?

(b) What is the source of this error?
  (i) Is there a systematic failure of certain projects to report correctly, or
  (ii) Is the non-reporting random?

(c) What can be done about
  (i) The non-reporting of data, and
  (ii) The resulting bias, if any?

(4) The Panel recommends that a study be undertaken to determine the validity of Social Security data for manpower program evaluation. Such a study would compare the outcomes of a true experimental design to evaluate a manpower program with outcomes as measured by Social Security data. The scope and target populations of the study are topics left to be developed by the U. S. Department of Labor.

I. The Problem Setting

Manpower training programs have been in existence a little over a decade, yet, with the possible exception of the Manpower Development and Training programs, little is known about the educational or economic effects of manpower training programs. This is troublesome, especially in light of the fact that about $180 million have been spent over the past ten years in an attempt to evaluate these programs.[1]

There are several reasons for lack of clarity in the definition of program effects: First, inadequate research methods are often used, even when adequate methods are available. For instance, a study may fail to use a proper control or comparison group, or may use no control group at all. Second, almost all evaluations are case studies rather than studies based on national samples, so that considerable restraint must be exercised in generalizing results to issues of national policy. Third, many studies use non-random judgment samples, rather than probability samples. As a result, we have no idea of the representativeness of the study sample compared with the population from which the samples were drawn. Fourth, most of the studies are retrospective. Considerable time passes between the end of a program and its evaluation. Many sample respondents disappear, resulting in serious non-response bias. For those respondents who are located, recall error further biases the

---

[1] Jon H. Goldstein, "The Effectiveness of Manpower Programs: A Review of Research on the Impact on the Poor," Studies in Public Welfare, Paper No. 3, Subcommittee on Fiscal Policy, Joint Economic Committee, Congress of the United States, Washington: U.S.G.P.O. 1972, p. 14.

results of the study. Next, studies often fail to collect appropriate socio-demographic information. Some of these variables influence program results but are not affected by those programs, and the analysis of program impacts is contaminated by extraneous factors. Finally, the existing analyses cover a spectrum of data, methods, projects, time periods and locales, and it is next to impossible to compare the results of studies of the same program.

In short, while reliable evaluation is badly needed, it does not exist even after ten years of study and the application of large amounts of public resources.

The need for a less expensive, more reliable evaluation strategy is imperative; for important decisions on social programs continue to be made in the absence of reliable objective information. It is with considerable sense of urgency, then, that the United States Department of Labor has been investigating the possibility of using economic and socio-demographic data from the earnings and tax records of the Social Security Administration (SSA). Indeed, the Department and other organizations have done considerable experimentation with these data. Some studies have used the data in actual evaluations, while others have been designed to test the feasibility of employing the data in evaluations.[2] Methodological studies unanimously conclude that Social Security data are extremely inexpensive as well as highly reliable data sources. However, while there are several positive

---

[2]For studies that use the data to evaluate selected manpower programs, see Michael E. Borus, "Time Trends in the Benefits from Retraining in Connecticut," Industrial Relations Research Association

advantages to using Social Security data, there are also some disadvantages.

Proceedings, Washington, D. C., December 28-29, 1967; Edward C. Prescott and Thomas F. Cooley, Evaluating the Impact of MDTA Programs Under Varying Labor Market Conditions, Final Report, MEL 73-08, U. S. Department of Labor Contract No. 83-42-71-04, Philadelphia, Pennsylvania: University of Pennsylvania, October 17, 1972; and James L. Stern, "Consequences of Plant Closure," The Journal of Human Resources, Winter, 1972.

Studies which attempt to assess the feasibility of using Social Security data as a tool in manpower program evaluation are the following: J. B. Berterman, Review of the Manpower Training Follow-up Data Analysis System, Final Report (Draft), U. S. Department of Labor Contract No. 43-1-003-51, The Planning Research Corporation, McLean, Virginia, March 17, 1973; William D. Commins, Social Security Data: An Aid to Manpower Program Evaluation, PRCR-1543, The Planning Research Corporation, McLean, Virginia, November 1970. David J. Farber, "Using Social Security Records to Measure Change in Trainee Earning Capacity," U. S. Department of Labor, Manpower Administration, OMMDS, Unpublished Draft Paper, November 25, 1970; David J. Farber, "Changes in the Duration of the Post-Training Period in Relative Earning Credits of Trainees: Class of 1964--A Graphic Synopsis," U. S. Department of Labor, Manpower Administration, OMMDS, Administratively Restricted Unpublished Paper, August 27, 1971; David J. Farber, "A Reply to the Miller Critique of the M.A. (Manpower Administration) Method of Evaluating the Gains in Earnings of MDTA Trainees," Unpublished Paper, Dated November 1972; Louis S. Jacobson, "The Use of Social Security Data in the Evaluation of Manpower Programs," The Public Research Institute, Center for Naval Analyses, Arlington, Virginia, Unpublished Draft Report, February 14, 1973: Louis S. Jacobson, "An Assessment of the Longitudinal Models of Income Determination Used to Estimate the Impact of MDTA Trainings on Earnings," The Public Research Institute, Center for Naval Analyses, Arlington, Virginia, Unpublished Draft Report, May 1, 1973. Revised June 13, 1973; and, Louis S. Jacobson, "The Use of Longitudinal Data to Assess the Impact of Manpower Training on Earnings," PRI 73-2, The Public Research Institute, Center for Naval Analyses, Arlington, Virginia, Final Report, 20 July 1973.

This report sets forth both the benefits and shortcomings of using Social Security data for program evaluation and, where appropriate, compares these data with the feasible alternatives. The report is divided into three parts. The first part deals with the structure of Social Security data for evaluation of manpower training programs. The second compares the benefits and shortcomings of using Social Security data in evaluations with alternative data sets. The third section discusses selected methodological issues. And a concluding summary ends the report.

II. Current Structure of Social Security Data Available for Evaluation of Manpower Training Programs

The procedure for assembling Social Security earnings data involves use of social security numbers taken from trainee records stored in the Manpower Automated Reporting System (MARS) file and matching them with earnings records on file at the Social Security Administration (SSA). The Social Security Administration provides the information shown in Table 1. The matched data are then returned to the Manpower Administration where they are merged with the information on trainee characteristics shown in Table 2. For purposes of comparison, the data from matched trainee records are compared with the data from a random sample of non-trainees taken from the Continuous Work History Sample (CWHS), a 1 percent sample of the basic SSA master file.

TABLE 1
VARIABLES INCLUDED ON THE CWHS DATA FILE AND
ACCESSIBLE TO MARS MATCHING FILES

Birth year
Birth month
Race
Sex
Quarters employed 1937-1950
Quarters employed 1951-1972
Total earnings 1937-1950
Total earnings 1951-1972
Dead or Alive Code
Total self employed quarters 1937-1950
Total agricultural quarters employed 1937-1950
Total self employed quarters 1951-1972
Total agricultural quarters employed 1951-1972
Earnings 1951 to present (1972) by year
Quarters employed 1951 to present (1972) by year

TABLE 2
SELECTED VARIABLES INCLUDED ON THE MARS FILE

Class	Termination date (actual or estimated)
Social Security Administration Number	Sex
Last Name	Race
Initials	Ethnic Origin
Birth Date	Language spoken
Program Code	Veteran Vietnam era
Contract Identification	Marital Status
State Code	Number of Dependents
Fiscal Year of approval	Highest school grade completed
Flag for Estimated Termination date	Public Assistance
Termination Status	Dictionary of Occupational Titles, Primary Occupation
Start date	Length of stay in program
	Test score (Job Corps only)
	Dictionary of Occupational Titles of training (three higher order digits)

As can be seen, a considerable amount of information can be generated on program participants. While these variables do not exhaust the list of eligible variables used in program evaluations, they do include information on age, sex, race, and education, which is most easily rationalized in all theoretical models used to estimate a program's effectiveness. Furthermore, in contrast to most other data sources, participants' earnings histories can be followed accurately for extended periods of time. However, these data, while extremely useful, are not perfect.

It must be noted that much of the information from trainee records shown in Table 2 does not exist for any comparison group one might wish to generate from the Continuous Work History Sample. While the Manpower Automatic Reporting System file provides information on such important variables as age, sex, race, marital status, education, veteran status and primary occupation of trainees, the CWHS file provides data only on age, sex, and race of the comparison group.

It is also true that the reporting of variables by type and number is not uniform across manpower programs. Nevertheless, SSA data include a highly accurate longitudinal earnings history. Indeed, this is their unique and most interesting feature. It can be argued that such factors as education, family background, motivation, and achievement fundamentally determine a person's expected lifetime earnings. Therefore, prior earnings histories must be a reflection of these very same variables. Use of an extensive earnings history prior to program involvement controls for labor market influences of socio-demographic variables, and the absence of certain specific variables, such as education, is

not damaging to the effective application of the SSA data. Prior patterns of earnings serve as very powerful controls, even though they may not compensate for all missing variables. On the whole, however, the critical variables for analysis do exist: age, sex, race, prior- and post-program earnings history, and information relating to program structure and experience.

It is possible, though relatively expensive, to use the CWHS of employers to add to the list of potential variables by linking it up with the CWHS of individuals. The Longitudinal Employee-Employer Data (LEED) sample achieves this with a 1 percent sample of SSA data from employer and employee records.[3] The LEED data can be used to assess industrial and geographical mobility of workers. Information can be obtained on workers' industry attachments at the four-digit Standard Industrial Classification level, as well as on their location. Such data would be desirable to determine if regional or industry-specific influences affect the pattern of benefits from manpower training.

However, the location variable is faulty in that it may report either an establishment location or the location of the firm's home office with no indication of which is involved. Thus, the location reported may not coincide with the location of the worker whose earnings are being reported. In addition, in order to trace most trainees' industrial employment patterns, it is necessary to scan every employer in the SSA file of employers.

---

[3] Longitudinal Employer-Employee Data (LEED), Social Security Administration, Office of Research and Statistics, Division of Statistics, Statistical Operations Branch, April 1970.

One crude estimate of the cost of generating mobility data is about $2,000 per observation, if performed on a quarterly basis. While location and industrial mobility data are useful, they are not critical to evaluation, since prior- and post-training earnings patterns to a large extent reflect the effect of industry and region. Therefore, the potential absence of industrial and geographic variables from analysis is not sufficient to reject the SSA data.

III. Comparisons of Social Security Data with Alternative Data Sets

Any recommendation with respect to the use of the SSA data depends on what one gains or loses in comparison with other data bases. Before discussing the salient advantages and disadvantages of the SSA data, a brief summary of the main positive and negative aspects of these data is in order.

The advantages gained from using these data are:

(1) The cost per unit of observation is extremely small.

(2) The data are of very high accuracy.

(3) The data are longitudinal.

(4) There is no non-response bias due to missing observations or variables.

(5) The data embody a comparison group as good as any that have been used in existing evaluations.

(6) The sample sizes are very large.

The disadvantages of using these data are:

(1) Earnings rather than hours of work and wage rates are reported.

(2) No detailed information is available on labor force participation.

(3) Reported earnings are truncated for those earning

above the Social Security maximum.

(4) Social Security coverage varies as a function of age.

(5) A limited number of socio-demographic variables are available.

(6) There is some time lag in the full reporting of the data.

(7) Problems exist with maintaining confidentiality of the data.

A. Advantages of SSA Data

Cost. With respect to cost, the SSA data are overwhelmingly superior to other sources. One need only contrast the cost of a few cents (less than $.10) per observation with the cost of over $600 per observation for the data now being collected for the Office of Economic Opportunity--U. S. Department of Labor Longitudinal Evaluation Study of Four Manpower Training Programs.[4] A far less costly study of the In-School and Summer Neighborhood Youth Corps still cost approximately $35 per observation.[5] The difference in cost between these two studies results from only one personal field interview for the NYC evaluation in

---

[4] Longitudinal Evaluation Study of Four Manpower Training Programs, Prepared under Contract No. B99-4783, U. S. Office of Economic Opportunity, Division of Evaluation, Washington, D. C., 1969 and other dates.

[5] Gerald G. Somers and Ernst W. Stromsdorfer, Cost-Effectiveness Study of the In-School and Summer Neighborhood Youth Corps, Madison, Wisconsin: Industrial Relations Research Institute, Center for Studies in Vocational and Technical Education, The University of Wisconsin, 1970.

contrast to four for the Longitudinal Evaluation. Also, lower expense was incurred with the NYC study because efforts to locate nonrespondents were less vigorous. Both these and similar studies characteristically collect many variables per observation and much elaborate detail on each variable. However, it has generally been the experience of the Panel members that only a small proportion of these variables is ever used. Therefore, the value of the enriched data of the field survey is often more apparent than real. Indeed, the collection of so many and diverse variables often reflects poor planning and the absence of an appropriate evaluative model. But, whatever the reason, it is clear that the marginal value of many of these data is very low. Such studies repeatedly fall back on a few variables whose theoretical effects in a model of income determination are predictable--age, sex, race, education, and marital status, to name the most obvious. And, of course, the SSA data contain information on age, sex, and race.

Errors in the Data. One distinct advantage of the SSA data lies in the fact that they contain neither interviewer bias nor interviewer error. The earnings reported are accurate, except insofar as employers may find it in their interest to underreport to avoid the tax or the costs of the paperwork. Respondents clearly cannot interject error into the data through failure to recall accurately, nor are they in a position to dissemble the true nature of their earnings. Finally, there is no interviewer to inject non-random error into the reported data. In contrast, sample survey data rely on retrospective recall and are subject to interviewer-interviewee interaction, which creates serious problems. No statistical technique can overcome these

errors.

Longitudinal Earnings. The strongest point in favor of the use of the SSA data lies in the longitudinal earnings history thus made available for analysis. The strengths of this information have been discussed above. However, we should again point out that SSA data allow one to accurately trace a worker's earnings history for the entire period in which he is working in covered employment. No survey data can do this. In addition, over 90 percent of the workers in the United States are now covered by Social Security.

Non-Response Bias. The SSA data are notable for their lack of non-response bias. This judgment must be tempered by an awareness of lack of coverage for certain occupations, as already discussed. By contrast, sample surveys that rely on mail questionnaires are fortunate to have a response rate as high as 30 percent. Personal field interviews can often pick up over 80 percent of an original sample, but the marginal cost of the hard to locate observations often exceeds $100 or more.

The Problem of the Control Group. With respect to the selection of a control group, past evaluations have been in no way superior to the comparison groups available to analyses based on the SSA data. The Panel is aware of only one evaluation study, a case study of black girls in an NYC program in Cincinnati, Ohio, which used a true experimental design with random assignment of a study sample to an experimental and control group. This study also suffered from non-response bias through attrition of

both controls and experimentals.[6]

Sample survey studies usually employ program dropouts or no-shows as comparison groups. Some investigators attempt to generate a comparison sample that is legally eligible to enroll in the program in question. But, none of these efforts overcomes the problem of self-selection bias; they merely redefine it. Thus, Herman Miller has criticized the Farber studies for using SSA-CWHS observations instead of program dropouts as a comparison group. Neither has an overwhelming theoretical appeal over the other. To be sure, dropouts self-select themselves into the program. In this regard, dropouts are similar to the trainees who complete a program. However, dropouts also self-select themselves out of the program--some because they perceive better opportunities elsewhere; others because they represent program failures. In the absence of variables that define the reasons for dropping out, the injection of bias due to self-selection out of the problem is some unknowable mixture of the two effects. The SSA-CWHS observations, on the other hand, can be matched as closely with program completers as can dropouts. Additionally, use of SSA-CWHS data can help settle the issue of choice between dropout comparison groups and CWHS comparison groups by analyzing pre-training earnings patterns of completers, dropouts, or CWHS observations for any given age, sex, or race group.

---

[6]Gerald D. Robin, An Assessment of the In-Public School Neighborhood Youth Corps Projects in Cincinnati and Detroit, with Special Reference to Summer-Only and Year-Round Enrollees, Philadelphia, PA: National Analysts, Inc., February, 1969.

Many evaluations use a before-after framework of comparison to override problems inherent in self-selection. However, before-and-after techniques inject a different type of error into program evaluations: Often individuals enter manpower programs because their earnings are temporarily low. MDTA records show that almost all trainees are unemployed when they join the program, making it difficult, if not impossible, to project what they would have earned in the absence of training.[7] However, their expected lifetime employment and earnings are higher than actual earnings at the time they enter the program. Over time their earnings will regress toward the mean. Thus, use of a before-after comparison without a control group must certainly overestimate program effects.[8]

The existence of temporarily low earnings due to poor labor market prospects prior to entering a program is a major problem that must be overcome statistically to arrive at an accurate estimate of program effect.[9] Trainees with temporarily low earnings prior to training may come from a different population of persons than the CWHS comparison group. The Department

---

[7]Jacobson, op. cit., February 14, 1973, p. 2.

[8]Hardin and Borus experimented with their Michigan retraining data and found the gains from retraining were $1,524 using a before-after method; when using a control group, the gains were only $216 in the year following training--a difference by a factor of seven. See Einar Hardin and Michael E. Borus, Economic Benefits and Costs of Retraining Courses in Michigan, East Lansing, Michigan: Michigan State University, December, 1969.

[9]Jacobson, op. cit., February 14, 1973, p. 9.

of Labor evaluation staff in the Assistant Secretary's Office of Policy, Evaluation and Research (ASPER) has demonstrated the critical impact of this issue. For white male MDTA institutional completers an explicit accounting for "trouble in the labor market" converted a negative program effect of approximately $200 per year to a positive effect of over $400 per year, both over the same five year period.

In summary, past sample survey evaluations have no clear advantage over the use of SSA-CWHS data with respect to choice of comparison groups. The problem of self-selection bias is present in both data sets and at this point no one can say where it is more severe. This difficulty will persist until the federal government undertakes carefully planned experiments in manpower training evaluation. The before-after design is no solution to the self-selection problem due to the problem of transitory low earnings and employment prior to training.

Thus, the SSA-CWHS data clearly warrant use and experimentation. Two methodological alternatives have been suggested to deal with the comparison group problem. One is to use people who enter a program in, say, 1969, as a control for those persons who enter the same program in 1967. Given appropriate inflationary adjustments, this might be legitimate if the objectives and target population of a given program do not change over the years in question. The second suggestion involves the use of successive age cohorts of trainees as comparisons for immediately prior age cohorts. Thus, for instance, when analyzing the effect of a program on persons 23 years of age one year after they leave a program, researchers can utilize the labor market experience of 24 year olds who are currently in the program as a possible

comparison group. Though neither alternative overcomes the transitorily low pre-training earnings problem, these and other techniques deserve consideration.

Finally, it must be noted that cross-program comparisons of particular socio-demographic groups are just as difficult as comparisons between trainees of a specific program and a selected comparison group. This is so because self-selection also exists as a function of program type. Such self-selection is not well understood, but this, of course, is a general problem.

B. Disadvantages of SSA Data

Earnings. Our discussion of the weakness of SSA earnings data encompasses the first three points listed on page 9 above.

One difficulty with the SSA earnings measure is immediate. An individual's earnings may exceed the maximum taxable income. The seriousness of this problem depends on the proportions of program participants and comparison groups from SSA data which exceed the maximum. The proportions undoubtedly vary among programs and socio-demographic groups. Table 3 presents an example for males and females reporting maximum earnings in some MDTA institutional and On-the-Job Training (OJT) manpower projects.

TABLE 3
PERCENT OF SAMPLE WITH MAXIMUM
SOCIAL SECURITY EARNINGS CREDITS

	1966	1969	1970
Earnings Maximum	$6600	$7800	$7800
Males	2	6	8
Females	0	0.5	0.5

Source: Prescott and Cooley, op. cit., Table 7, p. 13.

The loss of 2 percent of the male sample shown in Table 3 may not be critical to accurate evaluation. However, preliminary analysis by economists at ASPER on the impact of MDTA institutional and OJT training on white males resulted in a 33 percent loss of trainee observations when trainees whose earnings exceeded the maximum were excluded from the analysis.[10] Clearly, unknown biases may creep into the analysis when the loss is this large. The reasons for discrepancy between the ASPER and Prescott and Cooley results remain to be determined. However, part of the difference must be due to the fact that the ASPER Study was limited to white males only, while the Prescott and Cooley Study covered all males.

Some investigators have attempted to bypass the problem by extrapolating earnings of those who reach the maximum.[11] But all these methods are essentially arbitrary. If one cannot be reconciled to the use of arbitrary methods, persons with greater than maximum taxable earnings can be eliminated from the analysis. This creates a new problem by confining the analysis to the net remaining group: The data are not representative of the program population as a whole, though they can provide information for those with relatively low earnings, a group with which policymakers are often most concerned.

Another major problem with the earnings measure is that some workers report zero earnings in a given quarter. There are

---

[10] The maximum was $4,300 until 1964. This problem is less important today due to the high limit of $10,800. The limit is scheduled to rise still further.

[11] See Stern, op. cit., p. 10 and Borus, op. cit., p. 37.

four possible reasons for observing zero earnings:

(1) The worker is not in the civilian labor force.

(2) The worker is in the civilian labor force, but unemployed.

(3) The worker failed to earn the minimum of $50 from any given employer per quarter.

(4) The worker was employed in an uncovered occupation such as farm work, most federal government occupations, or some state and local government occupations.

As indicated above, about 90 percent of the workers in the United States are now covered by Social Security. Very few MDTA trainees are agricultural workers or federal employees and coverage is even higher for them.[12] Therefore, most persons who report no earnings in a quarter are either unemployed during the quarter, out of the labor force, or some combination of the two.

The lack of precise knowledge as to the reason for zero earnings can create bias in the estimate of the impact of a manpower program on earnings.[13] It makes a difference to the analysis whether a person has no market earnings because of voluntary withdrawal from the labor force or because of unemployment. The fact is that a large proportion of persons report zero earnings, though data from one study shown in Table 4 indicate the problem is much more important for females than for males. Yet the problem is far from trivial for males. When the ASPER group excluded zero earners from a sample of white males who had been in MDTA

---

[12] Prescott and Cooley, op. cit., p. 13.

[13] Louis Jacobson at the Center for Naval Analysis is currently investigating this problem.

TABLE 4
PERCENT OF SAMPLES WITH NO REPORTED SOCIAL SECURITY EARNINGS CREDITS BY YEAR

	1966	1969	1970
Males	17%	9%	16%
Females	39%	20%	28%

Source: Prescott and Cooley, op. cit., Table 8, p. 14.

institutional or OJT problems, the total number of trainee observations fell by more than 50 percent. Clearly, it is most important to gain information on the reasons why trainees had zero earnings in any given quarter.

It will be useful to obtain information on those persons in each manpower program who exceed the maximum earnings in any given year, those who have zero earnings in any given quarter, and the number of zero earnings quarters per year all classified by relevant socio-demographic characteristics. It should then be possible to determine which programs are most seriously affected by this limitation of the data. The U. S. Department of Labor should support a study to analyze the characteristics of persons who exceed the maximum, as well as of those who report zero earnings, in order to determine the structural and behavioral

reasons for these types of behavior.[14]

A final problem with the earnings data is due to the fact that Social Security sources do not separately report wage rates and hours worked. Observed earnings are not unambiguous measures of an increase in economic welfare, since earnings reflect variations in both wage rates and hours worked. Changes in hours worked imply corresponding changes in the benefit measures solely due to changes in non-market time available to a trainee. On the other hand, wage rates index real productivity. If training

---

[14] Consider the case in which the reason for zero earnings differs between the post-training and the pre-training period. An example would be the movement of a person from uncovered employment before training to covered employment after training. Zero earnings are reported before training, with a resulting upward bias in the estimation of the before-after training effects. A similar problem exists if a person moves from non-labor force participation prior to training to covered employment after training. Some or all of the earnings increase is due to the simple act of entering the labor force.

Two sets of data can be used to check the nature of these particular biases in the SSA data. First is the data set of the Longitudinal Evaluation Study of Four Manpower Training Programs, cited above. The other is the data set of the National Longitudinal Surveys developed by the U. S. Department of Commerce, Bureau of the Census and the Center for Human Resource Research at Ohio State University in Columbus, Ohio. Each of these data sets contain the Social Security number of the sample respondents. The National Longitudinal Survey data are already being utilized to evaluate training programs. See Gerald G. Somers, "An Evaluation of the Effects of Manpower Programs in the United States Based on the National Longitudinal Surveys," Madison, Wisconsin: Department of Economics, University of Wisconsin, in progress.

increases productivity, the worker's wage rate should rise. An increase in the wage rate results in a corresponding potential increase in income, with no loss of welfare due to reduced leisure or non-market work. Of course, the problem is more serious for women, since the uses of a woman's time in the home have a high value compared with other uses.[15] In short, due to the impossibility of decomposing earnings into wage rates and hours worked, as well as the impossibility of distinguishing the causes of low earnings--unemployment, involuntary short work week, or voluntary withdrawal from the labor force--the SSA data are limited to measuring a single specific outcome for programs that essentially have multiple outputs. This outcome can also be subject to considerable bias in measurement.

Coverage as a Function of Age. Related to the problem of zero-earnings experience is the fact that Social Security coverage is partially a function of age, as young workers first enter the labor force. Thus, Job Corps and Out-of-School Neighborhood Youth Corps (NYC) serve mainly young persons under 21. Yet, the labor force participation rate of males aged 16-19 is only 58.1 percent, while it is 83.9 percent for males aged 20-24 and increases to a high of 96.4 percent for males aged

---

[15] These ideas appear in a memorandum from Dr. Orley Ashenfelter, Director, Office of Evaluation, Department of Labor to Mr. Michael Moskow, Assistant Secretary for Policy, Evaluation, and Research, Department of Labor, dated May 31, 1972.

35-44.[16] Thus, if we desire to evaluate the Job Corps program with SSA data, it is likely that, without appropriate adjustment, we would over-estimate program benefits. There would be significant numbers of pre-program quarters of zero earnings due to non-labor force participation, while simple entrance to the labor force rather than training per se would increase the likelihood of positive measured earnings. Adjusting the data by dropping observations on persons with zero-earnings quarters would substantially preclude an analysis of the impact of the Job Corps or NYC programs. Thus, the data are not well suited to evaluate the training benefits to teenagers or young workers. In contrast, for males aged 35-44 in MDTA or NAB-JOBS, the problem is minimal.

Limitations in Available Socio-Demographic Variables. For the foreseeable future, use of the SSA will be constrained by the absence of such important socio-demographic variables as education or socio-demographic status. The available variables have been described above. Efforts are now under way within the Social Security Administration to link Social Security data with the Current Population Survey (CPS). One other major linkage project is under way involving Internal Revenue Service (IRS) data, March 1970 CPS data, and 1970 Decennial Census data to the summary Social Security earnings files. Linkage of the SSA summary earnings file for 1951-63 with the March 1964 CPS has already been

---

[16] Changes in the Employment Situation in 1972, Special Labor Force Report 152, Bureau of Labor Statistics, U.S. Department of Labor, 1973, Table A-28, p. A-27.

completed, covering over 7,000 families and 20,000 individuals. An additional linkage of 1973 Social Security Administration data is in the planning stages. If these several linked data sets can be tied in with the SSA data, most of the major analytical variables one would need in the evaluation of manpower programs will be accessible. However, these several linkages will probably be of little assistance in manpower evaluations because of the extremely low probability that sufficient numbers of persons receiving manpower training will appear in the separate samples.

It is apparent from the foregoing analysis that the SSA data are more useful for evaluating programs that serve mainly prime-age males. The data are not informative on the nature of labor-force behavior during quarters of zero earnings, and, therefore, are least useful for persons entering the WIN program, many of whom have been on welfare for extended periods. Nor is it reliable for those who shift back and forth between labor-force and non-labor-force status in response to employment opportunities. Likewise, these data will be similarly ill suited for evaluation when the children of welfare families who are forced to register in the WIN program are involved, since these children may have little or no labor-force attachment prior to entering the program. As we have mentioned above, the same is true of persons who enter the Job Corps or the Out-of-School NYC program. However, with an average enrollment age of 30 or more and a concentration on males, both the MDTA and the JOBS program are amenable to analysis with SSA data.

Relative Time Lag. Time lags exist in the collection of data from both Social Security files and from field surveys.

However, within 12 months, 95 percent of all the Summary Earnings Records (SER) are accessible for analysis. There is somewhat greater time lag for self-employment data, but this is not a major problem so far as manpower evaluation is concerned. There is a somewhat greater time lag in generating the CWHS file than in generating the SER data. For example, the complete Employer-Employee file (LEED) for 1971 is now available, so the lag here is about two years.[17]

In an evaluation based on a sample survey, it can easily take two years from the inception of a study to the time when actual analysis of the data begins. The exact time lag depends on the care with which the sample design is developed, on how extensive the effort is to locate non-respondents, and on the problems of data reduction. Evaluation studies often drag out several years.

Problems of Confidentiality. The Panel recognizes that the issue of confidentiality of the data contained in Social Security records is a difficult one. It seems singularly inappropriate for the federal government to release information to private citizens that has been entrusted to it in good faith as confidential. Yet, the power to abuse confidential data resides within the government also. Therefore, since the Panel recommends that these data be more widely used, the Panel also calls for strict controls and sanctions to be applied in order to prevent

---

[17] Based on information supplied by Mr. Warren Buckler of the SSA.

their illegal use by either private individuals or government agencies, whether federal, state, or local.

However, the Panel does recommend that the data be made available to private individuals for two reasons. First, it would be unwise and inappropriate for government agencies alone to be in a position to conduct evaluations of their own programs. Second, the Panel is not prepared to judge whether the greatest danger of violation of confidentiality exists when the data are used by private individuals or when they are used by the government. Thus, since agencies other than the Social Security Administration have access to individual records that can be identified, it is essential to devise a system whereby individual records can be released to private researchers and their confidentiality maintained. This is not an insuperable problem. One way to overcome the problem, though it has its drawbacks, is to allow researchers access to variance-covariance matrices or zero-order correlation matrices. Other possibilities exist.

IV. Methodological Techniques to Improve the Analytical Qualities of the Data

In attempting to evaluate the usefulness of the SSA files, studies by David J. Farber, unpublished studies by ASPER economists, and the work of Louis Jacobson were reviewed, as well as the critiques of these efforts[18] by Herman Miller and others.

---

[18] David J. Farber, in particular, deserves recognition for his continuing efforts to improve the analytical usefulness of the SSA data. Indeed, it is largely due to his pioneering efforts that the issue was brought into public debate.

The Panel holds no brief for any particular statistical method. Farber's various papers employ cross-tabulations; Prescott and Cooley, Borus, Stern, Jacobson, and the ASPER group use regression analysis. All are variations of the same basic technique, and none has a prior methodological claim.

Farber's cross-classification results are displayed in an 800 cell matrix. Patterns of average effect are not impossible to detect with this much detail, but the effort can become mind-boggling if only one or two more dichotomous variables are added. Multivariate analysis can simplify the data analysis, but at the cost of imposing more restrictions on the analytical model.

Farber's model for each of his 800 cells (age (10), sex (2), color (2), earnings rate (5), and earnings pattern (4)) is $(\bar{Y}_{Tprior} - \bar{Y}post) - (\bar{Y}_{Nprior} - \bar{Y}_{Npost})$ where $\bar{Y}$ equals average earnings, T equals trainee, N equals control, prior equals earnings prior to training, and post equals earnings after training. This particular model incorporates the important factor of differences between prior- and post-training earnings patterns of both the trainee and control group, though it adjusts for only 20 earnings-pattern distinctions. It is a certainty that there are many more earnings-rate/earnings-pattern distinctions. However, regression or other multivariate framework implies strong restrictions on the structural differences in earnings patterns between trainees and comparison groups.

Comparison of Research Methods. It is important to note that data do not speak for themselves. The model used to analyze data critically influences the estimation of program impact. Any model represents an alternative treatment of the data to control

TABLE 5

ANALYSIS OF THE IMPACT OF DIFFERENT METHODOLOGIES ON THE ESTIMATION OF EARNINGS BENEFITS TO THE 1964 INSTITUTIONAL MDTA CLASS, WHO COMPLETED TRAINING, ANNUAL EARNINGS INCREASE (DECREASE)

	Farber (1)	Miller (2)	ASPER (3)	ASPER (4)	ASPER (5)	ASPER (6)	ASPER (7)	Jacobson (8)
White Males	-$200 1/	$44 2/	-$334 3/	-$222 4/	-$219 5/	$433 6/	-$71 7/	$99 8/
Black Males	0	$56	---	---	---	---	$155	$119
White Females	68	$126	---	---	---	---	$118	$284
Black Females	188	$96	---	---	---	---	$244	$245

Sources:
1/ Louis D. Jacobson, "The Use of Longitudinal Data to Assess the Impact of Manpower Training on Earnings," Public Research Institute, Center for Naval Analysis, PRI 73-2, 20 July 1973, Table 1, p. 6.
2/ Herman P. Miller, "Critique of David Farber's Method of Evaluating the Gains in Earnings of MDTA Trainees," August 1972, Table 4, p. 14. This uses the MDTA noncompleters as a control.
3/ This is a simple average of the average yearly program effects, 1965-1969. White males, zero earners excluded. The negative benefit is increasing over time.
4/ This is a simple average of the average yearly program effects, 1965-1969, White males, zero and maximum earners excluded. The negative benefit is approximately constant over time.
5/ This is a simple average of the average yearly program effects, 1965-1969, White males, aged 25 through 40, zero and maximum earners excluded. The negative benefits are decreasing.

TABLE 5

ANALYSIS OF THE IMPACT OF DIFFERENT METHODOLOGIES ON THE ESTIMATION OF EARNINGS BENEFITS TO THE 1964 INSTITUTIONAL MDTA CLASS, WHO COMPLETED TRAINING, ANNUAL EARNINGS INCREASE (DECREASE)
(Continued)

6/ This is a simple average of the average yearly program effects, 1965-1969. White males, zero and maximum earners excluded, dummy variable in model to account for unemployment in 1963. These persons all started training in the first quarter of 1964 and finished in 1964. The benefits are decreasing.

7/ Each estimate is a simple average of the average yearly program effects, 1965-1969. For white males the earnings figure in the analysis represents total earnings divided by quarters employed for 1958-1969. For the other three groups, the figures simply represent total social security earnings for 1958-1969.

8/ Louis D. Jacobson, op. cit., Table II, p. 13.

for the influence of factors that may obscure the true nature of a program effect. Choices and compromises must be made among models, due to the set of constraints each of them imposes on the analysis. Table 5 presents different estimates of the impact of MDTA training using the same SSA data.

Most of the experimentation with the SSA data focuses on the 1964 class of MDTA trainees. Since Farber's work represents one of the most extensive efforts to employ these data, we should look at his results first. As indicated above, Farber uses a cross-classification scheme. In addition, he excludes 1963 earnings from his pre-training earnings control period, and all persons in the CWHS comparison group who had zero earnings in 1964. The first adjustment has the effect of eliminating from consideration in the analysis of a period of transitorily low earnings and high unemployment for the trainees, almost all of whom were unemployed shortly prior to taking training. This first adjustment results in comparing an unemployed trainee against an "average" CWHS worker. The second adjustment clearly biases the estimate of training effect downward. In any case, his results show negative average earnings for white males over the five year post-training period, but positive earnings for white and black females. Black males have zero net benefits.

The estimate by Miller uses MDTA institutional noncompleters as controls in an effort to avoid comparing trainees against "average CWHS workers." However, one reason for the dramatically different results between Miller and Farber is due to the weighting scheme used by Miller to standardize for differences among completers and noncompleters. Miller's weighting

scheme is different from that used by Farber and is only one of many arbitrary weighting schemes one could use.[19]

Column (6) of Table 5 represents a model estimated by the ASPER economists that attempts to account for the individual's condition immediately prior to training. Zero and maximum earners have also been excluded and the sample represents persons who began training in the first quarter of 1964 and completed training before the end of 1964. Thus, the sample is much different compared to the sample used by Farber. In any case, benefits to this group are very large--over $400 per year.

More in line with the Farber method are the results from the analysis shown in Column (7) of Table 5, which uses an auto-regressive multivariate framework instead of Farber's average quarterly earnings levels and patterns to control for the influence of pre-training earnings. Results of this method differ from Farber's and Miller's estimates. Also, the auto-regressive model reveals no statistically significant differences between using MDTA institutional noncompleters and the CWHS sample as comparison groups for either male or female blacks. But unresolved differences still exist between noncompleters and the CWHS sample for male and female whites.

The most elaborate treatment of the SSA data is by Jacobson. He had access to additional SSA data on employers and employees, and estimated positive earnings effects for all four

---

[19]See Ashenfelter, "Some Comments on....," pp. 7ff.

groups of MDTA institutional completers.[20] Jacobson, as well as the ASPER group, argues that persons who enter training are different from persons in the CWHS in that they have a higher average unemployment rate immediately prior to training. It is necessary to standardize for this effect in order to properly estimate the relation between training and earnings. Jacobson adds a proxy variable to control for differences in the probability of being unemployed in 1963. Jacobson's estimates are the largest of the four alternatives. We should note, however, that among the Miller, ASPER, and Jacobson estimates, various adjustments in the sample and alternative methods revealed a marked insensitivity for the estimates of benefits to black females. The largest variation in estimated benefits is for white males, for which the difference between the highest and the lowest estimated benefit is $299--($99 - (-$200)).

---

[20] Jacobson restricted his study sample in the following way. The sample age was from 23 to 59 years old as of 1959. Its earnings did not exceed the taxable limit of $4800 in any year. Only those samples were included whose individual records contained employer reports for each year covered by the study. The sample was finally split into a mobile and a non-mobile group based on whether the industry or country of the major job changed during the study period.

Clearly, these analyses show that the method and the precise sample data used affect the estimated program impacts. The problem at this point is whether reliance is to be placed on an empirical or judgmental justification for choosing among models, rather than on a well-developed theoretical argument. (And even the choice of a theoretical model involves judgment.) Over this question, differences of opinion can arise among analysts and policymakers. More research is needed to resolve these issues. The Panel strongly recommends that the Department of Labor support the research necessary to achieve such a resolution.

V. Summary

After ten years of massive expenditures on manpower-training programs, relatively little is known about their educational and labor market effects. Less expensive and more conceptually uniform data must be developed to evaluate these programs.

Social Security data are limited in the types of socio-demographic information they provide, and their earnings measure has some shortcomings. However, the earnings data are very accurate, given their limitations, and very inexpensive. In addition, they present true longitudinal data, which are crucial to the analysis of investments in training. These data represent a clear alternative to sample survey data for evaluating manpower programs, especially for prime-age males.

Statistical techniques exist for overcoming in large part the inadequacies of the quarterly earnings data reported by SSA.

In light of the history of manpower-training studies, the SSA data are just as adequate a source of comparison groups as tailor-made sample survey studies. In some respects the SSA data are even better because of the potentiality for matching pairs of observations on selected characteristics, especially with respect to prior earnings patterns.

In short, SSA data should be employed in the evaluation of manpower programs--especially those that tend to serve prime-age males, such as the MDTA or NAB-JOBS program. They will be less adequate for evaluating WIN, Job Corps, and the Out-of-School NYC.

Because of the problem of zero-earnings quarters and quarters in which earnings exceed the maximum, the U.S. Department of Labor should support a study to evaluate potential biases in the SSA data that may result. The National Longitudinal Surveys data or any of the SSA-CPS-IRS links matched to the SSA data will probably be sufficient to detect most of the biases inherent in models of earnings determination based on these data.

Moreover, the Department of Labor should analyze and evaluate the quality of data in the MARS file to determine the degree and source of the apparent large errors in merely reporting the true population of program enrollees. The Panel recognizes that better data cost more, but a definitive judgment must be made concerning the MARS data. At present not even the population of trainees is accurately known! Perhaps the most efficient approach would be to sample the universe of program projects and develop accurate samples, rather than attempt to gather information on the universe of trainees. A pre-condition for this approach, or any evaluation for that matter, must be the development of accurate lists of trainees for each manpower project. Such lists do not yet exist in the MARS file; this is a serious inadequacy that must be corrected.

BIBLIOGRAPHY

Ashenfelter, Orley (with attachment from Glen Cain), "Use of Social Security Work History Data to Analyze the Effects of Manpower Programs on Earnings," Memorandum to Michael Moskow, Assistant Secretary, ASPER, U. S. Department of Labor, May 31, 1972.

Ashenfelter, Orley, "Some Comments on Herman Miller's "Critique of David Farber's Method of Evaluating Gains..." Office of Evaluation, ASPER, U. S. Department of Labor, September 12, 1972.

Berterman, J. B., Review of the Manpower Training Follow-up Data Analysis System, Final Report (Draft) U. S. Department of Labor Contract 43-1-003-51, The Planning Research Corporation, McLean, Virginia, March 17, 1973.

Borus, Michael E., "Time Trends in the Benefits from Retraining in Connecticut," Industrial Relations Research Association, Proceedings, December 28-29, 1967.

Changes in the Employment Situation in 1972, Special Labor Force Report 152, Bureau of Labor Statistics, U. S. Department of Labor, 1973.

Commins, William D., Social Security Data: An Aid to Manpower Program Evaluation, PRC R-1543, The Planning Research Corporation, McLean, Virginia, November 1970.

Farber, David J., "Using Social Security Records to Measure Change in Trainee Earning Capacity," U. S. Department of Labor, Manpower Administration OMMDS, Unpublished Draft Paper, November 25, 1970.

Farber, David J., "Changes in the Duration of the Post-Training Period in Relative Earning Credits of Trainees: The 1965-69 Experience of MDTA Institutional and OJT Trainees, Class of 1964--A Graphic Synopsis," U. S. Department of Labor, Manpower Administration, OMMDS, Administratively Restricted Unpublished Paper, August 27, 1971.

Farber, David J., "A Reply to the Miller Critique of the M. A. (Manpower Administration) Method of Evaluating the Gains in Earnings of MDTA Trainees," Unpublished Paper, November 16, 1972.

Hardin, Einar and Michael E. Borus, Economic Benefits and Costs of Retraining Courses in Michigan, East Lansing, Michigan: Michigan State University, December 1969.

Heller, Robert N., "The Uses of Social Security Administration Data for Measuring the Impact of Manpower Programs," paper presented at the Conference on the Evaluation of the Impact of Manpower Programs, Center for Human Resource Research, Ohio State University, Columbus, Ohio, June 15-17, 1971.

Goldstein, Jon H., "The Effectiveness of Manpower Training Programs: A Review of Research on the Impact on the Poor," Studies in Public Welfare, Paper No. 3, Subcommittee on Fiscal Policy, Joint Economic Committee, Congress of the United States, U. S. G.P.O.: Washington, D. C., 1972.

Jacobson, Louis D., "The Use of Social Security Data in the Evaluation of Manpower Programs," The Public Research Institute, Center for Naval Analyses, Arlington, Virginia, Unpublished Draft Report, February 14, 1973.

Jacobson, Louis D., "An Assessment of the Longitudinal Models of Income Determination Used to Estimate the Impact of MDTA Trainings on Earnings," The Public Research Institute, Center for Naval Analyses, Arlington, Virginia, Unpublished Draft Report, May 1, 1973. Revised June 13, 1973.

Jacobson, Louis D., "The Use of Longitudinal Data to Assess the Impact of Manpower Training on Earnings," Public Research Institute, Center for Naval Analyses, PRI 73-2, July 20, 1973.

Koenig, Martin, "How OMEDS Data Can Be Used to Measure the Impact of Manpower Programs," paper presented at Conference on the Evaluation of the Impact of Manpower Programs, Center for Human Resource Research, Ohio State University, Columbus, Ohio, June 15-17, 1971.

Longitudinal Employer-Employee Data (LEED), Social Security Administration, Office of Research and Statistics, Division of Statistics, Statistical Operations Branch, April 1970.

Longitudinal Evaluation Study of Four Manpower Training Programs, prepared under Contract No. B99-4783, U. S. Office of Economic Opportunity, Division of Evaluation, Washington, D. C.: 1969 and other dates.

Michaelson, Jon, "Manpower Trainee Follow-up System," Division of Behavioral Sciences, National Research Council, National Academy of Sciences, Washington, D. C., Unpublished Study Background Paper, August 21, 1972.

Miller, Herman P., "Critique of David Farber's Method of Evaluating the Gains in Earnings of MDTA Trainees."

National Longitudinal Surveys, U. S. Department of Commerce, Bureau of the Census and Center for Human Resource Research, Ohio State University, Columbus, Ohio.

Nay, Joe N., Scanlon, John W., and Wholey, Joseph S., "Benefits and Costs of Manpower Training Programs: A Synthesis of Previous Studies with Reservations and Recommendations," Urban Institute Reprint 128-2400-1, The Urban Institute, Washington, D. C., March 1973.

Prescott, Edward C. and Cooley, Thomas F., Evaluating the Impact of MDTA Programs on Earnings Under Varying Labor Market Conditions, Final Report MEL 73-08 U. S. Department of Labor Contract No. 83-42-71-04, Philadelphia, Pennsylvania: University of Pennsylvania, October 17, 1972.

Robin, Gerald D., An Assessment of the In-Public School Neighborhood Youth Corps Projects in Cincinnati and Detroit, with Special Reference to Summer-Only and Year-Round Enrollees, Philadelphia, Pennsylvania: National Analyst, Inc., February 1969.

Somers, Gerald G., "An Evaluation of the Effects of Manpower Programs in the United States Based upon the National Longitudinal Surveys," Madison, Wisconsin: Department of Economics, University of Wisconsin, forthcoming.

Somers, Gerald G. & Ernst W. Stromsdorfer, Cost-Effectiveness Study of the In-School and Summer Neighborhood Youth Corps, Madison, Wisconsin: Industrial Relations Research Institute, Center for Studies in Vocational and Technical Education, The University of Wisconsin, 1970.

Steinberg, Joseph & Cooper, Hyman C., "Social Security Statistical Data, Social Science Research, and Confidentiality," Social Security Bulletin, October 1967.

Stern, James L., "Consequences of Plant Closure," The Journal of Human Resources, Winter, 1972.

Stromsdorfer, Ernst W., Review and Synthesis of Cost-Effectiveness Studies of Vocational and Technical Education, Columbus, Ohio: Center for Vocational and Technical Education, The Ohio State University, August 1972.

Author Not Stated, "An Analysis of Changes in Earnings of Participants in Manpower Training Programs," Agency Source not Stated, Draft paper, undated.