

AN ECONOMIC EVALUATION OF THE RETRAINING PROGRAM IN MICHIGAN: METHODOLOGICAL PROBLEMS OF RESEARCH

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A research project on the economics of the retraining program is currently being conducted at Michigan State University under a contract with the U. S. Department of Labor. The project has three main aims. It seeks to estimate (1) the economic benefits and costs to society as a whole which result from occupationally oriented institutional retraining courses undertaken in Michigan under the Manpower Development and Training Act and under the Area Redevelopment Act, (2) the economic benefits and costs which accrue to persons enrolling in retraining courses and (3) the impact of retraining courses upon the tax revenues, expenditures, and transfer payments of the government. Special efforts are being made to estimate how the impact of retraining varies with the characteristics of the training courses, the occupations for which training was intended, the labor markets, and the persons enrolled.

Of the many methodological problems which have arisen in our study and which may be common to a variety of benefit-cost studies of human resource programs, we shall deal with four: (1) estimating the social product gains on the basis of gains in trainee earnings, (2) use of a control group design for estimating the impact of retraining upon earnings of trainees, (3) accessibility and quality of earnings data, and (4) measuring the marginal social cost of retraining courses.

Estimating the Social Product Gains

Society may undertake retraining activities with many economic aims in mind: to alleviate unemployment and low earnings, to alleviate shortages of particular goods, or to expand the overall output of the nation. These objectives may be ends in themselves, and they may be means to broader, less clearly economic goals. For the main analysis, we interpret social economic benefits to mean the contribution that retraining courses make to aggregate national output over and beyond the direct effect of increased government expenditures on the retraining activities. Subsidiary analyses consider the impact of retraining upon employment status, welfare assistance status, occupational level, and other aspects having possible interest to policymakers.

There seems to be no way of observing directly the contribution of retraining courses to national output. It must instead be assessed by inference. The generally accepted method of inference is based on microeconomic theory, in particular the marginal productivity principle, as applied to perfectly competitive markets. According to this theory, the rate of remuneration earned by a resource will equal the contribution to output which was made by the unit of that resource last added to production. It follows from this proposition that if retraining induces a person to transfer from one occupation to another, the change in aggregate output resulting from retraining will equal the difference between the person's earnings in the two occupations.

Similarly, if retraining increases the person's efficiency in a particular occupation, aggregate output and trainee earnings will both increase and by approximately the same amount. If this line of reasoning is carried further, one could infer that the gains in aggregate output attributable to the whole retraining program are roughly equal to the sum of the gains in earnings of the trainees.

The equality of gains in output and earnings is strictly true only for marginal adjustments. If retraining courses were to affect a significant share of the labor force, a calculation based on discrete instead of marginal changes might become necessary. We do not think this is a major problem at the present time.

A much more important problem which must be overcome in measuring the gain in social output is that of non-market externalities. This problem has long been discussed. In the present context, the analysis should recognize that any reduction in unemployment, crime, and delinquency which might result from retraining would lower the demands placed on the public employment service and the welfare and social service agencies. The release of resources from these services to other uses in the economy will not be reflected in the wages that an employer pays a retrainee. No employer can be expected to count as a material benefit to himself the amount of resources which his action in hiring the unemployed saves society. As more becomes known about the effects of unemployment and low earnings upon the demand for social services, increasingly accurate adjustments for these external benefits should prove possible. At this time, however, benefit-cost analysis can at best make only tentative allowance for these factors.

A second type of analytical problem of even greater importance than that of non-market externalities occurs within the labor market. Retraining may enable an unemployed person to obtain a job which otherwise would have been filled by someone else. The trainee by securing a job increases his earnings. Although this increase equals the increment in output which society obtains by keeping the job filled instead of vacant, the job might not have remained vacant in the absence of retraining. Retraining would then merely cause one person to be displaced by another without adding to social product. In the course of time, the increased supply of persons available for a particular job would tend to reduce the relative wage rate for the job and would probably increase aggregate employment and output. But the extent and speed of this offset to the displacement effect are matters of faith rather than of knowledge.

Alternatively, retraining may enable a trainee to fill a vacancy which would otherwise have remained unfilled, and the trainee may have been recruited from an occupation where his former position was easily filled from among the unemployed. In this instance, the increment in social product attributable to retraining approximates the total

earnings of the trainee in his new occupation. It is equivalent to the gain in earnings of the trainee plus the gain in earnings of the person who would have been unemployed but who instead filled the trainee's former position. Retraining then not only upgrades one person, the trainee, but also creates a vacuum into which an unemployed person may move. A vacuum effect will also occur when the labor shortage occupation for which training takes place has important complementarities with other occupations which are easily filled from among the unemployed.

The vacuum effect can also appear in an economy experiencing full employment. If retraining of an individual for a shortage occupation induces another person to move up into the trainee's former occupation, the aggregate benefits to society equal the sum of the gains in earnings of the trainee and his replacement. If filling the shortage creates a demand for manpower in complementary occupations and if these vacancies are also filled by transfers from lower paid occupations, the aggregate benefits to society are enlarged further, but this additional benefit is not reflected in the gains of the trainee.

Fortunately for benefit-cost analysis these are extreme cases. Displacement is not likely to be important, if full employment prevails or if retraining is directed towards shortage occupations, as required by the Manpower Development and Training Act. The vacuum effect will be limited, if the trainees are recruited directly from among the unemployed, who are given priority in selection for the training courses, or if they are recruited from other shortage occupations. These mixed tendencies perhaps reduce the average bias in estimating the social product gains from private earnings. They also leave an uncomfortably wide margin for interpretation and qualification of findings.

Control Group Design

There are also problems in measuring how the retraining program affects the private earnings of the trainees themselves. To measure the private benefits of trainees, one must estimate how they would have fared in the labor market had they not become enrolled. A simple before-and-after comparison of the earnings of the trainees is not useful, because the earnings of a particular group of persons normally change over the course of time in response to cyclical and seasonal variation and to continuing displacement, attrition, and replacement hiring. Therefore, it is necessary to set up a control group of non-trainees for each course, who are as nearly similar to the trainees in their qualifications for retraining as it is possible to find, and to compare the earnings of the two groups for the same period. Such a control group might be composed of persons who have been considered for enrollment in the course, who possess the basic qualifications for enrolling, who have expressed an interest in enrolling, but who in fact have not enrolled.

In addition, it is necessary to obtain work history and other information for the nontrainees as well as for the trainees. By using personal background data from the period before training as

independent variables in the regression analyses, one can hope to eliminate statistically the major remaining differences between trainees and non-trainees as to initial skills, motivation, work habits, appearance, and other marketability factors.

Although the control group design might hold constant the basic marketability of individuals, it does not fully eliminate the danger of self-selection particularly when the earnings are measured for a rather short period of time after the end of the course. Fortuitous events, not predictable from basic marketability, in part determine who in a given group will get the job offers made at a particular time. If recipients of job offers abandon earlier decisions to enroll and instead accept the jobs, they will have earnings during at least part of the time the training course is in progress. Since these job opportunities are not necessarily available to the trainees, the earnings of nontrainees during the period of the course will tend to overstate the earnings foregone by the trainees while they are in the course. If the jobs accepted by the nontrainees last into the period after the end of the course or if they enhance their subsequent job opportunities, their earnings in the period after the training course will also be higher than the trainees could have expected to obtain, had they not enrolled. The observed difference between trainee and nontrainee earnings in the period after the end of the course will similarly understate the earnings gain resulting from the training course. The net effect will be an understatement of the rate of return from retraining courses.

In our study, we found a number of persons who indicated that they turned down the opportunity to enroll in retraining courses because they had found jobs or had received promises of jobs. We could not determine, however, if the trainees had similar job opportunities available at the time of enrollment. Therefore, we had to rely on two compromise solutions. One was to distinguish analytically between three groups of respondents: trainees, nontrainees with jobs or job promises as reasons for nonenrollment, and nontrainees for other reasons. The second solution was to classify the respondents into four groups on the basis of whether they were trainees or nontrainees and whether they did or did not have jobs when the courses started. Both solutions might help in constructing upper and lower bounds to the estimates of earnings gain and opportunity cost.

A decision to use control groups of qualified and interested nontrainees naturally implies that courses for which comparable nontrainees cannot be found must be excluded from the study. If these courses differ in effectiveness from retraining courses for which comparable nontrainees can be identified, the estimates of gains in earnings will be biased. In our study, we found that in a few instances the local employment service had been unable to recruit enough qualified and interested persons even to provide the enrollment planned. More commonly, it chose to recruit just enough persons to have one or two alternates to fill course vacancies resulting from early drop-outs. In some courses, no records had been set up

for persons who had been reviewed as potential enrollees, or the records had been discarded. Since the lack of control groups resulted from a variety of circumstances, only some of which could be expected to relate to the social or private profitability of the course, it probably did not markedly bias the selection of courses in our study.

Quality of Earnings Data

In order to estimate the gain in national product one must utilize data on earned income for trainees and for nontrainees during at least two periods of time: a time period after the course to estimate the future earnings gain, and the period of the course to estimate the earnings foregone by trainees while they are in training. In addition, as discussed earlier, it is desirable to obtain data on earnings for a period before the course, in order to construct a rough index of the persons' marketability. Interviews may be used for collecting this information and may also be employed to collect detailed personal data and other important facts, but they pose several problems: the time and expense of locating and interviewing named individuals at scattered locations on the basis of old addresses, the bias in the results which accrues from the inability to locate highly mobile or otherwise distinctive persons, the uneven quality of interview data on earnings, and the possible correlation between reporting errors and the main experimental variables.

In our study we were faced with each of these problems. Obtaining the data on earnings proved to be a most difficult and time-consuming task. Of the slightly more than 1,000 persons whom we sought, we ultimately succeeded in interviewing about 830 persons. A number of persons who had migrated to neighboring areas of Wisconsin, Illinois, Indiana, and Ohio were interviewed, but interstate migrants with their potentially different changes in earnings were probably underrepresented. Very few persons refused to be interviewed, but the answers of some persons were too spotty or too inconsistent to be useful.

In the interviews we sought information on work history, earnings, unemployment experience, prior education, and various personal characteristics. The interviewing was scheduled to ensure that work histories would cover a period of at least 365 days after the end of the course. In addition, the interview covered the period the course was in progress and several years prior to the course. Wide variations in quality were apparent within the 800 interviews that we are currently using in our analysis, even though the interviews were made by trained interviewers according to a detailed and fixed schedule. Some respondents kept excellent records, offered pay check stubs and copies of income tax returns in evidence, and criticized us for not asking them beforehand to have these records available. Others lacked records or resented suggestions that records be consulted. It early became clear that fringe benefit data would be very poor. Our data consequently included earnings before taxes and transfer payments, not total compensation for work performed, as would be more appropriate to a social economic benefit-cost analysis.

Our experience with the interview data led us to ask whether the response errors were related systematically to the main variable in the analysis, that is, to the person's status as trainee or nontrainee, or perhaps to variables with which the main variable might interact in its effect on the dependent variable, that is, private earnings. We, therefore, made a comparison of earnings data collected in interviews and earnings data obtained from employer reports that were kept for purposes of unemployment insurance. These data were gathered in a study of retraining in Connecticut which resembled the present study in interview method, items covered, and types of respondents interviewed.

The two bodies of data appeared to agree very closely despite minor discrepancies in coverage and definition: the difference in mean weekly earnings between the two groups was \$3.39 or about 5 per cent of the mean of earnings according to the interviews, and the simple product-moment correlation between the two sources was $r=0.95$. An analysis of the individual discrepancies showed, however, that these were significantly related to several personal data variables including age, sex, and education, all of which might be important in analyses of the economic benefits of retraining. Particularly relevant was the finding that the discrepancy between employer reports and survey data on weekly earnings was not the same for course dropouts as for graduates and nontrainees. This finding suggested that the true earnings advantage of the course graduates over the dropouts might have been as much as one-third greater than what was estimated from the survey data alone. Analysis of the economic benefits obtainable by reductions in the dropout rate would be seriously affected by errors of this magnitude, and even the estimates of the overall benefit-cost ratios would be weakened.

Measuring the Marginal Social Cost of Retraining

The direct social economic costs with which an analysis should compare the social economic benefits are composed essentially of two elements: the output foregone by society while the trainees are being retrained and the output foregone by society because of the diversion of resources to the retraining activity. The first element can be estimated from differences in private earnings during the period of the course, but with the weaknesses already discussed. The second element requires data of a different sort: the direct instructional costs incurred in the training facilities; the costs incurred in the activities of the public employment service for recruiting and selecting the trainees, administering the trainee allowance program, placing the trainees, and following up on their progress; the diffused costs of developing the training courses; and the costs of state and federal administration of the nation's manpower training program. The resources used in these activities will presumably be employed in other uses, if retraining does not exist. The value of the resources are then an estimate of the value of output foregone by their diversion to the retraining activity.

There are many problems in estimating the true value of the resources devoted to the

retraining program. The available records for the instructional costs show as part of the costs of the training course the entire purchase price of the equipment acquired or plant remodeling made for the sake of the course. This overstates the training costs, unless the capital assets have no further use and lack a significant salvage value. At the same time, facilities existing in the public vocational schools are used for some courses without any charge at all, which contributes to an understatement of training costs, while rented private facilities are used for some other courses with the rentals properly forming part of the current costs.

There are also problems with the accounts kept by the state employment service which is responsible for all of the local labor market aspects of the retraining program. The cost concept appropriate to the analysis of retraining is the additional cost incurred over and beyond what would have been incurred in the absence of retraining. At least some of the persons who are considered for retraining would receive services from the public employment service even if no retraining courses exist, and the cost for these services should properly be deducted from the ostensible costs of retraining. The proper size of the deduction is difficult to calculate, however, for it depends not only on the costs of normal services to an individual, but also on the impact that retraining has upon the subsequent demand from trainees and other persons for assistance from the public employment service, and this impact depends in turn on the extent to which trainees become securely employed in shortage occupations or merely displace others from surplus occupations. Sensitive benefit-cost analyses furthermore require an analysis of how the incremental costs of handling the retraining courses vary with such factors as course duration and the characteristics of prospective trainees, but no data adequate to this purpose are available.

The administrative costs of the overall program should also correspond to incremental costs, and the marginal costs of additional courses should be estimated. None of the detail required for this work can be obtained, and prorating the administrative costs in accordance with instructional costs seems the most acceptable compromise.

Conclusions

An understanding of how well the individual fares from retraining is an important element in judging the performance of the retraining effort. Many of the difficulties that we have described do not hamper the analysis of private benefits and costs, that is, the economic consequences for the individual person who contemplates being retrained. Except for the limited possibility that the post-training work experiences of trainees and control group members are interdependent, the effects of retraining upon other labor market participants are not relevant to the calculation of private benefits and costs and can be disregarded.

But what recommendations can be made about the analysis of social economic benefits and costs? Four main points may be made.

First, a benefit-cost analysis that infers social product gain from the differences in earnings between trainees and nontrainees tends to overstate the social economic benefits in periods of large, general unemployment, when retraining primarily redistributes jobs in favor of the trainees. It similarly tends to underestimate the benefits when there are pronounced labor shortages in particular occupations and the vacuum effect is likely to be important. Such situations may arise either in an economy of overfull employment without significant depressed areas or in a structurally maladjusted economy in which shortages and surpluses of manpower coexist. The calculations are most likely to be correct under conditions of balanced full employment if wages and prices are flexible. Since the passage of time tends to permit adjustment to new supply and demand conditions, it may be better to avoid making a benefit-cost analysis on the immediate effects of retraining, such as might be apparent in the first six to twelve months after the course, and to wait until the trainees have accumulated several years of labor market experience.

Second, if an analysis is to be made of the immediate effects, more weight should be given to results based on labor markets and time periods where unemployment is fairly low and evenly distributed than where a general recession or severe structural unemployment is evident. Efforts should also be made to refine the analysis by taking into account the shortages and surpluses existing in particular occupations in the period under observation. Short-run analyses might, perhaps, be corroborated in studies of employer adjustments to the filling and vacating of positions by trainees.

Third, the interview method of collecting data on private earnings is inaccurate and expensive, and it gives incomplete results. It should be replaced with a better method. This becomes increasingly urgent as the studies focus on longer-run effects or on programs in which geographic mobility may be a significant factor. The records of the Social Security Administration form a major useful body on the earnings of individuals. The limit on taxable reported earnings reduces the usefulness of these records when the analysis is to cover persons with medium or high earnings or when the limit has long remained unchanged despite a general growth in earnings. These difficulties are much less pronounced in analyses of human resource programs intended for low income groups. Another problem in using Social Security data results from the natural desire to prevent improper disclosure and use of information about individual persons. It should be possible, however, to find ways of enabling the analyst to use individual Social Security earnings data without actually disclosing the individual information to him. Having the statistical analysis performed in the agency is one possible solution. In another solution, which puts smaller burdens on the agency and which is probably also less costly and time-consuming to the analyst, the SSA would compute a sum of squares and cross products matrix based both on agency data and data supplied by the analyst. This would permit the analyst to use his own computational facilities and to explore the

material in greater detail.

Fourth, the measurement of social economic cost, except for earnings lost while the person is in training, would benefit from a detailed in-house study of many aspects of costs. These

should include the capital costs of instruction, the operating costs of the public employment service, and the dependence of overall administrative costs upon the number and nature of retraining courses undertaken.