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Abstract

This paper uses unique data from a major social experiment to identify what would have happened to the earnings of participants in a job training program had they not participated. We investigate the implications of these earnings patterns for the validity of widely used before-after and difference in differences estimators. Motivated by the failure of these estimators to produce credible estimates, we investigate the determinants of program participation. We find that labor force status dynamics, rather then just earnings or employment dynamics, drive the participation process. Our evidence suggests that training programs function as a form of job search for many of their participants. Methods that control only for earnings dynamics, like the difference in differences estimator, do not adequately capture the underlying choices leading to differences between participants and non-participants. Our findings regarding the participation process suggest how a valid nonexperimental evaluation strategy may be developed.

Key Words: Evaluation, Job Training, Ashenfelter's Dip, Difference in Differences, Experiments, JTPA

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1. Introduction

This paper uses unique data from a major social experiment to identify what would have happened to the earnings of participants in a job training program had they not participated. We investigate the implications of these earnings patterns for the validity of widely used before-after and difference in differences estimators. Motivated by the failure of these estimators to produce credible estimates, we investigate the determinants of program participation. We find that labor force status dynamics, rather then just earnings or employment dynamics, drive the participation process. Our evidence suggests that training programs function as a form of job search for many of their participants. Methods that control only for earnings dynamics, like the difference in differences estimator, do not adequately capture the underlying choices leading to differences between participants and non-participants. Our findings regarding the participation process suggest how a valid nonexperimental evaluation strategy may be developed.

The proliferation of labor market programs during the Great Society period led to a demand for evaluations of their effectiveness. The major challenge in conducting such evaluations is determining what would have happened to participants had they not participated. Early evaluators used before-after comparisons of participant outcomes to gauge the success of these programs. This approach attributes all improvements in outcomes relative to pre-program levels to the program being evaluated. In practice, early evaluators falsely attributed to these programs improvements due to life-cycle growth or economy-wide changes that would have occurred even in absence of participation. In a period of rapid economic growth, before-after estimators produced optimistic -- but distorted -- estimates of program impacts.

To address this problem, it became common to utilize a comparison group of non-participants to eliminate common life-cycle and economy-wide factors from the before-after estimator. In this difference in differences approach, the before-after earnings change for participants is compared to the before-after change for a temporally aligned group of non-participants. Orley Ashenfelter (1978) first pointed out a

potentially serious limitation of this procedure. In his influential analysis, Ashenfelter noted the empirical regularity that the mean earnings of participants in government training programs decline in the period prior to program entry. Subsequent research finds this regularity for participants in many other training programs (see Ashenfelter and David Card (1985) and Laurie Bassi (1983, 1984) and the papers they cite), leading it to be regarded as a universal phenomenon in the modern literature on program evaluation. The nature of this drop in earnings, in particular whether it is permanent or transitory, determines what would have happened to participants had they not participated and so has important implications for the success of the difference in differences estimation method. For example, if the drop in earnings for program participants is transitory, then before-after or difference in differences estimators will overstate the effect of participation on outcomes. The success of the many variants of the difference in differences evaluation strategy that control for earnings histories depends on the relationship between earnings and program participation.

In his work, Ashenfelter only had access to data on persons participating in a program and on a comparison group of non-participants. He was thus forced to speculate about what the earnings of participants would have been had they not participated. In this paper, we use data on the control group from a recent experimental evaluation of the employment and training programs funded under Title II-A of the Job Training Partnership Act (JTPA)[1] to learn what the earnings patterns of participants would have been had they not participated. Control group members were eligible for, applied to and were accepted into the JTPA program. Under certain conditions, their earnings represent the desired counterfactual.[2] The control group data show that only for adult males is the dip in mean earnings purely transitory or mean-reverting. For the other three demographic groups we consider, control group earnings experience

[1] See Howard Bloom et al. (1993) for a description of the National JTPA Study.

[2] James Heckman (1992) and Heckman and Jeffrey Smith (1993, 1995a) discuss the conditions under which experimental control group data provide the desired counterfactual.

growth above pre-program levels during the period after random assignment.

Using the control group data, we show that commonly used before-after comparisons of participant earnings yield seriously biased estimates of program impact. The empirical evidence from the JTPA experiment supports the criticisms of this estimator by the early evaluators.

Using comparison groups of non-participants and taking their earnings behavior as benchmarks against which to measure the change in participant earnings produces the widely used "difference in differences" approach. We implement this approach using the JTPA data and two comparison groups of eligibles.[3] The first consists of eligible non-participants (ENPs for short) at four of the sixteen sites in the experimental evaluation. In many ways, this comparison group is ideal. The ENPs reside in the same labor markets as the experimental treatments and controls, complete the same surveys, and are all eligible for JTPA. Heckman and Rebecca Roselius (1994) note that most comparison groups used in practice lack at least one, and often all, of these features. Smith (1995) demonstrates the importance of using the same survey instruments, while Heckman and Roselius document the importance of drawing participants and comparison group members from the same local labor market. The second comparison group of eligibles is drawn from the 1986 Full Panel of the Survey of Income and Program Participation (SIPP). This sample resembles those used in earlier evaluations with the exception that eligibility can be precisely determined using the wealth of information available in the SIPP data.

Using the experimental data as a standard, we demonstrate that the difference in differences approach applied to these comparison groups leads to seriously biased estimates of program impacts[4]. The earnings behavior of the comparison groups does not correspond to that of the controls, indicating that these groups do not provide the desired counterfactual. Furthermore, earnings growth among controls after random assignment makes the difference in differences estimator quite sensitive to the particular

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[3] See Appendix A for a detailed description of these samples.

[4] Burt Barnow, Heckman, Roselius and Smith (1995) examine this estimator in greater depth.

"before" and "after" periods considered. Ashenfelter's concerns about the validity of the difference in differences approach are clearly justified.

Finally, we investigate the determinants of Ashenfelter's dip and of participation in the JTPA program. We find that JTPA eligibility rules lead to a dip in the mean earnings of all eligibles. However, this dip does not match that observed for the controls. This mismatch implies that the eligibility rules do not cause Ashenfelter's dip, and that participation depends on pre-program earnings even after conditioning on eligibility. The divergence in pre-program earnings patterns between the controls and the comparison groups contributes to the bias and instability in the differences in differences estimator.

The failure of simple comparison group strategies suggests that successful estimators will have to build on a deeper understanding of the program participation process. Partly due to data limitations, early models of program participation and outcomes focused on earnings (Heckman, 1978 and Ashenfelter and Card, 1985) or employment (Card and Daniel Sullivan, 1988). We demonstrate that labor force status dynamics, in particular transitions to unemployment, and not earnings or employment dynamics, are the key determinants of participation in training programs. This is particularly true for groups other than adult males. These labor force status transitions are sometimes only weakly related to earnings dynamics. For example, persons who re-enter the labor force and become unemployed have no change in their earnings but become much more likely to participate in training programs. Training programs such as JTPA appear to operate as a form of job search. We show that a number of other factors such as age, schooling, marital status and family income help determine program participation. This evidence explains, in part, the failure of econometric methods based on the assumption that earnings histories drive program participation that is reported in Ashenfelter and Card (1985). A more effective econometric strategy exploits information on labor force status dynamics along with these other factors to account for self-selection bias in program participation. (See, e.g. Heckman and Roselius, 1994, and Heckman, Hidehiko Ichimura, Smith, and Petra Todd, 1995).

The plan of the paper is as follows: In section two we present our evidence on the post-random assignment earnings behavior of the experimental control group from the National JTPA Study. In section three, we show that the JTPA eligibility rules lead to a dip in mean earnings among eligibles. We compare the earnings of our comparison group samples to those of the controls and indicate their implications for difference in differences estimators of program impact. Section four considers the determinants of JTPA participation. The final section summarizes the implications of the analysis in this paper for future evaluations of labor market programs.

2. *Ashenfelter's Dip and the Before-After Estimator*

In this section, we examine the mean earnings of randomized-out JTPA participants, and consider their implications for before-after estimators of program impact. Figures 1A to 1D display the mean earnings of eligible JTPA applicants accepted into the program but randomly denied access to JTPA services at four of the 16 sites in the National JTPA Study. This group is labelled "Controls" in Figures 1A to 1D.[5] Month 't' in this case represents the month of random assignment, which coincides with the month of determination of eligibility for the program for most of the controls[6]. For these randomized-out control group members, the data show a large dip in mean earnings for <u>all</u> four demographic groups: adult males and females and male and female youth. In each case, the dip reaches its lowest point at month 't', the month of random assignment. For adults, the earnings decline begins more than a year before random assignment, while for youth it becomes noticeable only about six months prior to that time. The magnitude of the dip is substantial for all four groups. Among adults, mean earnings fall by over fifty

[5] Patterns are similar for the full set of 16 experimental sites included in the National JTPA Study. We focus here on the four sites at which detailed background information on the controls and a sample of eligible non-participants was gathered. Appendix A describes both the experimental control and treatment group samples in detail.

[6] In some cases, lags in the intake process may cause the month of random assignment to lie one or two months after the month of eligibility determination.

percent from the onset to the trough. The fall for youth is nearly as large in percentage terms.

The pattern of recovery from Ashenfelter's dip has important practical consequences for the performance of before-after estimators. If the decline in earnings prior to enrollment is a transient phenomenon, before-after comparisons will overstate the impact of the program on earnings if the earnings decline occurs in the period used to measure pre-training earnings. On the other hand, if the decline in mean earnings is persistent, the same before-after comparisons will understate the impact of the program if the earnings decline occurs during or after the period used to measure pre-training earnings. We find that for adult males the mean earnings decline is transient, while for the other three demographic groups, earnings in the post-random assignment period grow well above pre-program levels. In addition, the timing of the mean earnings decline indicates that evaluation strategies relying on before-after comparisons will require more than a year of pre-program data for adults and more than six months for youth. Even with sufficient pre-program data, the post-program earnings patterns displayed by the controls lead to a large upward bias in before-after estimators of program impact.

Table 1 presents estimates from before-after estimators applied to the JTPA data. The first two columns give the "before" and "after" periods used to define the estimator. The experimental impact for the "after" period is given in column three and the before-after estimates appear in column four. (The values in the remaining columns are defined later in this paper). For all demographic groups and for all base periods, the before-after estimator overstates the experimental impact, often substantially so. For example, the eighteen-month before-after impact estimate for adult males is $3,108.98 compared to an experimental estimate of $656.93. The contrast is even more dramatic for male youth where the experimental estimates are large and negative but the before-after estimates are large and positive.

3. Comparison Groups of Eligibles and the Difference in Differences Estimator

In this section, we show that the eligibility rules for the JTPA program produce a dip in the mean

family earnings of eligibles, and a dip in the mean individual earnings of adult eligibles. If the dip in individual earnings among eligibles matches that found for controls, this suggests that eligibility rules drive participation in the JTPA program. If so, program eligibles would provide a valid comparison group for nonexperimental evaluations. We show, however, that the earnings patterns of two comparison groups of eligibles differ in important ways from the pattern found for controls. As a result, difference in differences estimators based on these comparison group samples are both biased and unstable. We conclude that individual behavior conditional on eligibility, rather than JTPA eligibility rules, determine participation in the JTPA program.

A. Eligibility Rules for the JTPA Program

Economic disadvantage constitutes the primary avenue to eligibility for training provided under the Job Training Partnership Act. As defined by the Act, economic disadvantage arises if at least one of the following three criteria are met: (1) low family income in the six months prior to application to the program; (2) current receipt of cash public assistance such as Aid to Families with Dependent Children (AFDC) or general assistance; and (3) current receipt of food stamps. Similar measures of economic disadvantage have formed the basis of eligibility for most U.S. job training programs.

Table 2 presents the formal definition of economic disadvantage from the Job Training Partnership Act itself. The key features of the eligibility rules are the dependence on family income and the short six month window over which earnings are summed to determine eligibility. The six month window allows highly-skilled and normally highly-paid workers to become eligible for JTPA after only a few months of being out of work. According to the U.S. Department of Labor (1993a), in Program Year 1991[7] around 93 percent of JTPA participants qualified because they were economically disadvantaged.

A second, and much less important, avenue to JTPA eligibility is an "audit window" that allows

[7] Program Year (PY) 1991 covers the period from July 1991 to June 1992.

up to 10 percent of participants at each training site to be non-economically disadvantaged persons with other barriers to employment such as limited ability in English. Due to the subjective nature of these barriers, the eligibles examined here consist only of persons eligible via economic disadvantage. Theresa Devine and Heckman (1994) present an extensive discussion of the eligibility rules for JTPA, their variation over time and across states, and the implications of this variation for the composition of the eligible population.[8]

There are some differences between the eligibility criteria for JTPA and those of its predecessor programs CETA (Comprehensive Employment and Training Act) and MDTA (Manpower Development and Training Act). If eligibility rules vary substantially across programs, then we cannot generalize our results on the performance of comparison groups of eligibles, and our rejection of the simple model of random participation conditional on eligibility, to other programs. However, Barnow (1993) suggests that differences in eligibility rules across these programs are relatively modest.[9] All three programs have focused on displaced workers, persons with low incomes and transfer program participants. The eligibility rules during the later years of CETA were particularly close to those of JTPA. Furthermore, our evidence on the determinants of participation suggests that many differences in eligibility rules across programs have little impact on the types of persons participating. In particular, because recently unemployed persons and persons re-entering the labor force are much more likely to select into the JTPA program than other eligibles, differences in eligibility rules across programs that do not affect the eligibility status of these groups are likely to have only a limited effect on who participates.

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[8] Two other details regarding JTPA eligibility deserve note. First, the implementation of the general rules shown in Table 2 varies somewhat across localities, as states and training sites have some discretion over exactly what does and does not constitute family income and what does and does not constitute a family for the purposes of the program. Theresa Devine and Heckman (1994) show that such differences are too small to affect the patterns discussed here. Second, the eligibility rules described here are those in place at the time our data were collected. Since that time some marginal changes have been made. See Devine and Heckman or U.S. Department of Labor (1993b).

[9] CETA eligibility rules appear in the Federal Register on 3/19/74, 12/29/78, 4/3/79, and 5/20/80.

B. What the Eligibility Rules Imply About Family and Individual Earnings Patterns

As eligibility for JTPA depends in part on family income rather than on individual earnings, restrictions on the process generating monthly family income have implications for the time series pattern of mean family incomes of JTPA-eligible persons. In this section, we present two theorems indicating the implications of the eligibility rules for the time series of mean family income among eligibles for two broad classes of income processes. Both theorems apply only to eligibility resulting from low family income, and not to that resulting from transfer program participation.[10]

If monthly family income realizations are covariance stationary, so that the covariance between family income in any two months depends only on the number of intervening months, and if the covariance is positive, then the dip in mean family income among eligibles, should it appear, will reach its lowest point in the middle of the period over which family income is summed to determine eligibility. As family earnings are the primary source of family income in this population, the theorem should also hold for family earnings. In addition, because adult male earnings are still the main source of income for many families, the theorem roughly holds for adult male individual earnings as well. Formally, we establish the following Theorem:

Theorem 1: If the monthly family income process is covariance stationary, and positively correlated with linear conditional expectations, the trough in pre-program monthly family income among eligibles, if it exists, comes in the middle of the eligibility interval. ■

Proof: See Appendix B.

The intuition underlying the theorem is very simple. Let K be the number of periods over which family

[10] An examination of the time pattern of mean earnings among persons eligible via transfer program participation reveals an extremely gentle dip centered in the month of eligibility. Figure 2 shows that the earnings behavior of those eligible via low family income drives the overall mean.

income is summed to determine eligibility. A person is eligible if his or her total family income over these periods lies below a certain threshold: $\sum_{\ell=1}^{K} y_{t-\ell} \leq c$. From linearity of the regression,

$$E(Y_{t-\ell}|\sum_{\ell=1}^{K} Y_{t-\ell}) = \mu + \frac{Cov(Y_{t-\ell}, \sum_{\ell=1}^{K} Y_{t-\ell})}{Var(\sum_{\ell=1}^{K} Y_{t-\ell})} (\sum_{\ell=1}^{K} Y_{t-\ell} - \mu K).$$

Because the process is stationary, the only term in this expression that varies with ℓ is $Cov(Y_{t-\ell}, \sum_{\ell=1}^{K} Y_{t-\ell})$. This term is largest in the middle of the eligibility window when $Y_{t-\ell}$ is more highly correlated with all of the terms in $\sum_{\ell=1}^{K} Y_{t-\ell}$. Only if Y_ℓ is equicorrelated for all ℓ, ℓ', $\ell \neq \ell'$, will the conditional mean be flat over the interval. Conditional on income eligibility level c, we obtain

$$E(Y_{t-\ell}|\sum_{\ell=1}^{K} Y_{t-\ell} < c) = \mu + \frac{Cov(Y_{t-\ell}, \sum_{\ell=1}^{K} Y_{t-\ell})}{Var(\sum_{\ell=1}^{K} Y_{t-\ell})} \cdot E(\sum_{\ell=1}^{K} Y_{t-\ell} - \mu K|\sum_{\ell=1}^{K} Y_{t-\ell} < c)$$

where the final term is negative because $E(\sum_{\ell=1}^{K} Y_{t-\ell}) = \mu K$ and the truncation makes the mean of $\sum_{\ell=1}^{K} Y_{t-\ell}$ lie below the population mean. Thus the truncated mean is minimized in the period with the highest covariance, $Cov(Y_{t-\ell}, \sum_{\ell=1}^{K} Y_{t-\ell})$, which is in the "middle" of the eligibility window if the covariance between the monthly variables declines as the number of intervening months increases.

Figure 2 provides empirical support for the predictions of Theorem 1. This figure shows mean

family earnings for persons in the SIPP sample of eligibles.[11] For all four demographic groups, mean family earnings show a sizeable dip that reaches its lowest point three or four months prior to the month of eligibility. As predicted by Theorem 1, this is precisely the middle of the six month window used to determine JTPA eligibility.

Henry Farber and Robert Gibbons (1994) and Robert Topel and Michael Ward (1992) present evidence that earnings processes for males are nonstationary. If income increments are independent and identically distributed, and earnings follow a random walk, we have the following theorem.

Theorem 2. If the monthly family income process follows a random walk with linear conditional expectations, the trough in pre-program monthly family income among the eligibles comes at the end of the eligibility interval.

Proof: See Appendix B.

The intuition is the same as in Theorem 1 except that the underlying process is no longer stationary. Monthly income at the end of the interval is most highly correlated with income cumulated over the interval since the increments cumulate, and are not discounted as in a stationary earnings process. Non-stationarity in family income, combined with the operation of program eligibility rules, could explain the observed dip in mean earnings among controls centered at month 't' if the link between family income and individual earnings were sufficiently strong. However, the plots in Figure 2 provide no support for the random walk hypothesis regarding family income.

[11] No data are available on family income over time for the ENPs.

C. Comparing the Earnings Patterns of Eligibles and Participants

We now compare the mean earnings patterns of the two comparison group samples to that of the experimental controls from the National JTPA Study. If the patterns coincide, this provides support for a simple model of random participation conditional on eligibility. Put differently, it suggests that the eligibility rules rather than individual behavior determine participation in JTPA and account for Ashenfelter's dip. A difference between the time series of mean earnings of one of the comparison groups and the controls implies that difference in differences estimators based on that comparison group will yield biased estimates. The direction and magnitude of the bias, and the sensitivity of the estimator to changes in the time periods considered, depends on the particular form of the difference between the patterns.

Figures 1A to 1D display the mean individual earnings of all three groups around the month of measured eligibility or random assignment. For adult male and, to a much lesser extent, adult female SIPP eligibles, the pattern of mean individual earnings mimics that observed for mean family earnings in Figure 2. Youth in the SIPP eligible sample experience no dip in mean individual earnings corresponding to that found for family earnings. These differences across demographic groups in the relation between mean individual earnings and mean family earnings among the SIPP eligibles indicate that, except for adult males, eligibility depends crucially on the earnings behavior of other family members. For adult SIPP eligibles, mean earnings tend to recover from their decline because the eligibility rules for JTPA (and many other programs) operate to include persons suffering temporary adverse economic circumstances.

Comparing the mean earnings of the SIPP eligibles to those of the JTPA controls from the National JTPA Study, we find substantial differences between the two groups. Among adults, the magnitude of the dip is larger for the controls, whose dip is centered at month 't' rather than three or four months earlier. Among youth, only the controls show any dip at all. This evidence strongly suggests that while the structure of the JTPA eligibility rules clearly affects the mean earnings patterns observed for all eligibles, additional behavioral factors are required to account for the dip observed for participants.

Adult male and female ENPs show no dip in mean earnings during the period prior to month 't'. Smith (1995) demonstrates that the absence of a dip for this group results from the structure of the survey instrument used to gather earnings information on the ENPs. This survey instrument smooths away all within-job variation in earnings. Such variation is an important component of the dip observed among the SIPP eligibles.[12] It plays a relatively small role in the earnings dip for the controls, most of which results from the effects of job loss, which are captured by the survey. A better survey would have revealed a greater decline in earnings for both the ENPs and the controls.[13] Furthermore, with the exception of male youth, the ENPs do not experience earnings growth after month 't' to match that found for the controls.

The differences between the earnings patterns of the controls and the two comparison groups prior to month 't', combined with the divergence between the mean earnings of controls and both groups of eligibles in the period after month 't' due to earnings growth among controls, suggest the likely failure of difference in differences estimators. The last two columns of Table 1 present difference in differences estimates of the impact of training on earnings using the ENP (column 5) and SIPP eligible (column 6) comparison samples. These estimates reveal a consistent pattern of upward bias relative to the experimental impact estimates. Furthermore, the differences in the earnings patterns across groups prior to month 't' lead to a high degree of sensitivity in the difference in differences estimates to the "before" and "after" time periods used to generate the estimates. Barnow, Heckman, Roselius and Smith (1995) show that the failure of the difference in differences estimator for these comparison groups persists when the estimates are adjusted for differences in observable characteristics.

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[12] Research by Theresa Devine indicates that the self-employed account for much of the observed dip in mean earnings among JTPA eligible persons in the SIPP.

[13] See Smith (1995) and Appendix A for a more detailed discussion of these issues and of the difference in the level of mean earnings between the two samples of eligibles.

4. The Determinants of Participation in JTPA

Another approach to the construction of the counterfactual outcome corresponding to what would have happened to program participants had they not participated uses information about the determinants of program participation to construct econometric models that adjust for observed and unobserved differences between participants and comparison group members.[14] Though it still makes use of a comparison group, this strategy departs from the difference in differences approach in its greater reliance on empirically grounded models of program participation as a way to overcome the problem of selection bias.

Early work by Heckman (1978), Ashenfelter and Card (1985) and Card and Sullivan (1988) focused on earnings and employment changes as determinants of participation. This emphasis was a natural consequence of Ashenfelter's discovery and reflects the limited data available to these early analysts. Using richer data, we demonstrate that labor force status dynamics rather than earnings dynamics drive program participation. Table 3 presents program participation rates conditional on recent employment patterns calculated using the ENP and control group samples. We consider four employment patterns defined over the seven month period up to and including the month of random assignment for the controls or measured eligibility for the ENPs. These patterns are derived from the two most recent employment statuses prior to random assignment or eligibility. The resulting patterns are (1) continuous employment, (2) job gain, (3) job loss, (4) continuous non-employment.

For all four demographic groups, the table clearly shows that recent job losers have the highest participation rate in the program, followed by recent job gainers and the persistently non-employed. The persistently employed have the lowest estimated participation rates. Participation rates constructed from the SIPP sample of eligibles (not included in Table 3) show the same pattern. While job losers and job gainers have roughly equal representation among both samples of eligibles, job losers strongly outnumber

[14] See Heckman and Richard Robb (1985) for an extended discussion of this approach.

job gainers among the would-be participants who make up the experimental control group. This fact accounts for the difference in the temporal pattern of mean earnings between the two groups in the period prior to random assignment or measured eligibility. Similar findings regarding the importance of a recent job loss, and therefore of a recent decline in own earnings, in determining participation led to the emphasis on earnings and employment patterns in the earlier literature.

A. The Important Role of Labor Force Status Dynamics

In this section, we show that substantial variation in program participation probabilities exists within groups defined on the basis of recent employment and earnings patterns. This variation results from differences in the participation probabilities of persons with different labor force statuses, particularly between persons who are unemployed (not working but actively looking for work) and persons who are out of the labor force. This section presents our basic finding that labor force status dynamics - the temporal pattern of labor force participation and employment - provide additional information about the probability of participation beyond that provided by employment dynamics alone. In the following section, we show that measures based on labor force status dynamics do better at predicting participation among eligibles than alternative measures based on earnings or employment, particularly for groups other than adult men. Taken together, these results help account for the disappointing performance of econometric evaluation models that assume that program participation depends solely on earnings or employment histories.

Tables 4A to 4D present the distribution of labor force statuses among the SIPP eligibles and the ENPs at the time of measured eligibility, and among the controls at the time of random assignment. Participation rates calculated using the ENPs and controls are also presented. Labor force status plays a key role in determining the probability of participation in the JTPA program for all four demographic groups. In every case, those unemployed in the month of measured eligibility have by far the highest

probability of application to, and acceptance into, the JTPA program. As labor force status is not an explicit eligibility criterion, this evidence suggests that individual behavior and not program eligibility rules determine participation. Our results on the importance of labor force status in determining program participation are consistent with evidence reported in Steven Sandell and Kalman Rupp (1988). Looking across groups reveals that being employed and being out of the labor force imply very different participation probabilities for males, but rather similar participation probabilities for females. The high participation rate among the unemployed indicates the importance of labor market shocks in determining participation and is consistent with the high participation rate of job losers in the previous section.

Going back over spells, we find that both the labor force status in the month of measured eligibility or random assignment and labor force status in the preceding spell affect the probability of participation in JTPA. The two most recent labor force statuses during the period composed of the month of measured eligibility and the six preceding months define a set of nine labor force status patterns. For example, the pattern labelled "emp -> unm" refers to persons who were unemployed in the month of measured eligibility but whose most recent labor force status during the preceding six months was employment. Repeated patterns such as "olf -> olf" indicate persons with the same labor force status in the month of measured eligibility and in all of the six preceding months.

Several interesting patterns emerge from Table 4. First, substantial variation in participation rates exists among persons who do not work in any of the seven months up to and including the month of measured eligibility or random assignment. For all four demographic groups, the participation rate of persons persistently out of the labor force during this period lies well below that for persons unemployed for all seven months, and for persons who transit into or out of the labor force. For some demographic groups, there are additional differences between the continuously unemployed and those who move from unemployed to out of the labor force or vice versa.

Second, for all the groups other than male youth, job losers differ in their participation rates

depending on whether or not they leave the labor force after losing their jobs. Those actively looking for work after losing a job have a substantially higher probability of participation, especially among adult women and female youth.

Third, for adult females and for male youth, differences in participation rates among job gainers exist based on whether the person gained a job while unemployed or while out of the labor force. In both cases, those who find a job while unemployed have a higher participation probability than those who find a job while out of the labor force. For the other two groups, these two probabilities are roughly the same. Finally, for adult males the participation rates of persons of persons persistently out of the labor force substantially exceeds that for continuously employed persons. For the other three demographic groups, these two participation rates roughly equal one another.

B. Alternative Labor Market Variables

The analysis in the preceding section demonstrates that both the current and most recent preceding labor force status are important predictors of participation in JTPA conditional on eligibility. In this section we examine a variety of labor market variables to see which one performs best relative to a common measure of predictive performance. We seek to locate the key behavioral determinants of participation, so that they can form the cornerstone of an econometric model that successfully corrects for selection bias. The National JTPA Study (NJS) data contain a far richer set of variables than those available to previous analysts. Table 5 contrasts the data available from the NJS with that available in Ashenfelter (1978), Ashenfelter and Card (1986) and Robert LaLonde (1986). The improved data on labor force status dynamics reveals important new information about the program participation process. Heckman and Roselius (1994) and Heckman, Ichimura, Smith and Todd (1994) show that this better data greatly improve the performance of non-experimental estimators of program impact.

Table 7 summarizes our evidence on the performance of various predictors of program

participation. Definitions of the variables used in the estimation appear in Table 6. We consider fifteen specifications broken down into four groups. The first group contains two specifications limited to background variables; these specifications serve as a benchmark. The remaining groups include specifications based on employment, earnings and labor force status variables, respectively.

Each row of Table 7 presents the fraction of the observations predicted correctly using a particular set of variables. Estimated standard errors for the prediction rate appear in parentheses below each rate. For each specification, separate equations are estimated and reported for each of the four demographic groups. As shown in Appendix C, the relative performance of the alternative specifications is robust to removal of the background variables. The reported fraction of correct predictions consists of the simple average of the ENP and control correct prediction rates. This weighting is consistent with a symmetric loss function for misclassifications in the two groups.[15] A person is predicted to be a control if his or her estimated probability of participation exceeds 0.03, the assumed fraction of participants in the population.[16] Appendix C shows that, for the specifications discussed below, this cutoff value typically lies close to that which maximizes the equal-weights prediction rate. It also shows that changing the cutoff value from 0.03 to either 0.01 or 0.05 does not affect our conclusions from Table 7 on the relative performance of the various labor market variables at predicting control status.

The first group presented in Table 7 includes specifications based solely on background variables. The two specifications in this group differ only in that the second includes a categorical family income

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[15] Note that if the population-weighted prediction rate is used, then a correct prediction rate of 0.97 can be achieved by predicting everyone to be an ENP.

[16] Allen Hunt et al. (1984) estimate that 1.85 percent of persons eligible at some time during calendar year 1983 participated in JTPA. Sandell and Rupp (1988), using administrative data on JTPA participants from the Job Training Quarterly Survey (JTQS) for Program Years 1984 and 1985, along with data on persons eligible for JTPA constructed using the March 1986 CPS, estimate an annual participation rate of 2.3 percent among persons eligible at some time during a given year. This estimate may be broken down into separate estimates of 1.6 percent for adults age 22-64 and 5.1 percent for youth age 16-21. Estimates obtained using data from the National JTPA Study are presented in Smith (1994a). These data suggest annual participation rates between two and three percent.

variable. The small set of background variables included in the first specification predicts remarkably well, especially for adult males. Adding family income to the basic set of covariates improves the prediction rate for males but not for females.

The specifications in the second group include employment-related variables. The first specification includes only an indicator variable for whether or not the person is employed in the month of measured eligibility or random assignment. The second specification combines the employment indicator with the background variables. The specification based on employment at 't' alone has a surprisingly high prediction rate. The combination of employment at 't' and the background variables increases the prediction rate for all four groups relative to either the background variables alone or the employment indicator alone. The greater predictive power of the employment variables for adult males compared to the other three groups is a major finding, and motivates our search for other determinants of participation in our empirical work.

The third specification includes the employment transition variable used to produce the values in Table 3. This variable performs the best out of all of the employment-related variables for adult males and female youth. Indeed, for adult males, but not for the other three groups, employment transitions do almost as well as labor force status transitions at predicting program participation. The fourth specification in the employment group, denoted 'ETC' in Table 7, includes a categorical variable based on the number of transitions from employment to non-employment in the twenty-four months prior to measured eligibility or random assignment. This specification has the highest prediction rate among those based on employment-related variables for adult females and male youth, and has the highest prediction rate overall for male youth. The last two specifications in the employment group include categorical variables based on the number of job spells during the eighteen or forty-eight months prior to measured eligibility or random assignment. These specifications perform relatively poorly in comparison to that based on the employment transition variable, particularly for males.

The third group includes specifications based on earnings-related variables. The first specification in this group includes monthly earnings in each of the six months prior to the participation decision. The second includes quarterly earnings in each of the four quarters prior to the participation decision. The earnings history variables predict program participation moderately well for adult males, but much less well than the employment-related variables for the other three groups. We examined a number of other earnings-based variables, including more complicated variables based on earnings patterns in the months prior to measured eligibility or random assignment, and none performed particularly well. For this reason, we do not discuss them here. Earnings patterns alone are relatively poor predictors of participation in training programs, especially for groups other than adult males. This is an important finding because previous analysts have had to use earnings rather than labor force status transitions to predict participation in programs. This finding helps account for the disappointing results reported in Ashenfelter and Card (1985), who implement a non-experimental evaluation strategy based on the time paths of lagged earnings.

Specifications including labor force status variables comprise the final group in Table 7. The first specification includes only indicators for labor force status in month 't', while the second includes labor force status in 't' along with the background variables. Both specifications predict far better than the corresponding specifications involving employment at 't'. Distinguishing between non-employed persons based on whether or not they are looking for work is crucial to predicting program participation. The remaining three specifications incorporate labor force status dynamics. For adult males, the specification based on the two most recent labor force statuses defined earlier performs the best of all of the specifications considered in terms of predicting program participation. For women, the specification based on the amount of time in the most recent labor force status performs best overall, with the specification based on the two most recent labor force statuses a close second. For male youth, the specification based on the two most recent labor force statuses performs almost as well as that based on the employment transition variable that has the highest prediction rate for this group.

In comparing across specifications in Table 7, it is important to keep standard errors in mind. In many cases, the prediction rates of particular pairs of specifications can not be statistically distinguished. However, the broad pattern of the table is clear. With the exception of the employment transition variable for male youth, specifications based on recent labor force status dynamics consistently do better at predicting program participation than specifications based on employment or earnings variables. This is an important finding that suggests the need for improved models of program participation that explicitly account for labor force status dynamics.

C. Multivariate Analysis

This section presents a multivariate analysis of the determinants of participation in the JTPA program conditional on eligibility using the data on experimental controls and ENPs from the National JTPA Study.[17] Building on the results in the preceding section, we include variables indicating the two most recent labor force statuses in the seven months up to and including the month of the participation decision in our analysis. This multivariate analysis reveals the central role of recent labor force status dynamics in determining program participation, as well the contributing role of other factors such as age, schooling, marital status and family income.

Tables 8A to 8D report estimates of logit models of participation in the JTPA program as a function of observed characteristics for each of the four demographic groups. Coefficient estimates and estimated standard errors take account of the choice-based nature of the sample. These tables include coefficient estimates, estimated standard errors, p-values from standard tests of the null hypotheses that the true coefficients equal zero, and average numerical derivatives (or finite differences in the case of indicator variables). The training site indicators included in the model have no behavioral interpretation as the relative numbers of ENPs and controls at each site is an artifact of the study design.

[17] Heckman and Smith (1995b) present a more detailed analysis of the JTPA participation process.

Table 8E summarizes the predictive success of the model. This provides an additional measure of the overall importance of the included covariates and allows a comparison of alternative specifications on a common metric of interest. The table presents within-sample prediction rates when the model is estimated on the full sample. We report correct prediction rates for the ENPs and controls, as well as an equal-weighted average of the two. Appendix C provides additional details regarding the methods used to obtain the reported results.

The results for adult males reported in Table 8A show that all eight of the labor force status pattern indicators have coefficients statistically different from zero, though many of the coefficients can not be statistically distinguished from one another. The smallest coefficient is on the indicator variable for those persistently out of the labor force; their participation probabilities differ least from those of the persistently employed, who constitute the omitted group. The relative effects of the labor force status patterns on the predicted probability as summarized by the numerical derivatives parallel the ordering of univariate participation rates in Table 4A.

Among the other variables, older males have a lower conditional probability of participation. The estimated age effect accords with conventional arguments that the returns to training decline with age. The effect of completed schooling on the probability of participation shows a hill-shaped pattern, with persons with less than 10 or more than 15 years of schooling having differentially low estimated participation probabilities. Heckman and Smith (1995b) show that this pattern results from low rates of program awareness among those with little schooling, and low rates of participation conditional on awareness among the highly educated. Currently married men are relatively less likely to participate than never-married men, while those whose marriage ended more than two years ago are relatively more likely to participate. Food stamp receipt has a positive effect on the participation probability, while AFDC receipt has a negative effect. Because nearly all AFDC recipients also receive food stamps, the coefficient on the AFDC receipt indicator should be interpreted as the effect of receiving both types of assistance

rather than just food stamps. Finally, adult male eligibles with family incomes over $15,000 in the past year are relatively less likely to participate.

The results in Table 8B for adult women tell a similar story. Once again, all of the labor force status pattern indicators obtain high levels of statistical significance and have substantively important estimated numerical derivatives. As with adult males, the smallest estimated coefficient is for persons persistently out of the labor force. The relative effects of the various statuses closely match the ordering of the univariate participation rates in Table 4B.

The patterns for the other variables parallel those for adult males as well. Older women have a lower conditional probability of participation than women age 22 to 29. Those with relatively few or relatively many years of completed schooling have differentially low participation probabilities. Relative to never-married women, currently married women have lower conditional participation probabilities while previously married women have higher ones, with a larger effect for women whose marriage ended more than two years prior to the participation decision. Food stamp receipt again boosts the estimated participation probability while AFDC receipt, again interpreted as the marginal effect of receiving AFDC in addition to food stamps, reduces the participation probability.

Estimates for male youth appear in Table 8C. Perhaps because of the small sample size available for this group (only about a third that for adult males) only a few of the estimated coefficients are statistically different from zero. The pattern of point estimates on the labor force status transition variables roughly follows that found for adult males, with many of the individual coefficients attaining statistical significance. The familiar hill-shaped pattern in years of schooling reappears for male youth as well, though here it reaches its peak at 10-11 years of completed schooling rather than 12.

Finally, results for female youth appear in Table 8D. Nearly all of the labor force status pattern indicators achieve statistical significance at the five percent level, and most also have sizeable estimated numerical derivatives. As observed for the other three groups, labor force status patterns other than

continuous employment, particularly those incorporating unemployment in the month of the participation decision, have a strong positive effect on the probability of participation in JTPA. Among the labor force patterns other than continuous employment, being continuously out of the labor force has the smallest positive effect on participation. The pattern of schooling coefficients shows a monotonically increasing participation probability in years of schooling, though the coefficient for more than 12 years is poorly estimated. The effects of marital status follow those for adults, but do not achieve statistical significance. The AFDC and food stamp effects also parallel those for both adult groups.

Absent from the specifications reported here are measures of the state of the local economy at each of the four sites during the time that the ENP and control samples were collected. We estimated models including both county-level monthly unemployment rates averaged over the counties constituting each of the sites, and interactions between these unemployment rates and the site indicators. Surprisingly, given the strong relationship between individual unemployment and selection into the program found here, these variables never attained statistical significance and never had a noticeable impact on the proportion of correct predictions. One reason for this is that the number of ENPs whose month of measured eligibility occurs in a given calendar month depends not only on the size of the eligible population in that month, but also on the administrative schedule of the consulting firm conducting the surveys. A second reason is that the flow into the program, as measured by the number of persons randomly assigned in each calendar month, depends on other factors beyond the local economy, including the academic schedule of the community colleges that provide much of the JTPA training at these sites.

Our multivariate analysis of participation in JTPA conditional on eligibility reveals in a more structured statistical setting the fundamental importance of labor force status dynamics in determining participation. While the effects of these variables dominate those of the other covariates we examined, a number of other factors including age, schooling, marital status and family income also help to determine participation.

In contrast to the poor performance of the before-after and difference in differences impact estimators documented above, Heckman, Ichimura, Smith and Todd (1995) demonstrate that a non-parametric estimation strategy that builds upon our findings regarding the determinants of participation in JTPA can produce reliable estimates of program impacts. Their work shows that better data help solve the evaluation program by providing the richer understanding of the program participation process required for the successful implementation of non-experimental methods.

6. Summary and Conclusions

Using unique data on randomized-out control group members from a recent experimental evaluation of the JTPA program, we examined the earnings patterns of persons who would have participated in the counterfactual state where they do not participate. Combining the control group data with two comparison groups of persons eligible for JTPA, we analyzed the role of JTPA eligibility rules in inducing Ashenfelter's dip and considered the implications of the control (and comparison) group earnings patterns for commonly used before-after and difference in differences estimators. Finally, we used these rich data sources to gain a deeper understanding of the determinants of participation in training programs. Five main findings emerge from our analysis:

First, Ashenfelter's dip in the mean pre-program earnings of participants is found for all demographic groups in the JTPA data, though it is most important for adult males.

Second, earnings data on experimental control group members reveal that the dip in mean earnings for participants is not mean-reverting except for adult males. Instead, for adult women and for male and female youth, the control group data indicate the participants would experience earnings growth in the post-program period even if they did not participate. This growth leads to large upward bias in before-after estimators of program impact.

Third, we show that the JTPA eligibility rules lead to a dip in mean family earnings among

eligibles and in mean individual earnings among adult eligibles. This dip reaches its trough in the center of the eligibility window, rather than at the end as found for the experimental controls, and is mean-reverting in every case. The difference in the temporal patterns of mean earnings for eligibles and controls implies that eligibility rules alone do not account for Ashenfelter's dip. This in turn indicates that individual behavior conditional on eligibility determines program participation.

Fourth, comparison groups of program eligibles exhibit different pre-program and post-program earnings patterns than experimental control group members. That is, conditioning on eligibility status for the program results in a comparison group that is not equivalent to the experimental control group and which therefore does not represent the desired counterfactual outcome that participants would experience if they did not participate. Using two separate comparison groups of eligibles, we show that these differences in earnings patterns lead to substantial bias in difference in differences estimators of program impact. Furthermore, these estimators exhibit striking instability with respect to changes in the "before" and "after" time periods used to construct them. This confirms a finding in Ashenfelter and Card (1985).

Fifth, labor force status transitions, particularly transitions into unemployment both from employment and from outside the labor force, drive participation in JTPA among program eligibles. Earnings changes are only weak predictors of program participation. The emphasis on earnings declines as predictors of program participation in the previous literature reflects the lack of available data in earlier studies and helps to account for the disappointing performance of some of the earlier evaluation strategies based on earnings dynamics as predictors of program participation. Building on our findings here regarding the central role of labor force status transitions and the contributing role of additional factors such as age, schooling, marital status and family income, Heckman, Ichimura, Smith and Todd (1995) and Barnow, Heckman, Roselius and Smith (1995) develop an effective matching methodology that yields comparison groups truly comparable to experimental control groups. Comparison groups formed on this basis are virtually identical to experimental control groups in estimating program impacts.

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TABLE 1

Before-After and Difference in Differences Impact Estimates
NJS Control and Treatment Group and ENP Samples and SIPP Eligible Sample
Estimates in Dollars of Earnings Per 18 Months
Estimated Standard Errors in Parentheses

Before Period	After Period	Experimental (2) Estimate	Before (3) After Estimate	Diff-in-Diffs (4) Estimate (ENP)	Diff-in-Diffs (4) Estimate (SIPP)
Adult Males					
t-18 to t-1	t+1 to t+18	656.93 (562.78)	3108.98 (511.25)	922.89 (1143.08)	N.A. (5)
t-15 to t-1	t+1 to t+15	601.51 (578.83)	3413.89 (512.78)	1501.74 (1144.06)	2630.76 (535.54)
t-12 to t-1	t+1 to t+12	529.75 (586.53)	3592.49 (512.52)	1994.42 (1141.67)	2345.99 (532.26)
t-15 to t-13	t+13 to t+15	953.74 (703.98)	2626.14 (693.13)	-807.58 (1351.88)	3207.37 (719.28)
t-18 to t-16	t+18 to t+16	937.18 (687.96)	1854.91 (697.06)	-1960.56 (1342.43)	N.A. (5)
Adult Females					
t-18 to t-1	t+1 to t+18	845.17 (370.54)	3171.83 (317.11)	2188.61 (536.84)	N.A. (5)
t-15 to t-1	t+1 to t+15	877.88 (368.53)	3078.08 (315.99)	2236.26 (537.80)	2678.84 (322.53)
t-12 to t-1	t+1 to t+12	928.02 (366.41)	2986.58 (313.45)	2269.11 (537.48)	2552.33 (319.30)
t-15 to t-13	t+13 to t+15	753.15 (481.93)	3413.24 (425.47)	1989.68 (632.21)	3246.00 (432.45)
t-18 to t-16	t+18 to t+16	811.95 (476.98)	3600.43 (424.58)	1878.65 (631.71)	N.A. (5)

1. Table updated on February 14, 1995.
2. Experimental estimates include only treatments and controls at the four sites at which detailed information on controls and eligibles non-participants was collected. The experimental estimates presented are cross-section estimates obtained by differencing treatment and control mean earnings in the "after" period. Note that with experimental data the expected values of the cross section and difference-in-differences estimators are the same.
3. The before-after estimates are obtained by subtracting control group mean earnings in the "before" period from treatment group mean earnings in the "after" period.
4. The difference in differences estimates consist of the difference between the change in mean earnings for the treatment group between the "before" and "after" periods and the change in mean earnings for the comparison group (either SIPP or ENP) between the "before" and "after" periods. Treatment group mean earnings in the "before" period are estimated using control group mean earnings in the "before" period.
5. Some values for the SIPP are omitted due to the limited length of the panel.
6. The top one percent of monthly earnings are trimmed for each demographic group in each of the SIPP, ENP, control and treatment group samples.
7. The control group and ENP samples include only persons with a valid earnings observation in month t-18 and in month t+18. The treatment group sample includes only persons with a valid earnings observation for month t+18 (no earnings information is available for the treatment group prior to month t). The SIPP eligible sample includes only persons with valid earnings information in the first and last months of the panel.
8. Sample sizes are 1271 treatments, 453 controls, 401 ENPs, and 10864 SIPP eligibles for adult males and 1464 treatments, 599 controls, 885 ENPs and 19606 SIPP eligibles for adult females. The SIPP eligible sample consists of person-months rather than persons.

TABLE 1 (CONTINUED)

Before-After and Difference in Differences Impact Estimates
NJS Control and Treatment Group and ENP Samples and SIPP Eligible Sample
Estimates in Dollars of Earnings Per 18 Months
Estimated Standard Errors in Parentheses

Before Period	After Period	Experimental (2) Estimate	Before (3) After Estimate	Diff-in-Diffs (4) Estimate (ENP)	Diff-in-Diffs (4) Estimate (SIPP)
Male Youth					
t-18 to t-1	t+1 to t+18	-1060.02 (658.69)	2498.51 (527.17)	-1214.98 (1404.83)	N.A.
t-15 to t-1	t+1 to t+15	-1134.28 (690.22)	2014.13 (540.16)	-1156.27 (1430.55)	634.99 (561.19)
t-12 to t-1	t+1 to t+12	-1035.84 (694.07)	1486.05 (559.63)	-978.22 (1472.85)	161.08 (580.05)
t-15 to t-13	t+13 to t+15	-1500.32 (884.89)	4665.60 (647.23)	-2065.06 (1675.42)	2996.49 (670.39)
t-18 to t-16	t+18 to t+16	-1387.61 (843.04)	4836.80 (667.81)	-1957.95 (1756.79)	N.A.
Female Youth					
t-18 to t-1	t+1 to t+18	-112.83 (432.68)	2641.68 (322.33)	1180.19 (742.50)	N.A.
t-15 to t-1	t+1 to t+15	-96.70 (440.35)	2452.41 (328.15)	1313.47 (754.56)	1088.40 (344.45)
t-12 to t-1	t+1 to t+12	-148.89 (445.28)	2223.29 (333.17)	1327.33 (773.33)	971.08 (347.93)
t-15 to t-13	t+13 to t+15	292.14 (583.40)	3492.87 (435.97)	1302.14 (885.76)	1943.82 (454.26)
t-18 to t-16	t+18 to t+16	-105.99 (603.27)	3683.81 (427.29)	490.73 (918.57)	N.A.

1. Table updated on February 14, 1995.
2. Experimental estimates include only treatments and controls at the four sites at which detailed information on controls and eligibles non-participants was collected. The experimental estimates presented are cross-section estimates obtained by differencing treatment and control mean earnings in the "after" period. Note that with experimental data the expected values of the cross section and difference-in-differences estimators are the same.
3. The before-after estimates are obtained by subtracting control group mean earnings in the "before" period from treatment group mean earnings in the "after" period.
4. The difference in differences estimates consist of the difference between the change in mean earnings for the treatment group between the "before" and "after" periods and the change in mean earnings for the comparison group (either SIPP or ENP) between the "before" and "after" periods. Treatment group mean earnings in the "before" period are estimated using control group mean earnings in the "before" period.
5. Some values for the SIPP are omitted due to the limited length of the panel.
6. The top one percent of monthly earnings are trimmed for each demographic group in each of the SIPP, ENP, control and treatment group samples.
7. The control group and ENP samples include only persons with a valid earnings observation in month t-18 and in month t+18. The treatment group sample includes only persons with a valid earnings observation for month t+18 (no earnings information is available for the treatment group prior to month t). The SIPP eligible sample includes only persons with valid earnings information in the first and last months of the panel.
8. Sample sizes are 736 treatments, 230 controls, 85 ENPs and 2167 SIPP eligibles for male youth and 804 treatments, 289 controls, 154 ENPs and 3311 SIPP eligibles for female youth. The SIPP eligible sample consists of person-months rather than persons.

TABLE 2

DEFINITION OF ECONOMIC DISADVANTAGE

According to the Job Training Partnership Act, a person is economically disadvantaged, and hence eligible for the employment and training services provided under the Act, if he or she:

1) receives, or is a member of a family which receives, cash welfare payments under a Federal, State, or local welfare program;

2) has, or is a member of a family which has, received a total family income for the six-month period prior to application for the program involved (exclusive of unemployment compensation, child support payments, and welfare payments) which, in relation to family size, was not in excess of the higher of

   A) the poverty level determined in accordance with criteria established by the Director of the Office of Management and Budget, or

   B) 70 percent of the lower living standard income level;

3) is receiving food stamps pursuant to the Food Stamp Act of 1977 (42 U.S.C, 1305. October 1, 1977);

4) qualifies as a homeless individual under Section 103 of the Stewart B. McKinney Homeless Assistance Act;

5) is a foster child on behalf of whom State or local government payments are made; or

6) is an adult handicapped individual whose own income meets the requirements of clause (2) but who is a member of a family whose income does not meet such requirements.

Source: Job Training Partnership Act of 1982, Public Law 97-300, 29 USC 103.

TABLE 3

JTPA PARTICIPATION PERCENTAGES CONDITIONAL ON EMPLOYMENT TRANSITION PATTERNS NJS Control and ENP Samples

	Adult Males	Adult Females	Male Youth	Female Youth
Continuous Employment	0.84	1.40	1.66	1.15
	(0.23)	(0.24)	(0.55)	(0.40)
Job Gainer	5.12	3.73	3.80	3.74
	(0.56)	(0.38)	(0.83)	(0.72)
Job Loser	13.43	7.78	6.50	6.50
	(0.87)	(0.54)	(1.07)	(0.93)
Continuous Non-employment	6.56	3.09	2.62	2.76
	(0.63)	(0.35)	(0.69)	(0.62)

1. Table updated on March 8, 1995

2. Participation rates assume that participants constitute three percent of the eligible population.

3. Employment transition patterns are based on the two most recent employment statuses in the seven month period up to and including the month of eligibility screening or random assigment. The employed row refers to persons employed in all of these months. The job gainer row refers to persons employed at 't' but whose employment spell began within the preceding six months. The job loser row refers to persons not employed at 't' but whose non-employment spell began within the preceding six months. The not employed row refers to persons not employed during all seven months.

TABLE 4A

LABOR FORCE STATUS AND LABOR FORCE STATUS TRANSITIONS SAMPLE PROPORTIONS AND PARTICIPATION PERCENTAGES JTPA ELIGIBLES AND PARTICIPANTS

Adult Males

Variable	SIPP Eligible	NJS ENP	NJS Control	NJS Percent Participating
Employed	56.19	77.30	34.73	1.37
	(0.44)	(1.29)	(1.67)	(0.07)
Unemployed	18.60	11.91	51.04	11.71
	(0.35)	(1.01)	(1.75)	(1.06)
OLF	25.21	10.79	14.23	3.92
	(0.39)	(0.95)	(1.22)	(0.41)
Emp -> Emp	39.75	70.52	19.38	0.84
	(0.44)	(1.37)	(1.35)	(0.07)
Unm -> Emp	11.15	6.61	11.17	4.96
	(0.28)	(0.75)	(1.08)	(0.80)
OLF -> Emp	5.28	2.53	4.77	5.51
	(0.20)	(0.48)	(0.74)	(1.22)
Emp -> Unm	6.59	5.17	27.98	14.33
	(0.22)	(0.67)	(1.53)	(1.65)
Unm -> Unm	7.58	4.93	17.05	9.67
	(0.24)	(0.66)	(1.29)	(1.42)
OLF -> Unm	4.43	1.27	5.50	11.82
	(0.18)	(0.35)	(0.78)	(3.77)
Emp -> OLF	3.57	1.57	5.84	10.32
	(0.17)	(0.37)	(0.80)	(2.68)
Unm -> OLF	5.28	0.37	1.89	13.63
	(0.20)	(0.18)	(0.47)	(1.71)
OLF -> OLF	16.36	7.04	6.43	2.75
	(0.33)	(0.76)	(0.84)	(0.40)

1. Table updated on March 21, 1995

2. The column headed 'SIPP Eligible' refers to a sample of JTPA-eligible person months constructed from the 1986 Full Panel of the Survey of Income and Program Participation (SIPP). The column headed 'NJS ENP' refers to a sample of persons eligible for, but not participating in, JTPA drawn at four of the training sites included in the National JTPA Study (NJS). The column heaed 'NJS Control' refers to the experimental control group at the same four sites from the NJS. The final column displays the conditional percent participating calculated using the controls and ENPs under the assumption that the population participation rate is 0.03. Further details about the samples appear in Appendix A.

3. Labor force status transitions are defined by looking backward in time starting in month t and ending in month t-6. The second status in each pattern is the status in month t. The first status is the most recent prior status within the indicated time period. Thus, 'Emp -> Unm' indicates persons unemployed at t but whose most recent preceding labor force status within the prior six months was employed. Repeated patterns such as 'Emp -> Emp' indicate persons with the same labor force status from t-6 to t.

TABLE 4B

LABOR FORCE STATUS AND LABOR FORCE STATUS TRANSITIONS SAMPLE PROPORTIONS AND PARTICIPATION PERCENTAGES JTPA ELIGIBLES AND PARTICIPANTS

Adult Females

Variable	SIPP Eligible	NJS ENP	NJS Control	NJS Percent Participating
Employed	39.43	42.60	27.70	1.97
	(0.33)	(1.16)	(1.46)	(0.10)
Unemployed	10.73	11.62	42.54	10.17
	(0.21)	(0.75)	(1.61)	(0.56)
OLF	49.84	45.79	29.76	1.97
	(0.34)	(1.17)	(1.50)	(0.10)
Emp -> Emp	28.11	36.66	16.87	1.40
	(0.31)	(1.08)	(1.20)	(0.11)
Unm -> Emp	5.77	4.19	6.89	4.83
	(0.16)	(0.44)	(0.81)	(0.74)
OLF -> Emp	5.55	4.55	4.06	2.69
	(0.16)	(0.46)	(0.63)	(0.48)
Emp -> Unm	2.94	3.82	18.94	13.30
	(0.12)	(0.43)	(1.26)	(1.20)
Unm -> Unm	2.63	4.19	14.19	9.48
	(0.11)	(0.44)	(1.13)	(1.00)
OLF -> Unm	5.16	3.93	9.47	6.93
	(0.15)	(0.43)	(0.94)	(0.89)
Emp -> OLF	5.37	5.56	6.62	3.55
	(0.15)	(0.51)	(0.80)	(0.49)
Unm -> OLF	7.05	2.32	3.95	5.00
	(0.17)	(0.33)	(0.63)	(1.07)
OLF -> OLF	37.42	34.78	19.01	1.66
	(0.33)	(1.07)	(1.28)	(0.11)

1. Table updated on March 21, 1995

2. The column headed 'SIPP Eligible' refers to a sample of JTPA-eligible person months constructed from the 1986 Full Panel of the Survey of Income and Program Participation (SIPP). The column headed 'NJS ENP' refers to a sample of persons eligible for, but not participating in, JTPA drawn at four of the training sites included in the National JTPA Study (NJS). The column heaed 'NJS Control' refers to the experimental control group at the same four sites from the NJS. The final column displays the conditional percent participating calculated using the controls and ENPs under the assumption that the population participation rate is 0.03. Further details about the samples appear in Appendix A.

3. Labor force status transitions are defined by looking backward in time starting in month t and ending in month t-6. The second status in each pattern is the status in month t. The first status is the most recent prior status within the indicated time period. Thus, 'Emp -> Unm' indicates persons unemployed at t but whose most recent preceding labor force status within the prior six months was employed. Repeated patterns such as 'Emp -> Emp' indicate persons with the same labor force status from t-6 to t.

TABLE 4C

LABOR FORCE STATUS AND LABOR FORCE STATUS TRANSITIONS SAMPLE PROPORTIONS AND PARTICIPATION PERCENTAGES JTPA ELIGIBLES AND PARTICIPANTS

Male Youths

Variable	SIPP Eligible	NJS ENP	NJS Control	NJS Percent Participating
Employed	40.29	57.82	42.26	2.21
	(0.97)	(3.51)	(2.51)	(0.19)
Unemployed	24.24	24.04	39.58	4.84
	(0.85)	(3.02)	(2.48)	(0.68)
OLF	35.46	18.13	18.16	3.00
	(0.95)	(2.75)	(1.97)	(0.53)
Emp -> Emp	20.36	41.46	22.61	1.66
	(0.80)	(3.36)	(2.11)	(0.19)
Unm -> Emp	11.06	6.23	13.19	6.15
	(0.62)	(1.64)	(1.69)	(1.63)
OLF -> Emp	8.87	10.00	7.55	2.28
	(0.56)	(2.01)	(1.32)	(0.53)
Emp -> Unm	8.32	11.07	24.09	6.31
	(0.55)	(2.14)	(2.14)	(1.28)
Unm -> Unm	6.55	7.48	8.33	3.33
	(0.49)	(1.80)	(1.39)	(0.97)
OLF -> Unm	9.38	5.28	7.13	4.00
	(0.58)	(1.55)	(1.29)	(1.61)
Emp -> OLF	6.59	3.32	8.25	7.13
	(0.49)	(1.24)	(1.37)	(3.85)
Unm -> OLF	7.06	3.31	3.19	2.89
	(0.51)	(1.25)	(0.89)	(1.81)
OLF -> OLF	21.81	11.84	5.66	1.46
	(0.82)	(2.25)	(1.18)	(0.51)

1. Table updated on March 21, 1995

2. The column headed 'SIPP Eligible' refers to a sample of JTPA-eligible person months constructed from the 1986 Full Panel of the Survey of Income and Program Participation (SIPP). The column headed 'NJS ENP' refers to a sample of persons eligible for, but not participating in, JTPA drawn at four of the training sites included in the National JTPA Study (NJS). The column heaed 'NJS Control' refers to the experimental control group at the same four sites from the NJS. The final column displays the conditional percent participating calculated using the controls and ENPs under the assumption that the population participation rate is 0.03. Further details about the samples appear in Appendix A.

3. Labor force status transitions are defined by looking backward in time starting in month t and ending in month t-6. The second status in each pattern is the status in month t. The first status is the most recent prior status within the indicated time period. Thus, 'Emp -> Unm' indicates persons unemployed at t but whose most recent preceding labor force status within the prior six months was employed. Repeated patterns such as 'Emp -> Emp' indicate persons with the same labor force status from t-6 to t.

TABLE 4D

LABOR FORCE STATUS AND LABOR FORCE STATUS TRANSITIONS SAMPLE PROPORTIONS AND PARTICIPATION PERCENTAGES JTPA ELIGIBLES AND PARTICIPANTS

Female Youths

Variable	SIPP Eligible	NJS ENP	NJS Control	NJS Percent Participating
Employed	38.52	38.31	25.75	2.04
	(0.79)	(2.72)	(2.12)	(0.21)
Unemployed	15.00	13.87	42.61	8.68
	(0.58)	(1.90)	(2.39)	(1.09)
OLF	46.48	47.81	31.63	2.01
	(0.81)	(2.78)	(2.25)	(0.17)
Emp -> Emp	20.92	27.26	10.28	1.15
	(0.66)	(2.40)	(1.45)	(0.17)
Unm -> Emp	8.92	5.61	8.43	4.44
	(0.46)	(1.22)	(1.33)	(1.31)
OLF -> Emp	8.68	6.88	7.25	3.16
	(0.46)	(1.34)	(1.23)	(0.82)
Emp -> Unm	3.53	3.70	20.21	14.46
	(0.30)	(0.99)	(1.91)	(4.47)
Unm -> Unm	2.79	5.19	11.29	6.31
	(0.27)	(1.18)	(1.51)	(1.59)
OLF -> Unm	8.68	4.47	11.31	7.25
	(0.46)	(1.09)	(1.52)	(2.06)
Emp -> OLF	7.17	10.45	11.60	3.32
	(0.42)	(1.62)	(1.52)	(0.71)
Unm -> OLF	7.67	3.67	2.92	2.40
	(0.43)	(0.99)	(0.81)	(1.06)
OLF -> OLF	31.64	32.77	16.71	1.55
	(0.76)	(2.52)	(1.78)	(0.20)

1. Table updated on March 21, 1995

2. The column headed 'SIPP Eligible' refers to a sample of JTPA-eligible person months constructed from the 1986 Full Panel of the Survey of Income and Program Participation (SIPP). The column headed 'NJS ENP' refers to a sample of persons eligible for, but not participating in, JTPA drawn at four of the training sites included in the National JTPA Study (NJS). The column heaed 'NJS Control' refers to the experimental control group at the same four sites from the NJS. The final column displays the conditional percent participating calculated using the controls and ENPs under the assumption that the population participation rate is 0.03. Further details about the samples appear in Appendix A.

3. Labor force status transitions are defined by looking backward in time starting in month t and ending in month t-6. The second status in each pattern is the status in month t. The first status is the most recent prior status within the indicated time period. Thus, 'Emp -> Unm' indicates persons unemployed at t but whose most recent preceding labor force status within the prior six months was employed. Repeated patterns such as 'Emp -> Emp' indicate persons with the same labor force status from t-6 to t.

TABLE 5

DATA AVAILABLE IN STUDIES OF EMPLOYMENT AND TRAINING PROGRAMS

	Ashenfelter (1978)	Ashenfelter and Card (1985)	LaLonde (1986)	NJS
Demographic Variables				
Age	Yes	Yes	Yes	Yes
Sex	Yes	Yes	Yes	Yes
Race or ethnicity	Yes	Yes	Yes	Yes
Years of schooling	No	Yes	Yes	Yes
Marital status	No	Yes	Yes	Yes
Transfer Program Participation Variables				
AFDC receipt	No	No	No	Yes
Food stamp receipt	No	No	No	Yes
Labor Market Variables				
Pre-training hours	No	No	2 Years (Annual)	5 Years (Monthly)
Post-training hours	No	No	2 Years (Annual)	2 Years (Monthly)
Pre-training earnings and employment	5 Years (Annual)	5 Years (Annual)	2 Years (Annual)	5 Years (Monthly)
Post-training earnings and employment	5 Years (Annual)	2 Years (Annual)	2 Years (Annual)	2 Years (Monthly)
Pre-training LFS	No	No	No	1 Year (Monthly)
Post-training LFS	No	No	No	2 Years (Monthly)
Local labor market	No	No	No	Yes
Other Variables				
Family income	No	No	No	Yes

1. Table updated on March 22, 1995
2. NJS refers to studies based on the National JTPA Study data. In addition to this paper these include Heckman, Ichimura, Smith and Todd (1995), Heckman and Roselius (1994), Heckman and Smith (1995b) and Barnow, Heckman, Roselius and Smith (1995).
3. Ashenfelter and Card (1985) used differencing to remove the effects of time-invariant personal characteristics.
4. Ashenfelter (1978) and Ashenfelter and Card (1985) had Social Security earnings data matched to samples of program participants and to comparison groups constructed from the Current Population Survey. Lalonde had self-reported data on Supported Work experimental treatment and control group members, along with self-reported data on PSID sample members and Social Security earnings data on CPS comparison group members. The NJS studies have available constructed monthly earnings measures based on self-reported information about job spells for experimental control group members and for a comparison group of eligible non-participants at four of the 16 sites in the study.
5. LFS denotes labor force status, which refers to the CPS categories of employed, unemployed or out of the labor force.

TABLE 6
DEFINITIONS OF LABOR MARKET VARIABLES

Background Specifications

1. The background (BKGD) specification includes race and ethnicity indicators, age category indicators, years of completed schooling category indicators, marital status indicators, and an indicator for the presence of a child less than six years of age. These variables are included in all of the other specifications unless otherwise noted.

2. The family income specification adds a categorical measure of family income based on the earnings in the 12 months prior to the baseline interview of all family members living in the same household as the sample member at the time of the interview.

Employment Specifications

1. "Employment at 't'" is an indicator for whether or not the person was employed in the month of random assignment or eligibility determination.

2. "Employment transition" denotes the four patterns (continuous employment, job gainer, job loser, and continuous non-employment) based on employment in the seven months up to and including random assignment or eligibility determination. Univariate statistics for these patterns appear in Table 3.

3. "ETC" indicates categories of the number of transitions from employment to non-employment or vice versa in the 24 months prior to the baseline interview.

4. "18 month job spells" indicates categories of the total number of job spells in the 18 months prior to random assignment or eligibility determination.

5. "48 month job spells" indicates categories of the total number of job spells in the 48 months prior to random assignment or eligibility determination.

Earnings Specifications

1. "Earnings in t-1 to t-6" are own total earnings in each of the six months prior to random assignment or eligibility determination.

2. "Earnings in Q-1 to Q-4" are own total earnings in each of the four quarters prior to random assignment or eligibility determination.

Labor Force Status Specifications

1. "LFS at t" is the labor force status (employed, unemployed, or out of the labor force) in the month of random assignment or eligibility determination.

2. Time in labor force status is the number of months in the labor force status at random assignment or eligibility determination. There are separate variables for each status, employed, unemployed, and out of the labor force. For each status, there is a continuous variable for 0-6 months and an indicator variable for greater than six months in the status.

3. "2 Quarter LFS" consists of patterns formed by constructing quarterly labor force variables for the two quarters prior to random assignment or eligibility determination. That is, the statuses are first aggregated within quarters, with employment having precedence over unemployment and unemployment over OLF, and then combined into one of nine possible sequences.

4. "6 Month LFS2" is the two most recent labor force statuses in the seven months up to and including the month of random assignment or eligibility determination.

TABLE 7

JTPA PARTICIPATION PROBABILITY EQUATIONS

PREDICTION CUTOFF VALUE = 0.03

Mean Percent Correctly Predicted
Estimated Standard Errors in Parentheses
ENP and Control Samples - Four Full Baseline Sites
Four Demographic Groups

Specification	Adult Males	Adult Females	Male Youth	Female Youth
Background				
Background (BKGD)	.7010	.6362	.5968	.6172
	(.0116)	(.0100)	(.0226)	(.0185)
BKGD + Family income	.7453	.6317	.6372	.6240
	(.0111)	(.0101)	(.0219)	(.0185)
Employment Specifications				
Employment at t (No BKGD)	.7457	.5842	.5868	.5638
	(.0110)	(.0099)	(.0226)	(.0179)
BKGD + Employment at t	.7664	.6543	.6295	.6361
	(.0108)	(.0100)	(.0223)	(.0184)
BKGD + Employment transition	.8043	.6650	.6387	.6756
	(.0101)	(.0100)	(.0220)	(.0179)
BKGD + ETC	.7700	.6761	.6779	.6599
	(.0107)	(.0098)	(.0216)	(.0181)
BKGD + 18 month job spells	.7129	.6390	.6384	.6331
	(.0115)	(.0100)	(.0217)	(.0184)
BKGD + 48 month job spells	.7086	.6632	.6110	.6427
	(.0116)	(.0100)	(.0224)	(.0183)
Earnings Specifications				
BKGD + Earnings in t-1 to t-6	.7901	.6589	.6308	.6124
	(.0103)	(.0099)	(.0222)	(.0186)
BKGD + Earnings in Q-1 to Q-4	.7933	.6464	.6152	.5986
	(.0102)	(.0100)	(.0224)	(.0187)
Labor Force Status Specifications				
LFS at t (No BKGD)	.7542	.6831	.6008	.6632
	(.0109)	(.0093)	(.0225)	(.0159)
BKGD + LFS at t	.7714	.6960	.6393	.6365
	(.0107)	(.0098)	(.0221)	(.0178)
BKGD + Time in labor force status	.8016	.7049	.6417	.6954
	(.0101)	(.0097)	(.0220)	(.0174)
BKGD + 2 quarter LFS	.7517	.6611	.6241	.6536
	(.0110)	(.0100)	(.0223)	(.0182)
BKGD + 6 month LFS2	.8104	.7003	.6724	.6878
	(.0100)	(.0098)	(.0213)	(.0176)

1. Table updated on March 8, 1995.
2. BKGD includes race, age, years of schooling, marital status, and presence of a child less than six years of age.

TABLE 8A

JTPA PARTICIPATION PROBABILITY ESTIMATES

Weighted Logit Equation
Dependent Variable: Control Status
ENP and Control Samples - Four Full Baseline Sites
Adult Males
Number of observations: 1552

Variable	Coefficient	Std Err	P-Value	Num Drv
Ft. Wayne	2.077	0.354	0.000	0.058
Jersey City	1.147	0.320	0.000	0.023
Providence	1.056	0.358	0.003	0.017
Black	0.149	0.273	0.586	0.004
Hispanic	-0.256	0.308	0.405	-0.006
Other race-ethnic	0.394	0.409	0.335	0.011
Age 30-39	-0.458	0.228	0.044	-0.012
Age 40-49	-0.982	0.297	0.001	-0.022
Age 50-54	-0.400	0.394	0.310	-0.011
Highest grade < 10	-0.541	0.272	0.047	-0.012
Highest grade 10-11	0.354	0.266	0.183	0.010
Highest grade 13-15	0.711	0.311	0.022	0.023
Highest grade > 15	-1.373	0.416	0.001	-0.022
Currently married	-0.522	0.263	0.047	-0.012
Mrd 1-24 mths ago	-0.029	0.637	0.964	-0.001
Mrd > 24 mths ago	1.240	0.487	0.011	0.052
Child age < 6 years	-0.217	0.311	0.485	-0.005
Received AFDC at t	-1.196	0.511	0.019	-0.020
Food stamps at t	0.560	0.244	0.021	0.015
Unemp -> Employed	1.927	0.322	0.000	0.043
OLF -> Employed	2.083	0.418	0.000	0.051
Employed -> Unemp	3.239	0.330	0.000	0.136
Unemp -> Unemp	2.766	0.412	0.000	0.094
OLF -> Unemp	3.787	0.490	0.000	0.199
Employed -> OLF	2.684	0.626	0.000	0.087
Unemp -> OLF	3.633	0.774	0.000	0.179
OLF -> OLF	1.186	0.411	0.004	0.016
Fam Income 3K-9K	-0.347	0.364	0.341	-0.011
Fam Income 9K-15K	-0.025	0.400	0.950	-0.001
Fam Income > 15K	-1.599	0.474	0.001	-0.034
Constant	-4.871	0.503	0.000	0.000

1. Table updated on January 1, 1995.
2. The omitted site is Corpus Christi.
3. The omitted race group is whites.
4. The omitted age group is age 22-29.
5. Highest grade indicates the highest grade completed. Completion of grade 12 is the omitted category.
6. Marital status categories indicate the time in months since the most recent marriage. Having never been married is the omitted category.
7. Child age < 6 years indicates the presence of an own child age five years or younger in the home.
8. Received AFDC welfare in month t, either as a case head or as part of someone elses case.
9. Received Food Stamps in month t.
10. Labor force status patterns are defined by looking backward in time starting in month t and ending in month t-6. The second status in each pattern is the status in month t. The first status is the most recent prior status within the indicated time period. Thus Employed->Unemp indicates a person unemployed at t but whose most recent labor force status within the prior six months was employed.
11. The omitted family income category is annual family income less than $3000.

TABLE 8B

JTPA PARTICIPATION PROBABILITY ESTIMATES

Weighted Logit Equation
Dependent Variable: Control Status
ENP and Control Samples - Four Full Baseline Sites
Adult Females
Number of observations: 2438

Variable	Coefficient	Std Err	P-Value	Num Drv
Ft. Wayne	1.243	0.206	0.000	0.036
Jersey City	0.737	0.192	0.000	0.017
Providence	0.665	0.218	0.002	0.013
Black	0.234	0.174	0.179	0.006
Hispanic	0.345	0.192	0.072	0.009
Other race-ethnic	0.262	0.337	0.436	0.007
Age 30-39	-0.294	0.139	0.035	-0.008
Age 40-49	-0.229	0.180	0.202	-0.006
Age 50-54	-0.349	0.281	0.214	-0.009
Highest grade < 10	-0.498	0.154	0.001	-0.012
Highest grade 10-11	-0.063	0.162	0.697	-0.002
Highest grade 13-15	0.168	0.201	0.404	0.005
Highest grade > 15	-0.414	0.389	0.287	-0.011
Currently married	-0.904	0.184	0.000	-0.019
Mrd 1-24 mths ago	0.564	0.225	0.012	0.021
Mrd > 24 mths ago	1.263	0.199	0.000	0.064
Child age < 6 years	-0.245	0.133	0.066	-0.006
Received AFDC at t	-0.758	0.205	0.000	-0.019
Food stamps at t	0.452	0.174	0.010	0.013
Unemp -> Employed	1.556	0.276	0.000	0.034
OLF -> Employed	0.988	0.320	0.002	0.016
Employed -> Unemp	2.825	0.244	0.000	0.121
Unemp -> Unemp	2.621	0.263	0.000	0.101
OLF -> Unemp	2.146	0.297	0.000	0.065
Employed -> OLF	1.214	0.271	0.000	0.022
Unemp -> OLF	1.991	0.339	0.000	0.055
OLF -> OLF	0.770	0.222	0.001	0.011
Fam Income 3K-9K	0.543	0.207	0.009	0.016
Fam Income 9K-15K	0.162	0.284	0.567	0.004
Fam Income > 15K	0.029	0.269	0.915	0.001
Constant	-5.119	0.306	0.000	0.000

1. Table updated on January 1, 1995.
2. The omitted site is Corpus Christi.
3. The omitted race group is whites.
4. The omitted age group is age 22-29.
5. Highest grade indicates the highest grade completed. Completion of grade 12 is the omitted category.
6. Marital status categories indicate the time in months since the most recent marriage. Having never been married is the omitted category.
7. Child age < 6 years indicates the presence of an own child age five years or younger in the home.
8. Received AFDC welfare in month t, either as a case head or as part of someone elses case.
9. Received Food Stamps in month t.
10. Labor force status patterns are defined by looking backward in time starting in month t and ending in month t-6. The second status in each pattern is the status in month t. The first status is the most recent prior status within the indicated time period. Thus Employed->Unemp indicates a person unemployed at t but whose most recent labor force status within the prior six months was employed.
11. The omitted family income category is annual family income less than $3000.

TABLE 8C

JTPA PARTICIPATION PROBABILITY ESTIMATES

Weighted Logit Equation
Dependent Variable: Control Status
ENP and Control Samples - Four Full Baseline Sites
Male Youth
Number of observations: 530

Variable	Coefficient	Std Err	P-Value	Num Drv
Ft. Wayne	0.951	0.429	0.027	0.029
Jersey City	0.386	0.485	0.426	0.009
Providence	1.474	0.494	0.003	0.045
Black	0.410	0.384	0.285	0.014
Hispanic	-0.494	0.492	0.315	-0.011
Other race-ethnic	-1.846	0.899	0.040	-0.028
Age 19-21	0.153	0.347	0.660	0.004
Highest grade < 10	0.589	0.441	0.182	0.015
Highest grade 10-11	0.673	0.385	0.081	0.018
Highest grade > 12	-0.164	0.598	0.784	-0.003
Currently married	0.298	0.461	0.518	0.009
Div-Wid-Sep	-0.439	0.817	0.591	-0.010
Child age < 6 years	-1.059	0.498	0.033	-0.021
Received AFDC at t	-0.721	0.730	0.323	-0.015
Food stamps at t	-0.046	0.441	0.917	-0.001
Unemp -> Employed	2.125	0.482	0.000	0.089
OLF -> Employed	-0.166	0.511	0.745	-0.002
Employed -> Unemp	1.593	0.442	0.000	0.051
Unemp -> Unemp	1.162	0.579	0.045	0.030
OLF -> Unemp	1.000	0.597	0.094	0.024
Employed -> OLF	2.016	0.633	0.001	0.080
Unemp -> OLF	0.993	0.774	0.199	0.023
OLF -> OLF	0.191	0.567	0.737	0.003
Fam Income 3K-9K	1.450	0.574	0.012	0.058
Fam Income 9K-15K	0.110	0.602	0.855	0.002
Fam Income > 15K	0.048	0.642	0.940	0.001
Constant	-5.681	0.725	0.000	0.000

1. Table updated on January 1, 1995.
2. The omitted site is Corpus Christi.
3. The omitted race group is whites.
4. The omitted age group is age 16-18.
5. Highest grade indicates the highest grade completed. Completion of grade 12 is the omitted category.
6. Having never been married is the omitted marital status category.
7. Child age < 6 years indicates the presence of an own child age five years or younger in the home.
8. Received AFDC welfare in month t, either as a case head or as part of someone elses case.
9. Received Food Stamps in month t.
10. Labor force status patterns are defined by looking backward in time starting in month t and ending in month t-6. The second status in each pattern is the status in month t. The first status is the most recent prior status within the indicated time period. Thus Employed->Unemp indicates a person unemployed at t but whose most recent labor force status within the prior six months was employed.
11. The omitted family income category is annual family income less than $3000.

TABLE 8D

JTPA PARTICIPATION PROBABILITY ESTIMATES

Weighted Logit Equation
Dependent Variable: Control Status
ENP and Control Samples - Four Full Baseline Sites
Female Youth
Number of observations: 701

Variable	Coefficient	Std Err	P-Value	Num Drv
Ft. Wayne	1.047	0.392	0.008	0.034
Jersey City	0.515	0.375	0.169	0.013
Providence	1.032	0.407	0.011	0.028
Black	0.742	0.303	0.014	0.021
Hispanic	0.457	0.351	0.193	0.011
Other race-ethnic	-1.058	0.650	0.103	-0.014
Age 19-21	-0.535	0.265	0.044	-0.016
Highest grade < 10	-0.394	0.324	0.224	-0.011
Highest grade 10-11	-0.235	0.351	0.504	-0.007
Highest grade > 12	0.084	0.365	0.818	0.003
Currently married	-0.563	0.346	0.104	-0.013
Div-Wid-Sep	0.241	0.403	0.550	0.008
Child age < 6 years	-0.241	0.260	0.354	-0.007
Received AFDC at t	-0.988	0.363	0.006	-0.025
Food stamps at t	1.363	0.337	0.000	0.052
Unemp -> Employed	1.599	0.466	0.001	0.030
OLF -> Employed	1.394	0.449	0.002	0.023
Employed -> Unemp	3.218	0.472	0.000	0.149
Unemp -> Unemp	2.379	0.473	0.000	0.070
OLF -> Unemp	3.018	0.509	0.000	0.126
Employed -> OLF	1.554	0.421	0.000	0.028
Unemp -> OLF	1.106	0.725	0.127	0.016
OLF -> OLF	0.709	0.414	0.087	0.008
Fam Income 3K-9K	-0.466	0.452	0.302	-0.010
Fam Income 9K-15K	0.031	0.528	0.953	0.001
Fam Income > 15K	1.423	0.441	0.001	0.068
Constant	-5.297	0.610	0.000	0.000

1. Table updated on January 1, 1995.
2. The omitted site is Corpus Christi.
3. The omitted race group is whites.
4. The omitted age group is age 16-18.
5. Highest grade indicates the highest grade completed. Completion of grade 12 is the omitted category.
6. Having never been married is the omitted marital status category.
7. Child age < 6 years indicates the presence of an own child age five years or younger in the home.
8. Received AFDC welfare in month t, either as a case head or as part of someone elses case.
9. Received Food Stamps in month t.
10. Labor force status patterns are defined by looking backward in time starting in month t and ending in month t-6. The second status in each pattern is the status in month t. The first status is the most recent prior status within the indicated time period. Thus Employed->Unemp indicates a person unemployed at t but whose most recent labor force status within the prior six months was employed.
11. The omitted family income category is annual family income less than $3000.

TABLE 8E
WITHIN SAMPLE PREDICTION RATES

Weighted Logit Equation
Dependent Variable: Control Status
ENP and Control Samples - Four Full Baseline Sites

Adult Males **Cutoff Value is .030**	
Percent of ENPs predicted within sample:	82.89
Percent of controls predicted within sample:	84.88
Equal weights within-sample prediction rate:	83.88
Population weights within-sample prediction rate:	82.95
Adult Females **Cutoff Value is .030**	
Percent of ENPs predicted within sample:	76.67
Percent of controls predicted within sample:	70.66
Equal weights within-sample prediction rate:	73.67
Population weights within-sample prediction rate:	76.49
Male Youth **Cutoff Value is .030**	
Percent of ENPs predicted within sample:	69.27
Percent of controls predicted within sample:	66.10
Equal weights within-sample prediction rate:	67.68
Population weights within-sample prediction rate:	69.17
Female Youth **Cutoff Value is .030**	
Percent of ENPs predicted within sample:	73.58
Percent of controls predicted within sample:	67.16
Equal weights within-sample prediction rate:	70.37
Population weights within-sample prediction rate:	73.39

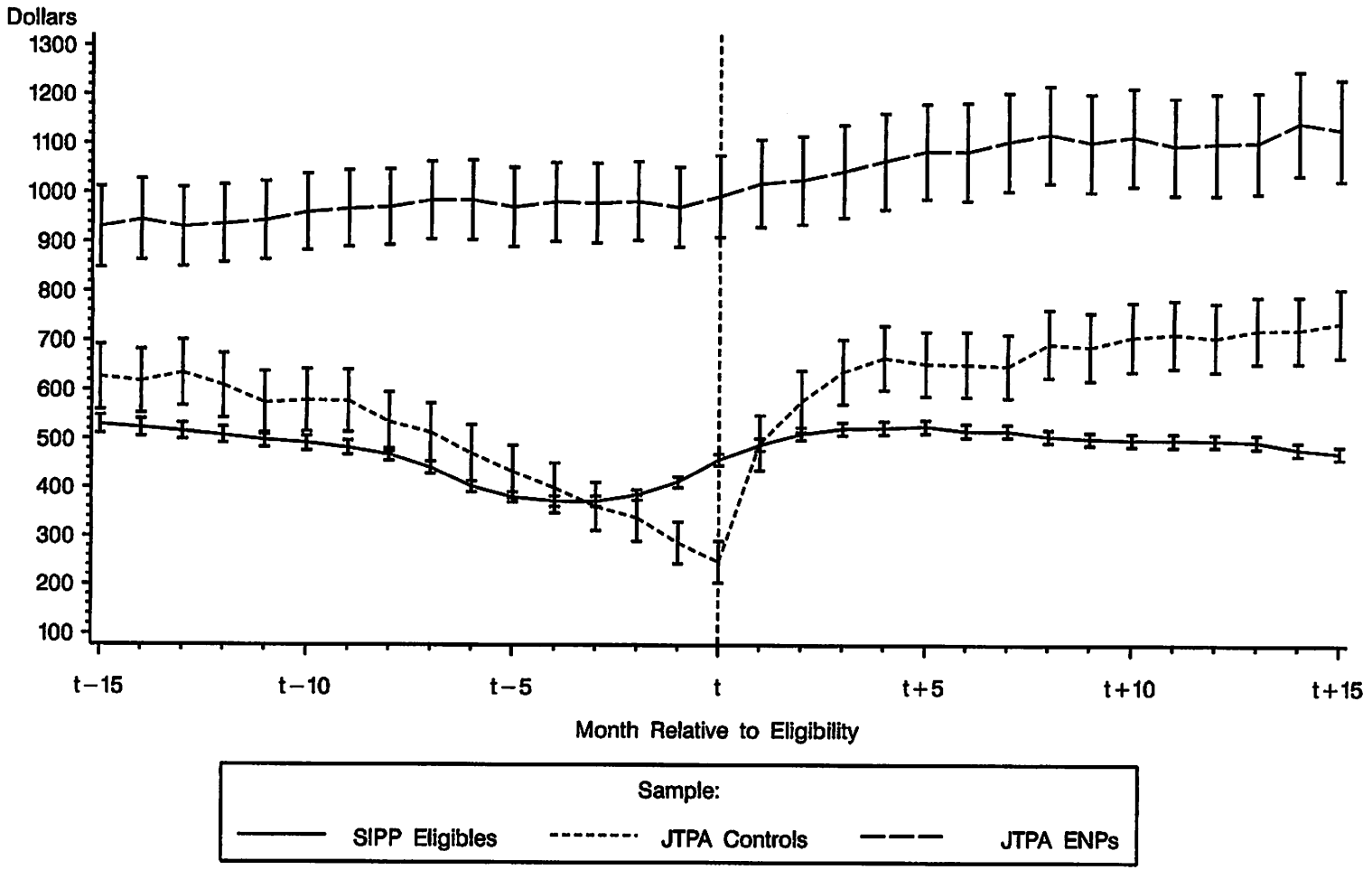
1. Table updated on January 1, 1995.
2. The equal weights within-sample prediction rate is the simple average of the ENP and control rates. The population weighted rate is 0.97 times the ENP rate plus 0.03 times the control rate.

Figure 1A

Mean Self–Reported Monthly Earnings

SIPP Eligibles and JTPA Controls and ENPs

Male Adults



1. SIPP uses all JTPA–eligible person–month observations of respondents present in both the first and last months of the panel.
2. Controls are randomized–out participants from the National JTPA Study. Observations based on quasi–rectangular sample.
3. ENPs are JTPA–eligible non–participants at the same sites as the controls from the National JTPA Study. Observations based on quasi–rectangular sample.
4. Standard error bars +/– 2 standard errors of the means.
5. Top 1% of earnings trimmed in each month for control, ENP and SIPP samples.

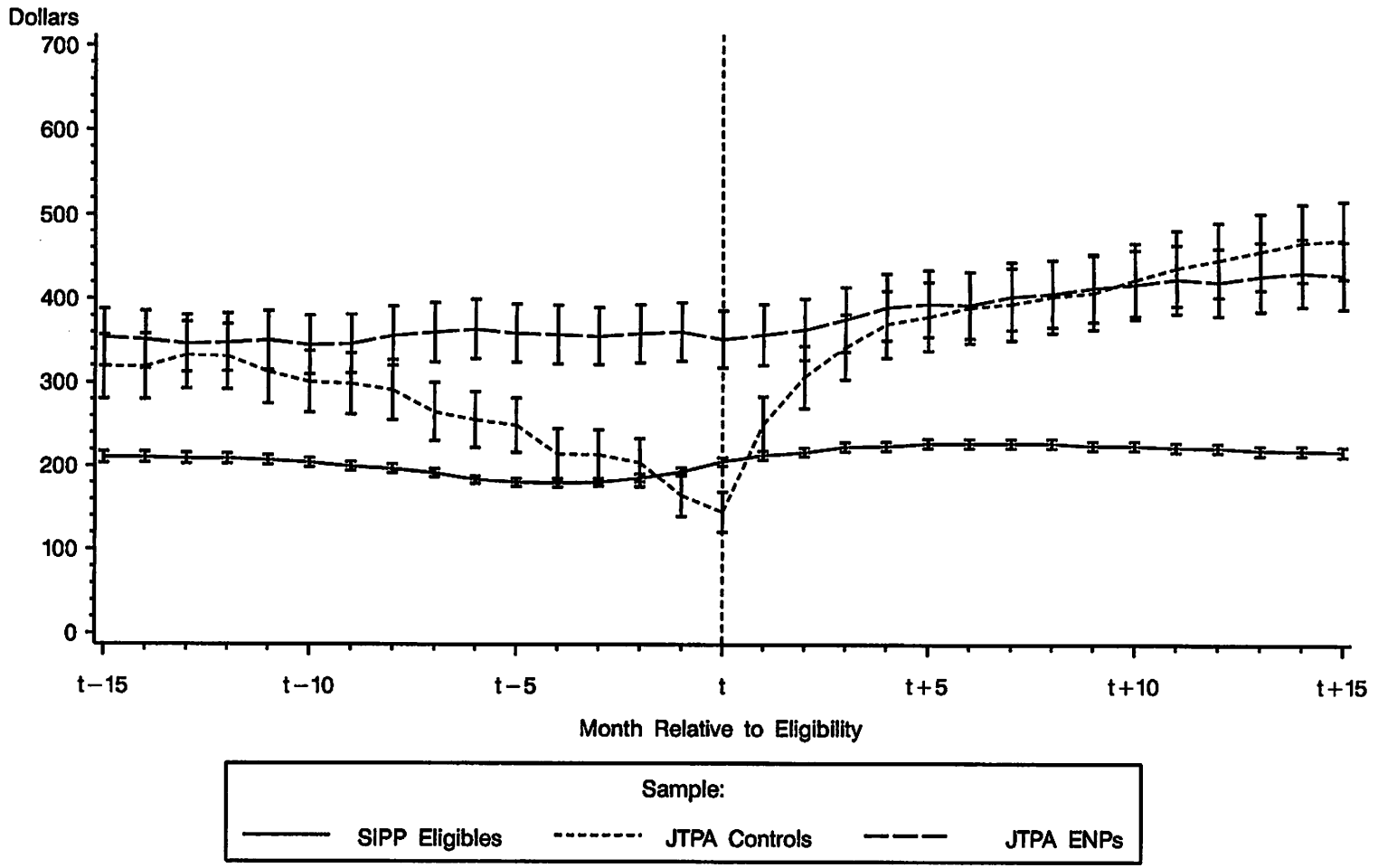
Program run on 12MAR95

Figure 1B

Mean Self-Reported Monthly Earnings

SIPP Eligibles and JTPA Controls and ENPs

Female Adults



1. SIPP uses all JTPA-eligible person-month observations of respondents present in both the first and last months of the panel.
2. Controls are randomized-out participants from the National JTPA Study. Observations based on quasi-rectangular sample.
3. ENPs are JTPA-eligible non-participants at the same sites as the controls from the National JTPA Study. Observations based on quasi-rectangular sample.
4. Standard error bars +/- 2 standard errors of the means.
5. Top 1% of earnings trimmed in each month for control, ENP and SIPP samples.

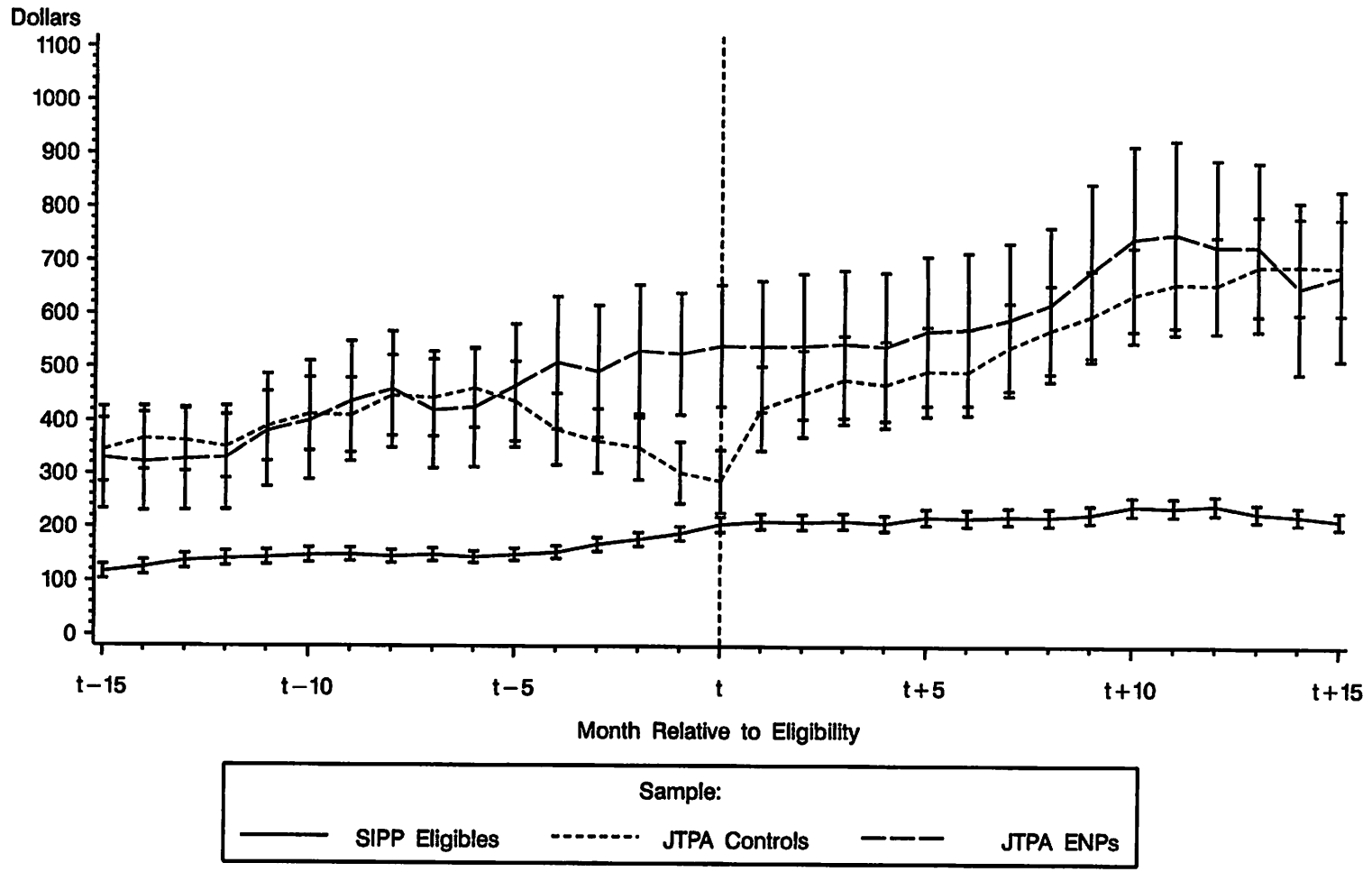
Program run on 12MAR95

Figure 1C

Mean Self-Reported Monthly Earnings

SIPP Eligibles and JTPA Controls and ENPs

Male Youths



1. SIPP uses all JTPA-eligible person-month observations of respondents present in both the first and last months of the panel.
2. Controls are randomized-out participants from the National JTPA Study. Observations based on quasi-rectangular sample.
3. ENPs are JTPA-eligible non-participants at the same sites as the controls from the National JTPA Study. Observations based on quasi-rectangular sample.
4. Standard error bars +/- 2 standard errors of the means.
5. Top 1% of earnings trimmed in each month for control, ENP and SIPP samples.

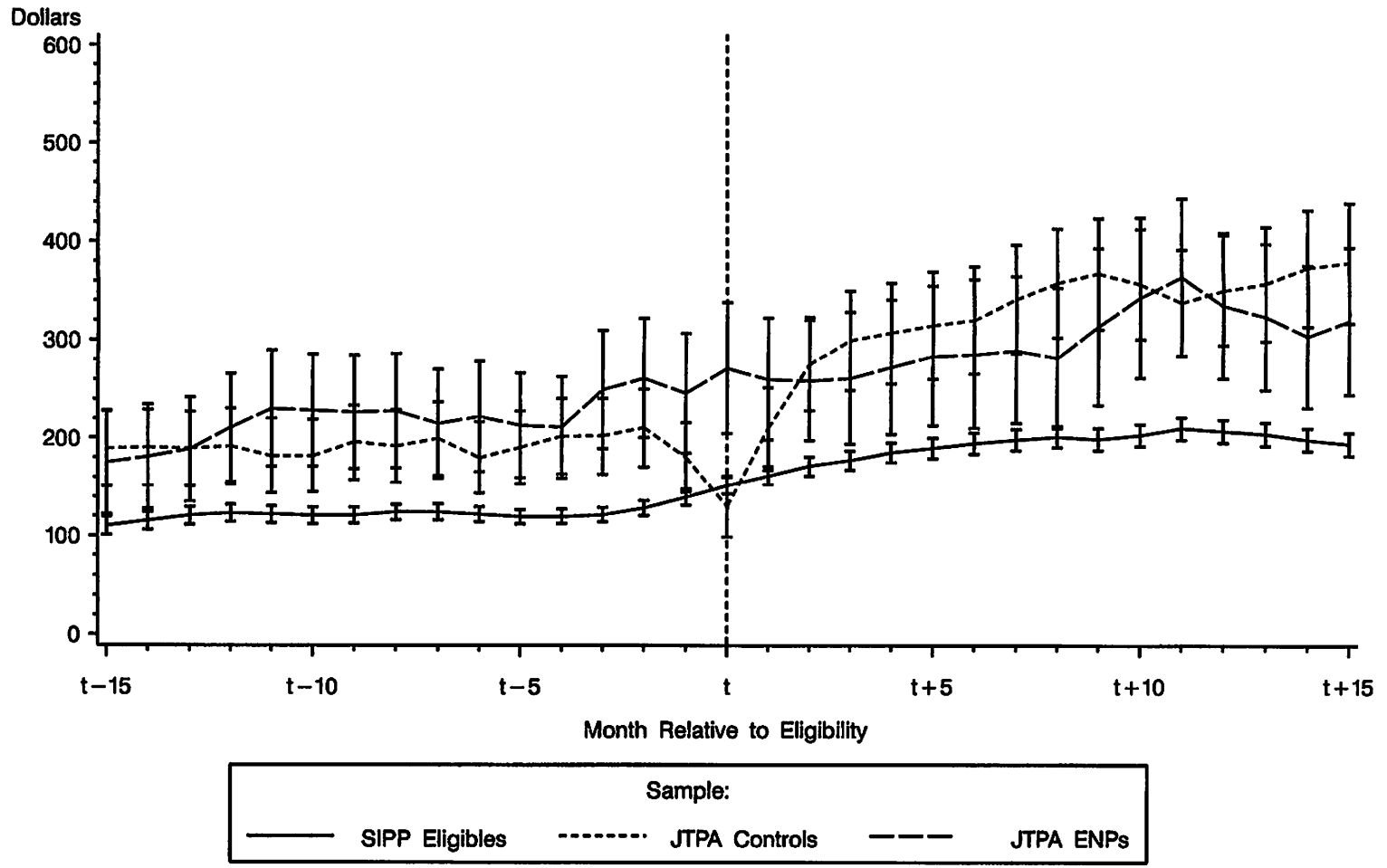
Program run on 12MAR95

Figure 1D

Mean Self-Reported Monthly Earnings

SIPP Eligibles and JTPA Controls and ENPs

Female Youths



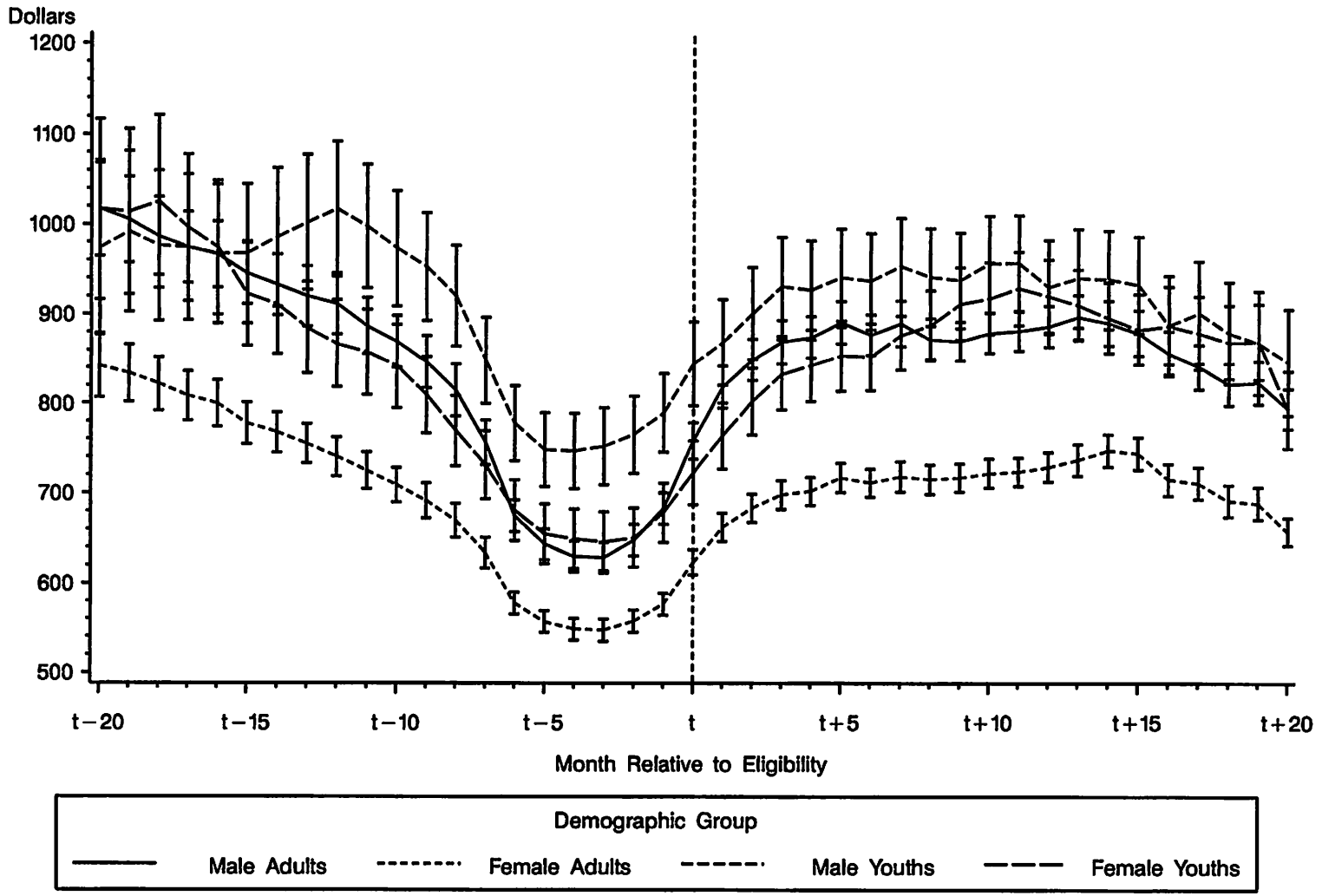
1. SIPP uses all JTPA-eligible person-month observations of respondents present in both the first and last months of the panel.
2. Controls are randomized-out participants from the National JTPA Study. Observations based on quasi-rectangular sample.
3. ENPs are JTPA-eligible non-participants at the same sites as the controls from the National JTPA Study. Observations based on quasi-rectangular sample.
4. Standard error bars +/- 2 standard errors of the means.
5. Top 1% of earnings trimmed in each month for control, ENP and SIPP samples.

Program run on 12MAR95

Figure 2

Mean Self-Reported Monthly Family Earnings

SIPP Sample of JTPA Eligibles



1. SIPP uses all JTPA-eligible person-month observations of respondents present in 1st month, 1st wave
2. Standard error bars +/- 2 standard errors of the means

Program run on 21NOV94

APPENDIX A

This Appendix documents the data used to perform the empirical analysis presented here. The first section describes the construction of the SIPP sample of persons eligible for JTPA, the second section describes the eligible non-participant (ENP) and experimental treatment and control group samples from the National JTPA Study and the third section discusses the differences between the earnings behavior of the SIPP eligibles and the ENPs.

1. SIPP Sample of JTPA Eligibles

Our national sample of persons eligible for the JTPA program is drawn from the 1986 Panel of the Survey of Income and Program Participation (SIPP). The SIPP is a continuing longitudinal self-weighting survey of the non-institutional population of the United States with a focus on current income and participation in social programs. A new panel is introduced every year with each panel followed for about 2.5 years. Respondents are divided into four rotation groups with a different group interviewed in each calendar month. In the 1986 SIPP Panel used here, three of the rotation groups are interviewed seven times, and one is interviewed six times. At least one rotation group is represented from October 1985 to March 1988. The calendar dates in which all four rotation groups are represented are January 1986 to December 1987. This period is immediately prior to the period during which the ENP and experimental control and treatment group samples from the National JTPA Study were determined eligible for JTPA. The reference period for each SIPP interview is the four calendar months preceding the interview month.

Like other surveys (see David Hill, 1987) the SIPP suffers from a seam problem (see Constance Citro and Graham Kalton, 1993). Important events such as job changes, marital status changes and the

beginning and ending of transfer program participation spells are differentially more likely to be reported to occur at the seam between two four-month reference periods than between months within a given reference period. Devine and Heckman (1994) document that because this effect is symmetric for employment spells, patterns in mean earnings such as those examined here are unaffected by the seam problem. Devine and Heckman also demonstrate that attrition from the SIPP panel has little effect on substantive results regarding JTPA eligibility.

The earnings measure in SIPP consists of responses to separate questions regarding earnings from up to two jobs and up to two businesses in each month. The underlying survey questions ask explicitly about total earnings in each job or business in each of the four months prior to the interview month. A supplementary combined question gathers information on earnings from additional jobs or businesses.

Establishing the JTPA eligibility status of respondents in the SIPP requires operational definitions of families and of family income. A person's family members include all other SIPP respondents who were living with the person and related by blood, marriage, or adoption. A person's family could be comprised of different people in each month. A person is eligible via participation in a cash welfare program in a given month if anyone in the person's current family receives AFDC payments, general assistance, or other cash welfare in that month. A person is eligible via participation in the food stamp program in a given month if anyone in the person's current family receives food stamps in that month. A person is eligible by virtue of low family income if the sum of family income in the previous six months is less than the higher of the poverty income guideline or the BLS lower living standard income level applicable to the month of eligibility determination and to the respondent's geographic location and family size. Family income in the previous six months is defined as the sum of the income in each month of all of the people who were in the person's family in that month.[1] Family income need not be the same

[1] See Devine and Heckman (1994) for a list of the types of income that do and do not count in determining JTPA eligibility.

for two people who are currently in the same family because they may have been in different families during the six months prior to eligibility determination. The definition of eligibility used here corresponds to Definition B in Devine and Heckman (1994) and captures only eligibility via economic disadvantage.

Note that in the SIPP data, we are not able to accurately measure foster child status, disability or homelessness on a monthly basis, and so we are unable to implement the special eligibility rules applicable to these groups in selecting our sample of eligibles. However, these groups represent only a very small fraction of the eligible population, and many of those eligible under the special provisions will also be identified as eligible using the basic family income and program participation criteria that apply to all individuals.

We established the eligibility status of each sample member in each month after the seventh month of the panel for which data were available. Eligibility cannot be established with certainty for all sample members during the first six months of the panel because the requisite six months of prior data on family income are not available. To match the ENP sample, we exclude persons outside the 16 to 54 age range along with persons enrolled in junior high or high school. The graphs in Figures 1A to 1D and the estimates in Table 1 use a rectangular sample consisting of all eligible person-months of persons present in both the first and last (either 24th or 28th depending on the rotation group) months of the panel. Figure 2 and Tables 4A to 4D rely on a sample composed of all available eligible person-months. We always exclude all person-month observations with earnings values imputed by the Census Bureau, as these imputations appear to be particularly unreliable for the JTPA eligible population.

2. *National JTPA Study Samples*[2]

A. Eligible Non-Participant (ENP) Sample[3]

The ENP sample is based on a sample of dwelling units drawn at the four sites. The sampling frame excluded low poverty areas containing up to, but not more than, five percent of those in each site with incomes at or below 125 percent of the poverty level in 1980. In the remaining areas of each site, each dwelling unit had an equal probability of selection for the initial screener interviews. These interviews gathered information sufficient to determine the eligibility status of each person in the surveyed household. The initial screening interviews were conducted from January 1988 to December 1989, and had an overall response rate at the four sites of 90 percent.

Attempts were made to administer the Full Baseline Survey (FBS) to all of the JTPA-eligible persons identified on the screeners at each site who were (1) eligible for JTPA via economic disadvantage, (2) 16 to 54 years of age, (3) not in junior high or high school, and (4) not permanently disabled. Persons over age 54 were known in advance to have a low participation rate in JTPA, and so were excluded in order to focus the available resources on groups more likely to participate in the program. Youth in junior high or high school were excluded in order to match a similar exclusion in the experimental evaluation. The FBS interviews were completed between June 1988 and December 1989, with a quarter of the completed interviews occurring five or more months after the initial screening. The overall response rate of potential ENPs to the FBS was 78 percent, yielding a sample of 3004 ENPs at the four sites.[4]

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[2] See Bloom et al. (1993) for a description of the National JTPA Study.

[3] See Smith (1994b) for a detailed description of the ENP sample.

[4] The ENP sample was originally intended to match the control sample in size at each of the four sites. The final sample sizes have Corpus Christi with 1060 ENPs and 489 controls, Ft. Wayne with 529 ENPs and 1191 controls, Jersey City with 892 ENPs and 530 controls, and Providence with 523 ENPs and 507 controls.

Following their inclusion in the ENP sample, roughly three percent (104) of the ENPs were later randomly assigned as part of the experimental component of the National JTPA Study. As a result, a small number of respondents appear in both the experimental and ENP samples analyzed in this paper. Because of their small number, we do not omit these persons from either group.

Only ENPs with valid values of monthly earnings for the 18th month before eligibility screening and the 18th month after eligibility screening were used in the construction of Figures 1A to 1D and in the calculation of the difference in differences estimates in Table 1. All ENPs with valid values for the relevant variables were used to construct the proportions and rates in Tables 3 and 4 and in the estimation of the logit models reported in Tables 7, 8A to 8D and in Appendix C.

B. Experimental Control Group Sample

The control group sample consists of persons randomly assigned to the experimental control group at four of the sixteen JTPA training sites taking part in the experimental evaluation component of the National JTPA Study. Control group members were not allowed to receive any JTPA services in the 18 months after random assignment. At the Corpus Christi and Fort Wayne sites, random assignment began in December 1987 and concluded in January 1989, while in Jersey City and Providence it ran from November 1987 to September 1989. During these periods, a total of 2717 persons were assigned to the control group at the four sites.

Only controls with valid values of monthly earnings for the 18th month before random assignment and the 18th month after random assignment were used in the construction of Figures 1A to 1D and in the calculation of the estimates in Table 1. All controls with valid values for the relevant variables were used to construct the proportions and rates in Tables 3 and 4 and in the estimation of the logit models reported in Tables 7, 8A to 8D and in Appendix C.

C. Experimental Treatment Group Sample

The treatment group sample consists of persons randomly assigned to the experimental treatment group at the same four sites in the National JTPA Study at which the control and ENP samples were drawn. Treatment group members were allowed to (but often did not) receive JTPA services in the 18 months after random assignment. A total of 5914 persons were randomly assigned to the experimental treatment group at the four sites. All treatment group members with valid monthly earnings values for 18th month after random assignment were used to calculate the estimates in Table 1.

D. Survey Instruments

The earnings variables used in this paper come from up to three surveys. The first is the Full Baseline Survey (FBS), which gathers detailed information on earnings and employment in the five years prior to the survey date (for the ENPs) or to random assignment (for the controls), as well as information on educational attainment, recent training, household composition and earnings, social program participation, attitudes and demographic characteristics. In order to reduce costs, the FBS was not administered to the treatment group.

The other two surveys are the first and second follow-up surveys, which are basically identical except for the time period covered. Both collect detailed information on earnings, employment, training, and social program participation, as well as limited additional background and demographic information. For the experimental treatment and control group samples, the first follow-up survey covers the period from random assignment to the first follow-up interview date, which is located 12 to 24 months after random assignment, while the second follow-up survey covers the period from the first follow-up survey

to the second follow-up interview date, which is located 24 to 48 months after random assignment.[5] Only one follow-up survey was administered to the ENPs. The interview dates for this survey were spread over the period from 12 to 48 months after the FBS interview date.

Of the 2717 controls at the four sites, 2376 completed the FBS, for a response rate of 87 percent. Attempts were made to administer the first follow-up survey to all of the control and treatment group members at the four sites. The response rate among controls was 81 percent. The second follow-up survey was administered to a random subset of the control and treatment group members consisting of approximately one quarter of the adults and one half of the youth. This latter survey had a response rate of 80 percent among controls at the four sites. Response rates for the treatment group for the two follow-up surveys were similar to those for the control group. The response rate of the ENPs to their single follow-up survey was 79 percent.

E. Construction of the Earnings Variables

The earnings variables for the ENP, control and treatment group samples are not based on direct questions about earnings on individual jobs in particular months, or about total earnings in particular months. Rather, they are constructed from questions about average hours worked and average rates of pay over job spells.

Constructing monthly earnings variables in this way induces a large amount of smoothing. Within each job spell, there is no variation in hours worked per week or in earnings per month other than that due to differences in the number of days across months. Jobs that extend across the seam between the reference periods of two surveys can have within-spell variation in earnings, but it all occurs at the seam

[5] For control and treatment group members not responding to the first follow-up survey, the second follow-up survey collected information from random assignment to the second follow-up survey interview date.

date. Because of this smoothing, any changes observed over time in total earnings other than at a seam can result only from entering or leaving employment, changing jobs, or changing the number of jobs worked. Almost all variation in monthly earnings due to variation in hours worked or in the rate of pay across months is smoothed away.

For the seam month between the FBS and the follow-up surveys, we use only the information from the FBS on the portion of the month before random assignment for the controls or before the FBS interview date for the ENPs. This information is weighted up to correspond to a full month. We found that the alternative of taking weighted averages of the partial month information from the FBS and follow-up surveys substantially overstated the employment rate for this month.

F. Imputations

Missing values due to item non-response were imputed for the variables included in the estimation of the logit JTPA participation equations. Missing values of dichotomous variables, such as the presence of an own child less than six years of age in the household, were replaced with the predicted probabilities estimated in a logit equation. Missing values of indicator variables corresponding to particular values of categorical variables with more than two categories, such as the five indicators for the categories of the highest grade completed variable, were replaced by the predicted probabilities obtained from a multinomial logit model with the categorical variable as the dependent variable.

In all cases, the estimating equations used to produce the imputations included the following: (1) indicators for race/ethnicity, (2) indicators for age categories, (3) indicators for receipt of a high school diploma or a GED, (4) site indicators and (5) interactions between control status and all of these variables. These variables were chosen because they had no (or very few) missing values in the sample. Imputed values were constructed separately for each of the four demographic target groups.

3. Earnings in the SIPP and ENP Samples

Smith (1995) finds substantial differences in both the levels and temporal patterns of mean earnings between the ENPs and the SIPP sample of JTPA eligibles. For each of the four demographic groups, ENP mean earnings substantially exceed those of the SIPP eligibles. Three factors account for most of this difference in means. The first is the relatively low unemployment rates at three of the four ENP sites during the period when these data were collected. Examination of the SIPP sample of eligibles reveals that the mean earnings of persons eligible for JTPA vary inversely with the unemployment rate measured at the state or Metropolitan Statistical Area (MSA) level. This finding is consistent with the evidence on the effect of local unemployment rates on wage levels reported by David Blanchflower and Andrew Oswald (1994). For adult males, for whom the difference in levels is most important, controlling for the unemployment rate eliminates between one quarter and one third of the difference in levels.

The second factor is the design of the survey instrument used to collect earnings information on the ENPs. As described earlier in this appendix, the earnings variables for the ENPs build upon questions about usual hours and rates of pay on individual jobs. Evidence from a number of comparisons across earnings measures from different sources, including a comparison of the self-reported earnings of the ENPs with matched administrative data from IRS records, suggests that this survey format leads to a substantial upward bias in measured earnings. This factor likely accounts for about half the difference in levels. The third factor is the differential non-participation of very low income eligible persons identified during the original screening interviews for the ENP sample.

There is also a difference in the temporal pattern of mean earnings between the two samples of eligibles. As shown in Figures 1A and 1B, there is no dip in earnings in the months just prior to measured eligibility for the ENP sample analogous to the dip that appears for adult male and adult female SIPP eligibles. This difference appears to result almost entirely from the format of the questions used to

construct the earnings measures for the ENPs. By asking only about usual hours and rates of pay on particular job spells, even the possibility of within-spell variation is removed. Evidence from the SIPP sample suggests that this within-spell variation constitutes a crucial component of the observed dip. Smith (1995) shows that when the earnings of the SIPP eligibles are smoothed by assigning to each month of a given employment spell the mean of the unadjusted monthly earnings values during the spell, the dip in the mean during the eligibility window almost entirely disappears. The results from this smoothing exercise, which serves to make the SIPP earnings data look roughly like that collected on the ENPs, suggest that survey design factors account for the absence of a dip in mean earnings among the ENPs.[6]

[6] Employment spells are used in place of job spells for simplicity. As a result, some of the reduction in the dip is due to variation in earnings across jobs for continuously employed persons. A further analysis by Theresa Devine shows that self-employed persons are particularly likely to experience large transitory earnings decreases within an employment spell.

APPENDIX B

1. Proof of Theorem 1

Proof: Let Y_j, j = 1,...,K be covariance-stationary random variables with finite means and variances. In this context, Y_j refers to monthly family earnings. Let $\sum_{j=1}^{K} Y_j$ be the cumulated value of Y_j over the eligibility window. A person is eligible by virtue of low family earnings if S < c, where c is a constant depending on family size and geographic location. Let $Cov(Y_\ell, Y_j) = \sigma_{\ell j}$ and $E(Y_j) = \mu$. Then

$$Cov(S,Y_j) = \sum_{\ell=1}^{K} Cov(Y_\ell, Y_j)$$

$$= \sum \sigma_{\ell j} .$$

From covariance stationarity, the covariance between earnings in any two months depends only on the number of months separating them, so that $\sigma_{\ell j} = \sigma(|\ell - j|)$.

Suppose that conditional expectations are linear in S. This can arise in a variety of non-normal and normal models (see, e.g. Abram Kagan, Iurii Linnik and Calyampudi Rao, 1973, and George Seber, 1984). One prominent case with linear conditional expectations in S is the class of elliptically symmetric distributions. (See Kai-Tai Fang and Yao-Ting Zhang, 1989). With linear conditional expectations,

$$E(Y_j|S) = \mu + \frac{Cov(S,Y_j)}{Var(S)} (S - \mu K)$$

$$E(Y_j|S<c) = \mu + \frac{Cov(S,Y_j)}{Var(S)} [E(S|S<c) - \mu K]$$

where $E(S \mid S < c) - \mu K < 0$.

We next demonstrate that

$$\underset{j}{Argmax}\ Cov(S,Y_j) = \begin{cases} \frac{K}{2} & \text{if } K \text{ is even} \\ \frac{K+1}{2} & \text{if } K \text{ is odd} \end{cases}$$

because

$$Cov(S,Y_j) = \sum_{k=1}^{K} \sigma(|j-k|)$$

$$= \sigma(0) + 2 \sum_{r=1}^{Min[j,K-j]} \sigma(r) + \sum_{r=Min[j,\,K-j]+1}^{Max[j,K-j]} \sigma(r)$$

where the final term on the right hand side is zero if Min[j,K-j] + 1 > Max [j,K-j]. This expression is maximized by choosing j to make the final term on the right hand side as small as possible. If K is even, Max[j,K-j] = Min[j, K-j] + 1 when j = K/2. If K is odd, this expression reaches its maximum value at j = (K+1)/2. Thus the minimum value of $E(Y_j \mid S < c)$ occurs in the "middle" of the interval.■

2. Proof of Theorem 2

Proof: In Theorem 2, monthly family earnings are again assumed to have linear conditional expectations, so that:

$$E(Y_j|S<c) = \mu + \frac{Cov(S,Y_j)}{Var(S)}\,[E(S|S<c) - \mu K]$$

Under the random walk assumption,

$$\underset{j}{Argmax}\ Cov(S,Y_j) = K.$$

Monthly earnings at the end of the interval are more highly correlated with total earnings than are monthly earnings at the beginning of the interval because the increments to earnings cumulate. Thus, in the random walk case, the minimum value of $E(Y_j \mid S < c)$ occurs at the end of the interval.■

APPENDIX C

1. Sensitivity of Prediction Rates

A. Sensitivity of Prediction Rates to Omission of Background Variables

Table C-1 displays results analogous to those in Table 7 in the main text but with the background variables omitted from the estimation. The pattern of relative performance of the various specifications closely parallels that observed with the background variables included. In particular, the specification based on the two most recent labor force statuses in the seven months up to and including eligibility or random assignment (6 Month LFS2) has the highest prediction rate for all four groups. The variable indicating the length of time in the most recent labor force status continues to predict well for all four groups, and the employment transition category (ETC) variable continues to do particularly well for male youth. At the same time, the earnings and employment specifications, with the exception of the ETC variable, continue to predict less well, as a group, than the specifications based on labor force status. The results in Table 7 on the relative predictive performance of alternative labor market variables thus appear quite robust to the exclusion of the background variables from the prediction equation.

B. Sensitivity of Prediction Rates to Control Cutoff Level

The results presented in Tables C-2 and C-3 shed light on the sensitivity of the relative performance of alternative labor market variables at predicting control status to the cutoff value used to define a predicted control. The prediction rate estimates in Table 7 follow from a cutoff value of 0.03, the assumed fraction of JTPA participants within the eligible population. To examine the sensitivity of these results to the cutoff value, we re-calculated the prediction rates using cutoff values of 0.01 and 0.05. The prediction rate estimates corresponding to these two cases appear in Tables C-2 and C-3, respectively.

Comparing the relative performance results in Table 7 with those in Table C-2 reveals a marked stability. For all four demographic groups, the same two specifications have the best prediction rates in both cases. Furthermore, the broad pattern of relative performance stays the same. There are a few instances of substantial changes in relative performance, most of them among the youth groups. For the variables with only two or three categories, such as employment at 't' or LFS at 't', moving the cutoff to 0.01 causes everyone in the sample to be predicted to be in the same group, with a resulting equal-weights prediction rate of 0.5000. This factor accounts for some of the big changes in relative performance. For male youth, the family income specification does much worse, and the quarterly earnings specification much better, with the 0.01 cutoff than the 0.03 cutoff.

The estimated prediction rates in Table C-3 indicate even greater stability in the relative performance of the various labor market variables when the cutoff value rises to 0.05 from 0.03. As in Table C-2, the partial exception is male youth, where the performance of the family income and 48 month job spell variables improves in both relative and absolute terms.

The results in Tables C-2 and C-3 also reveal that the equal-weights prediction rate falls in every case when the cutoff value drops from 0.03 to 0.01, and in all but a handful of cases when the cutoff value is raised from 0.03 to 0.05. This behavior foreshadows the finding in the next section that, for the specification presented in Tables 8A to 8D, the cutoff value of 0.03 typically comes close to maximizing the estimated equal-weights prediction rate.

C. Equal Weights Prediction Rates as a Function of Control Cutoff Level

In the main text, we use 0.03, the assumed proportion of JTPA participants within the eligible population, as the cutoff value in predicting control and ENP status. An alternative approach would pick the cutoff value that maximized the average of the control and ENP correct prediction rates. This

approach follows from minimization of the loss due to misclassification when the loss function is symmetric.

In this section, we examine how the estimated equal-weights correct prediction rate varies with the cutoff value used to determine predicted ENP and control status. For this purpose, we use the estimates for the specification presented in Tables 8A to 8D and calculate the estimated equal-weights prediction rate for values of the cutoff at intervals of 0.001 between 0.010 and 0.050. The results of this exercise appear in Tables C-4A to C-4D.

For adult males, the estimates in Table C-4A show that 0.03 does maximize the equal-weights prediction rate over this range of cutoff values. For adult females, we find in Table C-4B that the prediction rate implied by the 0.03 cutoff value lies close to maximum value attained over this range, located at a cutoff value of 0.026. Indeed, for this group the estimated prediction rate is quite stable over a wide range of cutoff values from 0.024 to about 0.044. For male youth, the 0.03 cutoff value does less well at approximating the maximum of the prediction rate. Here the estimated equal-weights prediction rate rises almost monotonically with the cutoff value up to its maximum value over this range at a cutoff value of 0.044. Finally, for female youth the prediction rate of 70.37 percent attained at the 0.03 cutoff lies quite close to the maximum of 71.22 percent that results from a cutoff value of 0.036. In general, the 0.03 value produces a prediction rate close to that which would be obtained by using maximization of the equal-weights prediction rate as the criterion for choosing the cutoff value.

2. *Construction of Reported Results*

A. Impact Estimates

This section describes the construction of the impact estimates presented in Table 1. The experimental estimates consist of the difference between treatment group and control group mean earnings in the "after" period. The before-after estimates were constructed by subtracting control group mean earnings in the "before" period from treatment group mean earnings in the "after" period. The ENP difference in differences estimates were obtained by subtracting the difference in ENP mean earnings between the "before" and "after" periods from the difference between treatment group mean earnings in the "after" period and control group mean earnings in the "before" period. The SIPP difference in differences estimates were constructed similarly, with the change in the mean earnings of the SIPP eligibles replacing the change in the mean earnings of the ENPs.

B. Logit Estimates

The logit estimates reported in Tables 7, 8A to 8D, and C-1 to C-3 were obtained using the ENP and control samples with control status as the dependent variable. Weighting is required because of the choice-based nature of the combined ENP and control sample, wherein the controls are well over-represented relative to their proportion in the overall eligible population. While the logit coefficient estimates other than the intercept are robust to the choice-based sampling, weighting is required to obtain this coefficient and to produce the correct average numerical derivatives. The weight for observations in the ENP sample consists of the ratio of the population proportion of eligible non-participants, which we assume to be 0.97, to the sample proportion of ENPs. The weight for the controls consists of the ratio of their assumed population proportion of 0.03 to the sample proportion of controls. In addition to

weighting, the estimated standard errors were also corrected for choice based sampling as described in Takeshi Amemiya (1985).

TABLE C-1

JTPA PARTICIPATION PROBABILITY EQUATIONS

BACKGROUND VARIABLES OMITTED

PREDICTION CUTOFF VALUE = 0.03

Mean Percent Correctly Predicted
Estimated Standard Errors in Parentheses
ENP and Control Samples - Four Full Baseline Sites
Four Demographic Groups

Specification	Adult Males	Adult Females	Male Youth	Female Youth
Employment Specifications				
Constant + Employment at t	.7457	.5842	.5868	.5638
	(.0110)	(.0099)	(.0226)	(.0179)
Constant + Employment transition	.8093	.6702	.6466	.6387
	(.0099)	(.0087)	(.0213)	(.0175)
Constant + ETC	.7394	.6607	.6525	.6811
	(.0106)	(.0100)	(.0204)	(.0178)
Constant + 18 month job spells	.5912	.5805	.5990	.5711
	(.0124)	(.0098)	(.0224)	(.0186)
Constant + 48 month job spells	.6208	.6156	.5852	.5742
	(.0123)	(.0103)	(.0226)	(.0187)
Earnings Specifications				
Constant + Earnings in t-1 to t-6	.7650	.6038	.5916	.5306
	(.0107)	(.0095)	(.0226)	(.0183)
Constant + Earnings in Q-1 to Q-4	.7582	.5783	.5760	.5128
	(.0109)	(.0100)	(.0227)	(.0185)
Labor Force Status Specifications				
Constant + LFS at t	.7542	.6831	.6008	.6632
	(.0109)	(.0093)	(.0225)	(.0159)
Constant + Time in labor force status	.7689	.6860	.6448	.6946
	(.0107)	(.0098)	(.0221)	(.0174)
Constant + 2 quarter LFS	.7143	.6575	.5930	.6234
	(.0106)	(.0096)	(.0194)	(.0173)
Constant + 6 month LFS2	.8069	.7246	.6724	.7047
	(.0100)	(.0095)	(.0212)	(.0175)

1. Table updated on March 8, 1995.
2. BKGD includes race, age, years of schooling, marital status, and presence of a child less than six years of age.

TABLE C-2

JTPA PARTICIPATION PROBABILITY EQUATIONS

PREDICTION CUTOFF VALUE = 0.01

Mean Percent Correctly Predicted
Estimated Standard Errors in Parentheses
ENP and Control Samples - Four Full Baseline Sites
Four Demographic Groups

Specification	Adult Males	Adult Females	Male Youth	Female Youth
Background				
Background (BKGD)	.6387	.5538	.5263	.5197
	(.0094)	(.0054)	(.0104)	(.0074)
BKGD + Family income	.6655	.5562	.5062	.5235
	(.0098)	(.0053)	(.0128)	(.0088)
Employment Specifications				
Employment at t (No BKGD)	.5000	.5000	.5000	.5000
	(.0000)	(.0000)	(.0000)	(.0000)
BKGD + Employment at t	.6886	.5663	.5361	.5164
	(.0098)	(.0060)	(.0112)	(.0080)
BKGD + Employment transition	.7376	.5995	.5599	.5629
	(.0100)	(.0067)	(.0135)	(.0120)
BKGD + ETC	.7083	.6007	.5803	.5575
	(.0098)	(.0064)	(.0171)	(.0117)
BKGD + 18 month job spells	.6449	.5666	.5373	.5285
	(.0094)	(.0053)	(.0132)	(.0085)
BKGD + 48 month job spells	.6455	.5711	.5471	.5260
	(.0092)	(.0058)	(.0138)	(.0086)
Earnings Specifications				
BKGD + Earnings in t-1 to t-6	.7266	.5786	.5442	.5349
	(.0098)	(.0065)	(.0139)	(.0101)
BKGD + Earnings in Q-1 to Q-4	.7160	.5699	.5541	.5210
	(.0099)	(.0060)	(.0144)	(.0082)
Labor Force Status Specifications				
LFS at t (No BKGD)	.5000	.5000	.5000	.5000
	(.0000)	(.0000)	(.0000)	(.0000)
BKGD + LFS at t	.6990	.5750	.5348	.5377
	(.0096)	(.0059)	(.0108)	(.0095)
BKGD + Time in labor force status	.7356	.6092	.5460	.5922
	(.0099)	(.0066)	(.0119)	(.0134)
BKGD + 2 quarter LFS	.6812	.5767	.5389	.5482
	(.0096)	(.0060)	(.0119)	(.0119)
BKGD + 6 month LFS2	.7434	.6160	.5681	.5793
	(.0099)	(.0068)	(.0147)	(.0138)

1. Table updated on March 8, 1995.
2. BKGD includes race, age, years of schooling, marital status, and presence of a child less than six years of age.

TABLE C-3

JTPA PARTICIPATION PROBABILITY EQUATIONS

PREDICTION CUTOFF VALUE = 0.05

Mean Percent Correctly Predicted
Estimated Standard Errors in Parentheses
ENP and Control Samples - Four Full Baseline Sites
Four Demographic Groups

Specification	Adult Males	Adult Females	Male Youth	Female Youth
Background				
Background (BKGD)	.6913	.5916	.5361	.5373
	(.0113)	(.0092)	(.0120)	(.0131)
BKGD + Family income	.7426	.6041	.6762	.5521
	(.0108)	(.0094)	(.0172)	(.0143)
Employment Specifications				
Employment at t (No BKGD)	.7181	.5000	.5000	.5000
	(.0113)	(.0000)	(.0000)	(.0000)
BKGD + Employment at t	.7462	.6215	.5554	.5893
	(.0107)	(.0095)	(.0167)	(.0158)
BKGD + Employment transition	.8172	.6655	.6040	.6226
	(.0098)	(.0096)	(.0183)	(.0155)
BKGD + ETC	.7509	.6541	.6216	.6616
	(.0108)	(.0097)	(.0197)	(.0157)
BKGD + 18 month job spells	.6873	.5952	.6084	.5788
	(.0113)	(.0092)	(.0187)	(.0141)
BKGD + 48 month job spells	.6925	.6120	.6164	.5762
	(.0112)	(.0094)	(.0171)	(.0147)
Earnings Specifications				
BKGD + Earnings in t-1 to t-6	.7765	.6403	.5938	.5823
	(.0105)	(.0096)	(.0172)	(.0153)
BKGD + Earnings in Q-1 to Q-4	.7702	.6196	.5914	.5605
	(.0105)	(.0096)	(.0189)	(.0139)
Labor Force Status Specifications				
LFS at t (No BKGD)	.7131	.6512	.5719	.6396
	(.0105)	(.0091)	(.0199)	(.0155)
BKGD + LFS at t	.7671	.6634	.5696	.6550
	(.0104)	(.0092)	(.0170)	(.0153)
BKGD + Time in labor force status	.7904	.6862	.6069	.6793
	(.0102)	(.0095)	(.0185)	(.0163)
BKGD + 2 quarter LFS	.7216	.6416	.5764	.6210
	(.0110)	(.0092)	(.0159)	(.0160)
BKGD + 6 month LFS2	.8220	.7061	.6283	.6781
	(.0097)	(.0095)	(.0189)	(.0161)

1. Table updated on March 8, 1995.
2. BKGD includes race, age, years of schooling, marital status, and presence of a child less than six years of age.

TABLE C-4A

WITHIN-SAMPLE CONTROL STATUS PREDICTION PROBABILITIES AS A FUNCTION OF PREDICTION CUTOFF VALUE
ENP and Control Samples - Four Full Baseline Sites
Base Specification + Two Most Recent Labor Force Statuses
Adult Males

Cutoff	ENP Percent Predicted	Control Percent Predicted	Equal Weight Percent Predicted	Pop Weight Percent Predicted
0.010	62.71	93.32	78.01	63.63
0.011	65.53	92.51	79.02	66.34
0.012	67.36	92.37	79.87	68.11
0.013	69.56	91.69	80.62	70.22
0.014	70.42	91.42	80.92	71.05
0.015	71.76	90.87	81.32	72.33
0.016	73.47	89.92	81.69	73.96
0.017	74.33	89.65	81.99	74.79
0.018	74.94	89.37	82.15	75.37
0.019	76.04	88.69	82.37	76.42
0.020	76.65	88.28	82.46	77.00
0.021	77.38	88.15	82.76	77.70
0.022	78.12	87.47	82.79	78.40
0.023	79.10	87.19	83.15	79.34
0.024	79.58	87.06	83.32	79.80
0.025	80.68	86.65	83.67	80.86
0.026	81.42	85.97	83.69	81.56
0.027	81.91	85.56	83.74	82.02
0.028	82.27	85.15	83.71	82.36
0.029	82.40	85.01	83.71	82.48
0.030	82.89	84.88	83.88	82.95
0.031	83.13	84.20	83.66	83.16
0.032	83.25	84.06	83.65	83.27
0.033	83.37	83.79	83.58	83.38
0.034	83.37	83.51	83.44	83.37
0.035	83.62	82.70	83.16	83.59
0.036	84.23	82.29	83.26	84.17
0.037	84.60	81.88	83.24	84.52
0.038	85.33	81.61	83.47	85.22
0.039	85.70	81.20	83.45	85.56
0.040	86.06	80.79	83.43	85.90
0.041	86.06	80.11	83.08	85.88
0.042	86.31	79.43	82.87	86.10
0.043	86.31	79.16	82.74	86.10
0.044	86.55	78.75	82.65	86.32
0.045	86.80	78.61	82.71	86.55
0.046	87.29	78.47	82.88	87.03
0.047	87.41	77.93	82.67	87.13
0.048	87.41	77.79	82.60	87.12
0.049	87.78	77.79	82.79	87.48
0.050	88.26	77.38	82.82	87.93

1. Table updated on January 15, 1995.
2. The equal weight percent predicted is the simple mean of the control and ENP percents predicted.
3. The population weight percent predicted is the population weighted mean of the control and ENP percents predicted.
4. Specification used is that from Tables 8A to 8D.

TABLE C-4B

WITHIN-SAMPLE CONTROL STATUS PREDICTION PROBABILITIES AS A FUNCTION OF PREDICTION CUTOFF VALUE
ENP and Control Samples - Four Full Baseline Sites
Base Specification + Two Most Recent Labor Force Statuses
Adult Females

Cutoff	ENP Percent Predicted	Control Percent Predicted	Equal Weight Percent Predicted	Pop Weight Percent Predicted
0.010	40.41	91.48	65.94	41.94
0.011	43.08	90.68	66.88	44.51
0.012	46.46	89.53	67.99	47.75
0.013	49.46	88.03	68.74	50.62
0.014	52.33	87.11	69.72	53.37
0.015	55.32	85.73	70.53	56.23
0.016	57.30	85.04	71.17	58.13
0.017	59.91	83.31	71.61	60.61
0.018	61.82	82.16	71.99	62.43
0.019	63.73	81.01	72.37	64.25
0.020	65.01	79.98	72.50	65.46
0.021	66.73	78.71	72.72	67.09
0.022	68.32	77.56	72.94	68.60
0.023	69.85	77.10	73.47	70.07
0.024	71.26	76.52	73.89	71.42
0.025	72.59	75.26	73.93	72.67
0.026	74.19	74.68	74.43	74.20
0.027	74.63	73.42	74.02	74.59
0.028	75.27	72.50	73.88	75.19
0.029	75.97	71.69	73.83	75.84
0.030	76.67	70.66	73.67	76.49
0.031	77.31	70.08	73.69	77.09
0.032	77.88	68.70	73.29	77.60
0.033	79.03	67.89	73.46	78.70
0.034	79.60	67.55	73.57	79.24
0.035	79.80	67.20	73.50	79.42
0.036	80.24	66.86	73.55	79.84
0.037	80.94	66.51	73.73	80.51
0.038	81.52	66.40	73.96	81.07
0.039	82.03	65.59	73.81	81.54
0.040	82.54	65.25	73.90	82.02
0.041	82.86	64.79	73.82	82.32
0.042	83.37	64.44	73.90	82.80
0.043	83.75	63.87	73.81	83.15
0.044	84.26	63.29	73.78	83.63
0.045	84.38	62.49	73.43	83.72
0.046	84.58	62.14	73.36	83.91
0.047	84.58	61.68	73.13	83.89
0.048	84.77	61.45	73.11	84.07
0.049	85.02	61.10	73.06	84.30
0.050	85.60	60.99	73.29	84.86

1. Table updated on January 15, 1995.
2. The equal weight percent predicted is the simple mean of the control and ENP percents predicted.
3. The population weight percent predicted is the population weighted mean of the control and ENP percents predicted.
4. Specification used is that from Tables 8A to 8D.

TABLE C-4C

WITHIN-SAMPLE CONTROL STATUS PREDICTION PROBABILITIES AS A FUNCTION OF PREDICTION CUTOFF VALUE
ENP and Control Samples - Four Full Baseline Sites
Base Specification + Two Most Recent Labor Force Statuses
Male Youth

Cutoff	ENP Percent Predicted	Control Percent Predicted	Equal Weight Percent Predicted	Pop Weight Percent Predicted
0.010	29.05	90.88	59.96	30.90
0.011	31.28	88.89	60.08	33.01
0.012	32.40	86.61	59.51	34.03
0.013	33.52	86.04	59.78	35.10
0.014	36.31	84.90	60.61	37.77
0.015	39.66	84.33	62.00	41.00
0.016	43.02	83.19	63.11	44.23
0.017	46.37	82.91	64.64	47.47
0.018	50.28	80.91	65.60	51.20
0.019	51.96	78.92	65.44	52.77
0.020	54.75	78.35	66.55	55.46
0.021	56.42	76.92	66.67	57.03
0.022	58.10	74.93	66.51	58.60
0.023	59.78	74.07	66.93	60.21
0.024	59.78	72.93	66.35	60.17
0.025	60.89	71.79	66.34	61.22
0.026	62.01	69.80	65.90	62.24
0.027	63.13	68.66	65.90	63.30
0.028	65.36	68.09	66.72	65.44
0.029	68.16	67.24	67.70	68.13
0.030	69.27	66.10	67.68	69.17
0.031	69.27	65.81	67.54	69.17
0.032	69.27	64.96	67.11	69.14
0.033	72.07	64.67	68.37	71.85
0.034	73.74	63.82	68.78	73.44
0.035	73.74	62.96	68.35	73.42
0.036	74.86	61.25	68.06	74.45
0.037	76.54	60.97	68.76	76.07
0.038	76.54	60.40	68.47	76.06
0.039	76.54	59.26	67.90	76.02
0.040	76.54	58.97	67.76	76.01
0.041	78.21	58.97	68.59	77.63
0.042	79.33	58.12	68.72	78.69
0.043	79.89	57.55	68.72	79.22
0.044	82.68	56.41	69.54	81.89
0.045	82.68	54.99	68.83	81.85
0.046	84.36	53.56	68.96	83.44
0.047	85.47	52.71	69.09	84.49
0.048	85.47	51.85	68.66	84.46
0.049	85.47	51.00	68.24	84.44
0.050	86.03	51.00	68.51	84.98

1. Table updated on January 15, 1995.
2. The equal weight percent predicted is the simple mean of the control and ENP percents predicted.
3. The population weight percent predicted is the population weighted mean of the control and ENP percents predicted.
4. Specification used is that from Tables 8A to 8D.

TABLE C-4D

WITHIN-SAMPLE CONTROL STATUS PREDICTION PROBABILITIES AS A FUNCTION OF PREDICTION CUTOFF VALUE
ENP and Control Samples - Four Full Baseline Sites
Base Specification + Two Most Recent Labor Force Statuses
Female Youth

Cutoff	ENP Percent Predicted	Control Percent Predicted	Equal Weight Percent Predicted	Pop Weight Percent Predicted
0.010	32.44	90.55	61.50	34.18
0.011	36.12	88.06	62.09	37.68
0.012	39.13	85.82	62.47	40.53
0.013	42.14	85.07	63.60	43.43
0.014	44.82	83.33	64.07	45.98
0.015	46.82	82.59	64.71	47.89
0.016	49.83	80.10	64.96	50.74
0.017	52.51	78.86	65.68	53.30
0.018	55.18	77.86	66.52	55.86
0.019	58.19	76.87	67.53	58.75
0.020	61.54	76.37	68.96	61.98
0.021	62.21	74.88	68.54	62.59
0.022	63.88	74.13	69.00	64.19
0.023	65.22	72.39	68.81	65.44
0.024	67.22	71.64	69.43	67.35
0.025	68.56	70.90	69.73	68.63
0.026	69.57	69.65	69.61	69.57
0.027	71.24	68.16	69.70	71.15
0.028	72.58	68.16	70.37	72.45
0.029	73.24	68.16	70.70	73.09
0.030	73.58	67.16	70.37	73.39
0.031	74.58	66.67	70.62	74.34
0.032	75.59	65.42	70.50	75.28
0.033	76.25	64.68	70.46	75.90
0.034	77.26	64.43	70.85	76.88
0.035	77.93	64.43	71.18	77.53
0.036	79.26	63.18	71.22	78.78
0.037	79.60	62.19	70.89	79.08
0.038	79.93	61.69	70.81	79.38
0.039	80.60	61.19	70.89	80.02
0.040	80.94	59.45	70.19	80.30
0.041	81.61	59.45	70.53	80.95
0.042	81.94	58.96	70.45	81.25
0.043	82.94	58.46	70.70	82.21
0.044	83.61	57.21	70.41	82.82
0.045	83.61	56.97	70.29	82.81
0.046	83.95	56.72	70.33	83.13
0.047	84.28	55.97	70.12	83.43
0.048	84.28	55.72	70.00	83.42
0.049	84.28	54.73	69.50	83.39
0.050	84.28	54.23	69.25	83.38

1. Table updated on January 15, 1995.
2. The equal weight percent predicted is the simple mean of the control and ENP percents predicted.
3. The population weight percent predicted is the population weighted mean of the control and ENP percents predicted.
4. Specification used is that from Tables 8A to 8D.