Job Displacement and Intragenerational Mobility

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Abstract:

The analysis presented here uses the 1968 through 1993 waves of the Panel Study of Income Dynamics to examine how job displacement influences intragenerational earnings and income mobility. Using individual labor earnings, this study shows displacement increases the probability of downward mobility for several years after separation occurs. Furthermore, the probability of being in the bottom half of the labor earnings distribution increases significantly, not only in the year of job loss, but also for several years following displacement. However, income from other family members and government transfer payments mitigates displacement's adverse effect. After considering these additional measures of financial well being, the short-term impact of displacement on movements throughout the income distribution is reduced, and the long-term effect is eliminated.

JEL Codes: J63; J65
Keywords: job displacement; earnings losses; intragenerational mobility

I. Introduction

Researchers are aware of the long-term effects job displacement has on individual workers' earnings. One area that has received relatively little attention is how this type of involuntary job loss influences the inter-temporal movement of workers through the earnings and income distributions. This study uses data from the Panel Study of Income Dynamics (PSID) and shows that displacement significantly increases downward earnings mobility and decreases upward movements within the labor earnings distribution for several years after job loss occurs. Understanding that workers have access to resources that may buffer the negative consequences of job displacement, the analysis also incorporates earnings and income from other family members and government transfer payments. When considering these other resources, displacement's short-run impact on mobility is reduced, and the long-term impact is eliminated.

Studying displacement's effect on mobility is important since movements within the income distribution have implications for policies designed to combat inequality.[1] Displacement may raise the probability of increased income inequality since this type of involuntary job loss permanently reduces workers' earnings relative to non-displaced individuals.[2] Berry, Gottschalk, and Wissoker (1988) and Stevens (2001) find the transitory variance of displaced workers' earnings increases upon job loss. This variance not only shows increases in static, year-to-year measures, but also shows an increasing trend over time (Stevens 2001).

The increased volatility of displaced workers' earnings is naturally a policy concern, but the more relevant question is whether short-term volatility is permanent or offset by long-term

[1] Economists have questioned why inequality has changed over time in the United States (Gottschalk and Moffitt 1994). Furthermore, researchers have conducted cross-national comparisons in order to judge the relative size of inequality in the United States (Burkhauser, Holtz-Eakin, and Rhody 1997). Finally, Burkhauser et al. (1999) and Burkhauser et al. (2004) examine the shape of the earnings distribution and provide empirical tests to show how the distribution has changed over time.

[2] See Ruhm (1991), Jacobson, LaLonde, and Sullivan (1993a, 1993b), Stevens (1997), and Couch and Placzek (forthcoming) for discussions of displacement's negative impact on earnings.

upward mobility as earnings recover. Little empirical research exists on displacement and mobility (Berry et al. 1988; DiPrete 2002). The papers that do investigate this topic find that displacement not only increases the probability of workers receiving low levels of labor earnings, but also increases the probability of falling into poverty. Other research has shown that all types of involuntary job loss (including displacement) reduce the probability of moving from the bottom quintile and remaining in the top quintile of the income distribution (Gittleman and Joyce 1999).

This study uses a methodology that extends the previous research. Using the 1968 through 1993 waves of the PSID, the analysis begins by using transition probabilities to compare the mobility patterns of displaced workers to a comparison group of never-displaced individuals. The study then uses a standard earnings equation in a latent variable model to provide estimates of the long-term earnings losses of displaced workers. These estimates are then used to calculate the probability of a displaced individual being in any decile of the earnings and income distributions relative to non-displaced workers. Finally, nonparametric kernel density estimators are used to analyze visually the movements of the earnings and income distributions of displaced workers over time relative to the year of job loss.

The rest of this paper proceeds by discussing the literature on earnings losses and the income distribution of displaced workers. Section III discusses the data and empirical methodology. Section IV presents the empirical results, and Section V concludes.

II. Previous Literature

Empirical findings in the literature suggest that job displacement should affect earnings and income mobility. Researchers have found that the average level of displaced workers' earnings falls significantly immediately following job loss (Ruhm 1991; Jacobson, LaLonde, and

Sullivan 1993a, 1993b; Stevens 1997; Couch and Placzek forthcoming). Several years after the event occurs, earnings are still below where they would be had displacement not occurred. These findings imply two results. First, since labor earnings significantly decrease in the year of job loss, the probability of downward earnings and income mobility should increase. Second, since earnings are still below those of non-displaced workers even several years after job loss occurs, the probability, and amount, of relative upward mobility should decrease.

Economists have several theories as to why workers lose substantial earnings upon displacement, and these theories have implications for income mobility after job loss.[3] Once displacement occurs, individuals not only lose firm, industry, and union wage premiums, but also high quality matches with their former employers. If firms maintain promotion from within policies, re-employed displaced workers will have difficulty increasing their earnings by moving up the organizational ladder. Additionally, workers may lose any firm/industry-specific human capital after displacement.[4]

There are other reasons why displacement should affect intragenerational earnings mobility. Individuals differ in their ability to adjust to job loss, and they may accept volatile earnings in an attempt to maintain the same expected level of income (Berry et al. 1988). In addition, it may take time for workers to establish a good match with a new employer, which could lead to subsequent displacements (Stevens 1997). Farber (1999) shows displaced workers are more likely to be in temporary and involuntary part-time work after separation. He notes displaced workers use these types of employment relationships as transitions into full-time occupations.

[3] See Fallick (1996) and Jacobson et al. (1993a, 1993b) for discussions of these topics.
[4] Carrington (1993) and Neal (1995) empirically show this type of human capital is important in determining the recovery of displaced workers' lost earnings. They show that those workers who find re-employment within the same industry have smaller earnings losses than those who switch industries after job loss occurs.

While the above results imply a directional impact of displacement on mobility, little research exists that calculates the magnitude of the effect (Berry et al. 1988; DiPrete 2002). Using an errors components model and the PSID, Berry et al. (1988) find that the probability of displaced workers earning less than $10,000 in a given year increases from 0.0034 two years before separation to 0.0123 the year after job loss occurs. Four years after separation, the authors find the proportion of displaced workers with earnings below this threshold is 0.0018. In a cross-national comparison of Sweden, Germany, and the United States (US), DiPrete (2002) finds the probability of a US household experiencing a displacement and entering poverty is between 0.035 and 0.05. In his study, poverty is defined as being less than 50 percent of the median-adjusted household disposable income, adjusted for family size.

While not focusing exclusively on job displacement, Gittleman and Joyce (1999) use the PSID and probit models to investigate how voluntary and involuntary job separations occurring over a five-year period affect mobility. Their definition of involuntary job loss includes not only displacement, but also job was completed, temporary work, and seasonal occupation. The authors find involuntary job loss reduces the probability of moving from the bottom quintile of the income distribution by five percentage points. Involuntary separations also reduce the probability of staying in the top quintile by 20 points.

This study contributes to the existing literature by analyzing three different measures of financial well being: annual labor earnings; the combined earnings of the husband and wife; and pre-tax, post-transfer total family income, which includes earnings and income from all family members and government transfer payments. The latter two are measured on a per capita basis. Previous papers examined only one of these measures. Berry et al. (1988) used annual labor

earnings; DiPrete (2002) analyzed size-adjusted household disposable income, and Gittleman and Joyce (1999) focused on size-adjusted family income.

It is important for any study of displacement and mobility to consider these various measures of financial well being. Labor earnings are the reward an individual receives for participating in the workforce. Displacement directly alters this reward by possibly reducing hours worked, causing spells of unemployment, and destroying firm/industry-specific human capital. However, individuals may have access to other sources of income that protect against displacement's negative influence on earnings. Therefore, it is important to consider the possibility that the displaced worker has access to earnings and income from other family members and government transfer payments.

III. Data and Empirical Methodology

Data

This study uses data from the 1968 through 1993 waves of the Panel Study of Income Dynamics (PSID). The PSID is a nationally representative survey conducted annually between 1968 and 1997, and biennially thereafter.[5] It includes an over-sample of low-income households, and the results reported in the next section come from using both the low-income and nationally representative samples.[6] To avoid any potential labor market adjustments made by females such

[5] Researchers also use the Displaced Workers Survey (DWS) to study displaced workers. While this data source has high quality information on the incidence of displacement, it has three major shortcomings. First, there is no natural comparison group available because the DWS only surveys individuals who experience displacement. Madden (1988) shows the importance of using a comparison group when studying displacement's effect on earnings. Second, the DWS asks respondents about the most recent job loss that occurs between three and five years before the actual survey date. Therefore, the DWS may have more recall bias and measurement error compared to the PSID. Finally, the DWS only inquires about the most recent pre-displacement job. Therefore, a long earnings history is not available.

[6] Appendix B contains the results from the majority of the analysis using the nationally representative sample. The qualitative results still hold.

as marriage, divorce, and child rearing, the unit of analysis is male household heads.[7] However, the analysis includes the labor earnings and income of wives and other family members, along with government transfer payments.

In each wave of the PSID, the income variables refer to the previous calendar year. Therefore, the estimation occurs from 1968 to 1992. Instead of relying on the original 1968 sample, individuals can enter the PSID sampling frame as time progresses. The only restriction placed on these individuals is that when they enter the PSID, they report being a head of household until 1993. The estimation is on all individuals in the years when they are between the ages of 25 and 61 and report non-zero labor earnings.[8] A natural concern with restricting the estimation to those with positive labor earnings is missing some potentially interesting analysis of movements out of and into the labor force. For this reason, Appendix C contains the majority of the results when including observations of zero labor earnings. The qualitative results still hold.

The analysis uses three different measures of financial well being, which are converted to real dollars using the appropriate year's CPI-U with 1982-84=100. The first measure is annual labor earnings, which include total wage and salary income, earnings from overtime, bonuses, and commissions, and the labor portion of farm, business, and roomers and boarders income. The analysis begins with this measure because labor earnings are the direct reward for an individual's involvement in the workforce. Displacement negatively alters this involvement by reducing hours worked, causing spells of unemployment, or destroying firm/industry-specific human capital.

[7] The results are similar when including female-headed households.
[8] The age restriction avoids potential retirement decisions. Borjas (2005) notes two-thirds of men retire between ages 62 and 65. When defining the sample of displaced workers, individuals must be no older than 56 at the time of job loss so they have the ability to be present during the follow-up period.

The second measure of well being is the summation of head and wife labor earnings, which is referred to throughout this paper as annual parental labor earnings. Finally, the analysis uses total family income, which equals the sum of labor earnings and unearned income from all members in the family unit, including government transfer payments. The analysis uses these two measures of well being because earnings and income from other family members and government transfer payments may offer protection against negative income shocks such as displacement (Seitchik 1991; Stephens 2002). These last two measures of well being are adjusted for family size by dividing them by the number of members in the family unit.[9] All earnings are pre-tax, and per capita family income is pre-tax, post-transfer (Berry et al. 1988; Gittleman and Joyce 1999).

From the group of males meeting the above restrictions, displacement is identified from a question asked of those workers who have been with their current job/employer for less than 12 months or since January of the previous year. The question asks why the worker changed jobs/employers. If the respondent states the reason is plant closure or lay-off/fire, then he is identified as experiencing a displacement. This is consistent with previous research on displacement using the PSID (Stevens 1997; Stevens 2001; Stephens 2002; Charles and Stephens 2004). Displacement is timed as occurring in the calendar year before the survey wave (Stephens 2002; Charles and Stephens 2004). Finally, in the 1968 survey, the question refers to displacements occurring over the previous ten years. Since displacements reported in the 1968 survey cannot be timed, anyone reporting displacement during that wave is removed from the analysis.

[9] Researchers have documented the increased probability of divorce associated with job displacement (Charles and Stephens 2004). Since the analysis adjusts parental earnings and family income for family size, it may be the case that a husband with a lower earning wife will appear to have higher family earnings and income upon divorce. Because of this possibility, sensitivity checks using a sample of continuously married couples are conducted. The qualitative results are unchanged and presented in Section IV.

This definition of displacement has two potential problems. First, the PSID does not delineate between firing for cause and mass layoff. If those workers who are fired for cause have below-average productivity, then this may bias the parameter estimates downwards. However, Boisjoly, Duncan, and Smeeding (1994) note that only 16 percent of those who report laid-off/fired are actually fired for cause (Stevens 1997).

Second, this definition of displacement does not specifically conform to that of the Bureau of Labor Statistics (BLS). The BLS defines a displaced individual as someone who is at least 20 years old, has at least three years of tenure, and lost a job due to plant closure, abolition of a position or shift, or slack work. The tenure portion of the BLS definition is difficult for researchers to implement with the PSID for two reasons. First, the coding of tenure changes from an interval to the actual number of months starting in the 1976 survey wave. Second, the type of tenure asked of respondents changes, varying from tenure on the current job, position, and employer. These are different concepts. Because of these changes, and since it is important to follow workers with some attachment to the labor market, the displaced workers identified above must have three consecutive years of positive labor earnings before displacement occurs. This restriction requires those who experience a displacement between 1968 and 1970 to be removed from the analysis. Upon implementing the selection rules, 3,410 individuals meet all of the sample selection criteria. Of these, 584 experienced a displacement between 1971 and 1992.

Empirical Methodology

The focus of this paper is not on how an individual's earnings vary with displacement, per se. Instead, interest lies in how this type of job loss affects an individual's movement and ranking in the earnings and income distributions. To study these concepts, this paper employs three different methodologies: transition matrices, correlated random-effects interval regressions,

and kernel density estimates. Each of these techniques provides a different perspective on how displacement alters a worker's ability to move throughout the income distribution over time, and each is discussed in turn.

Transition Matrices

Transition matrices provide useful summary measures of the probability of workers moving throughout the earnings and income distributions over relative time changes. Furthermore, these matrices provide insight into the persistence of income shocks. If these shocks tend to be transitory, then the probability of changing earnings or income deciles is the same over a three-year period as over a one-year period (Burkhauser, Holtz-Eakin, and Rhody 1997). However, if shocks tend to persist, then the probability of changing deciles grows over time. Therefore, using transition matrices to study displacement's effect on mobility will yield evidence as to how persistent this negative shock is to earnings and income.

To calculate the transition probabilities, the deciles of the earnings and income distributions need to be determined. The deciles are generated using distributions over the entire 25-year period. This method is different from generating the distributions in each year. By calculating the deciles in that manner, there are instances when the upper and lower bounds from adjacent deciles overlap between years. These bounds must remain fixed when using the interval regression (described below) to calculate the probability of an individual being in any one decile. Therefore, to be consistent across methodologies, the distribution is generated over the entire sample period.

After creating the deciles, the sample is broken into two subsets. The first contains never-displaced workers, and the second contains workers who experienced a displacement at some point between 1971 and 1992. Using a similar methodology and notation as Burkhauser et

al. (1997), indicator variables are created for each individual in each subset that capture the movement from one decile to another. These indicators, $\rho_{i,d,l}^{t,t+r}$, equal 1 if individual i moves from decile d to decile l between periods t and $t+r$. For each subgroup, the probability of transitioning between deciles is given by the following equation:

$$P = \frac{\sum_{i=1}^{n} w_i \rho_{i,d,l}^{t,t+r}}{\sum_{i=1}^{n} w_i} \qquad (1),$$

where w_i is the weight assigned to individual i in period $t+r$.

Weights are used because of the presence of the over-sample of low-income households. The use of weights is complicated by the fact that transition matrices inherently examine movements between multiple periods. In the PSID, the individual weights are not comparable between survey waves. Weights in the terminal year of the transition are used for the calculations. For example, if the movement of an individual occurs between 1990 and 1991, the 1991 weights are used.

The reference period (time t) is different for each subset. For those workers who experience a displacement, the reference point is the period three years before the job loss. Choosing a starting point for non-displaced workers is more complicated. This difficulty arises because displacement may have occurred any time between 1971 and 1992. This feature of the data makes it difficult to align temporally those who experience a displacement and those who do not. For this reason, a random reference period is chosen for each individual in the group of never-displaced workers.[10]

[10] For comparability, the actual date of entry into the sample was also used. The qualitative results are similar.

Correlated Random-Effects Interval Regression

The second methodology used is a correlated random-effects interval regression. The interval regression is a latent variable model that treats earnings and income as unobserved variables that fall within a pre-determined range. This range is the lower and upper bounds of the deciles of the earnings and income distributions. The structure of this model simultaneously captures two components. First, it uses a standard earnings equation to model the wage determination process and to provide estimates of the long-term impact of displacement on earnings and income. Second, by treating earnings and income as latent variables, the parameter estimates can be used to predict the probability of a displaced worker being in any decile of the earnings and income distributions.

The model begins with the standard earnings equation applied to panel data for the i^{th} individual,

$$y_{it}^{*} = z_{it}\beta + \mu_{it} \quad (2),$$

where

$$\mu_{it} = \nu_{i} + \varepsilon_{it} \quad (3).$$

Here, y_{it}^{*} is annual labor earnings, per capita parental earnings, or per capita family income of person *i* in year *t*. The z_{it} contains human capital characteristics thought to affect earnings, and μ_{it} is the error term. In (3), ν_{i} is a time-invariant, unobserved, individual-specific effect assumed independent of z_{it}; ε_{it} is a time-varying error. Both are independently and randomly distributed as normal with mean zero and variances σ_{ν}^{2} and σ_{ε}^{2}, respectively.

The model treats the earnings and income measures in (2) as latent, unobserved variables that fall within a pre-determined, observable range. This range equals the lower and upper

bounds of each decile of the earnings and income distributions calculated from the data. Therefore, for the i^{th} individual, define y_{it} to equal one of the deciles as follows:

$$y_{it} = \begin{cases} 1 & if \quad y_{it}^* \le \alpha_1 \\ 2,...,9 & if \quad \alpha_{j-1} < y_{it}^* \le \alpha_j \forall j = 2,...,9 \\ 10 & if \quad y_{it}^* > \alpha_9 \end{cases} \qquad (4).$$

Here, the α_j s are the lower and upper bounds of the income deciles, which are fixed, known parameters taken from the data. By plugging (3) into (2) and (2) into (4), with rearranging, (4) becomes

$$y_{it} = \begin{cases} 1 & if \quad \varepsilon_{it} \le \alpha_1 - (z_{it}\beta + \nu_i) \\ 2,...,9 & if \quad \alpha_{j-1} - (z_{it}\beta + \nu_i) < \varepsilon_{it} \le \alpha_j - (z_{it}\beta + \nu_i) \forall j = 2,...,9 \\ 10 & if \quad \varepsilon_{it} > \alpha_9 - (z_{it}\beta + \nu_i) \end{cases}.$$

The probability that y_{it} takes on the value of any one of the deciles is

$$\Pr(y_{it} = 1,...,10 \mid z_{it}, \nu_i) = \begin{cases} \Phi\left[\dfrac{\alpha_1 - (z_{it}\beta + \nu_i)}{\sigma_\varepsilon}\right], & j = 1 \\ \Phi\left[\dfrac{\alpha_j - (z_{it}\beta + \nu_i)}{\sigma_\varepsilon}\right] - \Phi\left[\dfrac{\alpha_{j-1} - (z_{it}\beta + \nu_i)}{\sigma_\varepsilon}\right], & \forall j = 2,...,9 \\ 1 - \Phi\left[\dfrac{\alpha_9 - (z_{it}\beta + \nu_i)}{\sigma_\varepsilon}\right], & j = 10 \end{cases} \qquad (5).$$

where $\Phi(.)$ is the standard normal cumulative density function.

Assuming conditional independence over time, the joint density of y_i is

$$f(y_{i1},...,y_{iT} \mid z_{i1},...,z_{iT}, \beta, \nu_i, \sigma_\varepsilon) = \prod_{t=1}^{T} F(y_{it} \mid z_{it}, \beta, \nu_i, \sigma_\varepsilon),$$

where

$$F(y_{it} \mid z_{it},\beta,\nu_i,\sigma_\varepsilon) = \begin{cases} \Phi\left[\dfrac{\alpha_1 - (z_{it}\beta+\nu_i)}{\sigma_\varepsilon}\right], & if \quad y_{it}=1 \\ \Phi\left[\dfrac{\alpha_j - (z_{it}\beta+\nu_i)}{\sigma_\varepsilon}\right] - \Phi\left[\dfrac{\alpha_{j-1} - (z_{it}\beta+\nu_i)}{\sigma_\varepsilon}\right], & if \quad y_{it}=2,...,9 \\ 1-\Phi\left[\dfrac{\alpha_9 - (z_{it}\beta+\nu_i)}{\sigma_\varepsilon}\right], & if \quad y_{it}=10 \end{cases}$$

The likelihood function for the i^{th} individual is

$$L_i = \int_{-\infty}^{\infty} \frac{1}{\sigma_\nu\sqrt{2\pi}} e^{\frac{-\nu_i^2}{2\sigma_\nu^2}} \prod_{t=1}^{T} F(y_{it} \mid z_{it},\beta,\sigma_\varepsilon,\nu_i) d\nu_i \qquad (6).$$

The analysis estimates equation (6) using adaptive Gauss-Hermite quadrature with 36 integration points.[11] The parameter estimates obtained from this model are then used in equation (5) to estimate the probability of a displaced worker being in any one decile of the earnings and income distributions relative to their non-displaced counterparts.

The random-effects model assumes the observed covariates are uncorrelated with the unobserved heterogeneity. If this assumption is true, then the random-effects model produces consistent estimates. This is not the case if the assumption is violated. In fact, Gibbons and Katz (1991) provide empirical evidence showing displaced workers are inherently different from other workers, and these differences are productivity-related. Because of this finding, researchers control for the potential correlation that may exist between the observed covariates and the unobserved heterogeneity. Since the standard normal distribution is a single index function, it is not possible to factor out ν_i from the model (Cameron and Trivedi 2005). Furthermore,

[11] When solving this model, a trade-off exists between computation time and precision of the integral's estimate (Butler and Moffitt 1982). Increasing the number of integration points adds to computation time while increasing the precision of the estimate. To speed computation time, the analysis uses parameter estimates from the pooled version of the model as starting values. To show the number of integration points does not significantly alter the parameter estimates, Appendix Table A-1 presents estimates when running this model using the labor earnings distribution and a range of integration points from four to 36. As shown in the table, altering the number of quadratures does not affect the results in any meaningful way.

inclusion of individual dummy variables may lead to the incidental parameters problem. Therefore, it is not possible to use standard fixed-effects techniques here.

To control for this possible correlation, the analysis follows Mundlak (1978) and proposes to parameterize the relationship between ν_i and the observed covariates.[12] Here, ν_i is linearly related to the observed covariates as $\nu_i = \bar{z}_i\lambda + u_i$, where $\bar{z}_i$ is the covariate's average for individual *i* over time, and $u_i \mid z_i \sim N(0, \sigma_u^2)$.[13] This is known as Mundlak's version of the correlated random-effects model.[14] The coefficients associated with the $\bar{z}_i$ are interpreted as the effect unobserved heterogeneity has on the dependent variable, whereas those associated with z_{it} provide the true effect of the variable of interest.

In order to estimate the likelihood function, (2) becomes:

$$y_{it}^* = x_{it}\theta + \bar{x}_i\pi + \sum_{k\geq -3} D_{is}^k\delta_k + \sum_{k\geq -3} \overline{D}_i^k\xi_k + \gamma_t + \bar{\gamma}_i + \eta_{it} \ .$$

This equation is similar to models used by Jacobson et al. (1993a, 1993b) and Couch and Placzek (forthcoming). Here, the structure of the model remains the same with $z_{it}\beta = x_{it}\theta + \sum_{k\geq -3} D_{is}^k\delta_k + \gamma_t$, $\bar{z}_i\lambda = \bar{x}_i\pi + \sum_{k\geq -3} \overline{D}_i^k\xi_k + \bar{\gamma}_i$, and $\eta_{it} = u_i + \varepsilon_{it}$. The γ_t s are year dummy variables. The D_{is}^k is a dummy variable equaling one in year *s* if individual *i* suffers displacement, and *k* indexes these variables starting three years before job loss. Finally, the x_{it} contains a quartic in potential experience. Potential experience equals age minus education minus six. If the individual has less than 12 years of education, then potential experience equals

[12] See Wooldridge (2002) and Cameron and Trivedi (2005) for a discussion.
[13] For a recent application using this technique to account for the potential correlation between the time-invariant, unobserved heterogeneity and the observed covariates in a non-linear panel data model, see Lorgelly and Lindley (2008).
[14] Chamberlain (1984) discusses a different version of the correlated random-effects model. He uses each observation of every covariate as an explanatory variable. However, this methodology requires a balanced panel (Stephens 2002; Sahm 2007). The analysis presented below comes from an unbalanced panel. When completely balancing the data, the sample size falls from 3,410 to 243 male household heads.

age minus 18 so not to overcompensate less educated workers by assigning them larger values of experience (Stephens 2002). Education is defined to be the same throughout time. This is done by assigning each individual his education as reported in the most recent survey wave for which that person reported education.

Kernel Density Estimates

The final methodology used is nonparametric kernel density estimation. This methodology provides estimates of the distribution of a variable without placing any prior assumptions on the data. Therefore, the distribution is not assumed to follow a specific functional form. These estimators provide visual representations of the earnings and income distributions. When graphing these estimators for displaced workers over time relative to job loss, researchers can see the potential impact displacement has on the earnings and income distributions. The estimators are constructed using the following formula:

$$p(\kappa_t) = \frac{1}{nb}\sum_{i=1}^{n} K\left(\frac{\kappa_{it} - \kappa_t}{b}\right) \qquad (7),$$

where κ equals annual labor earnings, per capita parental earnings, or per capita family income, n is the sample size, b is the bandwidth, and $K(.)$ is the kernel function.

The analysis uses the Epanechnikov kernel since it is the most efficient (Pagan and Ullah 1999). This kernel function equals the following:

$$K(\Delta) = \begin{cases} \frac{3}{4}\left(1 - \frac{1}{5}\Delta^2\right)/\sqrt{5}, & |\Delta| < \sqrt{5} \\ 0 & otherwise \end{cases}.$$

The bandwidth is chosen such that the mean integrated squared error of the estimate is minimized assuming the data follow a Gaussian distribution and a Gaussian kernel were used.

IV. Results

Tables 1 and 2 show some descriptive measures of the sample. Table 1 presents the number of displaced and non-displaced individuals in each year. The number of those experiencing a job displacement increases over time. This is consistent with previous research (Stevens 2001). Table 2 shows descriptive statistics of the sample by displacement status. Those who experience displacement tend to have relatively lower incomes of all types. In fact, the lower incomes are the only noticeable differences between the groups. These lower incomes are expected since the averages are calculated over the entire 25-year period. Calculating the average in this manner automatically considers any effect displacement has on earnings and income.

Table 3 presents parameter estimates from three fixed-effects regressions. The dependent variables in the regressions are annual labor earnings, per capita parental earnings, and per capita family income; the right-hand-side variables include a quartic in potential experience, year dummy variables, and the displacement dummy variables. Since the parameter estimates associated with the displacement variables are the ones of interest, they are the ones shown in the table. The purpose of presenting these results is to show the extent of displacement's effect on the initial drop and subsequent recovery of earnings and income over time.

Table 3 shows job displacement reduces annual labor earnings by $3,891 the year of job loss. Five years following the event, annual labor earnings are still $2,769 below where they would have been had displacement not occurred. These estimates are significantly different from zero at the one percent level. Displacement also negatively influences per capita parental earnings and family income. Table 3 shows per capita parental earnings and family income fall by $1,543 and $1,232, respectively, the year of job loss. Five years after displacement, the losses

in parental earnings and family income equal $853 and $878 and are significantly different from zero at the five percent level.

The results shown in Table 3 indicate earnings and income fall significantly the year of job loss and still do not recover to pre-displacement levels five years after the event occurs. When examining the parameter estimates in Table 3 as a percentage of earnings and income the year before job loss, the analysis shows that the declines in per capita parental earnings and family income are lower than the decline in annual labor earnings. Table 3 shows that the loss in annual labor earnings the year of displacement is 16.7 percent of pre-displacement earnings. For per capita parental earnings and family income, the losses are 14.7 and 10.3 percent, respectively. Five years following the event, the loss in annual labor earnings is 11.9 percent of pre-displacement earnings; for parental earnings and family income, the losses are 8.1 and 7.4 percent. This result shows that once workers have access to other sources of income, the short- and long-term negative effects of displacement on financial well being are reduced.

Table 4 contains three panels showing transition probabilities by displacement status and income type. Panel A uses labor earnings, Panel B uses per capita parental earnings, and Panel C uses per capita family income. The columns labeled $t+r$ indicate relative time changes for the displaced and non-displaced workers. For example, concentrating on displaced workers, the column labeled $t+1$ indicates a change from three years before job loss to two years before job loss. For the group of non-displaced workers, $t+1$ shows the movement from the random starting date to one year afterwards.

The rows in Table 4 show the associated movement within the various distributions. For example, the row labeled "Down 9" indicates a downward movement of nine deciles in the distribution during the period indicated in the column. As in Burkhauser et al. (1997), the entries

shown in each cell are derived from equation (1), and they show the proportion of individuals who make the associated transition relative to the number of people eligible to make the move. Column totals do not sum to 100 percent as a result. These transition matrices are useful in showing mobility patterns over relative time changes. The cells in bold indicate statistical differences between displaced and non-displaced workers at the five percent significance level. These differences provide some evidence as to how displacement affects worker mobility relative to a group of never-displaced individuals.

Each panel in Table 4 shows there are two general patterns exhibited by both displaced and non-displaced individuals. First, the proportion of immobile workers declines as time progresses. For example, in Panel A during period $t+1$, the proportion of non-displaced workers who are immobile equals approximately 50 percent. By period $t+8$, this number declines to 25 percent. The same figures for displaced workers are 47 percent and 23 percent, respectively. The second pattern, which is related to the first, is the general increase in the probabilities of changing deciles over time. For example, again concentrating on Panel A, the proportion of non-displaced workers moving down four deciles in period $t+1$ equals 0.6 percent. The proportion is 2.1 percent in period $t+8$. The same numbers for displaced workers are 2.3 percent and 9.5 percent, respectively. Since the probability of changing deciles generally increases over time, shocks to earnings and income tend to persist.

Even though displaced and non-displaced workers share the two general mobility patterns mentioned above, Panel A shows there are many statistical differences between the two groups beginning in period $t+3$. Recall Panel A uses annual labor earnings, and period $t+3$ is a change from three years before to the year of job loss for displaced workers. Starting in this period, displaced individuals have much larger probabilities of dropping in the earnings

distribution. For example, the proportion of displaced workers declining three deciles is 11.7 percent. For non-displaced workers, the proportion is three percent. Workers experiencing a displacement also have lower probabilities of moving up the income distribution starting in period $t+3$. This is particularly the case for moving up one and two deciles within the distribution over time.

When moving from Panel A to Panels B and C, the number of statistical differences between displaced and non-displaced workers greatly diminishes. Panel B, which uses per capita parental earnings, shows there are almost no statistical differences between these groups of workers starting in period $t+7$. This finding indicates that four years after job loss, displaced workers exhibit the same mobility patterns as their non-displaced counterparts. Panel C examines the per capita family income distribution and shows that any major statistical differences are erased in period $t+7$.

While the transition matrices in Table 4 provide good summary measures of mobility, they do not condition on factors affecting an individual's wage. Furthermore, they do not control for any possible selection into displacement. Table 5 shows the results from estimating the likelihood function of the correlated random-effects interval regression, equation (6). These regressions control for a quartic in potential experience, year effects, displacement, and time averages of all of these variables. The estimated coefficients found in Table 5 should be interpreted as the effect the covariates have on the latent variable (Wooldridge 2002).

Table 5 indicates all three measures of well being fall the year of displacement. Furthermore, each income measure shows some recovery thereafter. Annual labor earnings fall $4,484 the year of job loss and are $1,758 below expectations five years afterwards. Per capita parental earnings decline $1,806 the year of job loss, and per capita family income falls $1,440.

All four of these estimates are statistically significant at the one percent level. However, five years after displacement occurs, the coefficients associated with parental earnings and family income are not statistically different from zero. This finding indicates that once displaced workers access other sources of income, the long-term negative consequences of job displacement are eliminated.

Table 6 presents the marginal effects of displacement on the probability of being in any one of the deciles of the earnings and income distributions.[15] The marginal effects are calculated from equation (5) using the parameter estimates from the likelihood function, equation (6). Panel A shows the effects using the labor earnings distribution. Panels B and C show the effects using the per capita parental earnings and family income distributions, respectively.

Concentrating on Panel A, the results show the probability of a displaced worker being in the bottom decile the year of job loss is almost eight percentage points larger than for a non-displaced worker. Five years after displacement, the increased probability is still over two percentage points. The magnitude of displacement's effect decreases when moving from the tails to the center of the distribution. Panel A shows the year of job loss, a displaced worker is 0.41 percentage points more likely to be in the fifth decile when compared to a non-displaced worker.

Horizontally summing the rows shows the cumulative effect displacement has on being in particular portions of the distribution. For example, Panel A shows the probability of a displaced worker being in the bottom five deciles increases by almost 14 percentage points the year of job

[15] The marginal effects are calculated with all of the variables set at their means except for the displacement variables. The displacement variables are set to zero when calculating the marginal effects.

loss. This increased probability is over five percentage points five years afterwards.[16] This result indicates job displacement not only increases the probability of downward earnings mobility the year of job loss, but also decreases the probability of upward mobility after displacement occurs.

Panel B shows that the increased probability of being in the bottom five deciles the year of displacement is over nine percentage points; it is almost seven points in Panel C. Five years following displacement, the increased probability of an individual being in the bottom five deciles is 1.9 and 1.2 percentage points in Panels B and C, respectively. Furthermore, in Panels B and C, these increased percentages are not significantly different from zero starting four years following displacement. This finding indicates that displaced workers have the same probability of being in any one decile as their non-displaced counterparts beginning four years after job loss. The percentages in Panels B and C are smaller than the numbers in Panel A. This shows that earnings and income from other family members and government transfer payments offer protection against the adverse effects of displacement.[17]

The analysis presented above uses family-size adjusted parental earnings and family income. Research shows that the probability of divorce increases upon displacement (Charles and Stephens 2004). If a husband has a lower earning wife, and if the couple divorces after job loss occurs, then the husband will appear to have larger per capita parental earnings and family income after displacement and divorce. To see if divorce is driving the results, the correlated random effects interval regression was run on the analysis sample after selecting only those males who remained continuously married to the same person. Table 7 presents the results.

[16] Because of the symmetrical nature of the normal distribution, this implies the probability of a displaced worker being in the top five deciles decreases by 14 percentage points the year of displacement and six percentage points five years afterwards.

[17] Tables 5 and 6 were recreated using the square root equivalence scale for parental earnings and family income. The qualitative results still hold.

Table 7 shows that annual labor earnings decline $4,783 the year of displacement and are $2,423 below expectations five years afterwards. Both estimates are statistically different from zero at the one-percent level. Per capita parental earnings and family income decline $1,534 and $1,165 the year of job loss, respectively. Five years after displacement occurs, the losses are $787 and $572, and the estimates are insignificantly different from zero beginning three years after displacement. These results suggest that changes in marital status are not driving the qualitative findings presented above.

Figure 1 presents kernel density estimates of the distribution of logged labor earnings for displaced individuals for selected years relative to the year of job loss. These estimates provide good visual representations of displacement's effect on the earnings distribution. As Figure 1 shows, the shape and location of the earnings distribution changes significantly over time. The year of job loss is associated with a leftward shift and a flattening of the distribution when compared to the kernel three years before displacement. A Kolmogorov-Smirnov (K-S) test rejects the null hypothesis at the one-percent level that the two distributions are equal.[18] Five years after job loss, the earnings distribution is similar to the one three years before displacement. A K-S test cannot reject the null that the distributions are equal.

Figures 2 and 3 show kernel estimates for the log of per capita parental earnings and family income, respectively. The densities shown in Figures 2 and 3 follow the same general trends as those shown in Figure 1. The distributions the year of job loss are associated with a leftward shift when compared to the distributions three years before displacement. The distributions five years following displacement are similar to the ones three years before the event. Figure 2 shows that the kernel densities are closer together than they are in Figure 1. The distributions in Figure 3 are nearly indistinguishable from one another. When using the K-S

[18] The significance tests are conducted on the empirical distributions of the data as in Burkhauser et al. (1999).

statistic to test for significant differences between the distributions over time, similar results found for the distributions of logged labor earnings are found here. For parental earnings, the distribution the year of job loss is significantly different from the one three years before displacement at the one-percent level; for family income, they are different at the five-percent level. The distribution five years after displacement is not statistically different from the one three years before job loss for both parental earnings and family income.

V. Conclusions

This study uses data drawn from the 1968 through 1993 waves of the PSID to examine how job displacement influences the inter-temporal movement of workers through the earnings and income distributions. The results show that job displacement significantly reduces annual labor earnings, per capita parental earnings, and per capita family income in the year of separation. Even several years after job loss occurs, these earnings and income measures are still below where they would have been had displacement not occurred. However, when examining these losses as a percentage of pre-displacement earnings and income, the losses found for per capita parental earnings and family income are lower than the percentage losses of annual labor earnings. This result shows that once workers access other sources of income, the short- and long-term negative impact of displacement is reduced.

The analysis is extended to show how displacement affects earnings and income mobility. The results indicate that the deep earnings losses caused by displacement increase downward earnings mobility not only during the year of job loss, but also for five years afterwards. Furthermore, upward mobility is decreased for several years following the event. Results also show that during the year of job loss, displaced workers experience an increased probability of 14 percentage points of being in the bottom half of the labor earnings distribution.

Displacement's negative influence on earnings mobility dissipates as time progresses. Five years following job loss, the increased probability reduces to less than six percentage points.

After accounting for other sources of income, displacement's effect on mobility is reduced in the short-term and eliminated in the long run. The results show that the mobility patterns of displaced and non-displaced workers are equal four years after job loss occurs. Furthermore, results indicate that four years following job loss, displaced workers have the same probability of being in any one decile of the income distribution as their non-displaced counterparts. The results imply that policy initiatives designed to assist dislocated workers should consider the potential benefits provided by the earnings of other family members and the existing income available from government transfer payments.

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Tables and Figures

Table 1: Sample Size by Displacement Status

Year	Never Displaced	Displaced
1968	836	--
1969	881	--
1970	921	--
1971	954	19
1972	1,015	16
1973	1,096	16
1974	1,173	18
1975	1,226	22
1976	1,293	20
1977	1,386	20
1978	1,479	14
1979	1,560	24
1980	1,639	25
1981	1,706	34
1982	1,781	37
1983	1,869	33
1984	1,958	30
1985	2,086	32
1986	2,183	31
1987	2,292	27
1988	2,409	36
1989	2,511	29
1990	2,619	32
1991	2,730	38
1992	2,923	31

Unweighted sample sizes.
Source: 1968 - 1992 waves of the PSID

Table 2: Summary Statistics by Displacement Status

Variable	Displaced	Never Displaced
Annual Labor Income	$23,783.64	$27,525.67
Annual Total Family Income*	12,262.05	14,283.59
Annual Parental Earnings*	10,716.42	12,483.49
Age	39.15	39.15
Education	12.75	12.97
Black	23.58%	23.75%
Married	85.82%	88.09%
# Children	1.45	1.31
Experience	19.70	19.46

Unweighted averages and proportions.
Calculations use all person-year observations.
* Adjusted for family size assuming constant returns to scale in the family.
Source: 1968 through 1992 waves of the PSID.

Table 3: Fixed Effects Results

Dependent Variable	Annual Labor Earnings	Annual Parent Earnings	Annual Family Income
3 Years Before	1113.26	210.23	265.83
	(2.31)*	(0.74)	(0.85)
2 Years Before	466.97	12.26	60.27
	(0.84)	(0.03)	(0.16)
1 Year Before	-830.84	-305.06	-146.78
	(1.41)	(0.85)	(0.35)
Year Of	-3891.15	-1543.61	-1232.58
	(6.56)**	(3.97)**	(2.93)**
1 Year After	-3703.82	-1385.91	-1321.13
	(6.64)**	(4.14)**	(3.59)**
2 Years After	-3074.73	-1055.38	-1185.90
	(4.63)**	(2.94)**	(3.10)**
3 Years After	-3142.91	-950.28	-1141.73
	(4.39)**	(2.75)**	(3.10)**
4 Years After	-2198.97	-739.57	-789.23
	(3.89)**	(1.65)	(1.49)
5 Years After	-2769.09	-853.14	-878.01
	(4.99)**	(2.47)*	(2.35)*
Observations	40833	40833	40833
Number of id	3410	3410	3410
R-squared	0.06	0.05	0.06

Robust t statistics in parentheses
* significant at 5%; ** significant at 1%
All regressions include a quartic in potential experience and calendar dummies.
Source: 1968 through 1992 waves of the PSID.

Table 4 - Transition Probabilities (%) by Displacement Status: Panel A - Labor Earnings

	t+1		t+2		t+3		t+4	
Movement	Never Displaced	Displaced	Never Displaced	Displaced	Never Displaced	Displaced	Never Displaced	Displaced
Up 9	0.0	0.0	2.3	0.0	0.0	0.0	3.8	0.0
Up 8	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
Up 7	1.3	0.0	**2.4**	**0.0**	1.6	0.0	3.1	2.1
Up 6	1.1	0.0	1.7	1.6	2.0	0.7	1.6	1.6
Up 5	1.4	1.1	2.4	3.1	4.0	2.2	**4.1**	**0.9**
Up 4	1.6	0.6	2.7	0.9	2.4	0.9	4.7	2.0
Up 3	2.8	4.2	4.1	4.1	4.6	3.5	5.7	6.9
Up 2	6.6	7.2	9.8	7.1	**11.6**	**7.5**	**12.5**	**6.8**
Up 1	**22.3**	**17.2**	**25.1**	**17.0**	**24.2**	**12.7**	**24.6**	**16.0**
Immobile	49.5	47.1	**41.5**	**35.7**	**39.5**	**26.4**	**34.7**	**27.5**
Down 1	**15.9**	**21.5**	**13.2**	**25.0**	**12.2**	**23.6**	14.3	15.9
Down 2	4.2	3.4	6.7	8.4	**6.7**	**10.9**	**6.6**	**10.4**
Down 3	**1.8**	**4.6**	2.8	4.0	**3.0**	**11.7**	**1.7**	**11.1**
Down 4	**0.6**	**2.3**	**0.5**	**2.7**	**1.9**	**10.3**	**2.1**	**8.0**
Down 5	0.9	0.6	1.2	2.4	**1.3**	**5.9**	**1.9**	**9.0**
Down 6	1.1	2.0	**0.8**	**4.2**	1.5	3.2	**1.2**	**6.7**
Down 7	1.2	0.0	0.3	1.8	**0.6**	**6.4**	1.7	4.0
Down 8	0.0	0.0	1.9	1.5	2.3	2.9	1.9	4.7
Down 9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	t+5		t+6		t+7		t+8	
Movement	Never Displaced	Displaced	Never Displaced	Displaced	Never Displaced	Displaced	Never Displaced	Displaced
Up 9	0.0	0.0	3.4	0.0	3.9	0.0	6.9	0.0
Up 8	3.4	0.0	1.8	0.0	1.9	1.9	0.8	0.0
Up 7	0.9	1.1	0.1	2.2	1.1	1.3	2.5	5.7
Up 6	1.6	2.3	2.5	4.6	3.0	3.8	2.7	4.6
Up 5	5.0	6.5	5.7	2.4	**5.3**	**1.7**	4.5	3.8
Up 4	4.6	2.6	3.3	2.5	4.8	6.4	7.7	4.5
Up 3	5.5	6.5	9.0	6.5	8.8	5.5	6.2	7.1
Up 2	**12.6**	**6.7**	**13.9**	**9.3**	**17.6**	**8.2**	**15.4**	**9.8**
Up 1	**26.2**	**18.1**	**21.8**	**14.4**	20.2	17.4	**25.5**	**13.5**
Immobile	**33.9**	**22.3**	**35.0**	**25.2**	27.3	24.0	24.9	22.9
Down 1	13.6	17.4	**11.2**	**18.2**	16.5	20.3	15.1	17.2
Down 2	**6.9**	**12.8**	**6.1**	**10.8**	**6.1**	**10.9**	6.9	10.9
Down 3	**2.5**	**8.0**	**3.4**	**9.3**	**4.0**	**9.5**	**3.7**	**9.9**
Down 4	**1.4**	**8.3**	**2.1**	**7.9**	**2.0**	**7.1**	**2.1**	**9.5**
Down 5	**0.8**	**5.2**	**3.0**	**7.1**	1.7	1.3	2.1	3.2
Down 6	**1.3**	**7.6**	2.6	5.1	2.2	2.8	3.3	2.1
Down 7	1.7	4.1	**1.0**	**6.4**	**1.6**	**7.0**	**1.3**	**9.7**
Down 8	**2.4**	**9.0**	1.8	2.4	1.8	4.4	4.0	4.3
Down 9	2.6	0.0	0.0	0.0	2.1	2.9	0.0	0.0

Table 4 - Panel B: Per Capita Parental Earnings

	t+1		t+2		t+3		t+4	
Movement	Never Displaced	Displaced	Never Displaced	Displaced	Never Displaced	Displaced	Never Displaced	Displaced
Up 9	2.3	0.0	3.2	0.0	3.5	0.0	0.0	0.0
Up 8	1.9	3.6	0.9	1.8	1.0	0.0	2.4	3.6
Up 7	1.7	1.1	1.7	1.1	1.8	1.0	**4.0**	**0.3**
Up 6	2.2	3.3	3.2	2.4	2.1	0.2	3.1	1.6
Up 5	1.2	2.2	2.9	4.1	2.5	0.8	3.4	5.0
Up 4	1.8	1.5	3.3	2.3	3.8	4.9	**5.5**	**0.7**
Up 3	1.9	3.8	4.6	3.5	7.5	4.3	6.6	7.5
Up 2	**7.9**	**4.3**	9.3	7.9	13.1	9.6	13.4	11.7
Up 1	**20.4**	**16.0**	**22.4**	**17.0**	**19.5**	**14.3**	**20.0**	**14.0**
Immobile	48.7	45.3	38.2	33.3	**34.8**	**25.8**	**32.0**	**22.3**
Down 1	15.8	15.7	17.6	18.8	14.5	18.5	**13.7**	**22.5**
Down 2	**5.5**	**9.7**	**6.9**	**11.9**	**7.6**	**14.6**	**7.3**	**12.0**
Down 3	1.6	3.1	3.4	6.0	**4.9**	**9.6**	**4.3**	**8.0**
Down 4	**2.0**	**4.7**	**1.7**	**5.0**	4.1	7.0	5.3	7.8
Down 5	1.4	1.5	1.2	2.5	**2.0**	**6.0**	2.9	5.2
Down 6	1.0	2.3	1.0	3.0	**0.8**	**6.5**	1.9	3.0
Down 7	**0.4**	**2.5**	1.4	1.5	0.8	1.9	**1.0**	**3.9**
Down 8	0.7	1.5	0.4	1.6	1.1	3.9	0.8	0.0
Down 9	0.0	0.0	**0.0**	**2.9**	1.0	2.8	**0.0**	**6.2**

	t+5		t+6		t+7		t+8	
Movement	Never Displaced	Displaced	Never Displaced	Displaced	Never Displaced	Displaced	Never Displaced	Displaced
Up 9	2.4	0.0	0.0	0.0	0.0	0.3	5.6	0.0
Up 8	3.7	4.0	2.8	4.2	4.2	2.6	3.1	2.7
Up 7	2.3	2.5	**3.4**	**0.1**	3.1	2.2	4.1	2.4
Up 6	4.7	3.3	2.9	3.3	6.0	4.5	3.6	6.8
Up 5	2.2	2.5	5.1	4.5	4.6	4.9	4.5	5.3
Up 4	3.7	5.3	5.6	8.7	5.1	5.9	9.0	8.4
Up 3	10.5	7.6	8.6	7.1	12.2	9.1	12.7	11.6
Up 2	13.7	10.2	16.4	13.1	16.6	13.1	**16.6**	**10.3**
Up 1	23.1	17.9	**20.9**	**14.0**	19.6	16.8	18.8	18.1
Immobile	26.9	23.0	23.0	23.6	22.5	23.1	19.6	20.3
Down 1	12.3	14.9	13.5	14.1	12.1	10.7	14.4	13.0
Down 2	**6.7**	**11.6**	**6.0**	**12.7**	**6.6**	**12.1**	7.2	9.9
Down 3	7.0	7.6	7.3	7.3	7.5	9.8	5.1	6.0
Down 4	5.1	8.5	7.1	6.9	3.4	5.8	3.9	6.4
Down 5	**1.4**	**5.9**	**2.0**	**7.2**	3.0	4.7	2.8	4.4
Down 6	2.4	6.2	3.6	4.3	3.4	4.6	1.5	4.3
Down 7	1.4	2.3	2.3	0.7	1.2	1.6	2.6	3.3
Down 8	2.3	0.0	0.8	2.0	2.1	2.4	4.0	2.9
Down 9	**0.2**	**7.1**	0.0	0.0	2.4	0.0	0.0	0.0

Table 4 - Panel C: Per Capita Family Income

Movement	t+1		t+2		t+3		t+4	
	Never Displaced	Displaced	Never Displaced	Displaced	Never Displaced	Displaced	Never Displaced	Displaced
Up 9	0.0	0.0	3.0	0.0	1.2	0.0	0.0	0.0
Up 8	2.6	1.7	1.6	3.2	3.4	0.0	4.1	2.1
Up 7	1.6	4.1	1.4	1.2	2.3	0.4	4.5	2.2
Up 6	1.8	1.2	2.3	1.3	2.0	0.6	2.1	1.8
Up 5	1.3	2.6	2.8	4.0	2.6	2.8	**4.7**	**1.4**
Up 4	1.7	1.0	**3.3**	**0.6**	3.7	4.3	5.4	4.7
Up 3	2.6	2.1	4.2	6.2	6.4	3.8	7.0	8.0
Up 2	6.2	7.3	9.7	6.4	13.3	10.3	15.0	11.0
Up 1	22.7	18.2	24.5	22.8	**24.7**	**18.4**	21.8	18.7
Immobile	**47.6**	**42.2**	**36.8**	**30.4**	30.0	25.1	27.9	24.2
Down 1	15.0	17.8	17.2	19.3	**15.7**	**20.6**	15.7	15.8
Down 2	6.5	7.9	**6.1**	**10.5**	**8.7**	**12.8**	**6.8**	**14.5**
Down 3	2.2	4.1	3.8	5.3	**4.0**	**7.9**	5.1	6.7
Down 4	1.1	2.1	2.0	4.3	2.4	4.6	3.1	3.7
Down 5	0.8	1.5	1.6	2.9	2.9	4.3	3.3	6.4
Down 6	0.9	2.1	0.8	1.6	1.2	3.0	1.2	3.3
Down 7	**1.6**	**4.9**	1.1	2.1	**0.8**	**6.0**	1.2	3.0
Down 8	0.0	0.0	0.7	1.6	0.0	1.6	0.1	1.6
Down 9	0.9	0.0	0.0	0.0	0.0	0.0	0.0	3.6

Movement	t+5		t+6		t+7		t+8	
	Never Displaced	Displaced	Never Displaced	Displaced	Never Displaced	Displaced	Never Displaced	Displaced
Up 9	0.3	0.0	0.0	4.6	0.0	5.3	2.7	5.5
Up 8	2.7	2.4	1.5	0.2	3.2	0.5	4.7	0.4
Up 7	6.4	2.6	4.9	2.6	6.0	3.2	4.1	4.8
Up 6	2.6	3.7	2.5	4.4	3.6	2.6	3.5	3.5
Up 5	4.6	4.0	**2.2**	**5.9**	4.6	6.8	8.0	6.9
Up 4	5.3	3.1	9.2	5.1	11.0	6.4	10.9	10.2
Up 3	10.2	8.4	10.2	11.2	11.0	8.0	11.8	9.3
Up 2	15.1	12.4	**17.1**	**11.3**	17.9	14.3	18.7	17.6
Up 1	22.5	19.3	**24.4**	**14.6**	19.6	18.0	20.4	15.9
Immobile	26.5	23.7	**19.6**	**25.8**	20.7	23.3	16.9	21.2
Down 1	12.8	15.0	12.0	15.9	**11.2**	**16.1**	11.7	11.5
Down 2	**5.7**	**9.9**	8.5	7.7	8.1	8.1	7.1	11.4
Down 3	4.5	6.4	5.0	6.3	5.0	7.2	5.7	4.4
Down 4	5.2	8.1	4.6	8.6	4.1	3.1	2.3	2.1
Down 5	3.0	0.7	4.6	3.2	3.5	0.5	2.8	4.8
Down 6	**1.6**	**6.9**	1.8	3.7	2.4	5.7	4.3	1.3
Down 7	2.0	1.3	1.7	3.0	2.4	4.5	1.5	2.9
Down 8	**0.0**	**7.6**	1.9	0.0	0.0	0.0	2.7	0.0
Down 9	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Weighted transition probabilities are calculated from equation (1) in the text. For the never-displaced group, time is relative to a randomly chosen starting data. For the displaced group, time is relative to 3 years prior to displacement. Entries in bold indicate statistical differences at the 5% level using a two-tailed test.
Source: 1968 - 1992 waves of the PSID.

Table 5: Correlated Random Effects Interval Regression Results

Income Type	Annual Labor Earnings	Annual Parental Earnings	Annual Family Income
3 Years Before	697.65	117.46	78.80
	(1.20)	(0.34)	(0.21)
2 Years Before	264.90	-111.85	-94.94
	(0.46)	(0.32)	(0.25)
1 Year Before	-1,113.16	-634.85	-457.08
	(1.91)	(1.84)	(1.23)
Year of	-4,483.55	-1,805.65	-1,439.94
	(7.61)**	(5.19)**	(3.85)**
1 Year After	-3,579.72	-1,251.95	-1,174.47
	(5.92)**	(3.50)**	(3.04)**
2 Years After	-2,902.00	-915.56	-942.33
	(4.65)**	(2.48)*	(2.37)*
3 Years After	-2,891.33	-648.66	-787.20
	(4.46)**	(1.69)	(1.90)
4 Years After	-1,479.50	-470.16	-535.74
	(2.23)*	(1.20)	(1.27)
5 Years After	-1,758.08	-376.23	-261.28
	(2.53)*	(0.92)	(0.59)
Observations	40833	40833	40833
Number of id	3410	3410	3410

Absolute value of z statistics in parentheses
* significant at 5%; ** significant at 1%

All regressions include a quartic in potential experience, year dummy variables, and averages of the experience, year, and displacement variables.
Source: 1968 - 1992 waves of the PSID.

Table 6: Correlated Random Effects Marginal Effects of Displacement on Income Mobility

Percentile	1	2	3	4	5	6	7	8	9	10
Panel A: Annual Labor Earnings										
3 Years Before	-0.91%	-0.43%	-0.35%	-0.27%	-0.17%	-0.04%	0.13%	0.39%	0.89%	0.76%
2 Years Before	-0.35%	-0.16%	-0.13%	-0.10%	-0.06%	-0.01%	0.05%	0.15%	0.34%	0.28%
1 Year Before	1.60%	0.69%	0.54%	0.39% *	0.21% *	0.00%	-0.26%	-0.67%	-1.39%	-1.10% *
Year of	7.51% **	2.76% **	1.96% **	1.20% **	0.41% **	-0.47% **	-1.48% **	-2.96% **	-5.32% **	-3.61% **
1 Year After	5.76% **	2.22% **	1.63% **	1.04% **	0.42% **	-0.28% *	-1.10% **	-2.32% **	-4.32% **	-3.05% **
2 Years After	4.53% **	1.81% **	1.35% **	0.89% **	0.40% **	-0.17%	-0.84% **	-1.85% **	-3.55% **	-2.57% **
3 Years After	4.51% **	1.80% **	1.34% **	0.89% **	0.40% **	-0.17%	-0.83% **	-1.84% **	-3.53% **	-2.56% **
4 Years After	2.16% *	0.92% *	0.72% *	0.50% *	0.26% **	-0.02%	-0.37%	-0.90% *	-1.85% *	-1.43% *
5 Years After	2.60% *	1.09% *	0.84% **	0.59% **	0.30% **	-0.04%	-0.45% *	-1.08% **	-2.19% *	-1.67% **
Panel B: Annual Parental Earnings										
3 Years Before	-0.35%	-0.08%	-0.06%	-0.05%	-0.04%	-0.02%	0.02%	0.13%	0.31%	0.16%
2 Years Before	0.34%	0.08%	0.06%	0.05%	0.04%	0.02%	-0.03%	-0.13%	-0.29%	-0.14%
1 Year Before	2.00%	0.43%	0.34%	0.27%	0.21% *	0.09% **	-0.18%	-0.76%	-1.62%	-0.78% *
Year of	6.11% **	1.18% **	0.89% **	0.68% **	0.47% **	0.08% *	-0.71% **	-2.32% **	-4.44% **	-1.94% **
1 Year After	4.10% **	0.83% **	0.64% **	0.50% **	0.37% **	0.11% **	-0.43% *	-1.55% **	-3.14% **	-1.43% **
2 Years After	2.93% *	0.61% *	0.48% **	0.38% **	0.29% **	0.11% **	-0.28%	-1.11% *	-2.32% *	-1.09% **
3 Years After	2.04%	0.44%	0.34%	0.28%	0.22%	0.09% **	-0.18%	-0.77%	-1.66%	-0.79%
4 Years After	1.46%	0.32%	0.25%	0.20%	0.16%	0.07%	-0.12%	-0.55%	-1.21%	-0.59%
5 Years After	1.16%	0.25%	0.20%	0.16%	0.13%	0.06%	-0.10%	-0.44%	-0.97%	-0.47%
Panel C: Annual Family Income										
3 Years Before	-0.22%	-0.05%	-0.04%	-0.03%	-0.03%	-0.01%	0.02%	0.08%	0.19%	0.10%
2 Years Before	0.26%	0.06%	0.05%	0.04%	0.03%	0.02%	-0.02%	-0.10%	-0.23%	-0.11%
1 Year Before	1.31%	0.28%	0.22%	0.19%	0.15%	0.07%	-0.12%	-0.49%	-1.08%	-0.52%
Year of	4.37% **	0.88% **	0.67% **	0.55% **	0.41% **	0.11% **	-0.51% **	-1.66% **	-3.33% **	-1.49% **
1 Year After	3.51% **	0.72% **	0.55% **	0.46% **	0.35% **	0.11% **	-0.39% *	-1.33% **	-2.73% **	-1.25% **
2 Years After	2.77% *	0.58% *	0.45% *	0.38% *	0.29% **	0.10% **	-0.29%	-1.05% *	-2.21% *	-1.03% **
3 Years After	2.29%	0.49%	0.38% *	0.32% *	0.25% *	0.10% **	-0.23%	-0.87%	-1.85%	-0.87% *
4 Years After	1.54%	0.33%	0.26%	0.22%	0.18%	0.07%	-0.15%	-0.58%	-1.27%	-0.61%
5 Years After	0.74%	0.16%	0.13%	0.11%	0.09%	0.04%	-0.06%	-0.28%	-0.62%	-0.31%

** Indicates significance at the 1% level. * Indicates significance at the 5% level.

The estimates are calculated using the parameter estimates from the correlated random-effects interval regression. All variables are set to their mean levels except for the displacement variables. Those are set to zero when calculating the marginal effects.

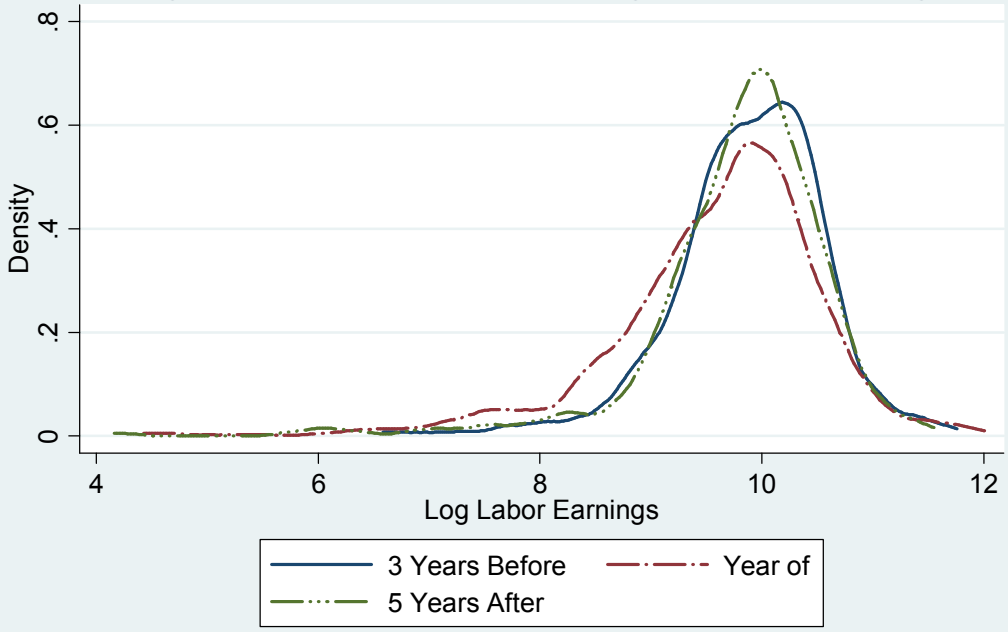
Table 7: Correlated Random Effects Interval Regression Results

Income Type	Annual Labor Earnings	Annual Parental Earnings	Annual Family Income
3 Years Before	308.40	31.51	138.07
	(0.39)	(0.08)	(0.32)
2 Years Before	123.63	-151.15	-53.80
	(0.16)	(0.39)	(0.13)
1 Year Before	-1,119.68	-542.95	-402.53
	(1.41)	(1.39)	(0.94)
Year of	-4,783.30	-1,534.25	-1,165.08
	(5.92)**	(3.90)**	(2.71)**
1 Year After	-4,150.54	-1,277.36	-978.27
	(5.07)**	(3.19)**	(2.24)*
2 Years After	-3,366.59	-1,036.17	-983.47
	(3.96)**	(2.49)*	(2.17)*
3 Years After	-3,335.12	-823.03	-796.71
	(3.78)**	(1.91)	(1.69)
4 Years After	-2,028.71	-538.45	-474.43
	(2.25)*	(1.23)	(0.99)
5 Years After	-2,423.08	-787.09	-572.47
	(2.58)**	(1.72)	(1.14)
Observations	25380	25380	25380
Number of id	2082	2082	2082

Absolute value of z statistics in parentheses
* significant at 5%; ** significant at 1%

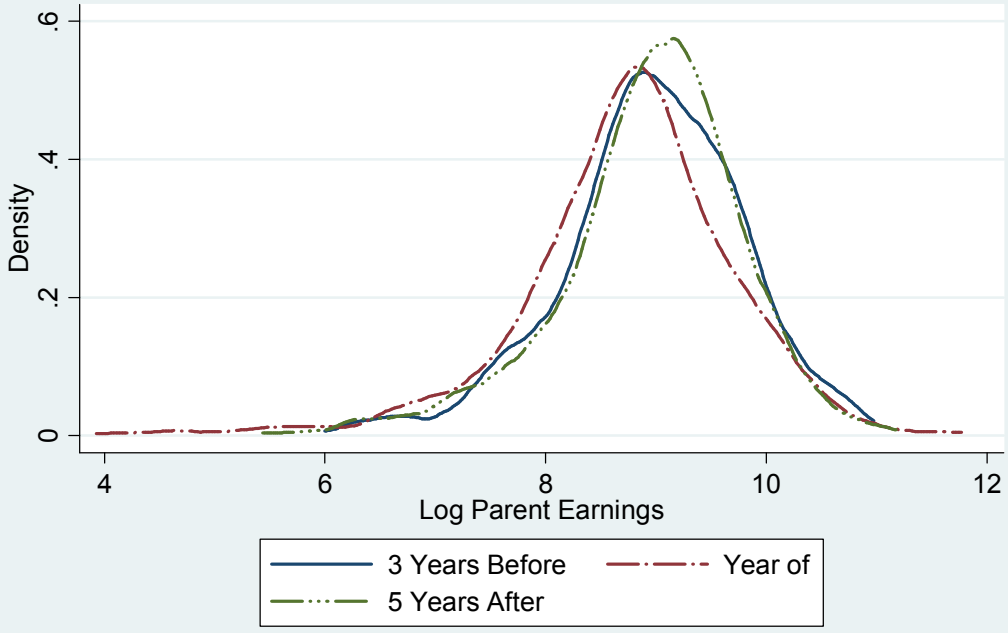
All regressions include a quartic in potential experience, year dummy variables, and averages of the experience, year, and displacement variables.
Source: 1968 - 1992 waves of the PSID.

Figure 1: Kernel Estimate - Log of Labor Earnings



Estimated on displaced workers only

Figure 2: Kernel Estimate - Log of Parent Earnings



Estimated on displaced workers only

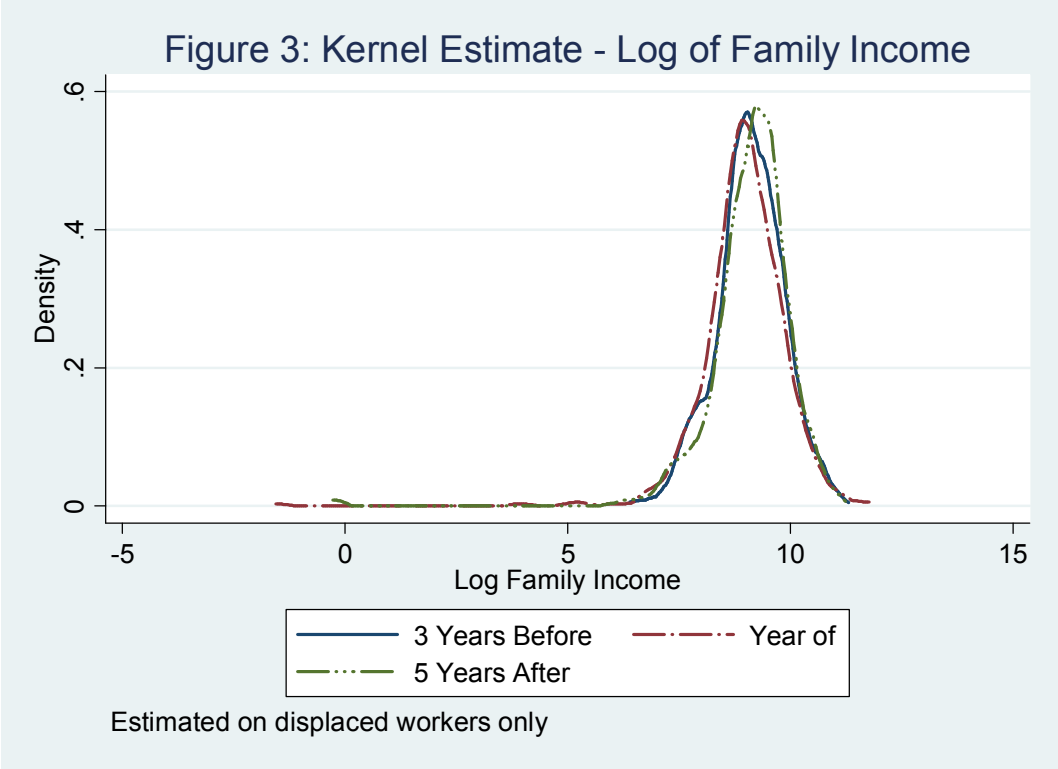


Figure 3: Kernel Estimate - Log of Family Income
Density
0
.2
.4
.6
-5
0
5
10
15
Log Family Income
3 Years Before
Year of
5 Years After
Estimated on displaced workers only

Appendix A:

Appendix Table A - Sensitivity Check for Number of Quadratures - Earnings is Total Labor Earnings

# Quadratures	4	8	12	16	20	24	28	32	36
Experience	3244.53	3244.53	3244.53	3244.54	3244.54	3244.54	3244.54	3244.54	3,244.54
Experience Squared	-170.38	-170.38	-170.38	-170.38	-170.38	-170.38	-170.38	-170.38	-170.38
Experience Cubed	3.91	3.91	3.91	3.91	3.91	3.91	3.91	3.91	3.91
Experience^4	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04
Time=1969	707.27	707.27	707.27	707.27	707.27	707.27	707.27	707.27	707.27
Time=1970	585.57	585.57	585.57	585.57	585.57	585.57	585.57	585.57	585.57
Time=1971	778.23	778.23	778.23	778.23	778.23	778.23	778.23	778.23	778.23
Time=1972	2083.57	2083.57	2083.57	2083.57	2083.57	2083.57	2083.58	2083.58	2,083.58
Time=1973	2585.41	2585.41	2585.41	2585.41	2585.41	2585.41	2585.41	2585.42	2,585.42
Time=1974	1276.11	1276.11	1276.11	1276.11	1276.11	1276.11	1276.11	1276.11	1,276.11
Time=1975	410.31	410.31	410.31	410.31	410.31	410.31	410.31	410.31	410.31
Time=1976	1195.87	1195.87	1195.87	1195.87	1195.87	1195.87	1195.87	1195.87	1,195.87
Time=1977	1692.86	1692.86	1692.87	1692.87	1692.87	1692.87	1692.87	1692.87	1,692.87
Time=1978	1743.87	1743.87	1743.87	1743.87	1743.87	1743.87	1743.88	1743.88	1,743.87
Time=1979	1333.83	1333.83	1333.83	1333.83	1333.83	1333.83	1333.83	1333.83	1,333.82
Time=1980	-28.72	-28.72	-28.72	-28.72	-28.72	-28.72	-28.72	-28.72	-28.72
Time=1981	-688.35	-688.35	-688.35	-688.35	-688.35	-688.35	-688.36	-688.36	-688.37
Time=1982	-1282.58	-1282.58	-1282.58	-1282.58	-1282.58	-1282.58	-1282.58	-1282.58	-1,282.60
Time=1983	-1176.33	-1176.33	-1176.33	-1176.33	-1176.33	-1176.33	-1176.33	-1176.33	-1,176.34
Time=1984	-29.89	-29.89	-29.89	-29.89	-29.89	-29.89	-29.89	-29.89	-29.90
Time=1985	-41.07	-41.07	-41.07	-41.07	-41.07	-41.07	-41.07	-41.07	-41.08
Time=1986	186.38	186.38	186.38	186.38	186.38	186.38	186.38	186.38	186.37
Time=1987	79.63	79.63	79.63	79.63	79.63	79.63	79.63	79.63	79.61
Time=1988	457.80	457.80	457.80	457.80	457.80	457.80	457.80	457.80	457.78
Time=1989	77.41	77.41	77.41	77.41	77.41	77.41	77.41	77.41	77.40
Time=1990	-143.88	-143.88	-143.88	-143.88	-143.88	-143.88	-143.88	-143.88	-143.89
Time=1991	-643.12	-643.12	-643.12	-643.12	-643.12	-643.12	-643.12	-643.12	-643.14
Time=1992	558.60	558.60	558.60	558.60	558.60	558.60	558.60	558.60	558.58
3 Years Before	697.65	697.65	697.65	697.65	697.65	697.65	697.65	697.65	697.65
2 Years Before	264.90	264.90	264.90	264.90	264.90	264.90	264.90	264.90	264.90
1 Year Before	-1113.15	-1113.15	-1113.15	-1113.16	-1113.16	-1113.16	-1113.16	-1113.16	-1,113.16
Year of	-4483.52	-4483.52	-4483.53	-4483.53	-4483.53	-4483.53	-4483.54	-4483.54	-4,483.55
1 Year After	-3579.70	-3579.70	-3579.70	-3579.70	-3579.71	-3579.71	-3579.71	-3579.71	-3,579.72
2 Years After	-2901.99	-2901.99	-2901.99	-2901.99	-2901.99	-2901.99	-2902.00	-2902.00	-2,902.00
3 Years After	-2891.32	-2891.32	-2891.32	-2891.32	-2891.33	-2891.33	-2891.33	-2891.33	-2,891.33
4 Years After	-1479.49	-1479.49	-1479.49	-1479.50	-1479.50	-1479.50	-1479.50	-1479.50	-1,479.50
5 Years After	-1758.07	-1758.07	-1758.08	-1758.08	-1758.08	-1758.08	-1758.08	-1758.08	-1,758.08
Avg. experience	-11673.58	-11673.58	-11673.57	-11673.57	-11673.56	-11673.55	-11673.54	-11673.54	-11,673.51
Avg. experience squared	726.81	726.81	726.81	726.81	726.81	726.81	726.81	726.81	726.81
Avg. experience cubed	-17.82	-17.82	-17.82	-17.82	-17.82	-17.82	-17.82	-17.82	-17.82
Avg. experience^4	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Avg. time=1969	-56.41	-56.41	-56.41	-56.41	-56.41	-56.41	-56.41	-56.41	-56.41
Avg. time=1970	-61.83	-61.83	-61.83	-61.83	-61.83	-61.82	-61.82	-61.82	-61.82
Avg. time=1971	-1.91	-1.91	-1.91	-1.91	-1.91	-1.91	-1.91	-1.91	-1.91
Avg. time=1972	-70.16	-70.16	-70.16	-70.16	-70.16	-70.16	-70.16	-70.16	-70.16
Avg. time=1973	-36.02	-36.02	-36.02	-36.02	-36.02	-36.02	-36.02	-36.02	-36.02
Avg. time=1974	-39.78	-39.78	-39.78	-39.78	-39.78	-39.78	-39.78	-39.78	-39.78
Avg. time=1975	-40.41	-40.41	-40.41	-40.41	-40.41	-40.41	-40.41	-40.41	-40.41
Avg. time=1976	-35.35	-35.35	-35.35	-35.35	-35.35	-35.35	-35.35	-35.35	-35.35
Avg. time=1977	-29.89	-29.89	-29.89	-29.89	-29.89	-29.89	-29.89	-29.89	-29.89
Avg. time=1978	-40.86	-40.86	-40.86	-40.86	-40.86	-40.86	-40.86	-40.86	-40.86
Avg. time=1979	-22.64	-22.64	-22.64	-22.64	-22.64	-22.64	-22.64	-22.64	-22.64
Avg. time=1980	-38.13	-38.13	-38.13	-38.13	-38.13	-38.13	-38.13	-38.13	-38.13
Avg. time=1981	-82.05	-82.05	-82.05	-82.05	-82.05	-82.05	-82.05	-82.05	-82.05
Avg. time=1982	10.83	10.83	10.83	10.83	10.83	10.83	10.83	10.83	10.83
Avg. time=1983	-59.90	-59.90	-59.90	-59.90	-59.90	-59.90	-59.90	-59.90	-59.90
Avg. time=1984	-28.43	-28.43	-28.43	-28.43	-28.43	-28.43	-28.43	-28.43	-28.43
Avg. time=1985	-41.13	-41.13	-41.13	-41.13	-41.13	-41.13	-41.13	-41.13	-41.13
Avg. time=1986	-34.87	-34.87	-34.87	-34.86	-34.86	-34.86	-34.86	-34.86	-34.86
Avg. time=1987	-37.88	-37.88	-37.87	-37.87	-37.87	-37.87	-37.87	-37.87	-37.87
Avg. time=1988	-32.51	-32.51	-32.51	-32.51	-32.51	-32.51	-32.51	-32.51	-32.51
Avg. time=1989	-58.26	-58.26	-58.26	-58.26	-58.25	-58.25	-58.25	-58.25	-58.25
Avg. time=1990	-41.55	-41.55	-41.55	-41.55	-41.55	-41.55	-41.55	-41.55	-41.55
Avg. time=1991	-50.96	-50.95	-50.95	-50.95	-50.95	-50.95	-50.95	-50.95	-50.95
Avg. time=1992	-52.31	-52.31	-52.31	-52.31	-52.31	-52.31	-52.31	-52.31	-52.31
Avg. Year of	-33.22	-33.22	-33.22	-33.22	-33.22	-33.22	-33.22	-33.22	-33.22
Avg. 1 Year After	26.86	26.86	26.86	26.86	26.86	26.86	26.86	26.86	26.86
Avg. 2 Years After	-52.41	-52.41	-52.41	-52.41	-52.41	-52.41	-52.41	-52.41	-52.41
Avg. 3 Years After	54.10	54.10	54.10	54.10	54.10	54.10	54.10	54.10	54.10
Avg. 4 Years After	-67.20	-67.20	-67.20	-67.20	-67.20	-67.20	-67.20	-67.20	-67.20
Avg. 5 Years After	6.41	6.41	6.41	6.41	6.41	6.41	6.41	6.41	6.41
Constant	105.90	105.90	105.90	105.90	105.90	105.90	105.90	105.90	105.90

The average time and displacement variables are presented in 1,000's.

Appendix B:

Appendix Table B-1 : Fixed Effects Results

Dependent Variable	Annual Labor Earnings	Annual Parental Earnings	Annual Family Income
3 Years Before	1,231.24	220.95	263.85
	(1.85)	(0.56)	(0.61)
2 Years Before	913.19	211.71	214.57
	(1.19)	(0.42)	(0.40)
1 Year Before	-481.61	-151.41	-48.51
	(0.59)	(0.30)	(0.08)
Year of	-4,030.99	-1,497.46	-1,271.71
	(5.01)**	(2.68)**	(2.10)*
1 Year After	-4,281.43	-1,692.22	-1,750.53
	(5.82)**	(3.77)**	(3.62)**
2 Years After	-3,618.26	-1,493.47	-1,685.76
	(3.87)**	(3.13)**	(3.33)**
3 Years After	-3,590.95	-1,495.20	-1,736.47
	(3.86)**	(3.32)**	(3.63)**
4 Years After	-2,497.28	-1,011.86	-989.95
	(3.20)**	(1.55)	(1.28)
5 Years After	-3,246.02	-1,320.65	-1,257.10
	(4.46)**	(3.08)**	(2.65)**
Observations	27408	27408	27408
Number of id	2105	2105	2105
R-squared	0.07	0.05	0.08

Robust t statistics in parentheses

* significant at 5%; ** significant at 1%

Appendix Table B-2: Correlated Random Effects Interval Regression Results

Income Type	Annual Labor Earnings	Annual Parental Earnings	Annual Family Income
3 Years Before	595.07	101.06	28.58
	(0.78)	(0.22)	(0.06)
2 Years Before	583.14	-77.53	-116.72
	(0.77)	(0.17)	(0.24)
1 Year Before	-810.73	-542.85	-542.19
	(1.06)	(1.20)	(1.09)
Year of	-4992.60	-2161.09	-1844.62
	(6.46)**	(4.71)**	(3.70)**
1 Year After	-4345.83	-1584.93	-1739.79
	(5.53)**	(3.40)**	(3.41)**
2 Years After	-3808.50	-1481.88	-1622.59
	(4.71)**	(3.09)**	(3.09)**
3 Years After	-3322.47	-1132.50	-1447.59
	(3.97)**	(2.29)*	(2.68)**
4 Years After	-1867.69	-672.78	-715.09
	(2.16)*	(1.32)	(1.28)
5 Years After	-2305.32	-554.20	-490.51
	(2.54)*	(1.03)	(0.84)
Observations	27408	27408	27408
Number of id	2105	2105	2105

Absolute value of z statistics in parentheses

* significant at 5%; ** significant at 1%

Appendix Table B-3: Correlated Random Effects Marginal Effects of Displacement on Income Mobility

Percentile	1	2	3	4	5	6	7	8	9	10
Panel A: Annual Labor Earnings										
3 Years Before	-0.74%	-0.37%	-0.28%	-0.21%	-0.13%	-0.03%	0.09%	0.32%	0.76%	0.58%
2 Years Before	-0.73%	-0.36%	-0.28%	-0.21%	-0.12%	-0.03%	0.09%	0.31%	0.75%	0.57%
1 Year Before	1.08%	0.51%	0.38%	0.27%	0.14%	0.02% **	-0.16%	-0.46%	-1.03%	-0.74%
Year of	8.02% **	3.08% **	2.03% **	1.20% **	0.37% **	-0.42% **	-1.54% **	-3.22% **	-5.95% **	-3.56% **
1 Year After	6.79% **	2.70% **	1.81% **	1.11% **	0.40% **	-0.30% *	-1.27% **	-2.77% **	-5.24% **	-3.22% **
2 Years After	5.82% **	2.37% **	1.62% **	1.02% **	0.40% **	-0.21%	-1.06% **	-2.40% **	-4.64% **	-2.91% **
3 Years After	4.97% **	2.07% **	1.44% **	0.92% **	0.39% **	-0.15%	-0.89% **	-2.07% **	-4.08% **	-2.61% **
4 Years After	2.62% *	1.17% *	0.85% *	0.58% *	0.29% **	-0.01%	-0.43%	-1.11% *	-2.35% *	-1.60% *
5 Years After	3.30% *	1.44% *	1.03% **	0.69% **	0.33% **	-0.04%	-0.55%	-1.39% *	-2.88% **	-1.92% **
Panel B: Annual Parental Earnings										
3 Years Before	-0.29%	-0.06%	-0.05%	-0.04%	-0.04%	-0.02%	0.02%	0.11%	0.25%	0.13%
2 Years Before	0.22%	0.05%	0.04%	0.03%	0.03%	0.02%	-0.02%	-0.08%	-0.19%	-0.10%
1 Year Before	1.62%	0.34%	0.26%	0.22%	0.18%	0.09%	-0.14%	-0.59%	-1.34%	-0.64%
Year of	7.11% **	1.29% **	0.94% **	0.75% **	0.53% **	0.07%	-0.88% **	-2.61% **	-5.07% **	-2.14% **
1 Year After	5.05% **	0.97% **	0.71% **	0.59% **	0.44% **	0.12% **	-0.56% *	-1.86% **	-3.79% **	-1.67% **
2 Years After	4.69% **	0.91% **	0.67% **	0.56% **	0.42% **	0.13% **	-0.51% *	-1.73% **	-3.55% **	-1.57% **
3 Years After	3.51% *	0.70% *	0.52% *	0.44% *	0.34% **	0.13% **	-0.36%	-1.29% *	-2.74% *	-1.25% **
4 Years After	2.03%	0.42%	0.32%	0.27%	0.22%	0.10% *	-0.18%	-0.74%	-1.65%	-0.78%
5 Years After	1.66%	0.34%	0.26%	0.23%	0.18%	0.09%	-0.14%	-0.61%	-1.36%	-0.65%
Panel C: Annual Family Income										
3 Years Before	-0.08%	-0.02%	-0.01%	-0.01%	-0.01%	-0.01%	0.01%	0.03%	0.07%	0.03%
2 Years Before	0.31%	0.06%	0.05%	0.05%	0.04%	0.02%	-0.03%	-0.12%	-0.27%	-0.13%
1 Year Before	1.47%	0.30%	0.24%	0.21%	0.17%	0.08%	-0.14%	-0.55%	-1.22%	-0.57%
Year of	5.39% **	0.99% **	0.76% **	0.65% **	0.48% **	0.12% **	-0.65% **	-2.02% **	-4.02% **	-1.71% **
1 Year After	5.05% **	0.94% **	0.73% **	0.62% **	0.46% **	0.12% **	-0.60% *	-1.90% **	-3.80% **	-1.63% **
2 Years After	4.68% **	0.88% **	0.68% **	0.59% **	0.44% **	0.13% **	-0.54% *	-1.76% **	-3.56% **	-1.54% **
3 Years After	4.14% *	0.79% **	0.61% **	0.53% **	0.41% **	0.13% **	-0.47% *	-1.56% *	-3.19% **	-1.40% **
4 Years After	1.96%	0.39%	0.31%	0.28%	0.23%	0.10%	-0.19%	-0.74%	-1.61%	-0.74%
5 Years After	1.33%	0.27%	0.22%	0.19%	0.16%	0.08%	-0.12%	-0.50%	-1.11%	-0.52%

** Indicates significance at the 1% level. * Indicates significance at the 5% level.

Appendix C:

Appendix Table C-1 : Fixed Effects Results

Dependent Variable	Annual Labor Earnings	Annual Parent Earnings	Annual Family Income
3 Years Before	1246.15	248.81	337.88
	(2.60)**	(0.88)	(1.09)
2 Years Before	651.05	73.56	153.48
	(1.18)	(0.21)	(0.41)
1 Year Before	-585.18	-215.85	-28.45
	(1.00)	(0.60)	(0.07)
Year of	-3556.15	-1411.36	-1079.00
	(6.01)**	(3.67)**	(2.60)**
1 Year After	-3478.19	-1302.48	-1205.75
	(6.24)**	(3.93)**	(3.33)**
2 Years After	-2860.14	-952.69	-1076.90
	(4.34)**	(2.70)**	(2.87)**
3 Years After	-2983.26	-881.36	-1049.43
	(4.30)**	(2.62)**	(2.92)**
4 Years After	-2249.22	-726.51	-667.93
	(3.61)**	(1.63)	(1.30)
5 Years After	-2569.20	-700.28	-706.07
	(4.34)**	(2.05)*	(1.97)*
Observations	42689	42689	42689
Number of id	3410	3410	3410
R-squared	0.07	0.03	0.05

Robust t statistics in parentheses

* significant at 5%; ** significant at 1%

Appendix Table C-2: Correlated Random Effects Interval Regression Results

Income Type	Annual Labor Earnings	Annual Parental Earnings	Annual Family Income
3 Years Before	907.62	115.16	173.71
	(1.51)	(0.33)	(0.47)
2 Years Before	340.88	-47.97	-7.54
	(0.57)	(0.14)	(0.02)
1 Year Before	-933.00	-442.46	-392.13
	(1.55)	(1.28)	(1.06)
Year of	-4243.65	-1622.32	-1281.14
	(7.01)**	(4.70)**	(3.46)**
1 Year After	-3316.99	-1143.30	-989.93
	(5.35)**	(3.22)**	(2.60)**
2 Years After	-2659.46	-792.92	-894.47
	(4.16)**	(2.17)*	(2.28)*
3 Years After	-2570.63	-604.04	-658.78
	(3.89)**	(1.60)	(1.63)
4 Years After	-1495.86	-362.49	-355.51
	(2.21)*	(0.94)	(0.86)
5 Years After	-1581.69	-344.06	-104.02
	(2.24)*	(0.85)	(0.24)
Observations	42689	42689	42689
Number of id	3410	3410	3410

Absolute value of z statistics in parentheses
* significant at 5%; ** significant at 1%

Appendix Table C-3: Correlated Random Effects Marginal Effects of Displacement on Income Mobility

Percentile	1	2	3	4	5	6	7	8	9	10
Panel A: Annual Labor Earnings										
3 Years Before	-1.05%	-0.64%	-0.47%	-0.32%	-0.19%	-0.02%	0.17%	0.50%	1.05%	0.98%
2 Years Before	-0.41%	-0.24%	-0.17%	-0.12%	-0.07%	0.00%	0.07%	0.19%	0.39%	0.36%
1 Year Before	1.18%	0.67%	0.46%	0.30%	0.15%	-0.03%	-0.22%	-0.55%	-1.06%	-0.91%
Year of	6.29% **	3.06% **	1.90% **	1.05% **	0.30% **	-0.51% **	-1.34% **	-2.72% **	-4.59% **	-3.43% **
1 Year After	4.72% **	2.40% **	1.54% **	0.89% **	0.32% **	-0.32% **	-0.98% **	-2.09% **	-3.65% **	-2.83% **
2 Years After	3.67% **	1.93% **	1.26% **	0.76% **	0.30% **	-0.21% *	-0.75% **	-1.65% **	-2.96% **	-2.35% **
3 Years After	3.53% **	1.86% **	1.22% **	0.74% **	0.30% **	-0.19% *	-0.72% **	-1.59% **	-2.86% **	-2.29% **
4 Years After	1.95% *	1.08% *	0.73% *	0.46% *	0.22% **	-0.07%	-0.38%	-0.90% *	-1.69% *	-1.41% *
5 Years After	2.07% *	1.14% *	0.77% *	0.49% *	0.23% **	-0.07%	-0.40%	-0.95% *	-1.78% *	-1.49% *
Panel B: Annual Parental Earnings										
3 Years Before	-0.34%	-0.09%	-0.06%	-0.05%	-0.04%	-0.02%	0.03%	0.13%	0.29%	0.15%
2 Years Before	0.14%	0.04%	0.03%	0.02%	0.02%	0.01%	-0.01%	-0.05%	-0.12%	-0.06%
1 Year Before	1.34%	0.33%	0.24%	0.19%	0.14%	0.06%	-0.13%	-0.52%	-1.11%	-0.56%
Year of	5.32% **	1.20% **	0.83% **	0.61% **	0.41% **	0.05%	-0.65% **	-2.04% **	-3.93% **	-1.79% **
1 Year After	3.63% **	0.85% **	0.61% **	0.46% **	0.32% **	0.08% **	-0.41% *	-1.40% **	-2.81% **	-1.33% **
2 Years After	2.46% *	0.60% *	0.43% *	0.33% *	0.24% *	0.08% **	-0.26%	-0.95% *	-1.97% *	-0.96% *
3 Years After	1.85%	0.46%	0.33%	0.25%	0.19%	0.07% **	-0.18%	-0.71%	-1.51%	-0.75%
4 Years After	1.09%	0.27%	0.20%	0.16%	0.12%	0.05%	-0.10%	-0.42%	-0.91%	-0.46%
5 Years After	1.04%	0.26%	0.19%	0.15%	0.11%	0.05%	-0.10%	-0.40%	-0.87%	-0.44%
Panel C: Annual Family Income										
3 Years Before	-0.48%	-0.11%	-0.09%	-0.07%	-0.06%	-0.03%	0.04%	0.18%	0.41%	0.22%
2 Years Before	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.01%	-0.02%	-0.01%
1 Year Before	1.12%	0.26%	0.20%	0.16%	0.13%	0.05%	-0.11%	-0.42%	-0.92%	-0.46%
Year of	3.85% **	0.82% **	0.61% **	0.48% **	0.36% **	0.09% **	-0.46% **	-1.46% **	-2.95% **	-1.37% **
1 Year After	2.93% *	0.64% **	0.48% **	0.38% **	0.30% **	0.09% **	-0.33% *	-1.11% *	-2.30% **	-1.09% **
2 Years After	2.63% *	0.58% *	0.44% *	0.35% *	0.27% **	0.09% **	-0.29%	-1.00% *	-2.08% *	-0.99% *
3 Years After	1.91%	0.43%	0.33%	0.26%	0.21%	0.08% **	-0.20%	-0.72%	-1.54%	-0.75%
4 Years After	1.01%	0.23%	0.18%	0.15%	0.12%	0.05%	-0.10%	-0.38%	-0.84%	-0.42%
5 Years After	0.29%	0.07%	0.05%	0.04%	0.04%	0.02%	-0.03%	-0.11%	-0.25%	-0.13%

** Indicates significance at the 1% level. * Indicates significance at the 5% level.