Long-Term Impacts of Short-Term Income Replacement Ratios After Job Loss

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Abstract

How does the first job after involuntary displacement affect later income growth? Displaced workers replace 133% of their pre-displacement hourly income within two years of involuntary displacement on average but this is not enough to catch up to those of the same age and similar education. Changes in these ratios have small impacts on the long-term. These results persist through robustness checks and align with a labor income process calibrated to the PSID. However, 35% of all displaced workers recover as defined in this paper. Being male or being white each increases the probability of recovering by about 20%.

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Introduction

Several sources find that the effect of involuntary job displacement is a permanent decrease in income on average, but some workers recover.[1] Looking at the long-term effects of short-term income replacement ratios after job loss helps us understand if the permanent decrease is immediately visible. The immediate change also helps us understand who recovers. Furthermore, this paper identifies how the odds of a long-term recovery change as this ratio increases. These changing odds of recovery are important to understand because it is related to our understanding of globalization, recessions, and the economic consequences of mass layoffs. This paper is also important for researchers because it bridges the gap between work on the effects of involuntary job loss using long-term panel data compared to similar work with a limited panel.

Most data available to study workers' income and unemployment are limited in their panel aspect. For example, the outgoing rotation groups of the Current Population Survey (CPS) provide two data points on respondents that are roughly one year apart. Data associated with training programs often work the same way in that they usually have a data point before entering a program and another after exit. Since these datasets with a limited panel dimension are much broader, they allow for a better investigation into the characteristics of those with different experiences, but the long-term ramifications of the findings in the short-term datasets deserve further inspection.

This paper provides a bridge between the job displacement literature that uses long-time panel data and similar work that uses data with a limited panel using the Panel Study of Income Dynamics (PSID). The PSID works well for this project since it is a representative sample over

[1] See Barnette and Michaud (2017) for more characteristics of a minority that experiences long-term recovery while Farber (2017) shows evidence for a minority that experience short-term recovery.

a long period and for this reason it is commonly used in research on job displacement. This paper limits the displaced workers to those with income information before and after their job displacement. In this way, a dataset is created where a portion of it can be examined as if it were one from a training program or from the outgoing rotation groups that do not have the long-time panel element. This sample allows an examination of the long-term impacts of displacement on workers based on the information before and after the event.

This paper finds that the average displaced worker experiences a long-term fall in hourly income of approximately 8.6% even though the worker obtains a 133% income replacement ratio. The replacement ratio here is determined by taking the maximum income from one to two years after displacement divided by the maximum income from one to two years before displacement; the formal definition of this ratio is discussed in more detail later. Even for higher achievers who obtain a replacement ratio between 150% and 180%, the long-term impact of the displacement is still a 2% reduction in hourly earnings. Overall, the impact of an increase in the replacement ratio is small with a 10% increase leading to a 0.3% reduction in the long-term fall in hourly earnings. These results hold up to several robustness checks and generally align with a standard labor income process that has displacements as a fall in the permanent component of the process.

Elsewhere in the literature, income replacement ratios are frequently less than 100% but these results come from different types of data which can lead to different ratios. For example, Decker and Corson (1995) is the most cited paper to evaluate the Trade Adjustment Assistance program and that paper documents income replacement ratios of 76-92%. Davis and Von Wachter (2011) uses Social Security Administration records in their study of displacement and their ratios are also less than 100%. Farber (2017) uses the Displaced Worker Surveys of the

CPS to examine the short-term changes of displaced workers. Although he finds 28-39% of full-time workers increase their earnings after displacement, on average, the displaced workers in his sample also have income replacement ratios below 100%. These differences in the ratios found elsewhere compared to those presented here are discussed later but they boil down to two major items: First, this paper constructs an income replacement ratio using income up to two years before displacement and up to two years after displacement. Second, income of zero is infrequent for the sample in this paper due to the construction of the ratio based on maximum values and due to the construction of this paper's sample requiring three observations of non-zero income.

This paper also examines how short-term income replacement ratios impact the probability of full recovery with heads of household that are white and male having a much higher probability of recovery. Although a more formal definition of recovery is given later, this paper's recovery occurs if average wages are not worse than their peers after displacement. A little more than one third of displaced workers make a full recovery and there is some variation based on the ratio. Displaced workers with an income replacement ratio of 90-120% have a 27% chance of full recovery while those with a ratio of 180-210% have a 32% chance of full recovery. This difference is not statistically different from one another, though. In fact, the odds of recovery are no longer statistically different from one another after 90%. However, males are 21% more likely to recover compared to their female counterparts. Heads of households that are white are also 20% more likely to recover.

This is an important topic to study since nearly every theory of income after job loss depends on the initial placement after the event. This is the case for theories of matching that are based on compatibility between the worker and the employer in which case the placement after displacement is crucial. Theories of human capital accumulation have the first job after displacement being important since the placement presents the point for which the human capital accumulation continues. Several more recent papers use the idea of job ladders which have some combination of these elements amongst others.[2]

The findings are checked against a calibrated simulation of the labor income process where a displacement involves a shock in permanent income that is like that found in the data. This simulation is used since there is little to no research on this topic of bridging long-term income data with the short-term and its relationship to involuntary displacement. The income process produces results like the empirical results presented within this paper. In the simulation, agents that replace 150-180% of their income have long-term income that is 1% smaller than their non-displaced counterparts. Like the data, the results of the simulation show that an increase in the income replacement ratio has small long-term impacts with a 10% increase in the ratio leading to a 0.6% increase in long-term income.

Data

This paper uses the heads of households between 18 and 65 years of age from the 1968-2017 waves of the PSID. The primary focus is on the sample constructed by the Survey Research Center which was designed to be representative of the US population although the robustness section of this paper examines the PSID data beyond this sample. Each individual needs to be present as the head of the household at least three times with at least three non-zero income observations as the head. Additional requirements for inclusion in this paper's sample are detailed below.

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[2] For a more thorough reading on the theories behind income after job displacement, see Carrington and Fallick (2017).

A key independent variable is involuntary displacement, and this paper follows the literature to determine who has met this requirement in the PSID. The idea is to use workers who have changed jobs involuntarily.[3] Heads of households with reported low tenure are asked what had happened with their previous job. Respondents can choose from various options but following work such as Stevens (1997) and more recently Krolikowski (2018), this paper considers displaced workers to be those that have changed their previous job due to being laid-off or due to the plant closing. Any respondents who have changed jobs prior to 1968 are not part of this sample since the reason for changing their job prior to 1968 is not reported in the PSID.

The income replacement ratio is constructed by examining the dependent variable up to two years before first displacement and up to two years after that displacement. The first displacement is the basis of the ratio since all the displaced workers in the sample have one. The income replacement ratio is then consistent across the displaced workers.[4] This paper uses the maximum value of the dependent variable from two years before first displacement or in the year before the event; this is placed in the denominator. The same is done after the first displacement where the dependent variable in the year after the displacement and two years after the event are examined. Again, the maximum value of the two is used with this value placed in the numerator of the ratio. The year before or after and two years before or after are used to account for the change in the PSID which moved to a biannual format after 1997.

Creating the income replacement ratio in this fashion misses some displaced workers since there may be missing information in the two years before or after the displacement which leads to a missing ratio. All 13,525 observations for these 1,393 workers with a missing ratio are

[3] See Jung and Kuhn (2019) for a discussion on the terminology of displaced workers.
[4] Calculating replacement rates based on all displacements does not change the main message of this paper.

dropped from the sample. 75% of these are dropped because there is no income information on these workers before displacement, which can occur if the worker is not consistently the head of the household or if the worker is displaced in the first year as the head of the household. Therefore, it is impossible to create an income replacement ratio based on the first displacement for these workers. The other discarded observations are due to some displaced workers missing from the sample in the two years after displacement. These are discarded to provide more uniformity in the definition since this covers the large majority of displaced workers.[5]

The main dependent variable for this paper is hourly income normalized with the consumer price index (CPIURS) to 2017 US dollars. Respondents of the PSID surveys are asked about several different types of income earned in the previous year along with the hours worked to obtain those different types of income. This main dependent variable is then simply the annual income from all income sources divided by all the hours worked by the individual. 62 observations are top coded in income and are therefore dropped from the sample.

The summary statistics for the sample of this paper are displayed in Table 1. The first column provides the summary statistics on those that are not displaced. This makes up those that are never displaced along with those that are not displaced but will be displaced later. Due to the way that the income replacement ratios are calculated, every worker in this sample is accounted for in that first column at least once. Overall, this paper will focus on 8,234 workers and their 102,077 observations.

The second column of Table 1 indicates that 2,055 workers in this study experience at least one displacement. The displaced workers are slightly older on average since they need to have been in the data at least once before this experience. These workers are of lower education

[5] Calculating an income replacement ratio based on income up to four or six years after displacement does not change the main results of this paper.

which makes this an important control variable in the baseline estimation. The annual income and hourly income are lower for displaced workers which goes along with the literature on the topic. Although not presented in the table, the hourly income immediately before displacement is $22.53 but this is skewed by age, education, and the year of the sample. After accounting for these, the difference between workers that are never displaced versus workers that are not displaced but will be displaced later is less than one percent.[6] Finally, just over half of the displaced workers experience more than one displacement.

This paper's income replacement ratios are larger than those from the literature mentioned in the introduction that are frequently below 100%. The averages of the ratios are 133%-137% with the medians being 105%-110% depending on the measure of income. The distribution of the bottom 95% of these ratios is also plotted in Figure 1. The differences of the ratios in Table 1 compared to those mentioned in the introduction are based on the nature of the data and the construction of the ratio. Here, the income replacement ratio is the maximum value of reported income found two years after the displacement event compared to this income two years before the event. Therefore, the length in time could be four years which is a contributor. Another difference is due to whether the studies keep displaced workers who are never reemployed; recall that this paper discards those workers. Finally, the ratio in this paper is based on the worker's first job displacement. However, this is not the biggest difference since the robustness section considers an alternative income replacement ratio based on all displacements that still has a mean of 120%.

Methodology

[6] This adjusted comparison of never displaced workers to workers who will be displaced later is done with a basic regression of log hourly income on age, age^2, age^3, time dummies and the level of education; the difference in the residuals is 0.006.

This paper estimates the cost of displacement using an event study approach that builds off of Jacobson, LaLonde, and Sullivan (1993), Stevens (1997), Jolly (2013), Krolikowski (2018), and several current working papers. The following equation is used to estimate the effect that displacement has on income. The approach here is similar with the addition of how this displacement effect varies with the income replacement ratio.

$$Y_{it} = \alpha_i + \psi_t + \boldsymbol{\beta X_{it}} + \boldsymbol{\delta D_{it}} + \rho\phi_{it}\boldsymbol{R}_i + \epsilon_{it} \qquad (1)$$

The dependent variable, Y_{it}, is the log transformation of income with the main emphasis of this paper being on hourly income. Although this paper also uses annual income for this estimation, annual income is not the focus since the results could be driven by hours and the hourly rate. The estimation includes fixed effects for the individual, α_i, and controls for time using annual year dummy variables with ψ_t. The time varying variables, $\boldsymbol{X}_{it}$, include the age, age squared and the cubic of age. Age, age squared and the cubic of age are also interacted with whether the head of the household has at least 16 years of education and less than 12 years of education since the age income profile varies based on education level. This addresses the differences in education for displaced workers that is evident in the summary statistics.

$\boldsymbol{D_{it}}$ is a vector of time varying dummy indicators related to displacement and this vector takes two different formats in this paper. The paper begins with a dummy variable for six years before displacement then a different dummy variable for every year up until displacement, with one for the year of displacement and a different variable for every year after displacement until a dummy indicator for whether it has been at least 20 years since displacement. This vector also includes time variant dummy variables for whether the worker has been displaced at least twice, three times, four times or at least five times since Stevens (1997) highlights the cost of multiple job losses. For workers that are never displaced, the dummy indicators are zero. These dummies are also zero for workers that are displaced at least seven years later in the sample. Therefore, this estimation is comparing workers that are displaced to those that have not been displaced. Since the comparison group also includes workers that have not been displaced but will be later, the estimation strategy avoids the bias of the original specification in Jacobson, LaLonde, and Sullivan (1993) that is noted in Krolikowski (2018) and Jung and Kuhn (2019).

The main specification for this paper has vector, $\boldsymbol{D_{it}}$, as time variant dummy indicators on the frequency that this worker has been displaced. Stephens (2001) has a specification like this to estimate the average of the post displacement effects on consumption. Previous research such as Huckfeldt (2018) also suggests that the fall in hourly income is a permanent fall with no change over time. While this approach does not account for the decrease in income that may occur before the displacement occurs, not controlling for the time immediately before displacement provides a cleaner interpretation for the effect of the income replacement ratio.[7] $\boldsymbol{D_{it}}$ still includes time variant dummy indicators on whether this worker has been displaced at least once, twice, three times, four times or at least five times. The dummies in this specification are zero if the worker has not been displaced at the time of the interview but will be any time later in the sample.

The income replacement ratio, $\boldsymbol{R_i}$, is multiplied by an indicator function, ϕ_{it}, for whether the year is beyond the year of the ratio calculation. The value of this indicator function is always zero for workers that are never displaced leaving $\phi_{it} R_i$ equal to zero for all years of a never displaced worker, i. Similarly, the value of this indicator is zero in all the years before a worker's first displacement and becomes one after the ratio is calculated. As an example, suppose a worker has their first displacement in 1984 and had a real hourly income of $9 in

[7] Changing to a specification that controls for the time leading up to the displacement has no significant impact on the results of this paper.

1982, $10 in 1983, $11 in 1984, $12 in 1985, and $13 in 1986. The income replacement ratio would be 130% from $13/$10 and the indicator function would be zero in every year until 1987 when the value of this function would be one.

The income replacement ratio takes various forms to demonstrate how it impacts income. First, this paper considers the ratio, $\boldsymbol{R_i}$, non-parametrically since it allows flexibility in examining the effect of the ratio on long-term income. Specifically, the estimation first uses a vector of dummy variables for the ratio in increments of 30 percentage points and ending at whether the ratio was at least 270%.[8] This specification has a dummy variable for the worker's income replacement ratio between 0% to 30%, 30% to 60%, etc. As an example, if the worker had a replacement ratio between zero and 30%, that dummy variable is always one and this dummy variable is multiplied by the indicator function, ϕ_{it}, discussed above. Displaced workers have one income replacement ratio for the majority of this paper's estimations although allowing displaced workers to have different ratios based on different displacements are considered in the robustness section. Additionally, multiple displacements are part of the controls in vector $\boldsymbol{D_{it}}$.

The income replacement ratio as a linear control together with this ratio as a cubic polynomial are also considered throughout this paper. The ratio used without a transformation is shown for comparison purposes, but this is not the baseline specification for the paper. It is possible that small ratios have a different marginal impact on the long-term compared to the largest ratios. This transformation allows for more variation in marginal responses at the high and low end than a simple quadratic specification while higher order polynomials did not add anything to the main message of this paper. The cubic polynomial also does better at fitting the main paper's sample as well as the various samples used in the robustness section of the paper.

[8] The main results of this paper are unchanged when using 10% or 20% increments for the replacement rates.

Results

The first set of point estimates are shown in Figure 2 and all estimates throughout the paper have standard errors clustered at the individual level. The results have estimates of a similar range as that found in Huckfeldt (2018) and Krolikowski (2018). Specifically, hourly income falls by about 14% in the year after displacement. Nineteen years later, hourly income is still approximately 13% lower than what you would expect given the worker's age and education level. Income begins falling before displacement as is commonly found in this literature going back to at least Jacobson, LaLonde, and Sullivan (1993). In this case, the hourly income is approximately 5% lower four years prior to displacement with the results smaller and statistically insignificant five and six years before the event. Figure 2 also demonstrates the impact of involuntarily job displacement on annual income. The figure shows that one year after job displacement, annual income is approximately 35% lower than normal. This is a much bigger drop than the change in hourly income, but this difference is due to the change in hours.

The point estimates from Figure 2 for the changes in hourly income are not statistically different from one another for nearly every year after displacement. Three years after displacement, the point estimate for the change in hourly income reaches its largest fall. However, the estimates are not statistically different from one another for every year after one year since the event. Additionally, after three years since displacement, the difference between the impact on hourly income and annual income is no longer statistically significant. This provides further support for the specification that estimates the average of the post displacement effects with simple time varying dummy variables. This specification with the simple time varying dummy variables decreases the estimated cost of involuntary job displacement since it ignores the fall before the event takes place. Ignoring the time before displacement simply shifts the curve from Figure 2 up slightly.

Figure 3 demonstrates how income replacement ratios impact the long-term cost to income. This figure plots the results for the coefficients on the various ratio bins. These results indicate that when a worker's income replacement ratio for hourly income is between 90% and 120%, the long-term impact on that income is a fall of approximately 12% while a displaced worker with a ratio of 120-150% have hourly income that is about 5% lower. Therefore, we can see that an increase in the ratio improves long-term outcomes. Figure 3 also has annual income which demonstrates a steeper recovery. Here, for an annual income replacement ratio between 90% and 120%, the long-term impact on that income is a fall of approximately 9%.

Table 2 displays the effect of each job displacement for those that have an income replacement ratio below 292% which is the 95th percentile. This paper cuts the top 5% since the ratios become quite large with the top 1% of ratios ranging from 600% to over 2,200%. The individually clustered standard errors are reported below the point estimates. The results indicate that hourly income drops by approximately 11% upon displacement. This is slightly smaller in magnitudes compared to Figure 2 since the average fall in hourly income there is 13%. This result of 11% is smaller since the fall in income is compared to one or two years before displacement as opposed to being compared to seven or eight years before displacement.[9]

The impact of the income replacement ratios due to displacement is also in Table 2. The results show that the ratio has a positive impact on long-term outcomes although the result is small. The result of 0.032 for the coefficient on the income replacement ratio indicates that for every 10-percentage point increase in the ratio for hourly income, this income rises by 0.32%. Columns 3 displays the results of the cubic estimation. These coefficients imply that at the median ratio of 110%, hourly income is approximately 13.4% lower.

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[9] Including time before displacement in the estimates changes this relative comparison but does not impact the main results of this paper.

Davis and Von Wachter (2011) shows that the unemployment rate at the time of displacement is also important for understanding the long-term fall in income after the event. For this reason, column (4) of Table 2 examines the results while controlling for the state unemployment rate at the time of displacement. The effect of an increase in the income replacement ratio is essentially the same for this specification compared to the baseline specification in column (3). Also, notice that because state unemployment rates are publicly available starting in 1976, the observations and individuals for this subsample is smaller.[10]

Robustness

Table 3 summarizes robustness checks which include using annual income as a dependent variable, different samples with the PSID, and small variations in this paper's definition of the income replacement ratio. The same requirements are used in creating the sample for each column: each household must be in the sample three times with at least three non-zero observations on the dependent variable, which is hourly income in all cases but column (1). Column (1) is the main sample from this paper but using annual income as the dependent variable. Column (2) uses the representative sample from the PSID discussed above together with the oversampled poverty group. To account for this oversampling, column (2) uses the household weights provided by the PSID. Column (3) is the same as the main sample of this paper but includes individual time trends since this is sometimes used in the literature to further control for individual heterogeneity. Column (4) uses the PSID waves before 1998 since these waves are conducted annually. Using this subset allows the construction of an alternative income replacement ratio based on one year before displacement and one year after rather than the two years before and after as mentioned above. Finally, column (5) uses a ratio calculated for

[10] Using the national unemployment rate at the time of displacement produces results which are not statistically different from the state's unemployment rate at the time of displacement.

every displacement; if a worker is displaced multiple times, they will have multiple income replacement ratios and therefore multiple observations. To account for these additional observations, household weights provided by the PSID divided by the number of displacements for these workers are used; these weights are behind the differences in observations here.[11]

Table 3 makes clear that the sample and the income replacement ratio definition in this paper are not driving the results. The coefficients on the cubic transformation of the income replacement ratio are not statistically different across the table from column (1) through column (5). Recall that Figure 2 makes clear that the changes in hourly and annual income converge quickly and therefore we find similar results in column (1) of Table 3 compared to column (3) of Table 2. There are slightly more observations in this column compared to Table 2 since some respondents in the PSID are missing hours worked and are therefore missing from Table 2 but present in this table. The rest of the observations are smaller since the samples are subsets of the main sample in this paper with the last column having more observations as noted above.

Recovery

This section considers whether displaced workers fully recover. Recall, from the results of equation (1) in Figure 2 and Table 2 that displaced workers do not catch up to their peers on average. However, with a high enough income replacement ratio, a displaced worker should catch up and Figure 3 seems to suggest this.

This paper defines a displaced worker that fully recovers as one who has an hourly income that is not worse than their peers on average after the displacement. To measure this, consider an estimation of equation (1) but with no controls on displacement as shown below in equation (2). After the estimation, consider the residual, $\widehat{\epsilon_{it}}$, for each displaced head of

[11] This paper also considered samples restricted to those over 25 years of age as well as those with higher levels of tenure; the main results of this paper still hold with those subsamples.

household which should contain most of the displacement effect. Next, consider the mean of these residuals for each displaced worker in the sample. A mean residual equal to zero or better after displacement indicates that the displaced worker has recovered since this would imply that their age income profile based on education is no different from their peers after displacement.[12] This is defined formally below in equations (3). We can use this definition of recovery to run simple probit estimations on how this recovery varies based on the income replacement ratio along with a couple other characteristics on the head of household. This is shown formally in equation (4) below.

$$Y_{it} = \widehat{\alpha_i} + \widehat{\psi_t} + \widehat{\beta \boldsymbol{X_{it}}} + \widehat{\epsilon_{it}} \tag{2}$$

$$Recovery_i = 1 \quad \text{if } mean(\widehat{\epsilon_{it}}) \geq 0$$
$$= 0 \quad \text{if } mean(\widehat{\epsilon_{it}}) < 0 \tag{3}$$

$$Recovery_i = \tilde{\alpha} + \tilde{\rho}\boldsymbol{R}_i + \zeta Male_i + \eta White_i + \widetilde{\epsilon_i} \tag{4}$$

Table 4 provides a summary of the residuals, recovery, and the marginal results from the probit estimation. Equation (2) is estimated on the same sample of 8,131 heads of households from Table 2 with the results of this estimation in column (0) of Table A in the appendix.[13] Of that sample, 1,681 of these heads experience a displacement and have enough information to calculate the income replacement ratio. Column (1) demonstrates that although the distribution numbers are larger than that of Figure 1, this is only due to aggregating into bins covering 30% in Table 4 whereas Figure 1 is aggregated into bins covering 10%. Otherwise, the distribution of the ratios in Table 4 is almost identical to that in Figure 1.

[12] An alternative is to take the residuals with controls for displacement and consider a recovery to be one where the residual on average is greater than or equal to the coefficients on displacement. The results of this alternative are virtually identical to that in Table 4.

[13] The main results for this recovery section are unchanged when running these on the larger weighted sample from column (2) of Table 3.

The overall mean in column (2) of Table 4 suggests that on average, the long-term cost from the first displacement is a 24% loss of hourly earnings. The values of this column are larger than the values in Figure 3 or the coefficients in Table 2 because there are no controls for multiple displacements. However, the values of this column provide a similar story of that in Table 2 and Figure 3. Although not shown in the table, the mean of these residuals for workers that have only been displaced once is -0.096 which is not statistically different from the -0.116 in column (1) of Table 2. Additionally, this column demonstrates that the cost of displacement generally falls as the income replacement ratio rises like Figure 3.

The rest of the columns of Table 4 explore the recovery of displaced workers and how this recovery varies with the income replacement ratio. The overall mean of column (3) indicates that 35% of all displaced workers recover. Like column (2), the proportion of those that recover generally rises with an increasing income replacement ratio and as the average residual increases, the rate of recovery rises along with it. However, like Figure 3, the recovery rate does not increase as quickly after a 90% replacement ratio. Workers with a ratio of 90%-120% experience recovery 39.5% of the time while those with ratios from 210%-270% recover less frequently.

Column (4) presents the marginal results from the probit estimation without controls on whether the head of household is male and white. The results of this column have an income replacement ratio of 0-30% as the comparison group and therefore the average marginal effects given here should be summed with the 0.1538 from column (3) to provide the overall recovery rate for the different groups. For example, we see that those with a ratio of 90%-120% have a 27% better chance at recovery compared to those with a ratio of 0-30%. Therefore, this bracket's overall chance of recovery is nearly 43% which is not statistically different from their mean of 39.5%. Similar results hold across the different bins of ratios indicating that the means are not misleading. In fact, the summation and the means never have a difference of more than 3.4 percentage points.

Column (4) of Table 4 also shows that the chance of recovery does not increase much with the income replacement ratio. The means provide a clue of this. After a 60% ratio, these marginal effects from the probit are not statistically different from one another. However, Table C of the appendix, uses a different set of dummy variables that are not exclusive bins but rather four different dummy variables indicating that the income replacement ratio is at least 30%, is at least 60%, is at least 90%, or is at least 120%. This specification indicates that those with at least a 60% ratio have a statistically different experience compared to those with at least a 90% ratio. Specifically, those with at least a 90% ratio have an 8.5% better probability of recovery compared to those with at least a 60% ratio. However, having at least a 120% income replacement ratio does not improve the chance of recovery compared to those with at least a 90% ratio.

The method from this section and its definition of recovery allows the examination of how the displacement experience varies for factors like sex and race. The first column of Table 4 indicates that 84% of the displaced heads in this sample are male while 88% of them are white. The next column indicates that while the average displaced worker experiences a 24% fall in long-term hourly wages, male displaced heads experience an 18% fall while white displaced heads experience a 19% fall in this income. This also translates into larger mean recovery with males or white displaced heads recovering 38% of the time. This is not additive, though; although not displayed in the table, displaced heads of households that are both white and male recover 40% of the time on average. The last column of Table 4 provides the marginal results from the probit estimation which includes the dummy variables for males and white heads of households. Once again, the marginal results summed with the average effect from an income replacement ratio of less than 30% are in line with the means from column (3). The biggest difference comes from those with a ratio above 270% but this is due to every one of these heads being both white and male. As a note for comparison, those with ratios of 210-240% are 88% male and 93% white while those with a ratio of 240-270% are 73.5% male and 91% white.

Simulation

Since there is little to no research on this topic of how the short-term effects of displacement impact the long-term effects, it is unclear whether the empirical results presented above are what is to be expected. Therefore, to provide context to these results, a simulation to create artificial data for comparison to the PSID is useful. To do this, consider a basic and common theoretical income process with both transitory and permanent shocks that has been used throughout the literature.[14]

$$Y_{i,s} = P_{i,s}\theta_{i,s} \tag{5}$$

$$P_{i,s} = G_s P_{i,s-1}\phi_{i,s} \tag{6}$$

$$\log\theta_{i,s} \sim N\left(-\frac{\sigma_\theta^2}{2}, \sigma_\theta^2\right) \tag{7}$$

$$\underset{\text{Shock}}{P_{i,S}} = \begin{cases} (1-d) & \text{with probabilty } \pi \\ \phi_S \text{ where } \log\phi_S \sim N\left(-\frac{\sigma_\phi^2}{2}, \sigma_\phi^2\right) & \text{with probability } (1-\pi) \end{cases} \tag{8}$$

Income for agent *i* at age *s* is denoted with $Y_{i,s}$ in equation (5) and it has a temporary component, $\theta_{i,s}$, and a permanent component, $P_{i,s}$. The temporary component is a one period shock that follows a log normal process described in equation (7); this has an expected value of

[14] See Meghir and Pistaferri (2011) in the latest Handbook of Labor Economics for more details on simulating the income process.

one. The process for the permanent component follows equation (6). Specifically, it grows at a standard rate G_s, for all agents that depends on the age of the agent. This permanent component is also subject to shocks, $\phi_{i,s}$. These shocks can either follow a log normal process with an expected value of one at probability π, otherwise the permanent process experiences a fall of d.

Simulating the income process like this is common. Support for using this type of process goes back to at least MaCurdy (1982). Heathcote, Perri, and Violante (2010) provides a review of several papers that use this along with different strategies for calibrating it. Carroll and Samwick (1997) use this process with log normal shocks like those in equations (7) and (8) but they apply an additional shock to the temporary component rather than the permanent component as done here. Barnette (2020) uses the same process as the one used in this paper to study the effects of displacement on wealth and consumption.

The parameters for equations (5) through (8) are estimated from this paper's sample that comes from the PSID. This paper follows Heathcote, Perri, and Violante (2010) in estimating the distribution for the two different shocks (θ and ϕ) using the method of first differences of log hourly income. The results for this procedure are available in Table 5. The permanent effect for displacement, d, is set to 0.1276, which is the average effect from job displacement after controlling for the fall in income before the event.[15] The average growth rate in hourly income for the middle 90% of each age, s, determines G_s. The bottom and top 5% of growth rates are dropped because these rates are taken without condition which leads to extreme values.[16] The probability of this shock, π, is based on the data with it chosen so that 24.96% of the sample

[15] This choice is not driving any of the results for the simulation. Alternative results using the effect of displacement being either a 9% fall in the permanent component or another alternative with agents losing 5% in the permanent component in the four years before displacement then losing the rest in the year of the event results in little change to the results in Table 6.

[16] The results for the simulation are nearly identical when dropping the bottom and top 25% of income growth observations conditional on age in the PSID to calibrate G_s.

experiences at least one displacement like that in the data; this results in the displacement shock hitting 0.6% of the observations (π = 0.006).

Equations (5) through (8) create artificial data for 200,000 hypothetical agents aged 18 through age 65. The starting point for the permanent component of income is at age 47 since this is halfway through the lifespan of the workers. $P_{i,47}$ is set to $31.37 for every agent, to match the average hourly income for a 47-year-old in this paper's sample. Using this as a starting point and using the process of equation (6) creates artificial permanent components forward and back for each agent participating in the labor force for every year of age 18 through age 65. With $P_{i,s}$ created for every agent at every age, this is plugged into equation (5) to create an artificial hourly income for every agent at every age.

Summary statistics for the simulated data are in Table 1. The biggest differences are the ages. Agents in the simulation work every year from 18 through 65 causing the age distribution to be slightly older there compared to the PSID.[17] This age difference is part of the reason that the average hourly income is larger for non-displaced agents versus their counterparts in the data. This is also part of the reason for the big difference in income for the displaced agents in the simulation. There, the displaced agents are nearly 9 years older on average which explains why their income is larger than the non-displaced agents.

The rate of displacement is lower in the simulation than that in the data since the target was to hit the proportion of agents displaced.[18] 24% of the agents are displaced leading to 13% of the observations being of displaced agents whereas 21% of the observations are of displaced workers in the data. This smaller rate of displacement explains why a large majority of the

[17] The main results for the paper are unchanged when changing the simulation's age distribution and the distribution of labor force experience to be like that in the PSID.
[18] The main results for the paper are unchanged if the calibration strategy is instead to target the displaced observations instead of the displaced agents.

displaced agents only experience one displacement while the data has a little less than half of the displaced individuals only experiencing one displacement. Finally, the income replacement ratios are similar. On average, agents earn 30% more income after their displacement compared to the data's ratio that indicates a 33% increase after displacement. This again points to the fact that the ratios are higher here than elsewhere in the literature based on ratios being calculated from the maximum of two years before displacement compared to two years after displacement. Additionally, the distribution of ratios is similar for the simulation compared to the data as is clear in Figure 1.

The main purpose of this artificial data is to use it to estimate equation (1). Again, the dependent variable is log income from the simulation with this calibrated to hourly income from the PSID. The time varying controls are age, age squared and age to the third power with the displacement vector being simple time variant indicators of whether one has been displaced at least once, at least twice, at least three times, or at least four times. There is no indicator for being displaced five times since it is rare in the simulation as is clear in the summary statistics of Table 1. The income replacement ratio is constructed like the one from the data. Specifically, the ratio uses the maximum of the income in either the period before or two periods before displacement in the denominator. Similarly, it uses the maximum income in the period after or two periods after displacement in the numerator. For proper comparison to the PSID, the estimates include individual fixed effects.

The results for the simulation's estimations are within Table 6. Column (1) indicates that being displaced once costs the agents approximately 12% of their income on average.[19] Column (2) and column (3) present the estimation using the income replacement ratio. The coefficient on

[19] When using a vector of displacement indicators indicating time since displacement, the coefficients are not statistically different from the 12.4% in column (1) of Table 6.

the linear ratio indicates that an agent that increases their ratio by 10% increases their overall hourly income by 0.64%. Column (3) uses the cubic specification for the income replacement ratio like that used for the PSID. These results do not vary much from the empirical results of column (3) in Table 2. For example, the coefficients indicate that a ratio of 110% leads to a fall of 14.8% in long-term income compared to the 13.4% fall based on the PSID estimation.

Figure 3 demonstrates that the effects of income replacement ratios in the simulation have a similar shape and magnitude to the results from the PSID further suggesting that the empirical results in this paper are reasonable. Recall that this figure uses 30% ratio bins on the x-axis with the y-axis being the coefficients from estimating equation (1) on income. The agents with the poor ratios on the left side of the figure do slightly worse than those in the data while agents with ratios of 180%-210% have better estimates than that in the data.

Conclusion

This paper provides a link and more context between labor datasets with a long-term panel element and datasets using a short-term panel. It provides evidence of the impacts that the first job after displacement has on long-term income and this research should be useful for future work that uses training data or supplements to the CPS such as the Displaced Worker Survey and the Merged Outgoing Rotation Groups.

On average, displaced workers recover 133% of their hourly income but these workers like most displaced workers do not fully recover. In fact, workers with an income replacement ratio between 150% and 180% have hourly income that is still 2% lower throughout their work history in the PSID. As the ratio rises, the long-term impact on income diminishes but the change is small; a 10-percentage point increase only results in a 0.3% rise in long-term incomes.

This paper showed these results persist when considering different samples from the PSID and different income replacement ratios.

The small rise in income due to the ratio masks the fact that several workers recover with sex and race being the best indicator for expected recovery. This paper shows that 35% of all displaced workers recover. Compared to those with low ratios of 0-30%, a ratio beyond 90% increases the probability of recovery by 20-30% depending on the specification. However, male heads alone have a 21% better chance of recovering compared to their female counterparts while white heads of households have a 20% better chance at recovery. A rising income replacement ratio increases the probability of a recovery but increases in the ratio beyond 120% do not change the probability of recovery significantly.

This paper also uses a simulation calibrated to the representative sample of the PSID and it suggests that the empirical results are in line with our understanding of the labor income process. Similar to the data, agents with an income replacement ratio of 150%-180%, have long-term income losses of 1%. The simulation also shows that a rising ratio leads to small increases in long-term wages; an increase of 10% in the income replacement ratio only leads to a 0.6% increase in long-term income which is like the empirical results from the PSID.

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Table 1: Summary Statistics

	PSID		Simulation	
VARIABLES	Not Displaced	Displaced	Not Displaced	Displaced
Age	39.2	42.4	40.4	49.3
Less Than 12 Years of Education	14%	18%		
12-15 Years of Education	54%	61%		
At Least 16 Years of Education	32%	22%		
Male	82%	87%		
White	90%	89%		
Annual Income	$59,295	$53,037		
Ann. Income Replacement Ratio		137%		
Median Income Replacement Ratio		105%		
Hourly Income	$27.90	$26.22	$31.29	$38.05
Hourly Income Replacement Ratio		133%		130%
Median Hourly Income Rep. Ratio		110%		110%
Displaced Once		46%		83%
Displaced Twice		25%		15%
Displaced Three Times		14%		1.5%
Displaced Four Times		8%		0.14%
Displaced at Least Five Times		7%		0.004%
Workers	8,234	2,055	200,000	48,907
Observations	80,447	21,630	8,370,241	1,229,759

Note: All dollar values are adjusted to a 2017 base year. The first column indicates the observations and workers that have not been displaced. The second column indicates the averages for the observations of displaced workers once the displacement has occurred. See more details on these variables and differences in the **Data** section. The third and fourth columns come from the simulation.

Table 2: Specifications for the Cost of Job Displacement on Income

VARIABLES	(1)	(2)	(3)	(4)
Displaced at Least Once	-0.116***	-0.133***	-0.101***	-0.111***
	(0.013)	(0.013)	(0.012)	(0.039)
Displaced at Least Twice	-0.088***	-0.100***	-0.082***	-0.098***
	(0.019)	(0.020)	(0.020)	(0.023)
Displaced at Least Three Times	-0.041	-0.045*	-0.041	-0.040
	(0.027)	(0.027)	(0.027)	(0.031)
Displaced at Least Four Times	-0.057	-0.060	-0.064*	-0.040
	(0.037)	(0.037)	(0.037)	(0.041)
Displaced at Least Five Times	-0.124*	-0.123*	-0.124*	-0.091
	(0.070)	(0.070)	(0.070)	(0.073)
Replacement Ratio		0.032**	-0.368***	-0.365***
		(0.012)	(0.079)	(0.085)
Replacement $Ratio^2$			0.412***	0.417***
			(0.101)	(0.109)
Replacement $Ratio^3$			-0.096***	-0.102***
			(0.030)	(0.032)
State Unemployment Rate at Displacement				0.059
				(0.504)
Observations	100,456	100,456	100,456	84,493
Within R-Squared	0.158	0.158	0.159	0.119
Number of ID	8,131	8,131	8,131	7,529

*** p<0.01, ** p<0.05, * p<0.1

Note: This table contains the key coefficients from the estimation of equation (1) on logged hourly income with robust standard errors clustered at the individual level. Displaced workers above the 95^{th} percentile for income replacement ratios are not included in this table. Column (1) does not control for this ratio. Column (2) controls for the ratio in a linear fashion. Column (3) uses a cubic control for the ratios while column (4) adds a control for the state unemployment rate. Coefficients not displayed in this table include a function of age and education levels along with time and individual fixed effects. See more details in the **Methodology** and **Results** sections as well as Table A of the appendix for these results with the coefficients on education and the age function.

Table 3: Robustness: Alternative Samples and Replacement Ratios

	Annual Income	Hourly Income			
		Weighted	Trends	Pre-1998	All Rates
VARIABLES	(1)	(2)	(3)	(4)	(5)
Displaced at Least Once	-0.196***	-0.124***	-0.105***	-0.104***	-0.085***
	(0.016)	(0.012)	(0.013)	(0.015)	(0.015)
Displaced at Least Twice	-0.140***	-0.074***	-0.068***	-0.053**	-0.035*
	(0.026)	(0.018)	(0.021)	(0.024)	(0.018)
Displaced at Least Three Times	-0.095**	-0.050*	-0.013	-0.039	-0.079***
	(0.039)	(0.025)	(0.031)	(0.031)	(0.022)
Displaced at Least Four Times	-0.059	-0.078**	-0.092**	-0.120***	-0.155***
	(0.057)	(0.036)	(0.041)	(0.041)	(0.032)
Displaced at Least Five Times	-0.036	-0.081	-0.004	-0.083	-0.090***
	(0.103)	(0.062)	(0.076)	(0.109)	(0.017)
Replacement Ratio	-0.325***	-0.316***	-0.303***	-0.367***	-0.343***
	(0.087)	(0.069)	(0.089)	(0.096)	(0.104)
Replacement Ratio^2	0.467***	0.365***	0.276**	0.417***	0.473***
	(0.107)	(0.085)	(0.113)	(0.126)	(0.146)
Replacement Ratio^3	-0.107***	-0.082***	-0.058*	-0.098**	-0.144***
	(0.030)	(0.024)	(0.033)	(0.039)	(0.049)
Observations	100,527	168,344	100,459	64,914	102,329
R-squared	0.143	0.140	0.360	0.151	0.165
Number of ID	8,116	14,897	8,131	5,109	7,967

*** p<0.01, ** p<0.05, * p<0.1

Note: This table contains the key coefficients from the estimation of equation (1) on logged hourly income for every column but column (1) with robust standard errors clustered at the individual level. Coefficients not displayed in this table include a function of age and education levels along with time and individual fixed effects; see Table B of the appendix for these results with the coefficients on education and the age function. Column (1) provides the estimates on logged annual income. Column (2) includes the main sample and the oversampled poverty group along with the sample weights from the PSID. Column (3) includes controls for individual time trends. Column (4) does not include years after 1997 and uses income replacement ratios based on the year before displacement and the year after the event instead of the two years used elsewhere in this paper. Column (5) uses a ratio based on every displacement. See more details in the **Robustness** section.

Table 4: Recovery Table

VARIABLES		Means		Probit	
	Count	Residual	Recovery	Margins	
Replacement Ratios	(1)	(2)	(3)	(4)	(5)
0-30%	39	-0.6459	0.1538	--	--
30-60%	164	-0.4659	0.2134	0.0818	0.0733
				(0.097)	(0.094)
60-90%	379	-0.3057	0.3087	0.1890**	0.1755**
				(0.091)	(0.088)
90-120%	486	-0.1608	0.3951	0.2737***	0.2508***
				(0.090)	(0.088)
120-150%	291	-0.1384	0.4055	0.2835***	0.2559***
				(0.092)	(0.089)
150-180%	150	-0.2882	0.3400	0.2206**	0.2048**
				(0.096)	(0.093)
180-210%	84	-0.0933	0.4405	0.3159***	0.2966***
				(0.101)	(0.098)
210-240%	41	-0.2205	0.3659	0.2458**	0.2117*
				(0.114)	(0.111)
240-270%	34	-0.2950	0.2647	0.1420	0.1290
				(0.122)	(0.120)
Above 270%	13	0.0769	0.4615	0.3352**	0.2631*
				(0.154)	(0.149)
Male Head	84%	-0.1820	0.3823	--	0.2050***
					(0.033)
White Head	88%	-0.1930	0.3745	--	0.1984***
					(0.039)
Overall Mean		-0.2401	0.3486		
Observations	1,681	1,681	1,681	1,681	1,681

*** p<0.01, ** p<0.05, * p<0.1

Note: This table provides the information used from the **Recovery** section in the text. There are 1,681 displaced heads of households with hourly income replacement ratios. Column (1) provides the distribution of ratios, sex, and a racial aspect for these heads of households. Column (2) provides average residuals from the estimation of equation (2) for hourly income on a cubic in age with individual and time fixed effects. Column (3) uses the residuals from the previous column to indicate the proportion of recovered displaced workers as explained in equation (3). Columns (4) and (5) provides the margin results from estimating equation (4) as a probit for whether a displaced worker has recovered on the income replacement ratios with indicators for whether the head is male and white used in the last column.

Table 5: Simulation Parameters

Parameter	Value
σ_θ^2	0.3862
σ_ϕ^2	0.1923
d	0.1276
π	0.006
$P_{i,47}$	31.371

Note: These parameters make up those used in simulating labor processes with equations (5)-(8) to match the US representative sample of the PSID. σ_θ^2 and σ_ϕ^2 are the standard deviations for temporary and permanent shocks, respectively. d is the fall in permanent income due to displacement and π is the frequency of this displacement in the simulation. $P_{i,47}$ is the permanent level of income for all 47-year-old agents. See the **Simulation** section for more details.

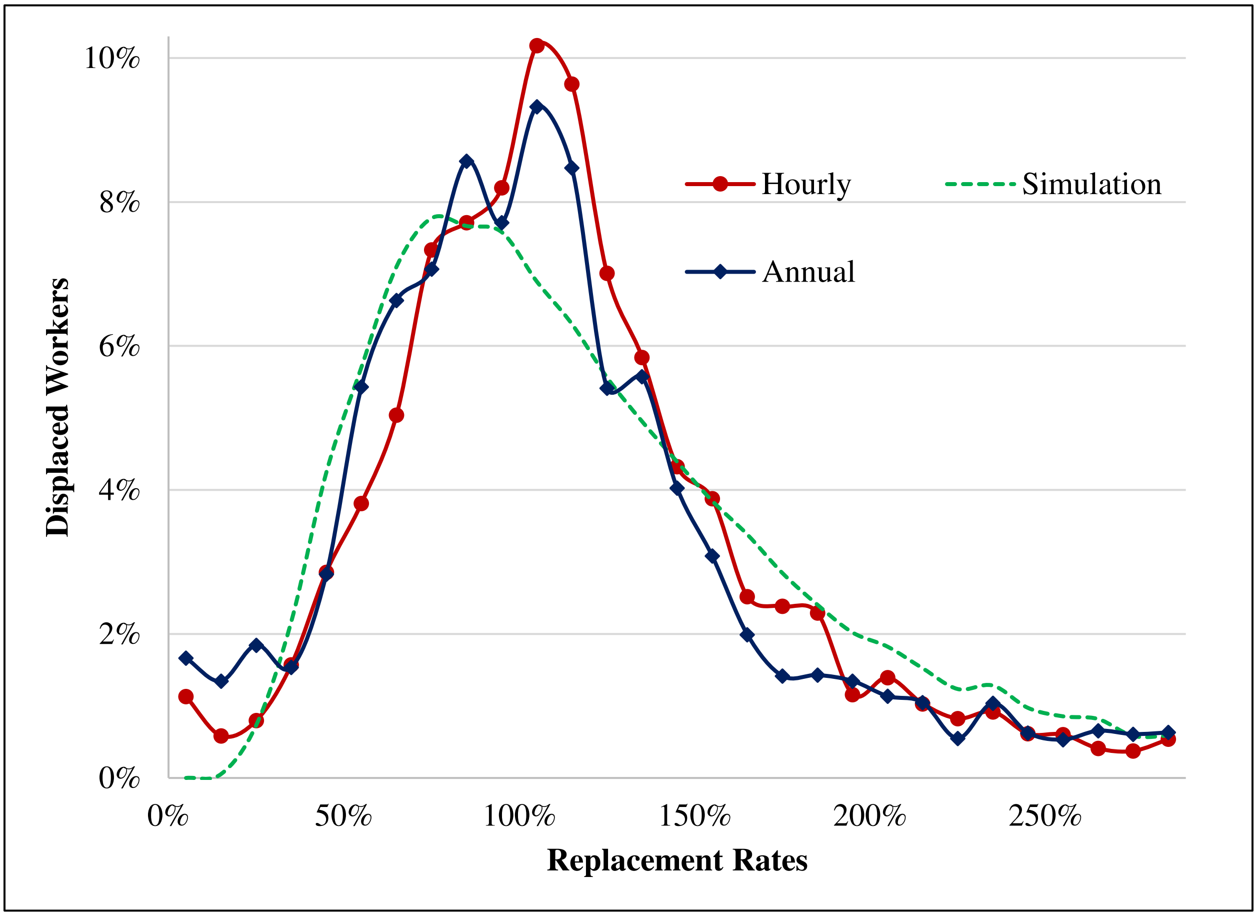
Table 6: Cost of Job Displacement from Simulating an Income Generating Process

VARIABLES	(1)	(2)	(3)
Displaced at Least Once	-0.124***	-0.181***	-0.081***
	(0.004)	(0.004)	(0.004)
Displaced at Least Twice	-0.115***	-0.128***	-0.109***
	(0.011)	(0.011)	(0.011)
Displaced at Least Three Times	-0.099***	-0.101***	-0.099***
	(0.034)	(0.034)	(0.034)
Displaced at Least Four Times	-0.137	-0.137	-0.136
	(0.117)	(0.118)	(0.118)
Replacement Ratio		0.064***	-0.579***
		(0.004)	(0.022)
Replacement Ratio^2			0.638***
			(0.027)
Replacement Ratio^3			-0.152***
			(0.008)
Observations	9,548,246	9,548,246	9,548,246
R-squared	0.408	0.409	0.409
Number of Agents	200,000	200,000	200,000
Individual FE	YES	YES	YES

*** p<0.01, ** p<0.05, * p<0.1

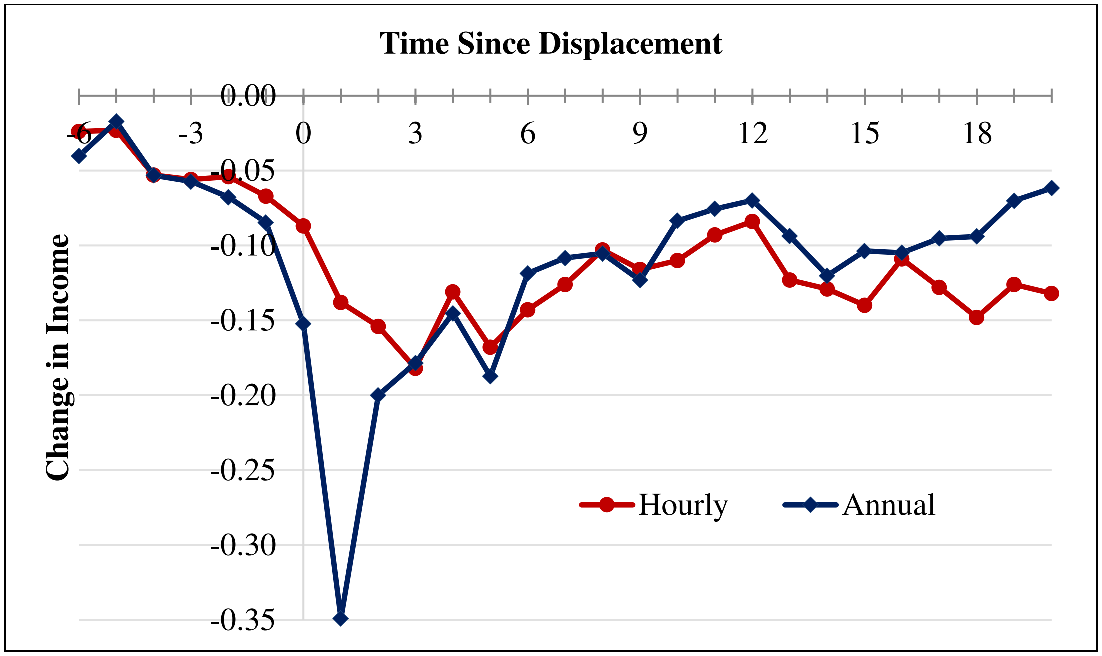
Note: This table contains the key coefficients from the estimation of equation (1) on simulated log income that is calibrated to hourly income from the PSID. Robust standard errors are clustered at the individual level. Coefficients not displayed in this table include a cubic of age along with individual fixed effects. Column (1) has no controls for income replacement ratios, column (2) controls for the ratio linearly, and column (3) controls for the cubic transformation of the ratio. See the **Simulation** section for more details.

Figure 1: Replacement Ratios Density



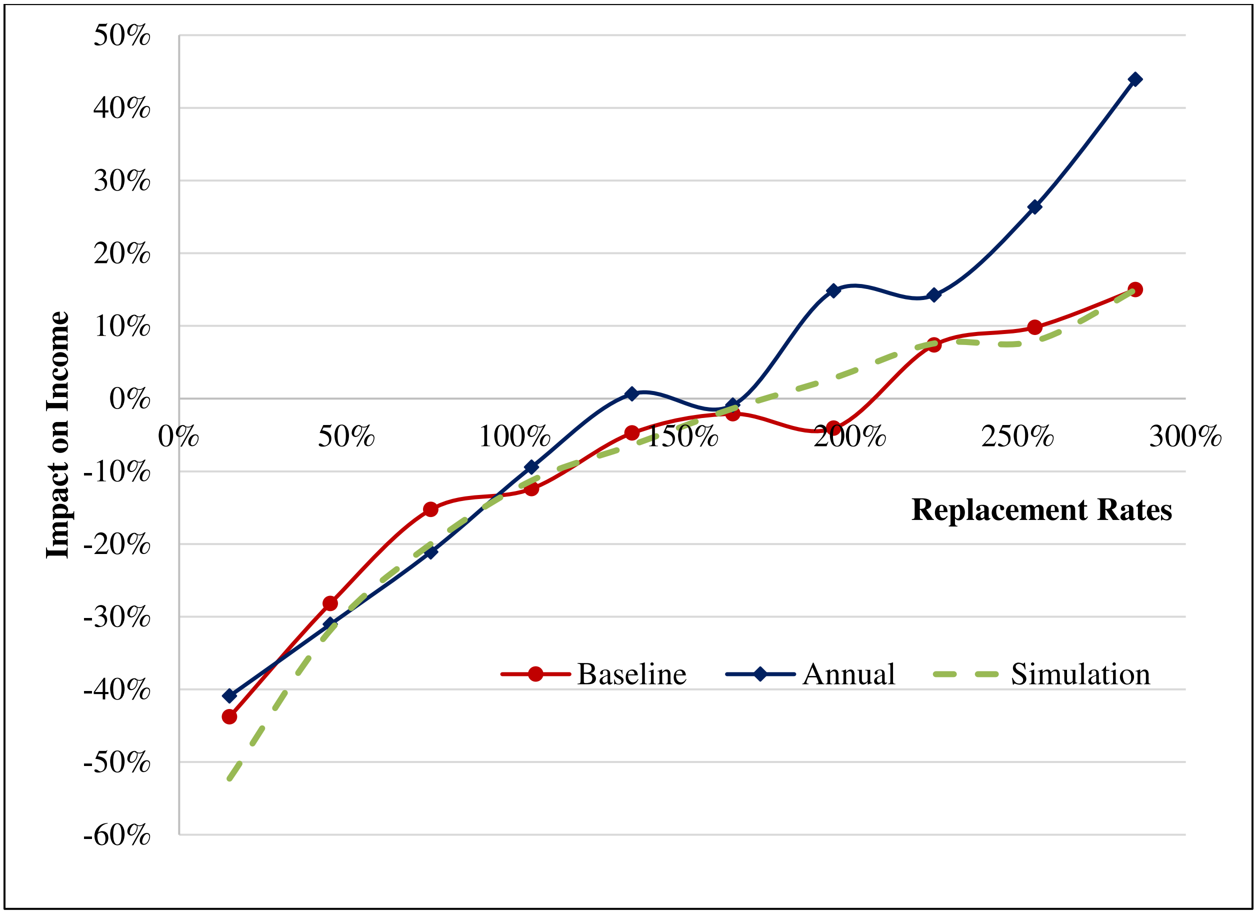
Note: This figure indicates the percentage of the displaced with the income replacement ratio shown on the x-axis. The x-axis indicates different income replacement ratios in 10% increments starting at 0-10% and ending at 290%. The line with circular markers indicates the percentage from the PSID using hourly income and the line with diamond markers indicates these percentages using annual income. The dashed line comes from the simulation.

Figure 2: Changes in Income Due to Displacement



Note: This figure contains the coefficients on time since first displacement from estimating equation (1) on logged income of all displaced workers. Additional controls include displacement indicators, a function of age and education levels along with time and individual fixed effects. The x-axis is time since displacement with the y-axis being the value of the coefficient on the time since displacement. The line with circular markers indicates the effects of displacement on hourly income and the line with diamond markers indicates the effects of displacement on annual income.

Figure 3: Replacement Ratios and Hourly Income



Note: This figure contains the coefficients on various income replacement ratio dummy variables from estimating equation (1) on logged income for all displaced workers. Additional controls include displacement indicators, a function of age and education levels along with time and individual fixed effects. The x-axis indicates different ratios in 30% increments starting at 0-30% and ending at 290%. The y-axis indicates the values for coefficients on the ratio dummy bins. The line with circular markers indicates the impacts of the ratio on long-term hourly income and the line with diamond markers indicates the impacts on annual income. The dashed line indicates the impacts of the ratio on long-term income in the simulation.

Appendix

Table A: Full Results of Specifications for the Cost of Job Displacement from Table 2

VARIABLES	(0)	(1)	(2)	(3)	(4)
Age	0.166***	0.172***	0.171***	0.168***	0.178***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.013)
(Age) * (Ed<12yrs)	0.012***	0.008*	0.008*	0.008*	0.007
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)
(Age) * (Ed>=16yrs)	-0.042***	-0.041***	-0.041***	-0.040***	-0.041***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Age^2	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
(Age^2) * (Ed<12yrs)	-0.001***	-0.000**	-0.000**	-0.000**	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
(Age^2) * (Ed>=16yrs)	0.002***	0.002***	0.002***	0.002***	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age^3	0.000***	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
(Age^3) * (Ed<12yrs)	0.000***	0.000**	0.000**	0.000**	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
(Age^3) * (Ed>=16yrs)	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Displaced at Least Once		-0.116***	-0.133***	-0.101***	-0.111***
		(0.013)	(0.013)	(0.012)	(0.039)
Displaced at Least Twice		-0.088***	-0.100***	-0.082***	-0.098***
		(0.019)	(0.020)	(0.020)	(0.023)
Displaced at Least Three Times		-0.041	-0.045*	-0.041	-0.040
		(0.027)	(0.027)	(0.027)	(0.031)
Displaced at Least Four Times		-0.057	-0.060	-0.064*	-0.040
		(0.037)	(0.037)	(0.037)	(0.041)
Displaced at Least Five Times		-0.124*	-0.123*	-0.124*	-0.091
		(0.070)	(0.070)	(0.070)	(0.073)
Replacement Ratio			0.032**	-0.368***	-0.365***
			(0.012)	(0.079)	(0.085)
Replacement $Ratio^2$				0.412***	0.417***
				(0.101)	(0.109)
Replacement $Ratio^3$				-0.096***	-0.102***
				(0.030)	(0.032)
State Unemployment Rate					0.059
at Displacement					(0.504)
Observations	100,456	100,456	100,456	100,456	84,493
Within R-Squared	0.153	0.158	0.158	0.159	0.119
Number of ID	8,131	8,131	8,131	8,131	7,529

*** p<0.01, ** p<0.05, * p<0.1

Note: This table contains the key coefficients from the estimation of equation (1) on logged hourly income with robust standard errors clustered at the individual level. Displaced workers above the 95th percentile of income replacement ratios are not included in this table. Column (0) has no controls on displacement indicators with the residuals of this estimation used in the **Recovery** section. Column (1) does not control for the ratio. Column (2) controls for the ratio in a linear fashion. Column (3) uses a cubic control for the ratios while column (4) adds a control for the state unemployment rate. Coefficients not displayed in this table include a function of age and education levels along with time and individual fixed effects.

Table B: Full Robustness Results of Alternative Samples and Replacement Ratios from Table 3

VARIABLES	Annual Income (1)	Hourly Income: Weighted (2)	Trends (3)	Pre98 (4)	All RR (5)
Age	0.187***	0.166***	0.095***	0.155***	0.163***
	(0.015)	(0.011)	(0.022)	(0.014)	(0.013)
(Age) * (Ed<12yrs)	-0.004	0.016***	-0.015**	0.001	0.007
	(0.006)	(0.004)	(0.006)	(0.005)	(0.005)
(Age) * (Ed>=16yrs)	-0.044***	-0.036***	-0.012**	-0.043***	-0.038***
	(0.005)	(0.004)	(0.006)	(0.006)	(0.005)
Age^2	-0.003***	-0.003***	-0.002***	-0.003***	-0.004***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
(Age^2) * (Ed<12yrs)	0.000	-0.001***	0.001**	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
(Age^2) * (Ed>=16yrs)	0.002***	0.002***	0.001***	0.002***	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age^3	0.000***	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
(Age^3) * (Ed<12yrs)	-0.000	0.000***	-0.000*	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
(Age^3) * (Ed>=16yrs)	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Displaced at Least Once	-0.196***	-0.124***	-0.105***	-0.104***	-0.085***
	(0.016)	(0.012)	(0.013)	(0.015)	(0.015)
Displaced at Least Twice	-0.140***	-0.074***	-0.068***	-0.053**	-0.035*
	(0.026)	(0.018)	(0.021)	(0.024)	(0.018)
Displaced at Least Three Times	-0.095**	-0.050*	-0.013	-0.039	-0.079***
	(0.039)	(0.025)	(0.031)	(0.031)	(0.022)
Displaced at Least Four Times	-0.059	-0.078**	-0.092**	-0.120***	-0.155***
	(0.057)	(0.036)	(0.041)	(0.041)	(0.032)
Displaced at Least Five Times	-0.036	-0.081	-0.004	-0.083	-0.090***
	(0.103)	(0.062)	(0.076)	(0.109)	(0.017)
Replacement Ratio	-0.325***	-0.316***	-0.303***	-0.367***	-0.343***
	(0.087)	(0.069)	(0.089)	(0.096)	(0.104)
Replacement $Ratio^2$	0.467***	0.365***	0.276**	0.417***	0.473***
	(0.107)	(0.085)	(0.113)	(0.126)	(0.146)
Replacement $Ratio^3$	-0.107***	-0.082***	-0.058*	-0.098**	-0.144***
	(0.030)	(0.024)	(0.033)	(0.039)	(0.049)
Observations	100,527	168,344	100,459	64,914	102,329
R-squared	0.143	0.140	0.360	0.151	0.165
Number of ID	8,116	14,897	8,131	5,109	7,967

*** p<0.01, ** p<0.05, * p<0.1

Note: This table contains the key coefficients from the estimation of equation (1) on logged hourly income for every column but column (1) with robust standard errors clustered at the individual level. Coefficients not displayed in this table include additional displacement indicators, a function of age and education levels along with time and individual fixed effects. Column (1) provides the estimates on logged annual income. Column (2) includes the main sample and the oversampled poverty group along with the sample weights from the PSID. Column (3) includes controls for individual time trends. Column (4) does not include years after 1997 and uses income replacement ratios based on the year before displacement and the year after the event instead of the two years used elsewhere in this paper. Column (5) uses a ratio based on every displacement. See more details in the **Robustness** section.

Table C: Probit Alternative for Recovery

VARIABLES	Probit Margins	
Replacement Ratios	(1)	(2)
At Least 30%	0.0821	0.0736
	(0.097)	(0.094)
At Least 60%	0.1074**	0.1025**
	(0.047)	(0.046)
At Least 90%	0.0849***	0.0755**
	(0.032)	(0.031)
At Least 120%	-0.0096	-0.0106
	(0.028)	(0.027)
Male Head		0.2079***
		(0.033)
White Head		0.1969***
		(0.039)
Observations	1,681	1,681

*** p<0.01, ** p<0.05, * p<0.1

Note: This table provides the marginal results when estimating equation (4) as a probit for whether a displaced worker has recovered on alternative income replacement ratio dummy variables. The ratio dummies indicate whether the displaced worker has an income replacement ratio of at least 30%, 60%, 90%, and at least 120%. The dependent variable is whether the worker has recovered from displacement as detailed in the **Recovery** section.