Wealth After Job Displacement

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Abstract

Income drops permanently after an involuntary job displacement, but it has never been clear what happens to long-run wealth in the United States. This paper concludes that involuntary job displacement has large effects on wealth throughout a worker's lifetime. Upon displacement, wealth falls 14% relative to workers of a similar age and education from the PSID. Their wealth is still 18% lower 12 years after the event. A standard life cycle model calibrated to US data with permanent decreases in income after displacement behaves differently than these findings. The agents in the model also experience a large drop in wealth but they recover. The biggest culprit for these differences is the changes to consumption being small and statistically insignificant in the PSID whereas agents in the model decrease their consumption considerably.

Key words: Job Loss, Unemployment, Wealth, Consumption, Debt
JEL Classification: E21, D31, J63, J33

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1 Introduction

The literature makes clear that income takes a permanent drop after an involuntary job displacement, but it has not been clear what happens to long-run wealth in the United States.[1] The level of wealth is an important backdrop for nearly every choice made by a household. Therefore, understanding this topic is at the heart of several issues in economics and beyond. Households may respond to a drop in income by decreasing consumption and/or decreasing their wealth. For example, a permanent drop in income by the highest earner for a household may be met with a change in consumption behavior which would result in small impacts for wealth. The opposite could occur where a drop in income may lead to a depletion of wealth if the household is unable to change its consumption patterns. This paper helps provide clarity on this by documenting the effect that displacement has on long-run wealth and consumption.

Involuntary job displacement leads to decreases in relative wealth with no signs of recovery. Upon first displacement, wealth including home equity is 14% lower than workers with similar characteristics from the Panel Study of Income Dynamics (PSID).[2] This wealth is still 18% lower when it has been at least 12 years since the event. The fall in wealth excluding home equity is similar with the initial fall being 16% and the lasting effect at 23%. These results are robust to different specifications and transformations. This paper also examines the various components of wealth and finds that no one component is driving the wealth results.

Consumption has a much smaller relative fall after involuntary job displacement. Specifically, households have 2% lower consumption upon displacement with this being less than 4% lower 12 years later. However, these differences are not statistically significant at the 5% level. The lack of a significant fall in consumption also holds for food consumption which is different than previous research on the topic and is explored in this paper.

A standard life cycle model does not match this behavior. The model from Carroll (2012) calibrated to US data suggests that workers should have a large initial drop in wealth but that there should also be recovery. The recovery exists in the model even though the parameters are estimated to successfully reproduce a lasting income drop like that found in the PSID. The model suggests a drop in consumption is to be expected and while this occurs in the data, the difference is in the magnitudes.

[1] See Carrington and Fallick (2017) for a thorough literature review of empirical findings and theory related to job displacement and income.

[2] The numbers reported here and throughout the paper come from $e^{\beta} - 1$ with the β coefficients reported in the empirical tables.

These results are an important contribution to the literature since it documents the long run impact that involuntary job displacement has on wealth, consumption and income for a representative sample in the United States. The empirical results are also put in direct context of theoretical expectations. These are contributions because the research done in this area examines short term impacts due to data limitations in the early data. Additionally, the literature on these topics either involves data from different countries or is based on data that is not representative of the United States.

The results of this paper fill a gap in the literature and indicate that the typical experience for average aged workers in the U.S. is worse than previous studies that used different data. For example, Basten et al. (2016) show that workers who experienced mass layoffs in Norway deplete 11-12% of their wealth in the two to four years after the event. Earlier work for the United States involves the Health and Retirement Study (HRS) of workers aged 50 to 61 and their spouses. Stevens et al. (2013) uses the HRS to show that these workers who experience job displacement experience wealth losses of 8-13% seven or more years after the event. Ozturk and Gallo (2013) is a working paper that also uses the HRS to show that displaced workers that are at least 51 years old experience an 8% reduction in wealth compared to similar workers without this type of job loss.[3] This work also complements Gruber (2001) and Dickens et al. (2017) who use the Survey of Income and Program Participation (SIPP) to examine wealth that is available to unemployed workers and how this has changed over the decades.

The consumption findings in this paper build off Stephens Jr (2001) by going beyond food consumption which was that paper's focus. In 1999, the PSID made a major change to its data collection on consumption. The data now goes beyond food to include 70% of all consumption items from the Consumer Expenditure Survey as noted in Blundell et al. (2016). Whereas Stephens Jr (2001) finds that displacement leads to a 9.75% decrease in food consumption, the findings in this paper using the new data suggest smaller decreases in the range of 3-4%.

The next section describes the PSID data that is used for this project before examining the estimation strategy and those results. The following section is the theoretical model with details on the simulation, the model's results, alternative calibration strategies, and followed with a conclusion.

[3] Schmeiser (2010) provides a more thorough literature review of "trigger events" that change the lifetime accumulation of wealth; these events include job displacement.

2 PSID Data

This study involves 5,169 heads of households from the nationally representative sample designed by the Survey Research Center for the PSID (2020). Each head in this study has reported information on wealth to the PSID at least twice. Wealth information only being collected in 1984, 1989, 1994, and every two years starting in 1999 through 2017 explains why the numbers of heads are somewhat smaller than typical PSID studies. Additional restrictions include following Stephens Jr (2001) and Cagetti (2003) to limit the sample to heads with a partner that is typically present. If a divorce takes place, the rest of the observations for that head are removed from this study.[4] To understand the effect of displacement for workers in their prime working years, this paper also limits the data to heads of the households aged 25 through 60 years old.

The wealth variables are key dependent variables in this study and they vary between wealth with home equity, wealth without the equity, home equity alone, and the other components of wealth. Debt is the total debt calculated by the PSID and this is available in every year noted above. In later waves, the PSID details that this debt is made up of credit card debt, student loan debt, medical debt, legal bills, debt related to business or farming, debt from real estate other than the main home, family loans along with any other type of debt that the family may have. The wealth variables account for the debt just mentioned along with the net value of a business or farm, the sum of checking and savings accounts, the net value of real estate, the value of stocks, the net value of vehicles, and the value of a host of assets such as bonds, life insurance, trusts, estates, collections, private annuities and individual retirement accounts(IRAs). Additionally, wealth for the household includes the money in all pensions and/or employer-based retirement plans. The individual components of wealth are available in every year noted above except for IRAs being individually unavailable in 1984, 1989 and 1994. However, the PSID collects the value of "other assets" in every year that wealth is collected.

The last dependent variable is total consumption which is also made up of several components. For this paper, consumption is based on household expenditures on child care, education, food, health care, housing and transportation. Following Blundell et al. (2016), missing components are counted as zeros before aggregation. All six consumption components are available in each wave of the PSID starting in 1999

[4]The main results for wealth and income remain when including heads of households that are single.

through 2017.[5]

Income is an important independent variable and like the previous variables, it is made up of several components. These components include the labor part of farm income, the labor part of business income, wages from main jobs, the labor part of market gardening income, the labor part of roomers and boarders income, income from professional practices or trade, bonuses, overtime, commissions, tips, wages from extra jobs along with other job-related income. This variable is available for the head of the household and partner in every wave of the PSID (annually 1968-1999 and every two years 1999-2017).

Perhaps the most important independent variable for this project is involuntary displacement. Workers are involuntarily displaced if their job loss occurred because the company folded, changed hands, went out of business or moved out of town. Additionally, a worker is involuntarily displaced if their job loss occurred due to being laid off or fired. This definition of displacement is commonly used with the PSID. For example, Stevens (1997) is the most cited example with Krolikowski (2018) being the most recently published paper at the time of this writing which uses this definition. Following this literature, if a worker switched jobs before 1968, they are not part of this study since it is unknown as to why this job change occurred.

The timing of the displacement is based on a few items. Heads of households for the sample in this paper can be displaced in any year from 1968 through 2017. Workers are asked if they are currently employed in every wave of the PSID. Workers are then asked if they missed work in the previous year due to unemployment. If the worker is not currently employed and they lost their job due to the reasons above and they were not unemployed in the previous year, they are counted as involuntarily displaced for the year of the interview. If the same conditions hold but they were unemployed in the previous year, they are counted as involuntarily displaced for the year before the interview. If a worker is employed but has had an employer switch due to the reasons explained above, they are counted as having been displaced in the year that the switch occurred.[6] Finally, this timing is checked using duration of unemployment compared to the date of the interview with the PSID.

[5]The PSID has additional consumption expenditures available but these expenditures are not part of this study since the data has only been available since 2005; preliminary results with this data shed no additional light to the results in this paper.

[6]An employer switch is defined in Kambourov and Manovskii (2009) and that paper's two page algorithm in its appendix is used for this definition as well. In short, an employer switch occurs when firm level tenure is small for a new head of household or when there is a large percentage change in firm level tenure for the same head of household between interviews.

2.1 PSID Summary Statistics

Summary statistics for these variables and others of importance are available in table 1. These values have been adjusted with CPI-U-RS using 2017 as the base year and these values include zeros along with potentially negative values. Medians and averages are displayed for the total sample. These values for overall wealth (Wealth with Home Equity) are in line with that found in Pfeffer et al. (2016) that compare the PSID and the 2007 Survey of Consumer Finances. The wealth median is also in line with the more recent Survey of Consumer Finances of 2017 from Bricker et al. (2017). However, the average is lower here and generally in the PSID as discussed in Pfeffer et al. (2016). Note that the averages for the components of wealth do not add up due to the missing information on IRAs noted above. Finally, the total consumption to wealth ratio aligns with Blundell et al. (2016).[7]

Overall, the sample includes 1,751 heads of households who have been displaced at least once along with 3,418 heads that have never been displaced. This ratio of displaced workers to those that have never been displaced is similar to that of a recent published paper on displaced workers using the PSID, Krolikowski (2018). The displaced sample has averages for before and after displacement.[8] These averages, whether they be before or after displacement, are lower than the averages in the total sample for every category listed. However, the sample of workers before displacement are younger than the total sample. Therefore, the differences between the total sample and the displaced workers before the event are not as large as the numbers suggest. The workers after displacement have more wealth than they had before since they are now much older. Looking through a few more of the notable variables show what is perhaps a surprise: debt levels for the displaced are lower although this could point to credit constraints. All types of consumption are also smaller although the gap between the total average and the displaced averages in consumption is not as large as the gaps in wealth. Finally, education levels for heads of displaced households are different compared to the total sample with displaced workers generally having less education.[9]

These summary statistics also shed light on how households are accumulating wealth. The median household has $118,164 worth of wealth with roughly half of

[7] Blundell et al. (2016) have their summary statistics reported as nominal values which is why the comparison to this paper should be a ratio such as total consumption to wealth.

[8] The results of this paper are unchanged when limiting the displaced sample to those individuals who also have observations before displacement.

[9] This difference in education levels for those that are displaced versus those that are not does not drive the results.

that wealth being home equity. In fact, when calculated separately, the median home equity to wealth ratio is 0.47 with 0.57 as the average value. The median values are zero for most of the wealth components. Therefore, it seems that the households in this sample have their wealth scattered throughout different avenues. This makes it difficult to answer the question of how households end up with less wealth after displacement.

Time since displacement is also an important variable for this paper but the new biennial format of the PSID makes estimating some of these years imprecise. Figure 1 provides the positive distribution on time since displacement conditional on being in this paper's samples; the width of each bar represents one year since displacement. The figure indicates that the odd values are much less common than the even values but this is a much bigger problem for the wealth observations in figure 1a compared to the income observations in figure 1b. For example, in figure 1a, 7% of the displaced wealth observations are from two years after displacement and 6% are from four years after displacement while 1% are from one year after displacement and 2% from three years after displacement. Due to the small sample size on the odd years, care must be taken when examining these as is discussed in the next section.

3 Estimation Using the PSID

This paper builds off the event study from Jacobson et al. (1993) and insights from Stevens (1997) to compare displaced workers with their counterparts who have not been displaced below in equation 1. All the workers help determine the coefficients on the controls in an attempt to isolate the effect of displacement. Huckfeldt et al. (2018), Jolly (2015) and Krolikowski (2018) are recent publications that examine displaced workers with an estimation strategy similar to this. The dependent variable, $w_{i,t}$, reported by an individual head of household i, takes on different values for income, wealth, wealth components, consumption, and food consumption leading to several estimations.

$$w_{i,t} = \sum_m \beta_m D1_{i,m} + \gamma_1 D2_i + \gamma_2 D3_i + \gamma_3 D4_i + \Theta \mathbf{X}_{i,t} + \Phi \mathbf{I}_{CD|HSD} + \zeta_i + y_t + \mathbf{S} + \epsilon_{i,t} \quad (1)$$

Time since first displacement is indicated with a time varying vector, $D1_{i,m}$, that takes two different forms. Several studies such as Jacobson et al. (1993) and Stevens (1997) find that income begins to drop before displacement and therefore this paper controls for those differences up to four years before the event. Due to the issues mentioned earlier, time since displacement is grouped into two-year time intervals. Specifically, the time since that displacement is estimated for m = -4 or -3, -2 or -1, 0 or 1,..., 18 or 19 and 20 plus years. For ease in reporting, an alternative for this vector groups the time since displacement into larger intervals with m = -4 or -3, -2 or -1, 0 or 1, 2 or 3, 4 to 11, and 12 plus years.

Additional displacements are estimated with time varying indicator functions $D2_i$, $D3_i$, and $D4_i$. Stevens (1997) emphasizes that multiple displacements are essential for understanding the effects of displacement and therefore this paper includes these controls. $D2_i$ is one if the head of the household, i, was displaced at least twice but it would be zero up until that second displacement. The same idea holds for $D3_i$ and $D4_i$ which control for being displaced at least three times and at least four times respectively.

Income along with spousal income are included in the time varying vector ($\mathbf{X}_{i,t}$) because this allows the reader to see if potential differences are extraordinary. Including these income variables introduces a bias in terms of understanding the overall effect due to an involuntary displacement. However, without these controls, the changes to relative wealth and relative consumption may be due to income alone since the literature has established that income falls after displacement.[10]

Additional time varying characteristics for the heads of households ($\mathbf{X}_{i,t}$) includes variables for age, age squared and age cubed along with an indicator for being currently separated from the partner, the number of children in the household, and several dummy variables representing various types of pensions or employer-based retirement plans the head or spouse may have.[11] The age terms are interacted with whether the worker has at least 16 years of education or has less than 12 years of education in ($\mathbf{I}_{CD|HSD}$) because income patterns vary on education and the summary statistics in section 2.1 indicate differences in education levels for displaced workers. Therefore, the results compare the dependant variable for the displaced head to other heads of similar education. Controls are included for the quantity of household members since this affects the levels of consumption and wealth. Types of pensions and/or retirement plans can also affect wealth accumulation which explains their dummy variable controls.

[10]When ignoring controls on household income, the results for wealth increase in magnitude but the results for consumption have little change as shown in table A.1 of the appendix when compared to table 2.

[11]See table A.2 in the appendix for a list of all the variables used as controls along with their impact on wealth without housing; nearly every one of them significantly impacts the level of wealth.

Finally, all estimations include three different types of fixed effects. Individual fixed effects for the head of the household (ζ_i) are included in an attempt to control their idiosyncracies. Fixed effects for the state of residence (**S**) are included to help control for local conditions, like housing values, that vary across the United States.[12] Annual fixed effects (y_t) help with changing values of wealth due to their respective markets. These fixed effects are also useful for controlling any systematic differences in the PSID that are unknown to the author.

3.1 Empirical Results From the PSID

Table 2 presents the main findings from this study with the format of this table followed throughout the empirical results. The first row indicates the log transformed dependent variables used in the estimation of equation 1. The first column indicates time since displacement and indicators for multiple displacements. The values of the coefficients for these are reported throughout the table without parentheses. The numbers with parentheses are the standard errors clustered for each head of household. Observations can vary due to the log transformation dropping nonpositive values or due to the changing availability of information noted in section 2. The individual heads of households vary because every estimation requires that each individual have at least two observations.

When workers experience an involuntary displacement, income falls immediately and their income remains lower than their peers' income. This is noted in the literature from the introduction and is shown again in table 2 to put the other results into context. Specifically, the income column of this table shows the results of estimating equation 1 on log annual income. Income is 20% ($-0.2 = e^{-.229} - 1$) lower for displaced workers compared to their peers upon the first two years of displacement and income is still 10% lower 12 plus years later.[13]

Table 2 makes clear that when the head of a household experiences an involuntary displacement, wealth is lower than the head's peers and that fall in wealth displays little to no recovery.[14] Specifically, total wealth is 14% lower in the year or in the year after the first displacement and is 15-20% lower than expected in all the following

[12] The main results of this paper still hold without state fixed effects.

[13] While different education groups have different age-income profiles, their relative level of income after displacement does not vary across education groups.

[14] Although not presented here, the wealth findings still generally hold when restricting the sample to those with wealth below the average and for those below the 75th percentile. This indicates that large wealth values are not driving the results.

years.[15] Housing wealth falls in similar magnitudes although this fall begins before displacement. However, wealth that excludes housing falls by 16% upon displacement with this fall increasing to 23% when the first displacement occurred at least 12 years prior.

The value of wealth should not be driving these results. The estimates in table 2 include time dummy variables which should capture national changes in several of the assets. While home equity is more local, wealth that excludes this is still much lower for displaced households suggesting that local conditions are also not the primary source for these results.

The literature in the introduction indicated wealth reductions in the 8% to 13% range. Table 2 demonstrates larger magnitudes, but given that previous research involved older workers from the HRS, the deviations for this difference is not surprising. Older workers have more wealth and therefore their percentage decreases should be smaller. Additionally, since older workers are closer to retirement, there is less time for the workers to fall further behind their peers.

The results in table 2 indicate that consumption falls upon displacement but that this fall is small to non-existent. The estimates range from a 2-4% decrease for overall consumption but the results are not statistically different from zero. The results on food consumption are similar with the consumption of food falling 3-4% but again these results have relatively large standard errors. The food consumption results are different from the results found in Stephens Jr (2001) where food consumption falls 9-11% after displacement with much more precision (smaller standard errors). These differences are further explored in the appendix section C.[16]

The fact that consumption does not fall much after an involuntary displacement is in line with consumption smoothing theory. The idea that individuals and households attempt to keep their consumption steady (consumption smooth) has a long history as Meghir and Pistaferri (2011) discuss in their chapter from the Handbook of Labor. More recent work in this area includes Blundell et al. (2016) who use a flexible life cycle model calibrated to the PSID to show the various avenues used to insure consumption streams within a family. That paper demonstrates the various consumption changes with respect to changes in wages. The two elasticities, which capture these ratios of changes, have different signs indicating that the overall difference in consumption may not be significantly different from zero. Sullivan (2008) examines the various

[15] See section B in the appendix for a discussion of how wealth changes with displacement and how this might illuminate these results.

[16] Koo (2020) is a working paper that also uses the PSID to examine consumption after job loss but the sample in that paper is much smaller and much different than the one in table 2.

impacts of unemployment on consumption for those with assets versus those without assets using the SIPP and the PSID. That paper finds that those with assets do not cut their consumption as much as those without assets. A heavy majority of the sample in table 2 has assets and therefore, these results do not run counter to those in Sullivan (2008).

3.2 Wealth Components

Table 3 also emphasizes the main point of this paper: when displacement occurs for the household, wealth, no matter the type, falls relative to other similarly educated households. This table presents the results of estimating equation 1 from section 3 with the dependent variable being the individual components of wealth after a log transformation. Almost all of the estimates in this table indicate a loss in wealth. For example, the last column of this table indicates that the value of a farm or business is 75% ($-0.75 = e^{-1.4} - 1$) lower than expected for households that have the head displaced.

The interpretation of these results in table 3 must be done with care since most of these wealth components have a median value of \$0 as shown in table 1. The estimation strategy in this paper is to compare workers that have been displaced to workers that have not been displaced *and* have non-zero values since these results have a natural log transformation.[17] The first column of results in table 3, which is for vehicles, has 27,773 observations or 94% of the total from this paper's sample but the last column of results for the value of a business or farm indicates 4,475 observations or 15% of the total from this paper's sample. Therefore, when stating that the value of the farm or business is 75% lower than expected, this is based on the individual fixed effect and the non-displaced workers of a similar education who own a farm or business with a positive value.

3.3 Robustness - Individual Time Trends

This section provides a robustness check of table 2 by examining those results with an individual linear time trend. This time trend goes one step further than the individual fixed effect to examine whether the specific individuals not only have different levels but also different rates of accumulation. This is helpful if displaced workers happen to have different rates of wealth accumulation compared to their counterparts.

[17] See section D in the appendix for results which include zeros and negative values using the inverse hyperbolic sine transformation.

Specifically, this robustness check is simply estimating equation 1 with an additional term, $\lambda_i t$. The results are in table 4 and indicate that the main results still hold; wealth drops upon displacement and this fall in wealth has a lasting impact. This holds whether the wealth includes home equity or not. The results for consumption are also largely unchanged although the point estimates display larger magnitudes. Section D of the appendix contains more robustness results including estimates containing zeros and negative values using the inverse hyperbolic sine transformation along with a note on the results without any transformation.

4 Theory

4.1 Model

A general life cycle model is useful because it provides the framework on what should be expected regarding wealth and consumption after displacement. Specifically, it helps to answer whether to expect workers to cut back more on consumption or wealth. This paper compares the aforementioned findings from the PSID to the life cycle model available in Carroll (2012) which is similar to that in Cagetti (2003), Carroll et al. (1992) and Carroll (1997). The model is of partial equilibrium where the dynamic problem for the agent is one of choosing consumption and hence savings for wealth. This choice is made to maximize utility for the rest of one's life based on income that is subject to life cycle growth along with uninsurable shocks. Specifically, the maximization problem for each agent is as follows:

$$\max \left\{ u(C_t) + E_t \left[\sum_{s=t+1}^{T} \delta^{s-t} \left(\Pi_{i=t+1}^{s} \beta_i \pi_i \right) u(C_s) \right] \right\}$$

subject to

$$\begin{aligned} C_s + A_s &= \hat{R} A_{s-1} + P_s \Theta_s \forall s \\ P_s &= G_s P_{s-1} N_s \end{aligned}$$

Utility in time period t is derived from consumption (C_t) along with the expected utility going forward with two discount factors. The time invariant discount factor (δ) makes up the first with the second being a time-variant discount factor (β_s) between ages s and $s-1$ used to reflect changes in spending over an agent's lifetime. Agents also face the possibility of death later in life with π_s being the probability of living until age s given living until age $s-1$. The choice for consumption indicates how much is saved (A_s) in time s which provides a constant gross interest rate ($\hat{R}$). The right hand side of the budget constraint also includes permanent income (P_s) which is exposed to a temporary shock (Θ_s) that can take the value of zero with probability p but otherwise follows a log normal distribution. Permanent income grows at a rate G_s between age $s-1$ and s while being exposed to another shock (N_s) with a log normal distribution detailed below:

$$\begin{aligned}\Theta_s &= 0 \text{ with probability } p \\ &= Z_s/(1-p) \text{ with probability } (1-p) \\ \log Z_s &\sim \mathcal{N}(-\sigma_\Theta^2/2, \sigma_\Theta^2) \\ \log N_s &\sim \mathcal{N}(-\sigma_N^2/2, \sigma_N^2)\end{aligned}$$

Shocks to income create displacements in the model. Displacements for the model depend of the severity (γ) of the negative shock. Therefore, displacements are defined to occur if *either* of the following holds:

$$\begin{aligned}N_s &< 1 - \gamma_N * \sigma_N \\ \Theta_s &< 1 - \gamma_\Theta * \sigma_\Theta\end{aligned}$$

The model needs displacements to depend on both types of shocks. Displacement from temporary shocks is needed in the model to replicate the fact that several displaced workers recover. If permanent shocks are the only target, there is not enough recovery. If temporary shocks are the only target, the average worker recovers immediately. Thus, the displaced sample needs to be a mix of those that have experienced permanent shocks and those that have experienced temporary shocks. Alternative possibilities of defining displacements for this model are discussed in section 4.6.

A key reason for using this model is its simplicity with the presence of permanent shocks to income. Its simplicity makes calibrating to new variables easier while previous research demonstrates its use for understanding wealth. The permanent shocks to income are crucial since most involuntary job displacement is accompanied by permanent decreases to income as noted in the introduction and found in table 2. However, this paper does not attempt to explain the nature of these decreases as in Jarosch (2015), Krolikowski (2017), or Michaud (2015). Rather, these shocks are a mechanical part of this framework.

4.2 Simulation

The simulated data on consumption, income and displacement comes from using the model to generate panel data for the three different types of workers identified in Cagetti (2003): those with less than 12 years of education, those with 12-15 years of education, and those with at least 16 years of education. These agents are capable of living up to 90 years old. For purposes of this paper, the simulated data is collected on agents aged 25 to 60 to match the age groups from the empirical work done with the PSID in this paper (table 2). Therefore, the model is simulated three times to produce a total of 18,000 workers with 648,000 observations where the proportions of the workers roughly reflect those from this paper's sample. Specifically, the code from Carroll (2012) solves the model above for one type of worker with variables normalized as a percentage of permanent income (P_s). Creating permanent income variables that scale the original variables result in the simulated data.

Since this model is closely related to the model in Cagetti (2003), a handful of the model's parameters come from that paper. The values for the probability of staying in the labor force (π) are equal to one for these 25-60 year-old agents. The real returns to saving is set constant at 3% ($\hat{R} = 1.03$). The values for the time varying discount factor (β) correspond to each type of agent and are summarized in figure E.1 of the appendix. The values for the growth rate of income (G) together with each type of worker's starting permanent income (P_{25}) are summarized in figure E.2 of the appendix.

The temporary shocks along with the permanent shocks follow a log normal distribution with the shocks having a mean of one and standard deviations calculated from the PSID. The income process for the three different types of workers is estimated using the first differences in log income following Heathcote et al. (2010) which uses heads of households that have worked more than 260 hours with a calculated hourly rate greater than \$2. The results of this approach are much closer to that of Carroll et al. (1992) which is used in Carroll (1997) as opposed to using moments in log income levels. The temporary shock to income (Θ) can result in zero income with probability $p = 0.5\%$ for all worker types; this number comes from this paper's PSID sample and is also used in Carroll (1997). The distribution of these shocks are reported in table 5.

Table 5 provides the rest of the calculated parameters for the model. The functional form for utility is one of constant relative risk aversion ($u(C_s) = C_s^{1-\rho}/(1-\rho)$) where the risk parameter (ρ) and the time invariant discount factor (δ) for each type of worker is found using the method of simulated moments. This process is used for each type of worker to approximate the median wealth to income ratios for seven age groups (26-30, 31-35, etc.) from the 1992 through the 2007 waves of the Survey of Consumer Finances with each moment having an equal weight following the procedure in Carroll (2012). As explained in Carroll (2012), the median wealth to income ratio is the target since this model is not designed for the high concentration levels of the most wealthy. The wealth medians and averages for the PSID sample in this study are also more representative of those outside these high concentration levels as noted in section 2.1. The targets and the model's performance are available in table E.1 of the appendix.

The severity of the shocks denoted with γ_N and γ_Θ are chosen to target the income distribution for displaced workers using a second round of simulated method of moments after the risk parameter (ρ) and the time invariant discount factor (δ) are determined. Specifically, the targets come from the following differences in income found in table 2: two to three years later, four to eleven years later, and twelve plus years later. The targets also include the proportion of each worker type that experiences a displacement and the peak fall in income after displacement. It is important to use the peak fall in income because when displacement occurs in the model, income takes a large fall. The peak fall in income comes one year after displacement when income falls by 24%.[18] Each of the targets has an equal weight resulting in the values for each γ in table 5. The targets and the model's performance on these dimensions are listed in table E.2 of the appendix. However, the calibration strategy is not driving the results; section 4.6 provides more information on alternative strategies for calibration and their issues.

4.3 Model Summary Statistics

The data generated by the model is summarized with the model's summary statistics in table 6. The model does a decent job with generating displacements correctly although there is one important thing to keep in mind when examining these numbers: displaced agents in the model are older than the displaced workers in the PSID data and the displaced agents are much older than the total sample from the model. This explains why the displaced agents in the model have more wealth than the total sample; they are older. The model also has a smaller percentage of agents being displaced.

[18]The peak fall in income comes from examining income after displacement, annually, with the 24% visible in figure 2.

4.4 Estimation Using the Model

The model, calibrated to generate a permanent decrease in income like that in the data, is now used to examine wealth and consumption after an event like displacement. Equation 1 again considers dependent variables ($w_{i,t}$) to be income, wealth, and consumption. The setup and estimation for the model's data is nearly the same as the estimation using the PSID. Because the model's data is more abundant, time since the first displacement is estimated annually. Several controls are unnecessary for this data. These include state and year fixed effects, but for comparison to the empirical results, the individual fixed effect (ζ_i) is included. These individual fixed effects also help correct for the fact that the average values for wealth and consumption differ in the PSID data compared to the generated data from the model.

4.5 Estimation Results From the Model

Figure 2 demonstrates the drop in income experienced by agents in the model in direct comparison to the heads of households from the PSID. The solid line without markers comes from the β coefficients on time since displacement for income based on equation 1 from the model. As shown, these agents experience a slightly larger drop in income with the fall being even worse every year after three years since displacement. When summing the decreases across the first 19 years of displacement, this costs the displaced agents 42% more income relative to the heads from the PSID.

Figure 3 depicts that displaced agents in the model experience a large loss in wealth but they recover, contrary to what is found in the PSID. The line without markers indicates the difference in agents' wealth that comes from the values for the β coefficients from equation 1 when time since displacement is measured annually. In the year of displacement, the agents have 27% less wealth compared to their counterparts from the model that are of equal age and education. However, wealth continues to increase relatively as the agents rebuild their wealth to buffer income shocks. As shown, this is much different than the results from the PSID even though the calibration has a fall in income being worse for those in the model.

Figure 4 depicts consumption after displacement for agents in the model compared to the PSID, which is the root cause of the different wealth experiences. The agents in the model decrease their consumption by 14% in the year after displacement and this decrease in consumption is still at 9% 20 years after displacement. Comparatively, households in the PSID are not changing their consumption in this fashion although their decreases in consumption are increasing in magnitude over time. In the year of displacement, the fall in consumption for agents in the model appears small due to income as an independent variable for these estimations. In other words, consumption relative to income does not fall much in the year of displacement because income is so low for displaced workers in the model. This also occurs on a smaller scale for the PSID.

4.6 Alternative Calibration Strategies

This section considers alternative strategies for defining a displacement in the model. Simply relying on the permanent component of the income process is intuitive since the results in figure 2 seem to indicate a permanent fall in income. Following a similar method of moments of targeting the income scar along with the displacement ratios leads to permanent falls in income, wealth, and consumption but the magnitudes are much too large and the model generates too many displacements. Specifically, this strategy leads to 52% of the agents experiencing a displacement, income falling 40% which leads to consumption falling 22%. This performs poorly because there is too little recovery in the model when displacements are only based on permanent shocks. While several workers in the PSID experience a permanent fall in annual income, several others recover which is why both types of shocks are needed.

Another alternative strategy is to only target the initial fall in income and the fall in income twelve years after displacement with the requirement that the lasting fall in income is no more severe than that found in the data. This strategy also requires that the displaced population make up no more than 50% of the population although the results are similar if including the proportion of the population displaced as a target; this 50% threshold gives the parameters their best chance of matching the fall in income. This strategy may be enticing since the current targets lead to an income scar that is worse than that in the data as is clear in figure 2. However, this strategy leads to wealth recovering even faster. Since wealth recovers faster, the fall in consumption is smaller yet agents in the model still cut consumption by much more than the households in the PSID.

In estimating these displacement parameters (γ), the estimation strategy either needs to target the proportion of displaced workers or there needs to be a threshold for the percentage of workers displaced. Otherwise, γ's are found which create too much displacement. The interpretation of the results from estimating equation 1 would then change because the non-displaced population would be small.

5 Conclusion

The main purpose of this paper is to investigate the level of wealth over time for displaced workers. Only recently has there been enough data to perform this type of exercise on wealth which contributes to this paper's novelty. Households with a displaced worker present have 18% less wealth when including home equity and 23% less wealth when ignoring home equity 12 years after displacement relative to their peers. This is a larger fall in wealth compared to previous findings. This paper also shows that to understand this effect on wealth, consumption is an important driver. Contrary to previous findings, in the newer PSID data, consumption demonstrates no significant fall after displacement with this same pattern holding true for food consumption. This result on consumption is also novel since there has been little work done like this with the newer measures of consumption in the PSID. These newer measures demonstrate a smaller fall than previously found.

A life-cycle model calibrated to the PSID with permanent decreases in income after displacement also demonstrates a large drop in wealth but in contrast to the data, it illustrates recovery. The model also suggests a larger fall in consumption compared to the PSID. This paper is agnostic on why the results from the data differ from the model; future work should examine which mechanisms explain this. There is much to be explored here but the empirical results from this paper together with the procedure used for assessing the theory will benefit this future research.

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6 Tables

Table 1: PSID Summary Statistics

Variable	Total Sample Median	Total Sample Average	Displaced Averages Before	Displaced Averages After
Wealth with Home Equity	$118,164	$388,082	$205,822	$307,024
Wealth w/o Home Equity	$50,000	$286,700	$129,254	$214,064
Home Equity	$48,528	$101,382	$76,568	$92,961
Vehicles	$15,000	$22,252	$18,467	$20,012
Bank Accounts	$5,726	$26,596	$17,330	$22,169
IRA	$0	$46,123	$30,140	$42,988
Pension	$0	$42,055	$15,704	$23,115
Stocks	$0	$49,521	$23,805	$31,422
Other Assets	$0	$17,576	$13,876	$12,398
Other Real Estate	$0	$42,576	$14,583	$36,138
Business or Farm	$0	$70,296	$17,173	$53,324
Debt	$3,282	$21,814	$12,139	$19,169
Total Consumption	$50,831	$57,464	$52,922	$53,940
Food Consumption	$9,372	$10,327	$9,517	$9,976
Income	$54,850	$73,036	$65,832	$61,220
Family Income from Others	$34,092	$45,054	$37,215	$42,482
Age		41.6	37.0	44.0
At Least 16 Years of Education		34.3%	30.5%	23.2%
Less Than 12 Years of Education		10.7%	10.0%	16.3%
Displaced Once		21.1%	80.0%	49.6%
Displaced Twice		9.1%	15.0%	25.8%
Displaced Three Times		4.2%	4.3%	12.6%
Displaced At Least Four Times		3.8%	0.9%	12.0%
Observations		29,661	2,138	9,167
Heads of Households		5,169	769	1,751

All the values here have been adjusted to 2017 values. Values for "Displaced" include all the observations before the event in the first column and all the observations after in the next column. See more details on the sample and these variables in section 2 with a discussion of this table in section 2.1.

Table 2: Effects of Displacement on Income, Wealth, and Consumption

	Annual	Wealth		Only	Consumption	
Displacement	Income	w/Home	No Home	Home	Total	Food
In Three to Four Years	-0.0228	-0.0388	-0.0052	-0.1117*	-0.0194	0.0197
	(0.021)	(0.064)	(0.084)	(0.055)	(0.022)	(0.026)
In Two to One Years	-0.0628**	0.0095	0.0146	-0.0775	0.0025	-0.0050
	(0.024)	(0.066)	(0.072)	(0.058)	(0.024)	(0.030)
Year of Displacement	-0.2290***	-0.1519*	-0.1781*	-0.1572*	-0.0215	-0.0472
or Year After	(0.026)	(0.066)	(0.075)	(0.064)	(0.025)	(0.035)
Two to Three Years Later	-0.1875***	-0.1664*	-0.1631*	-0.1779**	-0.0434	-0.0287
	(0.027)	(0.069)	(0.079)	(0.062)	(0.027)	(0.035)
Four to Eleven Years Later	-0.1118***	-0.2193***	-0.2440**	-0.1952**	-0.0283	-0.0441
	(0.028)	(0.066)	(0.076)	(0.059)	(0.028)	(0.036)
12+ Years Later	-0.1031**	-0.1958*	-0.2607**	-0.1590*	-0.0381	-0.0284
	(0.036)	(0.078)	(0.093)	(0.070)	(0.033)	(0.041)
At Least Twice Displaced	-0.1353***	-0.0470	-0.0141	0.0108	-0.0263	0.0013
	(0.028)	(0.065)	(0.075)	(0.054)	(0.028)	(0.036)
Three Times Displaced	-0.0953*	-0.3194**	-0.3330**	-0.0528	-0.1258***	-0.0773
(At Least)	(0.037)	(0.100)	(0.121)	(0.086)	(0.036)	(0.051)
Four Times Displaced	-0.0898	-0.0519	-0.3551*	0.1533	-0.0425	0.0489
(At Least)	(0.060)	(0.131)	(0.151)	(0.115)	(0.046)	(0.045)
Within R^2	0.107	0.258	0.204	0.237	0.154	0.092
Observations	59,931	26,189	25,002	21,365	24,047	23,959
Heads of Households	5,033	4,680	4,565	3,898	4,410	4,408

Significance levels: $+$: 10% $*$: 5% $**$: 1% $***$: 0.1%

Note: This table displays the results of equation 1 with m = -4 or -3,..., 4 to 11 and $D1_{i,12p}$ controlling for time varying individual characteristics including composition of household, annual fixed effects, state fixed effects, and individual fixed effects. Income is a control for the wealth and consumption estimations. The wealth estimates control for the holdings of different types of pensions. See section 3 for more details on this strategy. The first row indicates the dependent variables with the log transformation. The three wealth estimates include wealth with home equity (w/Home), wealth excluding home equity (No Home), and only home equity (Only Home). The values without parentheses are the coefficients for the independent variables listed in the first column which indicate time since displacement and whether the worker has been displaced multiple times. The numbers in parentheses are the standard errors clustered at the individual level.

Table 3: Effects of Displacement on Wealth Components

Displacement	Vehicles	Bank Accounts	Debt	IRA	Pension	Stocks	Other Assets	Other Estates	Business Farm
In Three to Four Years	-0.0682	-0.0547	0.0893	-0.1900	-0.1335	0.2351	0.4888*	0.4871	-0.8089
	(0.055)	(0.085)	(0.085)	(0.140)	(0.184)	(0.178)	(0.226)	(0.331)	(0.585)
In Two to One Years	-0.0153	-0.0820	0.1466+	-0.0085	0.0117	0.0056	0.3534	-0.1003	-0.3477
	(0.049)	(0.082)	(0.085)	(0.145)	(0.163)	(0.194)	(0.216)	(0.267)	(0.642)
Year of Displacement or Year After	-0.1197*	-0.0873	0.1283	-0.0423	-0.4397*	-0.0506	-0.0386	0.1726	-1.4005*
	(0.052)	(0.084)	(0.090)	(0.152)	(0.193)	(0.214)	(0.248)	(0.234)	(0.648)
Two to Three Years Later	-0.1044+	-0.2565**	0.1460	0.1038	-0.4381*	-0.0844	-0.0993	-0.0515	-1.1498+
	(0.054)	(0.086)	(0.096)	(0.151)	(0.204)	(0.200)	(0.226)	(0.237)	(0.640)
Four to Eleven Years Later	-0.1318**	-0.1344+	0.1537+	-0.1066	-0.4329*	-0.0328	-0.1665	-0.3380	-0.9171
	(0.049)	(0.081)	(0.091)	(0.157)	(0.209)	(0.189)	(0.218)	(0.245)	(0.576)
12+ Years Later	-0.0781	-0.0616	0.0814	-0.1258	-0.2141	-0.1856	-0.2150	-0.4382	-1.0480+
	(0.060)	(0.100)	(0.117)	(0.187)	(0.255)	(0.237)	(0.263)	(0.275)	(0.582)
At Least Twice Displaced	0.0239	0.0530	-0.0744	-0.1037	-0.3917+	0.2728	-0.1308	0.0441	-0.3981
	(0.052)	(0.079)	(0.087)	(0.193)	(0.229)	(0.188)	(0.221)	(0.186)	(0.473)
At Least Three Times Displaced	-0.0286	-0.0972	-0.1706	-0.6718**	0.3257	-0.2427	-0.7368*	-0.6226+	-0.3757
	(0.075)	(0.115)	(0.121)	(0.247)	(0.236)	(0.216)	(0.296)	(0.352)	(0.861)
At Least Four Times Displaced	-0.0724	0.0465	0.1267	-0.4672	0.2948	0.1134	-0.1753	-0.4193	-0.1497
	(0.106)	(0.157)	(0.188)	(0.500)	(0.436)	(0.405)	(0.296)	(1.171)	(0.706)
Within R^2	0.050	0.056	0.068	0.184	0.202	0.168	0.120	0.144	0.157
Observations	27,773	26,180	18,187	8,943	8,555	8,095	6,119	5,268	4,475

Significance levels: $+$: 10% $*$: 5% $**$: 1% $***$: 0.1%

Note: This table displays the results of equation 1 with m = -4 or -3,..., 4 to 11 and $D1_{i,12p}$ controlling for time varying individual characteristics including all household income, composition of household, annual fixed effects, state fixed effects, and individual fixed effects. See section 3 for more details. The first row indicates the dependent variables. "Bank Accounts" indicate the sum of checking and savings accounts, "IRA" indicates the value of private annuities and IRAs, "Other Assets" indicate the value of assets such as bonds, life insurance, trusts, estates and collections, "Other Estates" indicates the value of nonprimary real estate; see section 2 for more details on these components. The values without parentheses are the coefficients for the independent variables listed in the first column which indicate time since displacement and whether the worker has been displaced multiple times. The numbers in parentheses are the standard errors clustered at the individual level.

Table 4: Robustness - Effects of Displacement with Individual Time Trends

	Annual	Wealth		Only	Consumption	
Displacement	Income	w/Home	No Home	Home	Total	Food
In Three to Four Years	-0.0463*	-0.0559	-0.0968	-0.1269*	-0.0235	-0.0118
	(0.023)	(0.075)	(0.104)	(0.062)	(0.031)	(0.038)
In Two to One Years	-0.0811**	0.0213	0.0153	-0.0623	-0.0200	-0.0332
	(0.028)	(0.087)	(0.103)	(0.073)	(0.039)	(0.050)
Year of Displacement or Year After	-0.2584***	-0.1786+	-0.1459	-0.2182*	-0.0408	-0.0684
	(0.034)	(0.098)	(0.116)	(0.086)	(0.047)	(0.059)
Two to Three Years Later	-0.2247***	-0.1865+	-0.0949	-0.2489*	-0.0963+	-0.0499
	(0.037)	(0.113)	(0.145)	(0.100)	(0.056)	(0.068)
Four to Eleven Years Later	-0.1550***	-0.2811*	-0.2294	-0.2800*	-0.0883	-0.1202
	(0.042)	(0.128)	(0.163)	(0.112)	(0.066)	(0.086)
12+ Years Later	-0.1427**	-0.3081*	-0.3442+	-0.3198*	-0.0821	-0.1221
	(0.052)	(0.149)	(0.192)	(0.133)	(0.071)	(0.098)
At Least Twice Displaced	-0.1535***	-0.0953	-0.0484	0.0844	-0.0593	0.0132
	(0.033)	(0.089)	(0.107)	(0.082)	(0.038)	(0.053)
Three Times Displaced	-0.1593***	-0.3486**	-0.3858*	-0.1458	-0.1251*	-0.0202
(At Least)	(0.044)	(0.134)	(0.160)	(0.134)	(0.061)	(0.082)
Four Times Displaced	-0.1108	0.0195	-0.1915	0.0815	-0.0709	0.0601
(At Least)	(0.071)	(0.205)	(0.254)	(0.165)	(0.066)	(0.076)
Within R^2	0.346	0.543	0.491	0.536	0.456	0.392
Observations	59,931	26,189	25,002	21,365	24,047	23,959
Heads of Households	5,033	4,680	4,565	3,898	4,410	4,408

Significance levels: $+$: 10% $*$: 5% $**$: 1% $***$: 0.1%

Note: This table displays the results of equation 1 with m = -4 or -3,..., 4 to 11 and $D1_{i,12p}$ controlling for time varying individual characteristics including composition of household, annual fixed effects, state fixed effects, individual fixed effects, and individual time trends. Income is a control for the wealth and consumption estimations. The wealth estimates control for the holdings of different types of pensions. See section 3 and section 3.3 for more details. The first row indicates the dependent variables with the log transformation. The three wealth estimates include wealth with home equity (w/Home), wealth excluding home equity (No Home), and only home equity (Only Home). The values without parentheses are the coefficients for the independent variables listed in the first column which indicate time since displacement and whether the worker has been displaced multiple times. The numbers in parentheses are the standard errors clustered at the individual level.

Table 5: Model Parameters

	Temp. Shock	Perm. Shock	Risk	Discount Rate	Temp. Threshold	Perm. Threshold
	σ_Θ	σ_N	ρ	δ	γ_Θ	γ_N
Less Than 12 Years of Education	0.280	0.160	2.78	0.931	2.616	2.240
12-15 Years of Education	0.265	0.166	4.13	0.886	2.660	2.342
At Least 16 Years of Education	0.259	0.196	2.82	0.943	2.627	2.254

Note: This table summarizes all the parameters used in the model. The first two columns of parameters are found using first differences in log income following Heathcote et al. (2010). The next two columns are found using simulated method of moments where the targets and the model's performance are found in table E.1. The last two columns determine the thresholds for what creates a displacement in the model. These are found using another round of simulated method of moments with the targets and performance in table E.2. See more details in section 4.2.

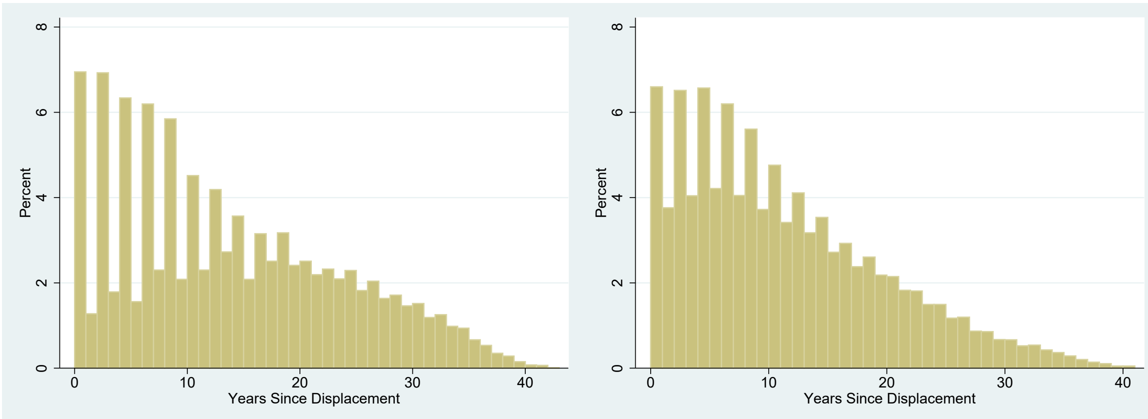
Table 6: Summary Statistics From the Model

	Total Sample		Displaced	
Model's Observations	Median	Average	Median	Average
Wealth	\$ 119,389	\$ 195,795	\$ 139,830	\$ 214,893
Consumption	\$ 47,167	\$ 67,059	\$ 43,992	\$ 65,437
Last Year's Income	\$ 48,820	\$ 71,935	\$ 41,786	\$ 67,455
Displaced Once		19.8%		83.5%
Displaced Twice		2.7%		15.2%
Three Times Displaced		0.2%		1.3%
Less Than 12 Years of Education		11.1%		13.2%
At Least 16 Years of Education		33.3%		32.6%
Age		42.5		48.1
Observations		648,000		78,667
Agents		18,000		4,085

All the values here have been adjusted to 2017 values. See section 4.1 for more details on the model and the calibration. Values for "Displaced" come from all the observations *after* displacement.

7 Figures

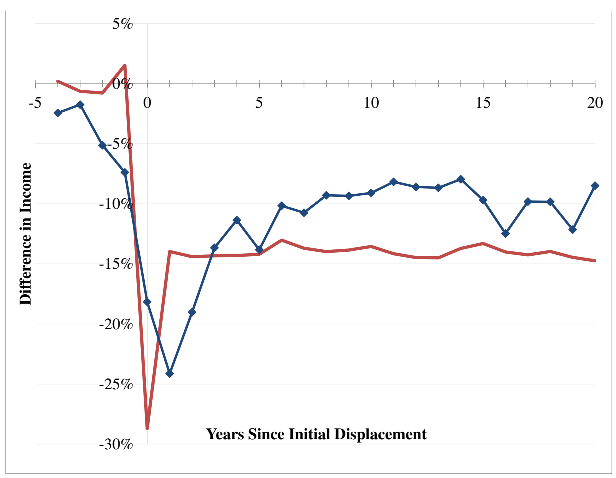
Figure 1: Observations Since Displacement



(a) Wealth Observations (b) Income Observations

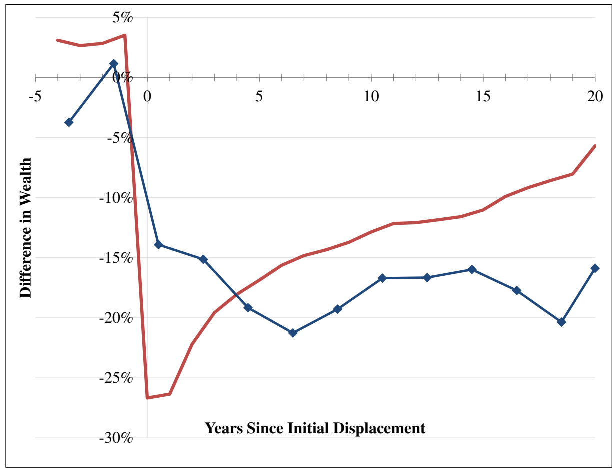
These figures plot the percent density of positive time since displacement for observations from the displaced heads that are part of the wealth sample for this paper. The width of each bar represents one year since displacement. Figure 1a demonstrates the distribution of positive time since displacement for the wealth observations while figure 1b demonstrates this for the income observations.

Figure 2: Income Differences Due to Displacement



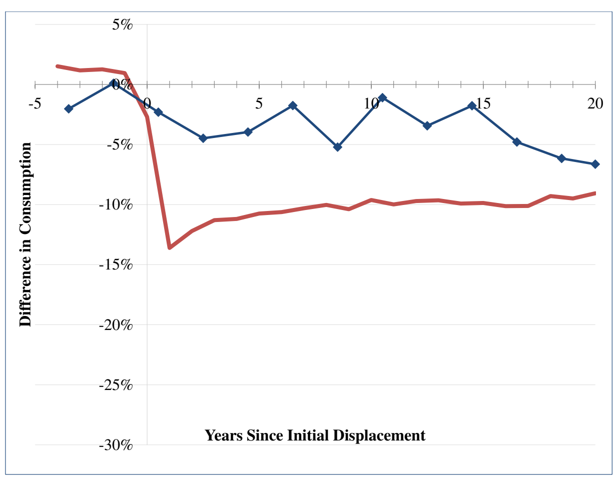
The solid line without markers indicates the difference in income which come from $e^{\beta} - 1$ where the β's come from equation 1 for the model and the solid line with square markers identify these values from the PSID data.

Figure 3: Wealth Differences Due to Displacement



The solid line without markers indicates the difference in wealth which come from $e^{\beta} - 1$ where the β's come from equation 1 for the model and the solid line with square markers identify these values from the PSID data.

Figure 4: Consumption Differences Due to Displacement



The solid line without markers indicates the difference in consumption which come from $e^{\beta} - 1$ where the β's come from equation 1 for the model and the solid line with square markers identify these values from the PSID data.

A Appendix

Table A.1: **Appendix** Effects of Displacement on Wealth and Consumption Without Income Controls

	Wealth		Only	Consumption	
Displacement	w/Home	No Home	Home	Total	Food
In Three to Four Years	-0.0432	-0.0109	-0.1141*	-0.0216	0.0178
	(0.064)	(0.085)	(0.055)	(0.022)	(0.026)
In Two to One Years	-0.0018	0.0023	-0.0810	-0.0004	-0.0073
	(0.066)	(0.073)	(0.058)	(0.024)	(0.030)
Year of Displacement or Year After	-0.1600*	-0.1871*	-0.1614*	-0.0243	-0.0492
	(0.066)	(0.075)	(0.064)	(0.026)	(0.035)
Two to Three Years Later	-0.1818**	-0.1812*	-0.1852**	-0.0490+	-0.0333
	(0.069)	(0.079)	(0.061)	(0.027)	(0.035)
Four to Eleven Years Later	-0.2325***	-0.2605***	-0.2020***	-0.0336	-0.0484
	(0.066)	(0.077)	(0.059)	(0.028)	(0.036)
12+ Years Later	-0.2115**	-0.2792**	-0.1666*	-0.0451	-0.0345
	(0.079)	(0.095)	(0.070)	(0.034)	(0.041)
At Least Twice Displaced	-0.0502	-0.0195	0.0086	-0.0274	0.0005
	(0.066)	(0.076)	(0.054)	(0.028)	(0.036)
At Least Three Times Displaced	-0.3236**	-0.3401**	-0.0550	-0.1264***	-0.0776
	(0.100)	(0.121)	(0.086)	(0.036)	(0.051)
At Least Four Times Displaced	-0.0599	-0.3633*	0.1498	-0.0468	0.0453
	(0.132)	(0.152)	(0.116)	(0.046)	(0.045)
Within R^2	0.252	0.197	0.235	0.147	0.088
Observations	26,189	25,002	21,365	24,047	23,959

Significance levels: $+$: 10% $*$: 5% $**$: 1% $***$: 0.1%

Note: This table displays the results of equation 1 with m = -4 or -3,..., 4 to 11 and $D1_{i,12p}$ controlling for time varying individual characteristics including composition of household, annual fixed effects, state fixed effects, and individual fixed effects. See section 3 for more details on this strategy. The first row indicates the dependent variables with the log transformation. The three wealth estimates include wealth with home equity (w/Home), wealth excluding home equity (No Home), and only home equity (Only Home). The values without parentheses are the coefficients for the independent variables listed in the first column which indicate time since displacement and whether the worker has been displaced multiple times. The numbers in parentheses are the standard errors clustered at the individual level.

Table A.2: **Appendix** Control Variables With and Without Controlling for Pension

		Wealth Without Home Equity	
Variable Description	Variable	I	II
Number of Children Living in the Home	X_1	-0.0137	-0.0116
Separated From Current Partner	X_5	-0.4892***	-0.4803***
Income From Last Year	X_6	6.84e-7***	6.77e-7***
Partner's Income From Last Year	X_7	1.48e-6***	1.49e-6***
Age	X_8	0.3806***	0.3708***
Age x (Ed < 12 Years)	$\Phi_1 I_{E<12}$	-0.0085	-0.0083
Age x (Ed ≥ 16 Years)	$\Phi_1 I_{E\geq 16}$	-0.0653***	-0.0672***
Age^2	X_9	-0.0085***	-0.0082***
Age^2 x (Ed < 12 Years)	$\Phi_2 I_{E<12}$	0.0007	0.0007
Age^2 x (Ed ≥ 16 Years)	$\Phi_2 I_{E\geq 16}$	0.0027***	0.0028***
Age^3	X_{10}	0.0001***	0.0001***
Age^3 x (Ed < 12 Years)	$\Phi_3 I_{E<12}$	-9.8e-6	-1.0e-5
Age^3 x (Ed ≥ 16 Years)	$\Phi_3 I_{E\geq 16}$	-2.5e-5***	-2.6e-5***
Current Job's Pension is Only Benefits	X_{11}	-0.2220***	
Partner's Current Job's Pension is Only Benefits	X_{12}	-0.1389***	
Current Job's Pension is Money & Benefits	X_{13}	0.2088***	
Partner's Current Job's Pension is Money & Benefits	X_{14}	0.1284***	
Last Job's Pension: Only Benefits	X_{15}	0.0197	
Partner's Last Job's Pension: Only Benefits	X_{16}	0.0155	
Last Job's Pension: Money & Benefits	X_{17}	-0.1805*	
Partner's Last Job's Pension: Money & Benefits	X_{18}	-0.0068	
2nd to Last Job's Pension: Only Benefits	X_{19}	0.3310***	
Partner's 2nd to Last Job's Pension: Only Benefits	X_{20}	0.0600	
2nd to Last Job's Pension: Money & Benefits	X_{21}	-0.2888	
Partner's 2nd to Last Job's Pension: Money & Benefits	X_{22}	-0.8070***	
Displaced in Three to Four Years	$\beta_{-4,-3}$	-0.0052	-0.0036
Displaced in One to Two Years	$\beta_{-2,-1}$	0.0146	0.0225
Year of Displacement or Year After	β_{0-1}	-0.1781*	-0.1637*
Two to Three Years After Displacement	β_{2-3}	-0.1631*	-0.1603*
Four to Eleven Years After Displacement	β_{4-11}	-0.2440**	-0.2435**
12+ Years After Displacement	β_{12+}	-0.2607**	-0.2551**
At Least Twice Displaced	γ_1	-0.0141	-0.0117
At Least Three Times Displaced	γ_2	-0.3330**	-0.3397**
At Least Four Times Displaced	γ_3	-0.3551*	-0.3414*
Constant		4.3802***	4.5253***
Within R^2	R^2	0.204	0.195
Observations	N	25,002	25,002

Note: This table displays most of the control variables from the results in table 2 for total log wealth excluding home equity with controls for pension type in column I and without controlling for pension type in column II. Additional controls include annual fixed effects, state fixed effects, and individual fixed effects.

B Changes in Wealth

Average annual changes in wealth and their components for displaced workers are in table B.1. The first column reports wealth variables and the next column indicates how that variable changes on average in between the two years for which the head reported its wealth and components. Before displacement, overall wealth increases annually by $18,802. In the year of displacement or the year after, overall wealth drops by $4,613. When calculated separately, the average wealth for households that are not displaced but that will be displaced is $205,822. If a worker with the average wealth of $205,822 is displaced, their new level of wealth would be $201,209 instead of the $224,625 that would have occurred with the average growth of $18,802. This represents a 10% difference in wealth. This is lower than the 14% difference in wealth reported from table 2 because these averages do not account for the fact that households accumulate more wealth as they age along with the other control variables from equation 1.

Table B.1 also points out which components fall the most in value on average. Here, the average fall is biggest in the value of stocks and other assets with these values dropping by roughly $5,000 on average. Home equity, the overall value of all bank accounts and IRAs still rise but the rise is smaller than before displacement. These values are helpful in understanding how displaced heads of households respond to their displacement event.

Table B.1: Change in Variables for Displaced Households

	Before	During	After
Wealth with Home Equity	$18,802	-$4,613	$22,008
Wealth w/o Home Equity	$12,264	-$5,911	$17,110
Home Equity	$6,539	$1,298	$4,897
Vehicles	$294	-$205	$242
Bank Accounts	$1,367	$364	$1,285
IRA	$2,744	$2,043	$3,325
Pension	$3,383	$784	$2,286
Stocks	$2,307	-$5,451	$1,680
Other Assets	$1,778	-$5,382	-$201
Other Real Estate	$1,417	$4,372	$3,450
Business or Farm	$198	-$605	$7,258
Debt	$1,224	$1,830	$2,215

Note: This table provides the average difference in the variables listed in the first column for the households whose head is displaced. The second column provides these changes before displacement, the next column is in the year or the year after displacement, and the last column provides these changes after displacement.

C Food Consumption Differences

This section briefly examines the differences in the food consumption results from this paper compared to Stephens Jr (2001). Table C.1 displays the results of equation 1 with m = -4 or -3,..., 4 to 11 and $D1_{i,12p}$ with the first two columns (I & II) having the log transformed food consumption data from 1968 through 1992 excluding 1973, 1988 and 1989 since this data was not collected in those waves. 1968 through 1992 is the timeframe and the variables used in Stephens Jr (2001). The last two columns (III & IV) use the log transformed food consumption data from this paper which covers every two years starting in 1999 and ending in 2017. The estimations are the same as in equation 1 of section 3 except that there is no pension controls since there is no pension information for any year before 1999 other than 1984. Columns II and IV are more similar to Stephens Jr (2001) in that they do not control for multiple displacements. Otherwise, the tables have the same control variables discussed in section 3.

The sample construction in this paper compared to Stephens Jr (2001) is also slightly different. The heads of households in this table all have at least two observations like the empirical results elsewhere in this paper. The first two columns have more observations since they cover more years of data but they have fewer individuals since the sample for this paper steadily grows every year until 2009 before it makes a small fall and plateaus.[19] The heads for the sample in table C.1 all have one wealth observation although the results are not statistically different if ignoring this requirement. Stephens Jr (2001) requires three consecutive observations for each head and if a head has missing information, data from the head's household are no longer included in the estimations going forward for that paper.[20]

The results differ when comparing the older data in columns I & II to the newer data in columns III & IV of table C.1. The earlier data with the results in column I and II demonstrates a fall in consumption for the first three years after displacement. Column I, which controls for multiple displacements, demonstrates some recovery in consumption spending by household. Column II, which does not control for multiple displacements, does not demonstrate a recovery in food consumption spending which is more similar to the results in Stephens Jr (2001). Therefore, it seems that the lasting impact on food consumption spending found in Stephens Jr (2001) is due to multiple displacements which is similar to the emphasis in Stevens (1997). However, this is not found in the more recent data which is clear when comparing column III to column IV.[21] Possible reasons for these differences are left to future research. There does not seem to be any systematic difference in the food consumption variables from the two time periods, though. The food consumption to income ratio for the first time period has similar averages, medians and distributions to the later data.

[19] In general, the size of the PSID grows every year but this paper's sample slows in growth due to the multiple observation requirement.

[20] The results in table C.1 are nearly identical when requiring the head to have three observations rather than two.

[21] Recall that the third column of results (III), which is almost identical to the sixth column of results in table 2, does not include information on pensions which explains the difference in results.

Table C.1: Effects of Displacement on Food Consumption

	Years			
	(1968-1992)		(1999-2017)	
Displacement	I	II	III	IV
In Three to Four Years	0.0259	0.0270	0.0197	0.0199
	(0.018)	(0.018)	(0.026)	(0.026)
In Two to One Years	-0.0058	-0.0050	-0.0050	-0.0047
	(0.021)	(0.021)	(0.030)	(0.030)
Year of Displacement or Year After	-0.0678**	-0.0696**	-0.0472	-0.0465
	(0.022)	(0.022)	(0.035)	(0.035)
Two to Three Years Later	-0.0772**	-0.0885***	-0.0287	-0.0277
	(0.025)	(0.025)	(0.035)	(0.035)
Four to Eleven Years Later	-0.0356	-0.0590*	-0.0441	-0.0447
	(0.026)	(0.024)	(0.036)	(0.036)
12+ Years Later	-0.0354	-0.0710*	-0.0284	-0.0320
	(0.032)	(0.030)	(0.041)	(0.042)
At Least Twice Displaced	-0.0401+		0.0013	
	(0.024)		(0.036)	
At Least Three Times Displaced	-0.0433		-0.0773	
	(0.036)		(0.051)	
At Least Four Times Displaced	-0.0379		0.0489	
	(0.051)		(0.045)	
Within R^2	0.239	0.238	0.092	0.092
Observations	29,589	29,589	23,959	23,959
Heads of Households	2,691	2,691	4,408	4,408

Significance levels: $+$: 10% $*$: 5% $**$: 1% $***$: 0.1%

Note: This table displays the results of equation 1 with m = -4 or -3,..., 4 to 11 and $D1_{i,12p}$ controlling for time varying individual characteristics including all household income, composition of household, annual fixed effects, state fixed effects, and individual fixed effects. See section 3 for more details on this strategy. The dependent variables are the log transformation of consumption from two different time periods. The values without parentheses are the coefficients for the independent variables listed in the first column which indicate time since displacement and whether the worker has been displaced multiple times. Columns II and IV do not control for multiple displacements. The numbers in parentheses are the standard errors clustered at the individual level.

D Inverse Hyperbolic Sine Transformation

The inverse hyperbolic sine (IHS) transformation is useful for wealth and several of its components because the interpretation is similar to that of the natural log but this transformation effectively deals with zeros and negative values.[22] This transformation is more useful than using non-transformed data since the IHS transformation also acts like the natural log function in its handling of outliers.[23] Specifically, this transformation uses the real value of the dependent variable, $w_{i,t}$, with the dependent variable after transformation as $\hat{w}_{i,t} = \log(w_{i,t} + (w_{i,t}^2 + 1)^{0.5})$.

Table D.1 provides the results on wealth after this transformation. Comparing this table to the wealth samples in table 2 demonstrates that nearly 3,500 of the observations are of those with zero or negative total wealth. Excluding housing from wealth indicates that there are approximately 4,700 non-positive observations. Including these observations suggests that the main results for this paper hold: wealth with or without home equity falls upon displacement with little to no recovery. The biggest difference is that the point estimates display larger magnitudes with larger standard errors. This is not being driven by the IHS transformation since the results are nearly identical when estimating the IHS transformed dependent variables on the same samples from table 2. These estimations also have a worse fit (smaller R^2). The fall in R^2 suggests that the specification does not work as well for observations with nonpositive wealth.[24]

The average changes in table B.1 shed light on the different estimates when using the inverse hyperbolic sine transformation versus the log transformation from table 2. While wealth for displaced workers falls by \$4,613 according to table B.1, there is variation. Although not presented in these tables, the average change in overall wealth for the subset of those workers with *positive* nonzero wealth is a \$101 increase of that wealth. These are the observations in table 2. The average change in overall wealth for those with negative or zero wealth in the year of the interview is a decrease of \$15,477. These are not in table 2 but are within table D.1 which explains part of the reason for the difference in estimates.

The estimates of the components of wealth are also done with the IHS transformation since so many of these components have zero values. Table D.2 has the results of

[22]For more information on the inverse hyperbolic sine transformation see Pence (2006).

[23]The estimates for this paper without any transformation result in large and statistically significant falls in wealth with small and mostly insignificant falls in consumption.

[24]This fall in R^2 occurs when excluding zeros as well as when limiting the sample to different lower bounds in wealth.

estimating equation 1 with the dependent variable being the IHS transformed component of wealth. This table also displays that the components of wealth are falling with displacement but that the standard errors are larger. Both tables are consistent in demonstrating that if a displaced worker's family owns a business or farm, this component of wealth falls dramatically.

Table D.1: Wealth with the Inverse Hyperbolic Sine Transformation

	Wealth		Only
Displacement	w/Home	No Home	Home
In Three to Four Years	0.1260	-0.3094	0.4417
	(0.331)	(0.377)	(0.283)
In Two to One Years	0.0967	-0.1426	0.3654
	(0.309)	(0.355)	(0.296)
Year of Displacement or Year After	-0.7898*	-0.9346*	-0.0303
	(0.344)	(0.379)	(0.315)
Two to Three Years Later	-0.5042	-0.7040+	-0.0935
	(0.350)	(0.399)	(0.318)
Four to Eleven Years Later	-0.6542*	-0.9662**	0.1270
	(0.315)	(0.368)	(0.300)
12+ Years Later	-0.3227	-0.6499	0.4666
	(0.363)	(0.425)	(0.354)
At Least Twice Displaced	-0.3089	-0.3730	-0.3228
	(0.354)	(0.348)	(0.313)
At Least Three Times Displaced	0.2288	0.0807	0.0136
	(0.442)	(0.550)	(0.349)
At Least Four Times Displaced	-0.7440	-0.8769	0.1483
	(0.578)	(0.673)	(0.475)
Within R^2	0.049	0.038	0.078
Observations	29,661	29,661	29,661

Significance levels: + : 10% $*$: 5% $**$: 1% $***$: 0.1%

Note: This table displays the results of equation 1 with m = -4 or -3,..., 4 to 11 and $D1_{i,12p}$ controlling for time varying individual characteristics including all household income, composition of household, annual fixed effects, state fixed effects, and individual fixed effects. The first row indicates the dependent variables with the inverse hyperbolic sine transformation: $x = \log(x + (x^2 + 1)^{0.5})$. The three wealth estimates include wealth with home equity (w/Home), wealth excluding home equity (No Home), and only home equity (Only Home). The values without parentheses are the coefficients for the independent variables listed in the first column which indicate time since displacement and whether the worker has been displaced multiple times. The numbers in parentheses are the standard errors clustered at the individual level.

Table D.2: Effects of Displacement on Inverse Hyperbolic Sine Transformed Wealth Components

Displacement	Vehicles	Bank Accounts	Debt	IRA	Pension	Stocks	Other Assets	Other Estates	Business Farm
In Three to Four Years	0.0279	-0.0456	0.0715	0.2441	0.3138	-0.1166	0.3315	0.2496	-0.0023
	(0.140)	(0.152)	(0.235)	(0.295)	(0.245)	(0.227)	(0.239)	(0.228)	(0.162)
In Two to One Years	-0.0978	0.0047	0.1971	0.3882	0.2028	-0.3559+	0.3448	-0.0687	-0.4493**
	(0.142)	(0.154)	(0.234)	(0.298)	(0.234)	(0.207)	(0.219)	(0.224)	(0.155)
Year of Displacement or Year After	-0.1608	-0.2077	0.1991	0.2194	-0.0395	-0.4152*	-0.0171	-0.1069	-0.7789***
	(0.139)	(0.149)	(0.233)	(0.292)	(0.230)	(0.211)	(0.219)	(0.228)	(0.151)
Two to Three Years Later	-0.2204	-0.2697+	-0.0421	0.4215	-0.2874	-0.4938*	0.0939	-0.1427	-0.6980***
	(0.148)	(0.152)	(0.252)	(0.298)	(0.236)	(0.214)	(0.228)	(0.240)	(0.170)
Four to Eleven Years Later	-0.2554*	-0.0672	0.2499	-0.1650	-0.0801	-0.6696**	-0.2093	-0.3150	-0.5327**
	(0.130)	(0.141)	(0.245)	(0.300)	(0.242)	(0.219)	(0.214)	(0.254)	(0.180)
12+ Years Later	-0.0728	0.0853	0.0937	-0.2679	-0.1581	-0.7718**	-0.1457	-0.5202+	-0.4433+
	(0.160)	(0.171)	(0.299)	(0.380)	(0.293)	(0.278)	(0.268)	(0.312)	(0.233)
At Least Twice Displaced	-0.0143	-0.1177	-0.2512	0.2536	-0.2176	0.2845	-0.1070	-0.0429	-0.0566
	(0.132)	(0.136)	(0.229)	(0.251)	(0.222)	(0.192)	(0.177)	(0.199)	(0.174)
At Least Three Times Displaced	0.1572	0.0532	-0.5752+	-0.2667	-0.1327	-0.3428	0.0021	-0.0025	-0.3705
	(0.170)	(0.218)	(0.329)	(0.381)	(0.247)	(0.233)	(0.233)	(0.248)	(0.238)
At Least Four Times Displaced	-0.0836	0.0878	0.1169	-0.5274	-0.8240*	0.3525	-0.1489	-0.3796	-0.5675*
	(0.237)	(0.264)	(0.409)	(0.505)	(0.372)	(0.318)	(0.336)	(0.351)	(0.269)
Within R^2	0.014	0.027	0.016	0.018	0.225	0.028	0.013	0.022	0.021
Observations	29,661	29,661	29,661	24,208	29,661	29,661	29,661	29,661	29,661

Significance levels: $+$: 10% $*$: 5% $**$: 1% $***$: 0.1%

Note: This table displays the results of equation 1 with m = -4 or -3,..., 4 to 11 and $D1_{i,12p}$ controlling for time varying individual characteristics including all household income, composition of household, annual fixed effects, state fixed effects, and individual fixed effects. The first row indicates the dependent variables with the inverse hyperbolic sine transformation: $x = \log(x + (x^2 + 1)^{0.5})$. The values without parentheses are the coefficients for the independent variables listed in the first column which indicate time since displacement and whether the worker has been displaced multiple times. The numbers in parentheses are the standard errors clustered at the individual level.

E Model Performance and Parameters

Table E.1: Median Wealth to Income Ratio Targets and Model Performance

	Ed < 12 Yrs		Ed 12-15 Yrs		Ed ≥ 12 Yrs	
Age Brackets	Model	Data	Model	Data	Model	Data
26 to 30	0.65	0.47	0.79	0.64	1.24	1.07
31 to 35	0.93	0.91	1.14	1.13	2.26	1.71
36 to 40	1.27	1.53	1.49	1.49	3.11	2.75
41 to 45	1.75	1.78	1.97	1.94	3.92	3.83
46 to 50	2.37	2.20	2.61	2.71	4.80	4.61
51 to 55	3.11	2.43	3.43	3.69	5.83	5.90
56 to 60	3.83	4.31	4.38	4.28	6.96	7.66

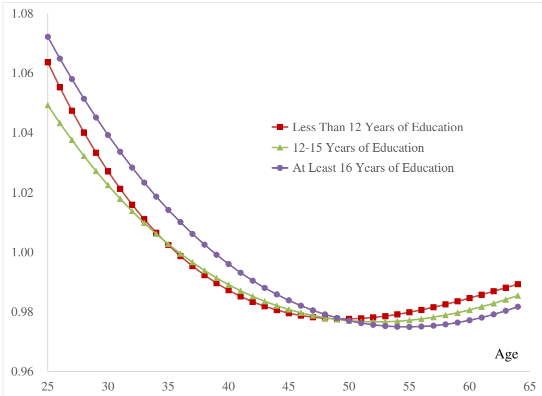
Note: This table demonstrates the targets and the model's performance for the method of simulated moments described in section 4.2. The wealth to income ratios are calculated using the 1992 through the 2007 waves of the Survey of Consumer Finances with each moment having an equal weight. These moments are the target for estimating the risk parameter (ρ) and the time invariant discount factor (δ) with those values displayed in table 5.

Table E.2: Displacement Threshold Targets and Model Performance

		Income Change		Displacement Rates	
		Immediate	12+ Year	Model	PSID
Model Agents:	Ed < 12 Yrs	-31%	-19%	27%	47%
	Ed 12-15 Yrs	-26%	-15%	22%	37%
	Ed ≥ 12 Yrs	-33%	-11%	22%	24%
	PSID Data:	-24%	-10%		

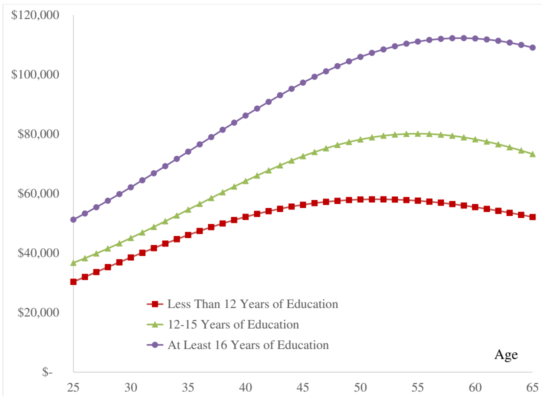
Note: This table demonstrates the targets and the model's performance for the second round of simulated method of moments described in section 4.2 to determine the threshold of shocks (γ_N and γ_Θ) which determine a displacement in the model. The first two columns of statistics indicate income differences after displacement. The last two columns indicate the displacement rate for different types of workers. The last row and column indicate the values found in the PSID. The rest comes from the model to demonstrate its performance. The values for γ_N and γ_Θ are located in table 5.

Figure E.1: Time Varying Discount Factors



These lines indicate the values for the time varying discount factors (β_s) for the three types of agents in the model. These values come from Cagetti (2003).

Figure E.2: Average Permanent Income Paths



Each of the three types of worker's starting permanent income level and their growth rate, G, form these average permanent income paths. These values come from Cagetti (2003) although they have been adjusted here to 2017 real values.