

Effect of Job Loss on Wealth Accumulation of Older Workers^{*}

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Abstract

In this study, we examine the impact of job displacement on wealth holdings of older workers. Using data from the Health and Retirement Study, we measure the impact of job loss on the total wealth and its subcomponents. We find that a typical worker experiences a persistent reduction in his/her wealth balances at a rate of 8 percent six or more years post job loss. Wealth shocks of this magnitude during the years leading up to retirement may jeopardize wealth adequacy during retirement. In our assessment of wealth adequacy, we find that job displacement can push more people into “near poverty”. We use the formulation of Love et al. (2007) to compare household wealth to poverty by computing the ratio of household wealth to the actuarial present value of poverty lines. We find that 11.1 percent of the displaced survey respondents have poverty ratio between 1 and 1.5 as opposed to 7.8 percent of the not displaced survey respondents.

I. Introduction

Previous studies show that job loss among older workers has long-lasting and devastating effects along several dimensions, such as lost earnings, diminishing reemployment opportunities, declining resources to be used in retirement and deterioration of health (Couch 1998, Gallo et al. 2000, Chan and Stevens 2001, Munnell et al. 2006, Deb et al. 2010, Stevens and Moulton 2011). Older workers are prone to higher losses when they are displaced because of firm-specific capital they have built during the years before job loss.¹ This results in reduced opportunities for re-employment and higher wage loss.

Research has consistently suggested that older workers' earnings losses, upon reemployment, are higher than those of younger workers (Stevens, 1997, Couch, 1998, Munnell et al. 2006). Couch (1998) finds that the median displaced worker experienced a 48 percent reduction in his/her income the year following job displacement. Chan and Stevens (2001) report an immediate loss of 32% in earnings of displaced workers where a great portion of the reduction persisted for several years after displacement. On the other hand, the range of estimates from the studies that analyze the labor market experience of younger workers (aged 20 to 65) is 7 to 15 percent (Couch and Placzek, 2010). Even though job displacement results in long-lasting earnings losses, evidence shows that its effect on employment probabilities is not persistent. Stevens and Moulton (2012) find that employment probabilities for men and women decline by 14 and 18 percentage points two years post displacement. However, there is convergence in the employment rates of displaced and not displaced workers over the next several years.

¹An individual is displaced when his/her employment ends due to business closure or when s/he is "laid off or let go".¹

In addition to the widely studied impact of job loss on earnings, Haider and Stephens (2001) also assess the impact of job displacement on pension wealth and health insurance that are usually ignored in the studies of job displacement. They find that job displacement results in substantial losses in average compensation amounting to \$90,000 (in 1998 dollars).

Even though adverse consequences of job loss on earnings and employment have been extensively studied in the literature, research on wealth effects of job loss is limited. However, it is the level of wealth holdings that ultimately influence our decisions on consumption and retirement. Therefore, wealth holdings provide a better assessment of one's resource constraints. A previous study finds that substantial and long-lasting earnings losses translate into lower non-housing asset holdings (Chan and Stevens 2001). Another study by Stevens and Moulton (2011) report that job displacement leads to a 13 percent reduction in the wealth holdings of a typical displaced worker, and the effect is even stronger (15 to 17 percent) among the less educated workers and workers who have low wealth holdings to begin with. In this study, we utilize all ten waves of the Health and Retirement Study (from 1992 to 2010) to estimate the portion of wealth changes that is attributed to job displacement. We control for other important factors such as health, insurance and marital status of the individuals. Further investigation of the effect of job loss on wealth components such as financial and housing wealth allow us to understand how its impact changes depending on the asset's degree of liquidity. Given that we observe lower wealth balances as a result of job displacement, we wonder to what extent a late-life career disruption affects the adequacy of wealth during retirement. Our analysis makes three additions to the literature on wealth effects of job displacement. First, we provide model specifications that control for changes in health, insurance and marital status of individuals in addition to the dummy variables that investigate the effect of job displacement. Second, we provide estimates

that analyze the effect of job displacement on the asset and liability sides of the housing and financial wealth. Third, we analyze the adequacy of wealth during retirement by comparing the annuitized wealth and the poverty ratio of the displaced and the not displaced.

We find that late-life career disruption leads to substantial reductions in wealth balances. A typical worker experiences a persistent reduction in his/her wealth balances which stabilizes at a rate of 8 percent six or more years post job loss. Wealth shocks of this magnitude during the years leading up to retirement may jeopardize wealth adequacy during retirement. In our assessment of wealth adequacy, we find that job displacement can push more people into “near poverty”. We use the formulation of Love et al. (2007) to compare household wealth to the poverty line wealth by computing the ratio of household wealth to the actuarial present value of poverty line wealth. People fall into “near poverty” when the poverty ratio attains a value greater than 1 and less than or equal to 1.5. We find that 11.2 percent of the displaced survey respondents have poverty ratio between 1 and 1.5 as opposed to 7.8 percent of the not displaced participants.

II. Data and the Sample

We use data from the Health and Retirement Study (HRS). The HRS is a nationally representative longitudinal survey of older American households. It investigates the experiences of older workers as they transition from work to retirement. Besides its particular emphasis on health outcomes, the HRS provides a great source of information to analyze life cycle patterns of wealth accumulation, with extensive data on assets and savings of households and detailed information on economic well-being. The survey began with an initial cohort, born 1931 to 1941, and followed them every two years thereafter. The addition of two more cohorts; War Babies (born 1942 to 1947) and Children of the Depression (born 1924 to 1930) resulted in a

representative sample of the U.S. households aged 51 and over. A new cohort of Early Baby Boomers (born 1948 to 1953) was added in 2004. At present there are 10 waves of data (1992-2010).

Our sample consists of individuals who are employed for at least the first wave they are observed in the survey. In line with the previous research and the federal government definition of job displacement, we include people who were at risk of losing a job that was held for at least three years, excluding self-employment (Couch 1998, Haider and Stephens 2001). By starting with a sample of individuals with strong labor force attachment, we also ensure that workers who will be displaced during the analysis period are otherwise similar to workers who will not be displaced.

The survey investigates the reasons if a person reports that s/he is not working for the same employer from the previous wave. There are a variety of responses available like business closure, “laid off or let go”, poor health, family care, better job, quit, retired, family move, strike, change in pension rules and so on. We follow the previous research in our definition of job displacement, and define that an individual is displaced when his/her employment ends due to business closure or when s/he is “laid off or let go”.² This definition incorporates exogenous shifts in job loss due to cyclical factors such as getting laid off as a result of plant closing. But, it may also include those workers who are laid off for a cause and might have lower wealth holdings had they not displaced. Our statistical approach tackles with this potential problem by controlling for unobserved individual fixed effects, and hence produces reliable estimates for wealth costs of displacement.

² If a person experiences multiple job displacements during the sample period, we only include the first job displacement. This is similar to the approach of Kletzer and Fairlie (2003) where future displacement is viewed as a potential cost of the first displacement.

Given these restrictions, our sample includes 8,233 males and females who are at risk for displacement in at least one period. The breakdown of the sample is as follows: the original HRS cohort (born 1931-1941) makes up 47% of the sample, the War Babies cohort (born 1942-1947) makes up 30% of the sample, the Early Baby Boomers cohort (born 1948-1953) makes up 20% and, the remaining 3% of the sample is composed of Children of the Depression cohort (born 1924-1930) and the AHEAD cohort (born before 1924). We identify that approximately 22% of the at risk-workers experienced job loss during 1992-2010.³

We use an expansive set of wealth measures. In the first part of our analysis, we focus on stocks of wealth which includes net total wealth excluding secondary residence, net financial wealth, and net primary housing wealth.⁴ Total wealth is the sum of all wealth components such as value of primary housing, other real estate, vehicles, businesses, individual retirement accounts, and financial wealth less value of mortgages from primary residence and other home loans and outstanding debts. Financial wealth is composed of assets such as stocks, bonds, checking accounts as well as other savings accounts less outstanding debt.

In the second part of our analysis, we investigate the wealth adequacy by job displacement status. In order to assess the wealth adequacy during retirement, we need to focus on a broader measure of wealth in addition to the previously mentioned stocks of wealth. In particular, we extend our wealth measure by adding projected retirement income from Social Security and employer pensions. In this part, we focus on the wealth holdings of 2010 survey respondents who report that they are fully retired as of 2010. The reason that we focus on retirees is due to data limitations. In the HRS, approximately 50 percent of the study participants do not provide answers to the questions related to the pension and Social Security benefits. Since most

³ We exclude those workers who lost their jobs prior 1992 since we do not have data on wealth holdings before 1992.

⁴ We exclude secondary residence due to data limitation.

of the fullyretired study participants already claimed their benefits, self-reported benefits are likely to be more accurate and missing data problem is not a concern. Chan and Huff Stevens (2006) find inconsistencies in pension information when they compare respondent reports of pension holdings and pension plan types before and at retirement. In particular, they find that “Among those reporting pensions on a job that has ended, almost one quarter indicated in the previous wave that they did not have a pension on this job, while another 30% are inconsistent in their pension type reports, did not know their pension type, or refused to answer the question.” Moreover, by focusing on retirees, we do not have to make additional assumptions regarding the future streams of wage payments, and/or contributions to retirement accounts.

We believe that using a broader measure of wealth and undertaking a comparative analysis to assess the wealth adequacy of displaced and not displaced participants is still important even though that limits our analysis to a cross section of retirees. Focusing on a broader measure of wealth enables us to construct and compare ratios of comprehensive wealth to poverty line wealth of the displaced and the not displaced respondents. Given these restrictions, there are 3,181 fully retired people as of 2010 where 26 percent of them experienced job loss some time during 1992-2010.

The HRS reports total, financial and housing wealth at household level. Since marital status may change over time, we follow the method of Johnson, Mermin and Uccello (2006) to adjust household wealth for household size. In particular, we divide reported wealth of married respondents by 1.62, which is the median household equivalence scale suggested by the National Academy of Science (Citro and Michael 1995). This adjustment also takes into account economies of scale that arise due to sharing living quarters and assigns the same level of wealth

to the married respondents in a given household.⁵ All amounts are expressed in constant 2010 dollars.

II. A. Descriptive Statistics

Table 1a presents descriptive statistics for the displaced and non-displaced workers based on the first wave they enter the sample. Although both the displaced and non-displaced workers show similarities on characteristics such as race, age, gender, self-reported health status, and the total number of self-reported years worked, there are statistically significant differences in the levels of education, divorce rates and the years of tenure on the longest-held job. We observe that displaced workers are less-educated, more likely to be single and have less tenure on their longest-held job than their non-displaced counterparts. By 2010, we continue to observe similar trends as in the base period. However, displaced workers are on average older than their non-displaced counterparts (see Table 1b). This can be partly attributed to the fact that we are more likely to observe a job displacement the longer we follow a worker in the sample. This fact combined with the disproportionate representation of the not displaced workers in the cohort of Early Baby Boomers (born 1948 to 1953 and first interviewed in 2004) explains the age differentials between the not displaced and the displaced workers in 2010.⁶ In order to control for the differences in age profiles of wealth between the displaced and not displaced workers, we follow Stevens and Moulton (2011) and include age dummies for each year of age in all our analysis.

Table 2 compares the levels of wealth for displaced and non-displaced workers at various points of the wealth distribution. Initial wealth holdings of workers who will not be displaced

⁵ In order to check the robustness of our results, we run additional analyses where we ignore economies of scale. We obtain similar results from the unadjusted wealth measures.

⁶ We do not observe statistically significant age differences between the displaced and not displaced workers when they respond to the same number of interviews.

during the survey period are slightly higher than that of workers who will experience a job loss during 1992-2010. The median and mean wealth among displaced workers are \$96,484 and \$189,845, respectively. They are approximately \$24,000 and \$19,000 less than the corresponding amounts of non-displaced workers. Lower wealth balances of those workers who will be displaced during the survey period may be an indication of disproportionate concentration of less-educated workers among them. Similarly, we do not observe substantial differences in the other components of wealth prior to displacement. By the end of the survey period, we observe that the average total wealth of displaced workers grew 12 percent more slowly than the average total wealth of non-displaced workers. Average total wealth grew faster among non-displaced workers primarily due to the faster growth of financial wealth, which increased by 49 percent during the survey period. In contrast, the corresponding value for the growth of financial wealth among displaced workers increased by 27 percent.

Since housing wealth grew at a similar rate for both displaced and non-displaced workers over the period of analysis, we continue to observe similar housing wealth differentials by the end of the survey period. Wealth differentials become more pronounced for those people at or below the median of the wealth distribution. For example, median total wealth of the non-displaced workers increased by 65% (from 115,652 to 190,317), whereas it increased by 44% (from 96,484 to 138,888) for their displaced counterparts.

III. Methods

III.A Statistical Model for Wealth Effects of Job Displacement

For our statistical analysis, we use a regression model that is similar to the ones used in much of the job displacement literature (Jacobson, Lalonde and Sullivan 1993, Kletzer and Fairlie 2003, Couch and Placzek 2010, Stevens and Moulton 2011). In particular, we estimate

$$W_{it} = \alpha_i + D_{it}'\delta + X_{it}'\beta + \gamma_t + \varepsilon_{it} \quad (1)$$

where W_{it} is a particular wealth component (i.e. total wealth, financial wealth or housing wealth) for individual i in period t ; D_{it} is a vector of dummy variables indicating the years before and after the worker's job displacement; X_{it} is a vector of time-varying individual characteristics; γ_t is a vector of period fixed effects; α_i is a time invariant individual fixed-effect; and ε_{it} is a disturbance term. The disturbance term is assumed to have a constant variance, and uncorrelated across time and individuals. This regression model allows us to control for both observable individual characteristics that vary over time and observable or unobservable individual characteristics that are time invariant. In addition to measuring the impact of job displacement on wealth holdings, the coefficients of the time-since displacement dummies differentiate short and long-term impacts of job displacement. Moreover, the vector of time fixed effects control for macroeconomic factors that affect wealth holdings. This estimation technique ensures that our estimates of job displacement are unbiased.

In our preferred specification, we include four time-since displacement dummies that measure the impact of displacement up to one year after displacement (D_1), two or three years after displacement (D_2), four or five years after displacement (D_3), six or more years after displacement (D_4). In line with the previous literature that investigates the earnings losses of job displacement, we also control for dummies several years before displacement to analyze the potential wealth reductions prior to job loss. Since we do not find any significant estimated wealth losses due to job displacement prior to job separation, we report the results from specifications with time-since displacement dummies.⁷

⁷ The results from alternative specifications are available from the authors upon request.

Due to the increasing incidence of older adults experiencing negative shocks as they get older, we control for changes in health conditions and marital status of individuals over time. In addition to these, we include dummies for each year of age and survey-year. Besides providing an additional control for time-varying respondent characteristics, this allows us to better understand the impact of job loss on wealth in comparison to health shocks and marital status changes.

In our analysis, we make two transformations to circumvent the problem of highly skewed distributions of wealth measures. First, consistent with the previous research, we trim the top and bottom 1 percent of wealth measures in order to reduce the impact of outliers (Stevens and Moulton, 2011). Second, we carry out analysis for the log-transformed total wealth to approximate the distribution of wealth to normal distribution. Although we have to discard participants with zero or negative wealth holdings, it appears worthwhile to undertake the log-transformation since we lose about 5 percent of the sample (see Table 3).

III. B. Testing Adequacy of Wealth

If displaced workers experience substantial reductions in their wealth holdings as a result of involuntary job separation, then their dependence on retirement income from Social Security and employer pensions may increase during retirement. However, previous research shows that pension wealth is not immune to late-life job displacement (Haider and Stephens 2001, Johnson et al. 2006). Haider and Stephens (2001) describe the two channels that a job loss may affect pension wealth. In particular, a displaced worker may incur “capital losses” because of the lost delayed compensation, and “accumulation losses” because of the lost future pension benefits.

Since Social Security wealth and wealth from employer pensions make up an important share of overall household wealth, we adopt a broader measure of wealth that incorporates projected retirement income in addition to the previously discussed stocks of wealth. Focusing on a more comprehensive measure of wealth allows us to assess the wealth adequacy of the displaced and not displaced during retirement.

Besides the previously mentioned sources of wealth (financial and non-financial wealth), we add actuarial present value of defined-benefit pensions, Social Security benefits, and annuities to overall wealth balances. This method discounts future streams of payments and takes into account survival probabilities, cost of living adjustments and survivor's benefits. Our calculations are based on the formulas provided in Love et al. (2007). We present the details regarding the construction of actuarial present values of Social Security Benefits, and defined benefit pensions in the Appendix.

We use the two methods of wealth adequacy developed by Love et al. (2007); “*annuitized comprehensive wealth*” and the “*ratio of comprehensive wealth to poverty-line wealth*”.⁸ Annuitized wealth is an expected level of yearly consumption that a member of the household can undertake over her/his remaining lifetime assuming that s/he depletes all forms of wealth. Their method converts comprehensive household wealth into annuities so that the respondent and the spouse can have the same level of consumption over their remaining lifetimes. In particular, comprehensive wealth is linked to annuity wealth via an annuity factor (a_h) and is defined as:

⁸ Their measure of comprehensive wealth includes financial wealth, non-financial wealth, individual retirement accounts, Defined Contribution balances, actuarial present value of Social Security and defined benefit payments and projected wealth from welfare payments.

$$a_h = \frac{i}{2-d_{LE_r}-d_{LE_s}} \text{ for married respondents, } a_h = \frac{i}{1-d_{LE_r}} \text{ for single respondent} \quad (2)$$

where i is the nominal interest rate, $d=1/(1+i)$ is the discount rate LE_r and LE_s are the life expectancy of the respondent and the spouse, respectively. Life expectancies are taken from the 2007 period Life Table provided by the Social Security Administration, and following Love et al. (2007), we set the nominal interest rate at 4.5 percent. Despite its attractive feature of ranking respondents based on their wealth holdings, this method is not without limitations. First, it ignores any bequest motives and precautionary savings behavior. Second, the specification of the formula above does not make an adjustment to economies of scale. Since the level of consumption of a married respondent may differ from that of a single person given the same level of resources, we also provide an alternative analysis where we assume economies of scale equal to 1.62 as in our prior analysis.

The second measure of retirement wealth adequacy calculates the expected present value of poverty line wealth and compares it to the comprehensive wealth of the household. Poverty line wealth can be interpreted as the expected level of wealth that will provide a stream of incomes derived from the poverty lines over the household's remaining lifetime. In other words, it is the level of wealth holding that is adequate to finance household consumption at poverty level, and it is based on ages and survival probabilities of household members. Poverty thresholds which vary with household size and ages of household members are taken from the US Census Bureau (2010). The method considers four possible cases; single respondents aged 65 or older; singles younger than 65; couples with a member at least 65 or older, and couples whose members are older than 65. More specifically, we use the following formula;

$$PL_t = \sum_{t=a_r}^{119} d^{t-a_r} \left\{ \begin{array}{l} p^r(t, a^r)p^s(t + \Delta, a^s)f(t, t + \Delta, \tau + t - a^r) + \\ p^r(t, a^r)[1 - p^s(t + \Delta, a^s)]f(t, 0, t + \tau - a^r) + \\ [1 - p^r(t, a^r)]p^s(t + \Delta, a^s)f(0, t + \Delta, \tau + t - a^r) \end{array} \right\} \quad (3)$$

where function f maps the age of the respondent and the spouse to a household-specific poverty line. $p^r(t, a^r)$ is the probability of the respondent living to age t conditional on being alive at age a^r ; Δ is the age difference between the spouse and the respondent; d is the discount factor. The first term in the formula takes into account the possibility that both household members are alive. The second and the third terms correspond to the cases where only the respondent or the spouse is alive.

We calculate both measures of wealth adequacy for the displaced and not displaced study participants. This allows us to assess whether displaced participants achieve comparable living standards to that of the not displaced participants during retirement using a broader measure of wealth.

IV. Results

IV. A. Wealth Effects of Displacement

We estimate equation (1) to investigate the effect of job displacement on various wealth measures. Table 3 reports the regression results on the impact of job loss on size-adjusted total wealth holdings. We find an immediate reduction in the amount of \$17,000 in wealth holdings of displaced workers one year following job displacement. The effects of job displacement on wealth holdings become stronger and persistent over the next several years. Six or more years post job loss, total wealth holdings decline significantly by an average of \$31,955. Considering that displaced workers accumulate approximately \$295,000 total wealth on average by 2010, the loss due to job loss makes up the 11% of total wealth. The results from log-transformed total wealth regressions tell a similar story (column 2). Wealth accumulation of

displaced workers declines at a rate of 11 percent within the three years of job displacement. We do not observe much improvement thereafter, since their wealth holdings continue to decline at rate of 8 percent six or more years post job loss. Controlling for measurable time varying characteristics such as changes in marital status, self-reported health status and the insurance coverage of workers do not alter the results (columns 3 and 4).

Table 4 reports the estimates of job displacement on two components of wealth; net financial and housing wealth. There is a gradual reduction in financial wealth holdings of displaced workers. Study participants who suffer job loss have reductions of \$13,000 six or more years post job displacement (columns 1 and 2). Moreover, we observe a significant reduction in the housing wealth of displaced workers in the amount of \$8,504 and \$11,123 following two to three years and four to five years post job loss, respectively. However, the cost of job displacement becomes smaller and insignificant six or more years following job displacement. In an alternative specification (not shown here) where we explicitly follow wealth changes of non-displaced workers as well as displaced works, we find that housing wealth of non-displaced workers falls by 7 percent following seven or more years of being at risk for displacement. Therefore, an economy-wide fall in housing prices might have adversely affected both displaced and non-displaced workers. Further analysis that differentiates the asset and liability side of financial and housing wealth indicate that job displacement primarily affects the asset side of these wealth holdings rather than the liability side (see Appendix B). In particular, job loss does not increase any outstanding debt such as credit card balances, medical debts, loans from relatives or other home loans on average. The net effect of job displacement that we present in Table 4 is a result of the reductions in reported value of savings and houses of displaced workers.

Table 5 reports the impact of job displacement by subgroups based on gender and the level of education. Results indicate that displaced men suffer from higher wealth losses (14 percent) compared to women (8 percent) within five of years of job displacement. There is some evidence that the effect continues six or more years following the occurrence of job displacement especially for displaced men. There are immediate and substantial wealth reductions of displaced college graduates, reaching 15 percent two or more years following displacement. Less educated displaced workers experience comparable reductions in their wealth holdings reaching 12 percent within five years of displacement. Even though wealth effect of job displacement is persistent for less-educated workers (10 percent six or more years following displacement), we do not observe persistent reductions in the case of displaced college graduates.

IV.B Wealth Adequacy during retirement

The results from previous section indicate that the wealth effect of job displacement is substantial and long-lasting. We find that a typical displaced worker loses 8 percent of his/her stock of wealth six or more years following displacement. Wealth shocks of this magnitude during the years leading up to retirement may translate into more reliance on retirement income from Social Security and employer pensions during retirement. In this section, we explore how adequacy of wealth holdings differs by job displacement status of the study participants, and whether displaced participants achieve comparable living standards to that of not displaced participants during retirement.

Table 6 reports the mean values of actuarial present value of Social Security wealth, defined benefit plans, annuities, total household wealth and annuitized wealth. There are 3,181 respondents where 824 of them have a history of job displacement. We observe slight differences in the components of household wealth. The differential in pension wealth holdings of the

displaced and the not displaced is approximately \$27,000 and it is statistically significant at 10 percent level. On average, Social Security wealth holding of the displaced is slightly greater than that of the not displaced, and this can be attributed to the greater percentage of the displaced respondents with a non-zero Social Security wealth (95% versus 92%).

In Table 6, we also report the annuitized wealth for the displaced and the not displaced participants. We find that the yearly level of consumption of a not displaced participant is approximately \$46,400, and it is \$43,046 for a displaced respondent. The difference in average annuitized wealth becomes even more substantial and statistically significant when we adjust levels of wealth for the economies of scale. The average level of annuitized wealth of the not displaced participants is \$68,100, and it is \$60,737 for the displaced participants.

Table 7 reports the average poverty ratio of total household wealth to poverty line wealth. Descriptive evidence shows that the average poverty ratio is 4.73 across all respondents. In other words, a typical respondent's wealth is on average more than four times the wealth at poverty. Furthermore, they are 4.44 and 4.83 for the displaced and the not displaced participants, respectively. Table 7 also reports the share of respondents that fall into a specific range of poverty ratio. The percentage of the displaced and the not displaced participants that have poverty ratios smaller than or equal to 1 are similar, and they are 9.7 percent and 8.8 percent, respectively. However, we observe bigger differences in the percentage of respondents that have near poverty ratios (between 1.0 and 1.5). The percentage of the displaced respondents with poverty ratios between 1 and 1.5 (near poverty) is 11.1 whereas it is 7.8 for the not displaced respondents. The difference is statistically significant at 5 percent significance level.

V. Discussion and Conclusion

In this study, we investigate the effect of late-life job displacement on various wealth measures. Besides losing the opportunity to make significant additions to their wealth balances in the years leading to retirement, displaced workers also experience substantial reductions in their wealth holdings. A typical displaced worker experiences 11 percent reduction in her/his wealth holdings within five years of job displacement, and a great portion of the reduction (8 percent) continues six or more years post job loss.

Our analyses on financial and housing wealth indicate that job displacement affects both liquid and less liquid assets. The effect of job loss on net financial wealth holdings increases gradually and becomes significant six or more years post job loss. This evidence combined with the significant reductions in the net housing wealth two or three years post job loss may indicate that displaced workers have inadequate liquid assets to begin with and they are credit constrained in the short-term. This argument is sustained by a further investigation of the effect of job loss on the asset and liability sides of financial and housing wealth separately. We find that the effect of job loss on net wealth holdings presented here is a reflection of changes in the asset side of financial and housing wealth holdings rather than the liability side that includes loans, mortgage debt, credit card balances and so on.

Even though job displacement leads to significant reductions in the wealth holdings of different subgroups based on gender and the level of education, the persistence and the magnitude of effects differ across subgroups. In particular, displaced men experience higher losses that persist six or more years following displacement. Displaced women also experience comparable reductions in their wealth holdings, however, we have weak evidence on its persistence. These findings may be an indication of men continuing to be the primary earners in

the household. Restricting our focus to single females increases the magnitude of wealth loss due to job displacement, but does not change its persistence. Moreover, both less-educated workers and college graduates experience substantial wealth losses following job loss. Even though the effect of job displacement for college graduates diminishes six or more years post job loss, less educated workers suffer from persistent reductions in their wealth holdings.

We also compute the comprehensive wealth holdings of survey respondents. However, our calculations of comprehensive wealth are based on a subgroup of participants from the original sample. We focus only on 2010 survey participants who have reported that they are retired as of 2010. There are two reasons for focusing on a subgroup of participants. . The first reason is that retired people are better informed about their pension holdings compared to the non-retirees. The second reason is that focusing on non-retirees in addition to the retirees would require assumptions about the future streams of wage payments, and/or contributions to retirement accounts both for the displaced and not displaced participants. When we focus on a broader measure of wealth to assess its adequacy, we observe that job displacement is associated with lower levels of pension wealth, and household-size adjusted annuitized wealth. Although the percentage of participants that fall into poverty are similar across the displaced and the not displaced participants, a greater percentage of the displaced respondents (11.1 percent versus 7.8 percent) have wealth balances that are near poverty. Hence, late-life job displacement can push more people into near poverty during retirement. The push into near poverty can be devastating if these people do not have access to safety net provisions. In conclusion, involuntary job displacement at older ages leads to substantial reductions both in liquid and illiquid stocks of wealth. Even though our cross-section analysis of comprehensive wealth do not indicate significant differentials in comprehensive wealth holdings of the displaced and the not displaced,

a comparative analysis with the actuarial present value of poverty line wealth indicate that displaced people may face financial insecurity during retirement. An important extension of this study is an addition of more years of data where comprehensive wealth measures can be used to analyze the effects of job displacement by conducting panel data analysis.

Appendix A

Following Love et al. (2007), we compute actuarial present value of defined benefit pensions, using the following formula:

$$PV_{DB} = DB \sum_{t=a_r}^{119} d^{t-a_r} \{p^r(t, a^r) + \theta[p^r(t, a^r)]p^s(t + \Delta, a^s)\} \quad (A1)$$

where PV_{DB} is the actuarial present value of defined-benefit payments (DB); DB is the amount of self-reported current or expected annual pension wealth; d is the discount factor; $p^r(t, a^r)$ is the probability of the respondent living to age t conditional on being alive at age a^r ; Δ is the age difference between the spouse and the respondent; θ is the fraction of pension that will be received by the spouse if the respondent dies. We take the mortality rates from the Social Security Administration's 2007 Period Life Table.

For plans with the cost of living adjustments (COLA), the discount factor is based on the real interest rate. As in Love et al. (2007), we assume that the inflation rate is 2 percent and real interest rate is 2.5 percent. Since some individuals have multiple pensions, we sum the present value of each plan to obtain the wealth from defined benefit plans. We use the same formula to calculate wealth from annuities and make adjustments for COLAs and take into account survivor benefits where applicable.

Similarly, social security wealth of the household is calculated using the following formula:

$$PV_{SS} = \sum_{t=a_r}^{119} d^{t-a_r} \{P_1(SS_t^r + SS_{t+\Delta}^s) + P_2 \max(SS_t^r, SS_{t+\Delta}^s)\} \quad (A2)$$

where SS_t^r is the current or expected annual social security benefit of the respondent at age t and $SS_{t+\Delta}^s$ is the amount for the spouse at age $t + \Delta$. Social security benefits are adjusted for inflation. ; P_1 is the conditional probability of both respondent and spouse being alive; and P_2 is the conditional probability of one household member's being alive.

$$P_1 = p^r(t, a^r)p^s(t + \Delta, a^s) \text{ and } P_2 = p^r(t, a^r) + p^s(t + \Delta, a^s) - 2p^r(t, a^r)p^s(t + \Delta, a^s) \quad (A3)$$

According to A(2), household wealth from Social Security is a combination of two terms. The first one is that when both members of the household are alive, then the total benefits are the sum of respondent's and spouse's individual amounts. The second term incorporates the rule of Social Security regarding the widow/widower benefits where a retirement-age widow/widower collects the maximum of own benefits and 100% of deceased spouse's benefits.

Appendix B

Table B1: Effect of Job Displacement on the Asset Component of Financial and Housing Wealth

	Financial Wealth (1)	Housing Wealth (2)
Regressors		
D1	-1,138 (4,187)	-4,414 (2,975)
D2	-7,565* (4,583)	-10,540*** (2,896)
D3	-6,596 (7,747)	-12,820*** (3,225)
D4	-12,949** (6,151)	-8,408** (3,927)
Excellent-Good Health	6,781*** (2,110)	2,742 (2,070)
Married	-26,530*** (9,231)	-24,052*** (4,137)
Insured	16,110*** (3,850)	7,744*** (2,343)
N	51,255	51,255

Note: ***p<0.01, **p<0.05, *p<0.10. All wealth measures are adjusted for economies of scale. Top and bottom 1 percent of size-adjusted wealth is trimmed. All specifications include dummies for period fixed effects and dummies for each year of age. Individuals are aged 46 to 85. Cluster-robust standard errors are presented in parenthesis.

Table B2: Effect of Job Displacement on the Liability Component of Financial and Housing Wealth

	Financial Wealth (1)	Housing Wealth ¹ (2)	Housing Wealth ² (3)
Regressors			
D1	474* (305)	-310 (326)	-1,770 (1,799)
D2	-99 (319)	-197 (335)	-3,447** (1,730)
D3	46 (369)	355 (485)	-2,654 (1,878)
D4	112 (340)	181 (470)	-3,336* (1,953)
Excellent-Good Health	-493 (228)	84 (224)	-257 (739)
Married	-1,201* (649)	-49 (409)	-4,807*** (1,705)
Insured	-255 (224)	-186 (242)	457 (1,127)
N	51,255	51,255	51,255

Note:¹Liability component of the housing wealth. ²Mortgage component of the housing wealth. ***p<0.01, **p<0.05, *p<0.10. All wealth measures are adjusted for economies of scale. Top and bottom 1 percent of size-adjusted wealth is trimmed. All specifications include dummies for period fixed effects and dummies for each year of age. Individuals are aged 46 to 85. Cluster-robust standard errors are presented in parenthesis.

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Table 1a: Sample Characteristics by Displacement Status, first wave

	At-risk and will not be displaced (N=6,423)	At-risk and will be displaced (N= 1,810)
	Mean	Mean
Age	53.6 (0.113)	53.7 (0.283)
White	0.81 (0.010)	0.81 (0.014)
Male	0.50 (0.006)	0.48 (0.013)
College	0.56 (0.011)	0.49 (0.014)
HS graduate	0.31 (0.008)	0.35 (0.013)
Less than HS grad	0.13 (0.007)	0.17 (0.011)
Divorced	0.14 (0.005)	0.16 (0.011)
Widowed	0.04 (0.002)	0.05 (0.005)
Excellent-Good Health	0.86 (0.005)	0.85 (0.009)
Total years Worked	31.0 (0.131)	30.8 (0.272)
Tenure on the longest Job	17.3 (0.158)	15.3 (0.234)

Source: Authors tabulations from the HRS.

Notes: All means are weighted. Standard errors are in parenthesis.

Table 1b: Sample Characteristics by Displacement Status, 2010

	At risk and will not be displaced (N=4,393)	At risk and will be displaced (N=1,416)
Age	64.5 (0.133)	65.7 (0.205)
Divorced	0.10 (0.005)	0.13 (0.008)
Widowed	0.07 (0.003)	0.09 (0.006)
Excellent-Good Health	0.60 (0.006)	0.65 (0.010)
Total years Worked	38.6 (0.179)	38.6 (0.286)
Tenure on the longest Job	22.1 (0.211)	18.2 (0.299)

Source: Authors tabulations from the HRS.

Notes: All means are weighted. Standard errors are in parenthesis.

Table 2: Wealth Measures by Displacement Status, 2010 \$

	First Wave				2010			
	Non-Displaced (N=6,423)				Non-Displaced (N=4,393)			
	Mean	Median	25th	75th	Mean	Median	25th	75th
Total Wealth	213,832	115,652	45,409	246,913	357,317	190,317	60,317	436,507
Fin Wealth	58,344	8,656	83	45,977	87,058	12,000	62	65,000
Housing Wealth	79,015	55,342	19,594	106,428	101,666	68,418	20,000	138,889
	Displaced (N=1,810)				Displaced (N=1,416)			
Total Wealth	189,845	96,484	33,082	227,769	294,308	138,888	34,126	385,714
Fin Wealth	47,972	6,385	0	39,090	61,083	5,246	0	46,296
Housing Wealth	73,050	47,260	14,899	100,100	95,584	60,493	3,000	123,457

Source: Authors tabulations from the HRS.

Notes: All means are weighted.

Table 3: Effect of Job Displacement on Total Wealth

	Total Wealth (1)	Log Total Wealth (2)	Total Wealth (3)	Log Total Wealth (4)
Regressors				
D1	-17,000** (7,307)	-0.017 (0.032)	-17,317** (7,206)	-0.017 (0.032)
D2	-32,463*** (8,246)	-0.112*** (0.039)	-32,264 *** (8,621)	-0.112*** (0.040)
D3	-30,173*** (10,954)	-0.105*** (0.040)	-29,867 *** (10,982)	-0.104** (0.040)
D4	-31,955*** (11,318)	-0.081** (0.038)	-32,069*** (11,436)	-0.082** (0.039)
Excellent-Good Health	-	-	17,228*** (4,809)	0.110*** (0.022)
Married	-	-	18,587 (13,276)	-0.009 (0.040)
Insured	-	-	4,714 (7,137)	0.034** (0.016)
N	51,957	49,294	51,957	48,642

Note: ***p<0.01, **p<0.05, *p<0.10. All wealth measures are adjusted for economies of scale. Top and bottom 1 percent of size-adjusted wealth is trimmed. All specifications include dummies for period fixed effects and dummies for each year of age. Individuals are aged 46 to 85. Cluster-robust standard errors are presented in parenthesis.

Table 4: Effect of Job Displacement on Financial and Housing Wealth

	Financial Wealth (1)	Financial Wealth (2)	Housing Wealth (3)	Housing Wealth (4)
Regressors				
D1	-797 (4,127)	-1,613 (4,203)	-3,189 (2,883)	-2,709 (2,919)
D2	-6,729 (4,305)	-7,465 (4,616)	-8,920*** (2,797)	-8,054*** (2,834)
D3	-7,265 (7,728)	-6,643 (7,763)	-12,030*** (3,180)	-11,123*** (3,207)
D4	-13,036** (5,893)	-13,171** (6,157)	-6,803* (4,023)	-5,992 (4,086)
Excellent-Good Health	-	6,732*** (2,218)	-	2,888 (2,130)
Married	-	-24,255*** (9,945)	-	-18,760*** (3,628)
Insured	-	-2,930 (5,140)	-	5,926*** (1,805)
N	51,957	51,255	51,957	51,255

Note: ***p<0.01, **p<0.05, *p<0.10. All wealth measures are adjusted for economies of scale. Top and bottom 1 percent of size-adjusted wealth is trimmed. All specifications include dummies for period fixed effects and dummies for each year of age. Individuals are aged 46 to 85. Cluster-robust standard errors are presented in parenthesis.

Table 5: Effect of Job Displacement by Gender and Education Level

	Log Total Wealth Males (1)	Log Total Wealth Females (2)	Log Total Wealth HS grad and less (3)	Log Total Wealth College Grad (4)
Regressors				
D1	0.050 (0.039)	-0.085* (0.051)	0.036 (0.047)	-0.087** (0.044)
D2	-0.128** (0.056)	-0.099* (0.055)	-0.072 (0.051)	-0.151** (0.060)
D3	-0.142** (0.057)	-0.083 (0.057)	-0.123** (0.060)	-0.086*** (0.053)
D4	-0.100* (0.056)	-0.068 (0.053)	-0.101** (0.050)	-0.049 (0.054)
N	22,136	27,132	26,173	23,064

Notes: ***p<0.01, **p<0.05, *p<0.10. All wealth measures are adjusted for economies of scale. Top and bottom 1 percent of size-adjusted wealth is trimmed. All specifications include dummies for period fixed effects and dummies for each year of age. Individuals are aged 46 to 85. Cluster robust standard errors are presented in parenthesis.

Table 6: Components of Household Wealth in 2010 (2010\$)

Respondents Aged 56 and Older				
Mean Value of Various Wealth Components				
	Not Displaced		Displaced	
PV of Household DB plans and Annuities	164,874 (9,281)		138,168* (13,926)	
PV of Household Social Security Benefits	231,037 (6,637)		233,119 (7,891)	
Total Household Wealth	838,875 (28,918)		776,861 (44,019)	
Annuitized Wealth ¹	46,396 (1,247)		43,046 (2,006)	
Annuitized Wealth ²	68,100 (1,999)		60,737** (2,851)	
N	2,357		824	

Only non-zero Wealth Components				
	Mean Value of Various Wealth Components		Percent with Non-zero Asset	
	Not Displaced		Displaced	
PV of DB plans and Annuities	345,954 (16,262)	289,864* (27,366)	46.5	49.2
PV of Social Security Benefits	250,173 (6,756)	244,470 (7,762)	92	95**
Total Household Wealth	840,524 (25,647)	777,579 (46,186)	99	99

Notes: Authors' calculations from the RAND HRS File and 2010 RAND-Enhanced Fat Files. All means and proportions are weighted. ¹ Annuitized household wealth is not adjusted for economies of scale. ² Annuitized household wealth is adjusted for economies of scale using the scale factor 1.62. We also performed t-tests for the differences in average value of wealth component of the displaced from that of the not displaced, and report significant differences. ***p<0.01, **p<0.05, *p<0.10.

Table 7: Share of Respondents with Various Poverty Ratios

	Not Displaced	Displaced	All
	8.8	9.7	9.0
Poverty Ratio <=1	(0.007)	(0.013)	(0.007)
	7.8	11.1**	8.6
Poverty Ratio Btw 1.0-1.5	(0.007)	(0.015)	(0.006)
	16.6	20.8**	17.6
Poverty Ratio <=1.5	(0.010)	(0.018)	(0.008)
	24.3	25.2	24.5
Poverty Ratio Btw 1.5-3.0	(0.011)	(0.029)	(0.010)
	59.0	53.9**	57.7
Poverty Ratio >=3	(0.013)	(0.022)	(0.012)
	4.83	4.44*	4.73
Average Poverty Ratio	(0.133)	(0.210)	(0.115)

Notes: We do not adjust wealth measures for economies of scale when calculating poverty ratios. The table shows the share of individuals with poverty ratios in specified ranges. Cluster-robust standard errors are in parenthesis. ***p<0.01, **p<0.05, *p<0.10 indicates the statistical significance of the differences.