

Wage Insurance and Labor Market Trajectories

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The consequences of job displacement are often severe, with many workers experiencing large earnings declines, protracted periods of unemployment, and other negative outcomes.¹ Since at least the late 1980s, researchers have proposed wage insurance systems to counteract these effects. In such systems, workers whose reemployment wages are lower than their pre-displacement wages receive a temporary subsidy covering a portion of the wage decline.² Proponents argue that wage insurance compensates workers facing wage reductions after job displacement, incentivizes job search, shortens unemployment durations, and supports workers for whom job training may be less effective.³

Since 2002, the U.S. Trade Adjustment Assistance (TAA) program has included a wage insurance program available to workers age 50 and over who were laid off in a trade-related displacement. This national program is the largest and longest-running wage insurance program in the world.⁴ Hyman, Kovak and Leive (2020) study the program using an age-eligibility regression discontinuity design with nationally representative data from the U.S. Census Bureau’s Longitudinal Employer Household Dy-

namics (LEHD) dataset.

Here, we complement that work using administrative worker-level data from Virginia, providing details on program participation and benefit amounts received, linked to long-run earnings histories covering 2005-2018. While all TAA-certified workers had access to training and extended unemployment insurance payments, only those over age 50 had the additional option of receiving wage insurance. We therefore compare employment and earnings trajectories for workers exceeding this threshold against those for slightly younger workers. Because wage insurance increases workers’ effective wages, we expect shorter unemployment durations and lower earnings for eligible workers.⁵

We find that wage-insurance eligible workers are indeed more likely to be employed in the years just after displacement. Their quarterly earnings as a share of pre-displacement average earnings are also modestly higher during this period, but this difference is entirely accounted for by the higher probability of employment. In the longer run, the gap in employment probability closes, and wage insurance eligible workers’ normalized earnings equal or fall slightly below those of ineligible workers.

I. RTAA Wage Insurance Program

The TAA Program provides benefits to workers who experience job loss or reduced hours or wages “as a result of increased imports or shifts in production out of the United States.”⁶ The program’s primary benefits cover job training costs for up to three years and extended unemployment insurance (UI) payments during training.⁷ Worker eligibility for TAA is contingent upon the Department of Labor certifying that the displacement event was trade related.

In 2002, the TAA program introduced a pilot wage insurance program for older workers.

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¹Among many others, Jacobson, LaLonde and Sullivan (1993), Kletzer (1998), and Couch and Placzek (2010) study effects on earnings and unemployment, and Sullivan and Von Wachter (2009) analyze effects on mortality.

²See Lawrence and Litan (1986) on “earnings insurance.”

³Kletzer and Litan (2001), Kletzer (2004), among others.

⁴Bloom et al. (1999) evaluate a two-year wage insurance experiment run in 5 Canadian cities. A landmark Mathematica TAA evaluation provided suggestive evidence regarding wage insurance using a small sample (Schochet et al., 2012).

⁵These predictions follow from a standard partial-equilibrium McCall (1970) search model.

⁶Department of Labor, Employment and Training Administration. https://www.doleta.gov/tradeact/taa_wdp.cfm

⁷See Hyman (2018) for details on TAA.

We study the permanent version of the program, Reemployment Trade Adjustment Assistance (RTAA), which started in 2009.⁸ RTAA-eligible workers who are reemployed at a wage below their pre-displacement wage may apply for a subsidy covering up to 50 percent of the gap between their pre- and post-displacement wages for up to two years. In order to be eligible for this wage insurance payment, the worker must be age 50 or over, a member of a TAA-certified group of displaced workers, reemployed full time or at least 20 hours per week if combined with TAA-approved training, and must not exceed income and benefit limits.⁹

II. Data and Empirical Approach

Given this eligibility structure, our analysis compares earnings and employment trajectories for workers who were more or less likely to be eligible for wage insurance, based on the worker's age at displacement. Specifically, workers who were age 50-54 at displacement were eligible for wage insurance immediately upon separation, while younger workers, age 45-49, were not.

To implement this comparison, we must identify TAA-certified displacement episodes and observe associated workers' age, employment status, and earnings over time. We do so using administrative data from the Virginia Employment Commission. The database contains worker-level information on all TAA-eligible individuals in Virginia who received services under a Department of Labor (DOL) program, including those receiving training and income support under the standard TAA program and those receiving wage insurance under RTAA. These records were then merged with quarterly UI-covered earnings from 2005 to 2018. We therefore observe the evolution of workers' earnings and employment status at the quarterly level for several years both preceding and fol-

lowing a TAA-eligible displacement.

The main limitation of these data is that they omit workers who were eligible for TAA but did not receive services from TAA or other DOL programs.¹⁰ These omitted workers likely include those who quickly found favorable reemployment and thus did not pursue TAA training or RTAA wage insurance payments. If these missing workers had systematic differences in outcomes from observed workers, and the probability of being omitted differed by age, then comparisons between the two age groups would be confounded. However, it appears that this concern is unlikely to be quantitatively important in this context. The distribution of age at separation is continuous at age 50 (Appendix Figure A1), and workers' observable features, including pre-displacement earnings, are balanced between the two age groups (Table 1). Thus, we do not expect this issue to substantially affect our empirical findings.

Our sample covers TAA-certified workers whose petitions were filed on or after May 18, 2009 and who were displaced by the end of 2017. These restrictions ensure that workers were eligible for RTAA, while also allowing us to observe earnings and employment for at least one year following separation. We include workers age 45 to 54 at the date of separation and restrict attention to those with high labor force attachment, defined as earning at least \$3,000 in each quarter from 8 to 5 quarters prior to separation. We impose this condition two years before separation to avoid endogenous sample selection from any anticipatory changes in earnings in the year before displacement.

Our two main outcomes are quarterly earnings and employment.¹¹ A worker is categorized as employed if they have nonzero earnings in a given quarter. To mitigate the effects of unobserved worker heterogeneity on our earnings measure, we calculate the earnings replacement rate as earnings in a given quarter divided by average quarterly earnings 8 to 5 quarters prior

⁸The pilot program, Alternative TAA, had restrictive eligibility rules and low takeup. RTAA relaxed these requirements, and takeup increased substantially.

⁹In 2009-2010, eligible workers had to be age 50 or over upon reemployment. From 2011 onward, workers could obtain reemployment earlier, but only receive benefits after turning 50. Estimated annual reemployment earnings could not exceed \$55,000 in 2009-2010 and \$50,000 thereafter. The 2-year benefit eligibility window begins at the earlier of reemployment or the exhaustion of UI payments, and the maximum benefit was \$12,000 in 2009-2010, and \$10,000 thereafter.

¹⁰15 percent of our sample neither received training nor income support payments from traditional TAA or wage insurance. Instead, they received benefits from other DOL programs such as WIA/WIOA services. See Appendix Figure A2 for program takeup by age group.

¹¹We deflate earnings to 2018Q1, and to reduce noise, drop observations in the top 1 percent of earnings within each separation quarter. Earnings do not include RTAA payments.

TABLE 1—DESCRIPTIVE STATISTICS AND PRE-DISPLACEMENT BALANCE

	Separation Age: 45-49			Separation Age: 50-54			(50-54) - (45-49)	
	Mean (1)	SD (2)	# Workers (3)	Mean (4)	SD (5)	# Workers (6)	Δ (7)	SE (8)
Age at Separation	47.5	[1.44]	1,027	52.0	[1.15]	1,003	4.44	(0.058)
Wage Insurance Takeup	0.049	[0.22]	1,027	0.30	[0.46]	1,003	0.25	(0.016)
Employer Tenure (Years)	13.3	[8.45]	836	18.7	[10.9]	841	5.46	(0.48)
Year of Separation	2010.6	[1.97]	1,027	2010.8	[1.95]	1,003	0.19	(0.087)
Earnings, Quarters -8 to -5	12,645	[6,971]	1,027	12,542	[6,619]	1,003	-103	(301)
Less than High School	0.093	[0.29]	839	0.099	[0.30]	840	0.0058	(0.014)
High School	0.59	[0.49]	839	0.60	[0.49]	840	0.0088	(0.024)
Some Postsecondary	0.24	[0.43]	839	0.24	[0.43]	840	0.0045	(0.021)
College or Higher	0.081	[0.27]	839	0.062	[0.24]	840	-0.019	(0.013)
Female	0.38	[0.49]	839	0.36	[0.48]	841	-0.020	(0.024)
Black	0.28	[0.45]	810	0.28	[0.45]	822	0.0045	(0.022)
White	0.66	[0.47]	810	0.67	[0.47]	822	0.011	(0.023)

Notes: Sample is restricted to high labor force attachment as defined in the text. Columns (7-8) presents results from a two-sided t-test with heteroskedastic-robust standard errors. Observation counts vary due to incomplete demographic data (treated as missing in regressions with controls).

to separation.¹²

Table 1 presents summary statistics and balance tests for our sample of 2,030 displaced workers meeting the criteria described above. By design, the average ages differ across the two age-at-displacement groups, and the older workers are 25 percentage points more likely to receive wage insurance payments. Average displacement timing and average earnings are very similar across the two groups. The older workers have about 5 more years of average tenure with their pre-displacement employer, consistent with the age difference between the groups. Overall, nearly 70 percent of the workers had a high school degree or less, and average pre-displacement tenure was more than 16 years. Both of these characteristics are associated with large and enduring losses from displacement.¹³

III. Employment and Earnings Trajectories

Panels (a) and (b) of Figure 1 plot employment shares and earnings replacement rates by quarter relative to separation for younger and older displaced workers. The pre-separation profiles for both outcomes are roughly constant and are similar across the two age groups. By restricting to highly-attached workers, we constrain the employment profiles to equal one in quarters -8 to -5 relative to separation.

Reassuringly, the outcomes in the preceding and following years remain roughly constant even though they are not constrained by the highly-attached definition. These similarities in pre-displacement outcomes across the two age groups reinforce the balance in Table 1.

Following displacement, workers in our sample exhibit large declines in employment shares and earnings replacement rates. The employment share falls by roughly 60 percent before recovering, while earnings fall by nearly 80 percent from baseline. Note that the mean earnings replacement rate includes zeros for non-employed individuals, so the earnings decline in Panel (b) captures both the decline in the probability of employment in Panel (a) and the decline in earnings conditional on employment (shown in Appendix Figure A3, Panel (b)).

Panel (a) shows that during the three years following displacement, workers over age 50 are more likely to be employed than younger workers. This difference is consistent with the differences in program participation between the two groups (Appendix Figure A2): many older workers quickly find reemployment to take advantage of the RTAA wage insurance subsidies, while most younger workers without access to wage insurance pursue TAA training.¹⁴ For

¹²Earnings levels are also similar (Appendix Figure A3).

¹³See Kletzer (1998) and White (2010).

¹⁴Eligibility for disability insurance becomes more lenient at age 50 (Chen and van der Klaauw, 2008), which would work in the opposite direction.

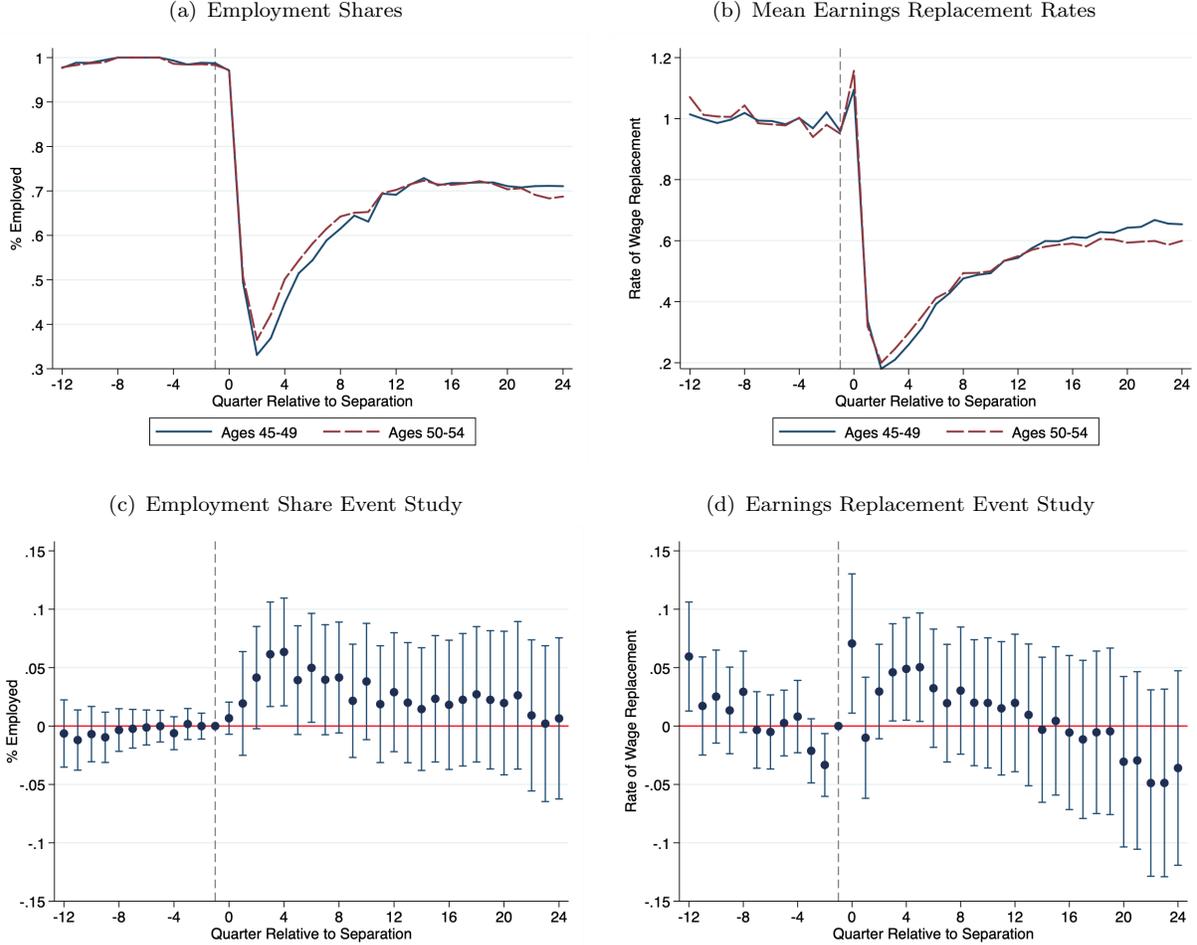


FIGURE 1. EMPLOYMENT AND EARNINGS TRAJECTORIES

Notes: Panels (a) and (b) plot raw means for employment and earnings replacement rates. Panels (c) and (d) plot β_τ estimates from Equation 1. Sample is restricted to high labor force attachment in second year prior to displacement (see text for details).

nearly all workers, the period of wage insurance or training eligibility ends within three years following separation. From that point on, the two groups' employment shares are equal or are slightly lower for older workers.

Panel (c) presents an event study estimating

$$(1) Y_{it} = \alpha D_i + \sum_{\tau \neq -1} [\delta_\tau * \mathbb{1}\{t - s_i = \tau\} + \beta_\tau * \mathbb{1}\{t - s_i = \tau\} * D_i] + \mathbf{X}'_{it} \gamma + \varepsilon_{it}$$

where Y_{it} is an outcome for worker i in quarter t ; s_i is worker i 's separation quarter; D_i is an indicator for being at least age 50 at displacement; \mathbf{X}_{it} is a vector of controls consisting of quarter of separation fixed effects, race, gender, education, pre-displacement tenure, and a

quadratic in calendar age; and ε_{it} is an error term.¹⁵ Older workers are more likely to be employed during the three-year period of potential benefit eligibility and exhibit smaller differences thereafter. Wage insurance eligibility thus appears to encourage reemployment and shorten unemployment durations relative to eligibility for standard TAA, while both programs yield similar long-term employment trajectories.

In Panels (b) and (d), older workers' earnings replacement rates are a bit higher than those of younger workers shortly after displacement, but this pattern is driven almost entirely by the differences in employment shares.¹⁶ After the

¹⁵Standard errors are clustered by individual.

¹⁶The short-run differences disappear when restricting to

three-year period of potential benefit eligibility, older workers' earnings replacement rates consistently fall below those of younger workers.¹⁷

IV. Discussion

Although we find similar long-run outcomes for workers who were and were not eligible for wage insurance, this does not imply that wage insurance had no impact. All workers in our sample were eligible for TAA training, and the vast majority of workers under 50 took up these services (Appendix Figure A2). Finding similar employment and earnings trajectories for the two age-at-separation groups suggests that wage insurance and TAA training may yield similar effects, even though TAA training substantially increases participants' long-run earnings (Hyman, 2018). While wage insurance does not appear to provide a bridge to higher wage jobs as some proponents advocate, it may facilitate income smoothing benefits which training programs cannot.

Future research should confirm whether standard TAA and wage insurance indeed have similar effects on workers' outcomes. If so, which of the two programs achieves these favorable outcomes at a lower social cost? Although additional evidence is needed before deciding to apply wage insurance more broadly, our findings suggest that wage insurance should be considered alongside other proposals seeking to reduce inequality through increased earnings and employment.

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- employed workers (Appendix Figure A3). The small earnings spike in the displacement quarter reflects lump-sum severance payouts and is commonly observed in prior work (see Couch and Placzek (2010)).
- ¹⁷Appendix Tables A1 and A2 present difference-in-difference regressions summarizing these event study results.
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APPENDIX: SUPPLEMENTAL ANALYSIS [FOR ONLINE PUBLICATION]

This Appendix provides additional description of results summarized in the main text of Hyman, Kovak, Leive, and Naff (2020) “Wage Insurance and Labor Market Trajectories.”

Age Distribution of TAA Participants: Figure A1 plots a histogram of workers in our data by age at separation from their TAA-certified employer. The majority of displaced workers that we observe are between ages 40 and 60 at separation. There is no visual evidence that the distribution changes at age 50, when workers are immediately eligible for wage insurance. The smooth distribution across the eligibility for wage insurance reduces concerns that our sample systematically omits workers below age 50 who are re-employed quickly but not eligible for wage insurance.

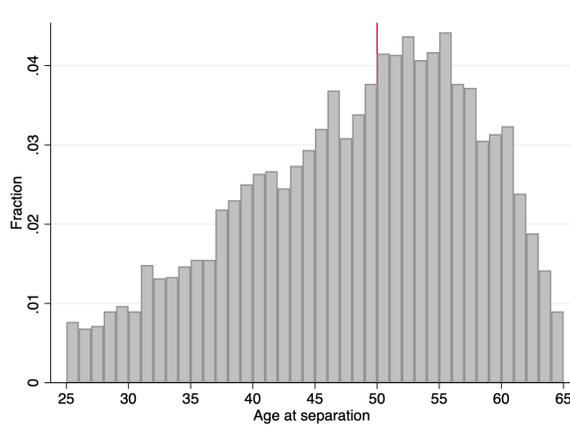


FIGURE A1. DISTRIBUTION OF AGE AT SEPARATION

Notes: Figure plots histogram of age at separation with 1-year bin width. Age calculated from month-year date of birth.

Program Takeup Over Time: Figure A2 shows the timing of takeup of TAA and wage insurance among our analysis sample. TAA excludes wage insurance, so the two groups are mutually exclusive. We stratify the graphs by age to illustrate the higher rate of wage insurance takeup among those over age 50 (Panel (b)) compared to under age 50 at separation (Panel (a)). Nearly all workers who receive TAA benefits other than wage insurance do so within 4 quarters of separation. Approximately 80 percent of workers aged 45-49 at separation eventually take up training, extended UI, or other TAA benefits. Around 5 percent of this younger group receives wage insurance benefits, and the large majority who do so were aged 49 at displacement and became eligible for wage insurance within one year. Among workers over age 50 at separation, about 30 percent receive wage insurance within two years. The share of those over 50 who instead take up other benefits is about 60 percent. Since we do not observe a full 24 quarters post separation for all workers in our sample, the composition of those taking wage insurance versus TAA changes slightly at the end of our analysis period.

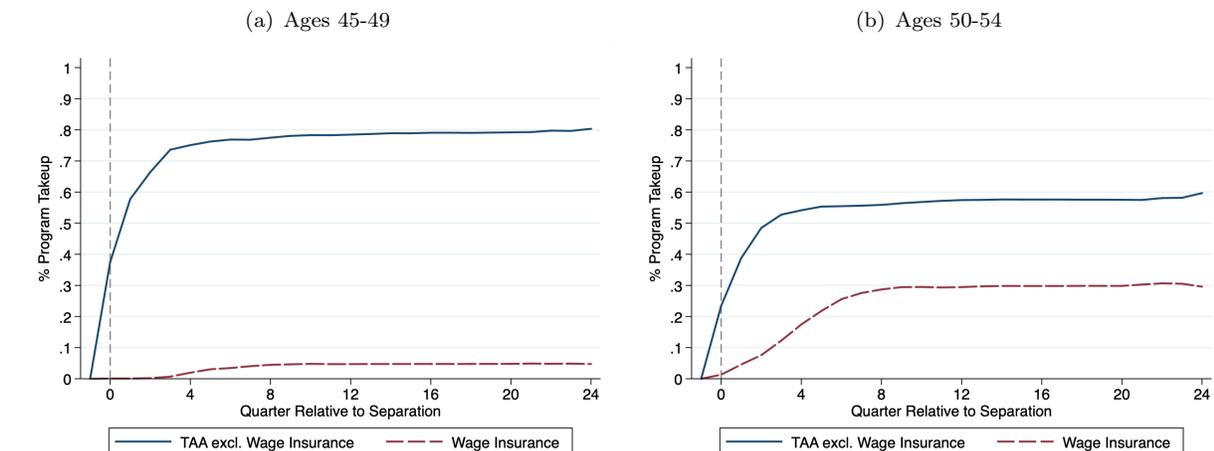


FIGURE A2. CUMULATIVE PROGRAM TAKEUP BY AGE AT SEPARATION

Notes: Panel (a) plots takeup of wage insurance (dashed line) and any TAA benefit excluding wage insurance (solid line) for ages 45 to 49. Panel (b) plots takeup of wage insurance (dashed line) and any TAA benefit excluding wage insurance (solid line) for ages 50 to 54. Sample is restricted to high labor force attachment in the second year before displacement, defined as 4 quarters with UI-covered earnings each exceeding \$3,000. Takeup is measured along each worker's first unemployment spell.

Additional Event Studies: We supplement our analysis of employment and replacement rates by analyzing mean earnings levels and earnings replacement rates conditional on employment. Figure A3 replicates Figure 1 from the main text. Panels (a) and (c) show mean earnings, including any zeros from periods of unemployment. Panels (b) and (d) show mean earnings replacement rates conditional on employment. Panels (c) and (d) show the estimates from the event-study specification presented in equation (1) in the main text, that include controls for calendar quarter of separation fixed effects, race, gender, education, pre-displacement tenure, and a quadratic in calendar age.

Mean earnings paths by age are nearly identical prior to separation. After separation, they continue to evolve on the same trajectory until roughly 12 quarters post-separation. Beyond that, the mean earnings of workers who are younger than 50 at separation begin to diverge. The differences are not statistically significant, though, as shown in Panel (c). We choose not to focus our interpretation on differences observed at six years after separation since the older group begins approaching retirement age at that time.

Conditional on employment, mean earnings replacement rates are also quite similar across ages in the three years prior to separation, and in the first 3 years afterwards. Replacement rates then grow more slowly for workers who are older than 50 at separation, relative to younger workers. Mean earnings do not recover their pre-displacement levels after six years for either group.

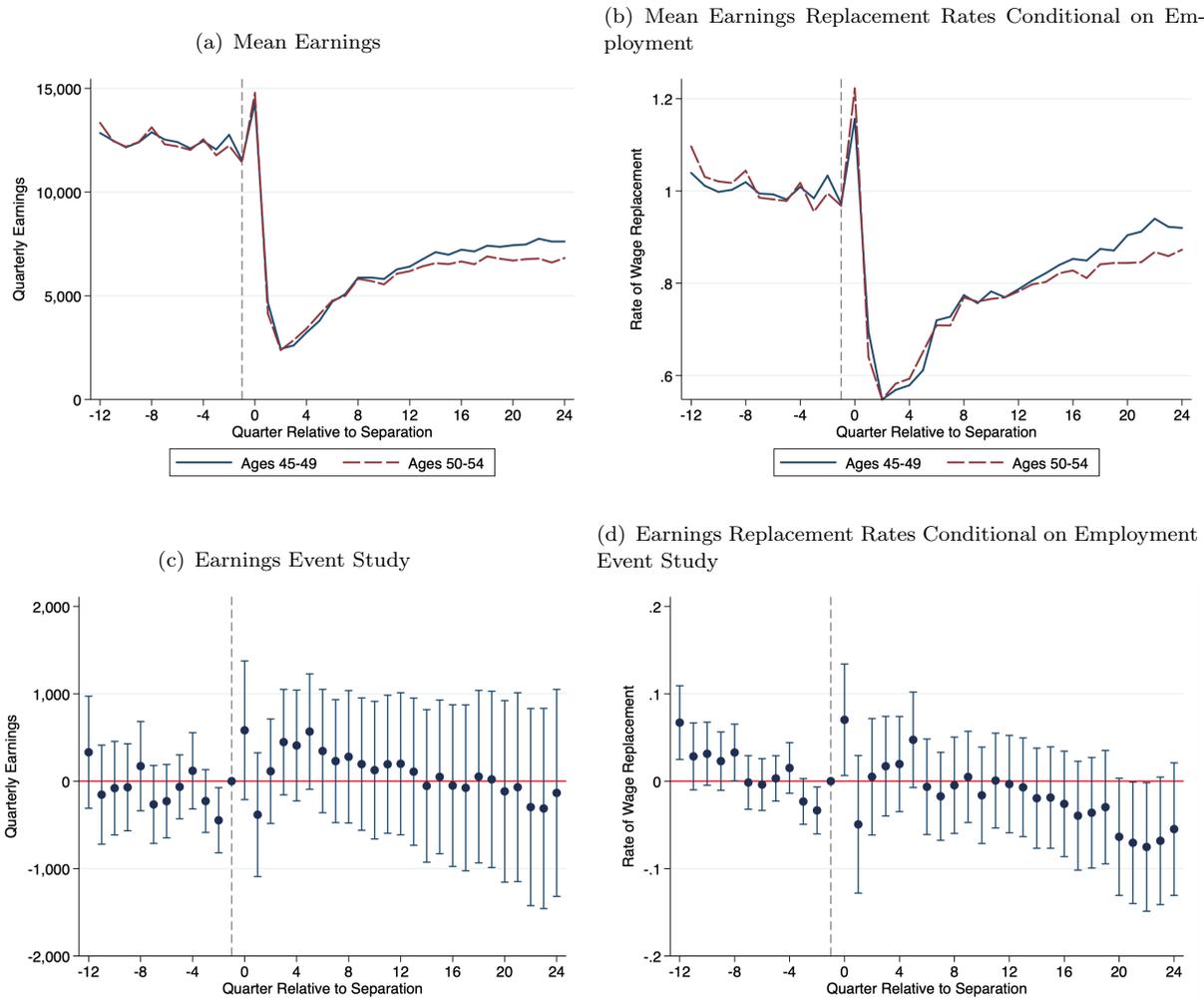


FIGURE A3. EARNINGS AND REPLACEMENT RATE TRAJECTORIES CONDITIONAL ON EMPLOYMENT

Notes: Panels (a) and (b) plot raw means for earnings and earnings replacement rates conditional on positive employment. Panels (c) and (d) plot event study estimates β_s from Equation 1 conditional on positive employment, and include calendar quarter of separation fixed effects, indicators for gender, race, highest education level, employer tenure indicators in 5-year bin increments (top-coding 25+ years into largest bin), and a quadratic in calendar age. Sample is restricted to high labor force attachment in the second year prior to displacement (see text for details).

Difference-in-Differences Regressions: To summarize our main event-study results on employment and replacement rates in Figure 1 more concisely, we implement a difference-in-differences analysis dividing time relative to separation into three periods: quarters prior to separation; the period during potential benefit receipt (quarters 1 to 12 following separation, labeled “During”), and the period after potential benefit receipt (quarters 13 to 24, labeled “After”). The pre-separation period is the omitted category, and the coefficients of interest are the interactions of the 50+ age-at-displacement indicator with indicators for the During and After periods. Table A1 presents results including the same controls as in Figure 1.

Older workers are more likely than younger workers to be employed during the benefit receipt period, but the groups have very similar employment probabilities thereafter. The two groups have similar earnings replacement rates in the benefit receipt period, but older workers’ earnings fall behind in subsequent years. In the last column of Table A1, we examine the earnings replacement rate including wage insurance payments. This modestly increases the relative replacement rate for

older workers during the benefit-receipt period, compared to estimate in column (2). By construction, the payments have no effect in the “After” period. Table A2 shows results are qualitatively similar, but less precise, without controls.

TABLE A1—DIFFERENCE-IN-DIFFERENCES ESTIMATES

	(1) Employed	(2) Replacement Rate	(3) Replacement Rate with WI Payments
Age 50+ × During	0.035 (0.018)	0.000 (0.019)	0.009 (0.019)
Age 50+ × After	0.007 (0.025)	-0.058 (0.030)	-0.058 (0.030)
During (quarters 1-12)	-0.479 (0.013)	-0.650 (0.014)	-0.649 (0.014)
After (quarters 13-24)	-0.337 (0.018)	-0.449 (0.022)	-0.452 (0.022)
Age 50+	-0.049 (0.010)	-0.040 (0.013)	-0.043 (0.013)
Observations	72,337	72,337	72,337
Control mean prior to separation	0.988	1.002	1.002

Notes: Table presents results from difference-in-differences regression models using data from 12 quarters prior to separation to 24 quarters post-separation. Standard errors clustered by individual worker in parentheses. Controls include calendar quarter of separation fixed effects, indicators for gender, race, highest education level, employer tenure indicators in 5-year bin increments (top-coding 25+ years into largest bin), and a quadratic in calendar age. Sample is restricted to high labor force attachment in the second year before displacement, defined as 4 quarters with UI-covered earnings exceeding \$3,000. The number of observations records the count of person-quarters used in each regression. See text for further sample restrictions.

TABLE A2—DIFFERENCE-IN-DIFFERENCES ESTIMATES WITHOUT DEMOGRAPHIC CONTROLS

	(1) Employed	(2) Replacement Rate	(3) Replacement Rate with WI Payments
Age 50+ × During	0.028 (0.016)	0.008 (0.016)	0.017 (0.016)
Age 50+ × After	-0.005 (0.019)	-0.041 (0.023)	-0.041 (0.023)
During (quarters 1-12)	-0.445 (0.011)	-0.616 (0.011)	-0.614 (0.011)
After (quarters 13-24)	-0.275 (0.013)	-0.376 (0.016)	-0.376 (0.016)
Age 50+	-0.002 (0.002)	0.007 (0.005)	0.007 (0.005)
Observations	72,337	72,337	72,337
Control mean prior to separation	0.990	1.002	1.002

Notes: Table presents results from difference-in-differences regression models using data from 12 quarters prior to separation to 24 quarters post-separation, without controls. Standard errors clustered by individual worker in parentheses. Sample is restricted to high labor force attachment in the second year before displacement, defined as 4 quarters with UI-covered earnings exceeding \$3,000. The number of observations records the count of person-quarters used in each regression. See text for further sample restrictions.