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."

External validity: Virginia vs. Rest of United States: To assess external validity, we compare the composition of TAA participants in Virginia to those in the rest of the country. We use the universe of TAA participant microdata from the Trade Activity Participant Reports (TAPR) between 2009 and 2011. These data were obtained from two separate Freedom of Information Act (FOIA) requests at the US Department of Labor (DOL), made by Kara Reynolds and Jooyoun Park. We are grateful to Drs. Reynolds and Park for the use of these data sources. Table A1 shows that observable characteristics are similar, on average, between workers in Virginia and other states. While the mean differences for all variables are statistically distinguishable, the magnitudes are generally small. This comparison indicates that TAA participants in Virginia and the rest of the country are quite similar, although in Virginia average earnings are somewhat higher and a larger share of TAA participants are Black.

Table A1—Balance Table: Virginia vs. Other States

	TAPR for VA		TAPR for Rest		Rest - Virginia	
	Mean	SD	Mean	SD	Difference	P-Value
HS or Less	0.71	0.45	0.65	0.48	-0.07	0.00
Female	0.38	0.49	0.41	0.49	0.03	0.00
Asian	0.036	0.19	0.052	0.22	0.02	0.00
Black	0.25	0.43	0.18	0.38	-0.08	0.00
Hispanic	0.011	0.10	0.076	0.26	0.06	0.00
White	0.71	0.45	0.78	0.42	0.06	0.00
Veteran Status	0.098	0.30	0.083	0.28	-0.01	0.00
Tenure (months)	149.8	125.1	135.4	123.1	-14.44	0.00
Age at Separation	47.0	9.89	46.3	10.4	-0.63	0.00
Prior Earnings (3Q)	8,853.4	5,851.1	7,874.6	7,365.0	-978.72	0.00
Prior Earnings (2Q)	8,834.1	6,467.4	7,299.7	7,840.8	-1534.37	0.00
Prior Earnings (1Q)	7,563.2	6,794.0	6,177.2	7,979.6	-1,386.04	0.00
Δ Prior Earnings	1,339.3	7,057.1	1,692.4	14,570.4	353.09	0.00
Observations	6,973		150,990		157,963	

Notes: Table reports descriptive statistics of TAA participants from June 2009 through December 2011, corresponding to petition numbers over 70,000.

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 eligbility 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 because of their age.

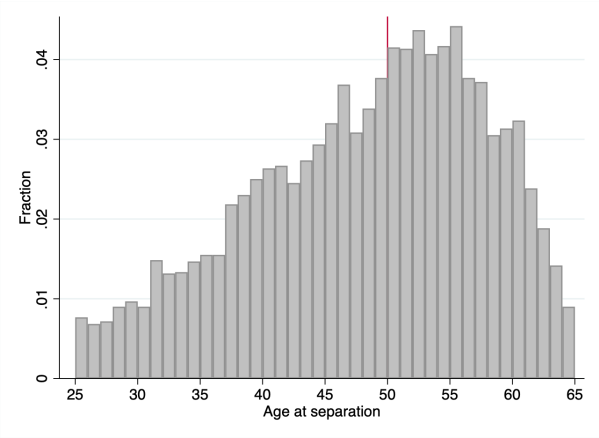


FIGURE A1. DISTRIBUTION OF AGE AT SEPARATION

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 standard TAA benefits do so within 4 quarters of separation. Approximately 80 percent of workers aged 45-49 at separation eventually take up training, extended UI (via TAA), 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.

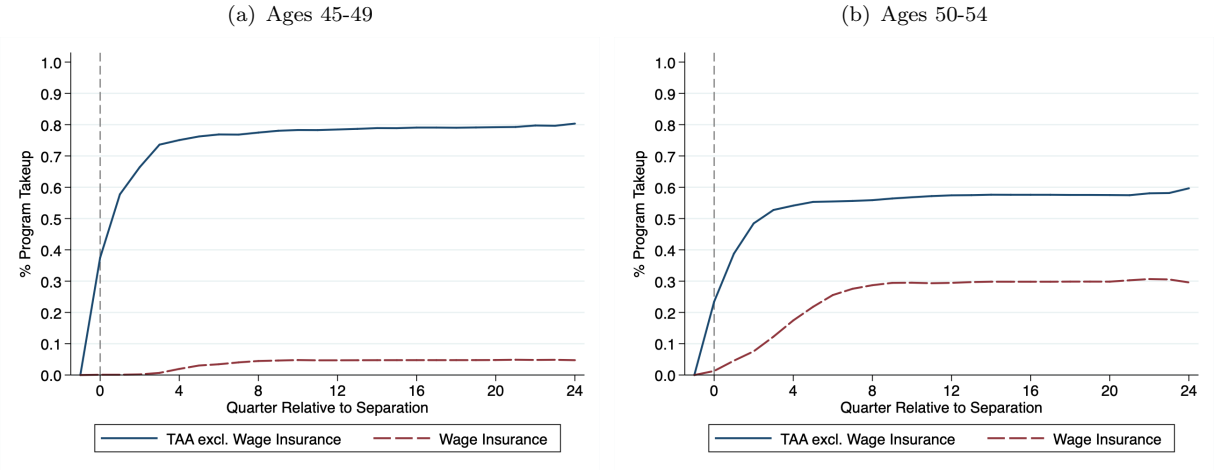


Figure A2. Cumulative Program Takeup by Age at Separation

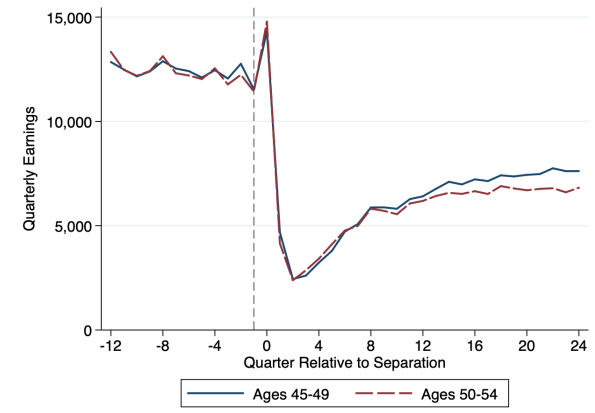
Notes: Panel (a) plots takeup of wage insurance (dashed line) and any TAA benefit excluding wage insurance (solid line) for ages 45 to 49. Panel (b) plots takeup of wage insurance (dashed line) and any TAA benefit excluding wage insurance (solid line) for ages 50 to 54. Sample is restricted to high labor 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, including calendar quarter of separation fixed effects and controls for race, gender, education, pre-displacement tenure, and a quadratic in calendar age.

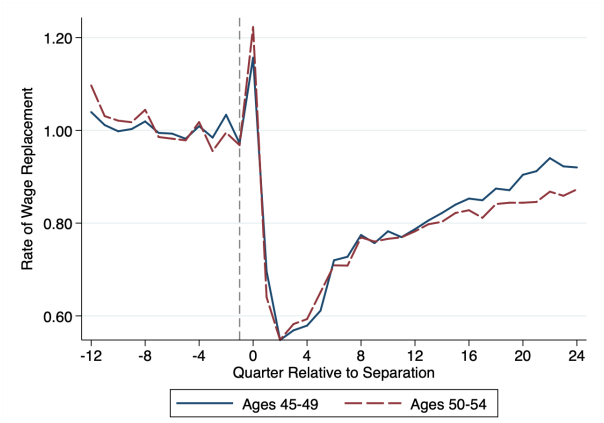
Mean earnings paths by age are nearly identical prior to separation. After separation, they continue to evolve on the same trajectory until roughly 12 quarters post-separation. Beyond that, the mean earnings of workers who are younger than 50 at separation begin to diverge. The differences are not statistically 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 three 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.

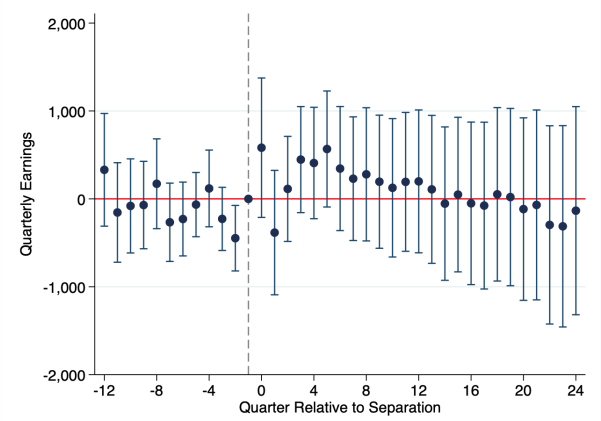
(a) Mean Earnings



(b) Mean Earnings Replacement Rates Conditional on Employment



(c) Earnings Event Study



(d) Earnings Replacement Rates Conditional on Employment Event Study

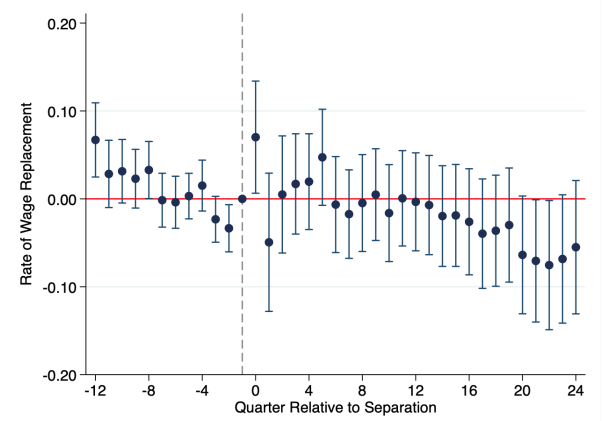


FIGURE A3. EARNINGS AND REPLACEMENT RATE TRAJECTORIES CONDITIONAL ON EMPLOYMENT

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. The regression specification is:

$$\text{(A1)} \quad Y_{it} = \alpha_0 + \alpha D_i + \theta_1 During_t + \theta_2 After_t + \theta_3 D_i \times During_t + \theta_4 D_i \times After_t + \mathbf{X}_{it}^{'}\gamma + e_{it}$$

where Y_{it} is an outcome for worker i in quarter t; 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 e_{it} is an error term.

The coefficients of interest are θ_3 and θ_4 on the interactions between the 50+ age-at-displacement indicator with indicators for the During and After periods, respectively. Table A2 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 A2, 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 A3 shows results are qualitatively similar, but less precise, without controls. Table A4 shows results are also similar if we include adjust the definition of wage insurance eligibility to also include workers aged 49 or older at separation.

Table A2—Difference-in-Differences Estimates

	(1) Employed	(2) Replacement Rate	(3) Replacement Rate with WI Payments
Age 50+ × During	0.035	0.000	0.009
	(0.018)	(0.019)	(0.019)
Age 50+ × After	0.007	-0.058	-0.058
	(0.025)	(0.030)	(0.030)
During (quarters 1-12)	-0.479	-0.650	-0.649
	(0.013)	(0.014)	(0.014)
After (quarters 13-24)	-0.337	-0.449	-0.452
	(0.018)	(0.022)	(0.022)
Age 50+	-0.049	-0.040	-0.043
	(0.010)	(0.013)	(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 A3—DIFFERENCE-IN-DIFFERENCES ESTIMATES WITHOUT DEMOGRAPHIC CONTROLS

	(1) Employed	(2) Replacement Rate	(3) Replacement Rate with WI Payments
Age 50+ × During	0.028	0.008	0.017
	(0.016)	(0.016)	(0.016)
Age 50+ × After	-0.005	-0.041	-0.041
	(0.019)	(0.023)	(0.023)
During (quarters 1-12)	-0.445	-0.616	-0.614
	(0.011)	(0.011)	(0.011)
After (quarters 13-24)	-0.275	-0.376	-0.376
	(0.013)	(0.016)	(0.016)
Age 50+	-0.002	0.007	0.007
	(0.002)	(0.005)	(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.

TABLE A4—DIFFERENCE-IN-DIFFERENCES ESTIMATES, ADJUSTED AGE CUTOFF

	(1) Employed	(2) Replacement Rate	(3) Replacement Rate with WI Payments
Age 49+ × During	0.038	-0.002	0.008
	(0.019)	(0.019)	(0.019)
Age 49+ × After	-0.011	-0.073	-0.074
	(0.027)	(0.032)	(0.032)
During (quarters 1-12)	-0.488	-0.657	-0.657
	(0.015)	(0.016)	(0.016)
After (quarters 13-24)	-0.334	-0.448	-0.449
	(0.018)	(0.023)	(0.023)
Age 49+	-0.052	-0.053	-0.054
	(0.010)	(0.014)	(0.014)
Observations	72,337	72,337	72,337
Control mean prior to separation	0.988	1.001	1.001

Notes: Table presents results from difference-in-differences regression models using data from 12 quarters prior to separation to 24 quarters post-separation. The variable Age 49+ is an indicator for being 49 or older at separation, instead of age 50 or older as in the main regressions. 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.

Power Calculations: For both employment and earnings replacement rates, we simulate power to assess our ability to statistically reject the null hypothesis that $\theta_3 = 0$ in equation A1. We calculate power for a range of values of θ_3, allowing for a type I error rate of 5%. We implement this procedure in three steps:

1) Set values for the other parameters: $\{\alpha_0, \alpha_1, \theta_1, \theta_2, \theta_4, \gamma\}$. We obtain values for α_0, α_1, and the vector γ as the point estimates from the regression:

$$Y_{it} = \alpha_0 + \alpha_1 D_i + \mathbf{X}_{it}^{'}\gamma + v_{it} \tag{A2}$$

using only data from quarters prior to separation. We obtain values for θ_1, θ_2, and separation quarter fixed effects as the point estimates from the regression:

$$Y_{it} = \alpha_0 + \theta_1 During_t + \theta_2 After_t + \mathbf{X}_{it}^{'}\gamma + \xi_{it} \tag{A3}$$

using only data from those under 50 at separation ($D_i = 0$). We restrict $\theta_4 = 0$.

2) For each worker, simulate outcomes based on the proposed true effect size θ_3 and a random error, drawn from a normal distribution with mean zero and standard deviation calculated from the residuals ξ_{it} from regression (A3). Repeat this process 2,000 times to construct 2,000 simulated samples.

3) Estimate equation (A1), clustering standard errors at the individual level, in each of the 2,000 simulated samples, and record the percentage of cases in which the p-value when testing $\theta_3 = 0$ is below 0.05.

For both outcomes, we repeat this process for a range of values of θ_3 from 0.01 to 0.04 in increments of 0.0025. Figure A4 plots the results of these simulations. The simulations suggest the difference-in-difference regressions are well-powered. At 80% power, we can detect a 2.25 percentage point change in employment and a 2.5 percentage point change in the earnings replacement rate, which are both modest effect sizes.

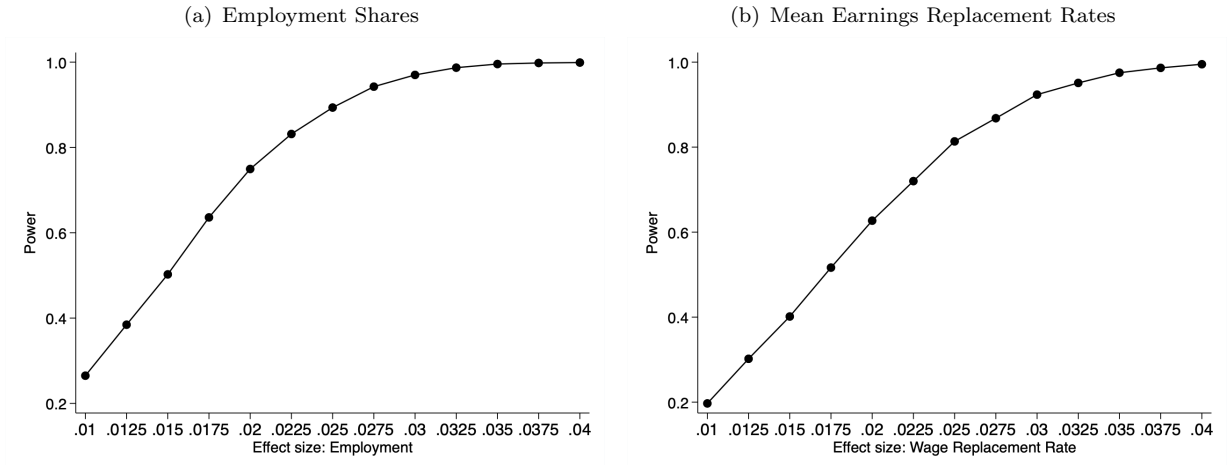


Figure A4. Power Calculations

Notes: Figures plot power against hypothesized effect sizes assuming a type I error rate of 0.05.