FIGURE 3-A.—EARNINGS DISTRIBUTION, 1980–81

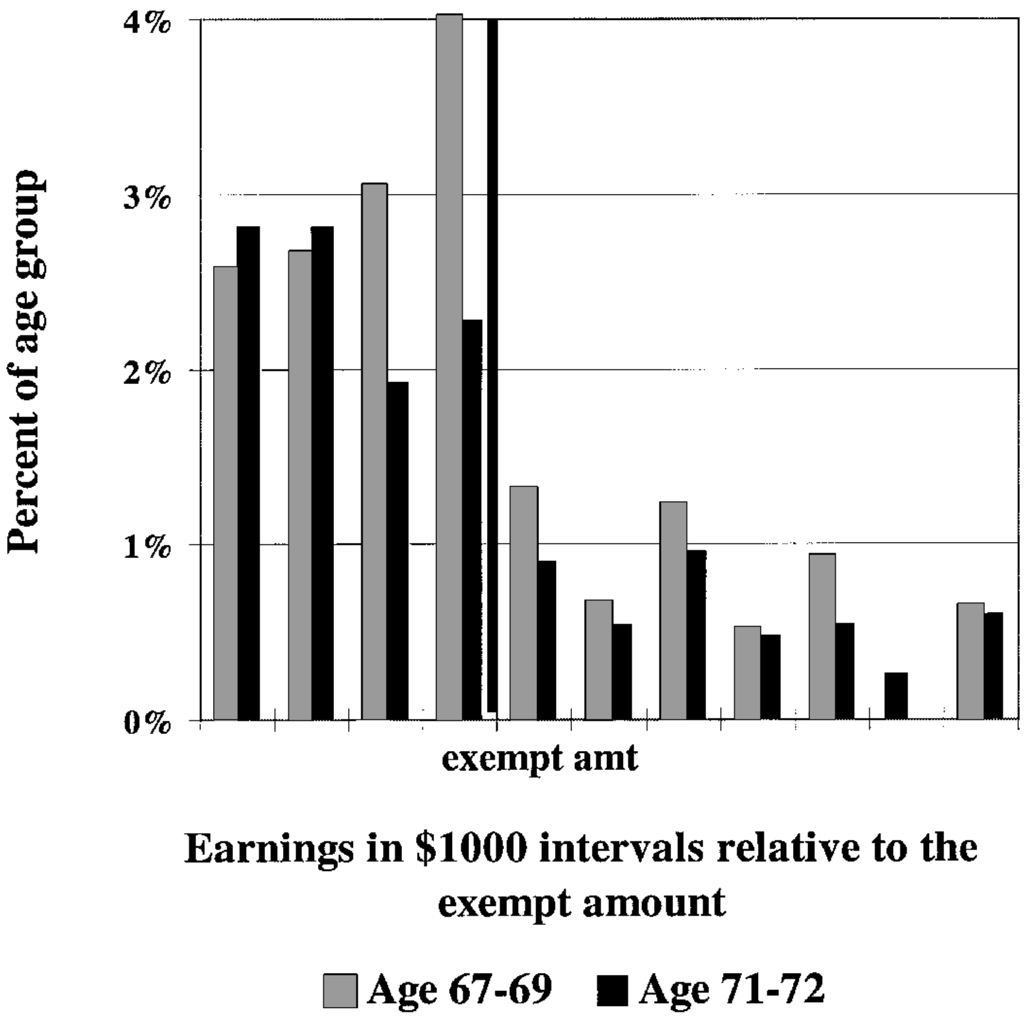
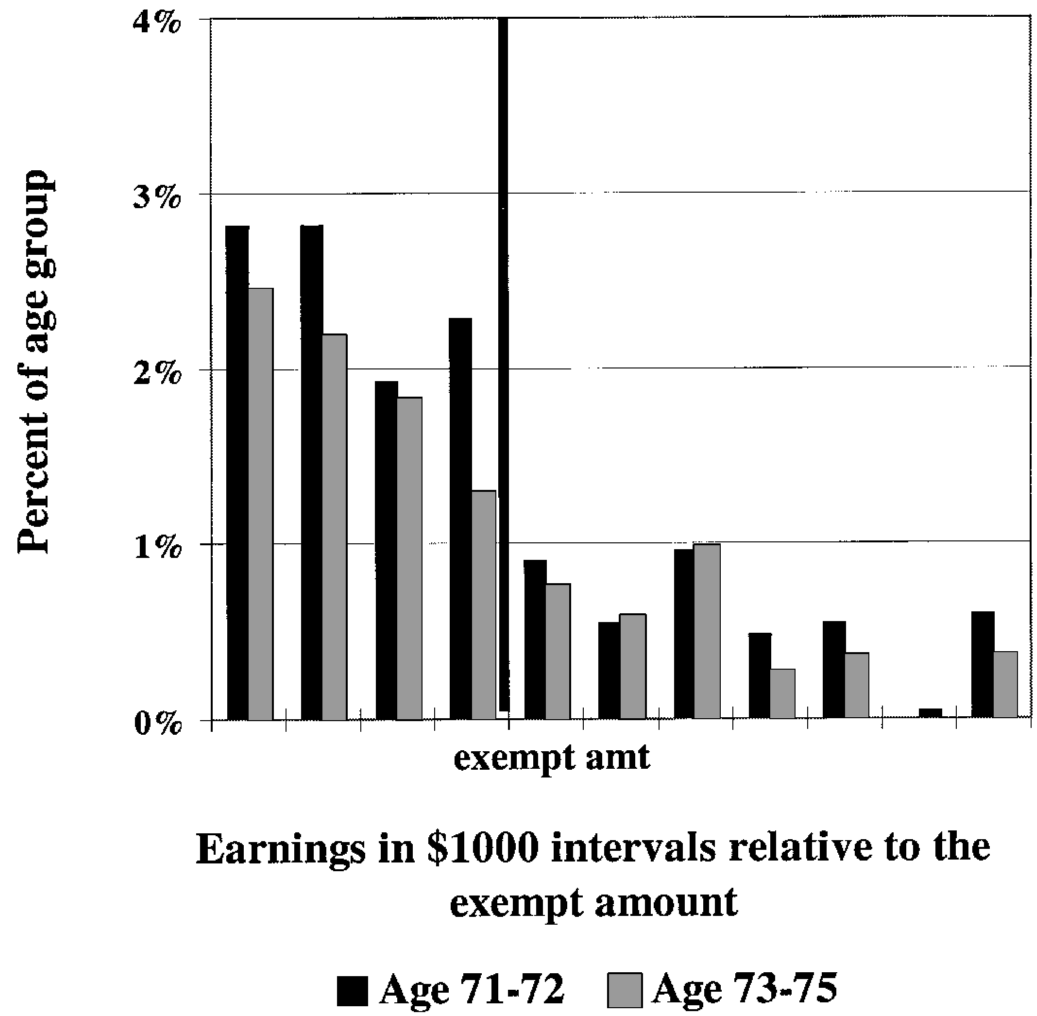


FIGURE 3-B.—EARNINGS DISTRIBUTION, 1980–81



Source: Friedberg (2000), p. 55

FIGURE 3-C.—EARNINGS DISTRIBUTION, 1984–86

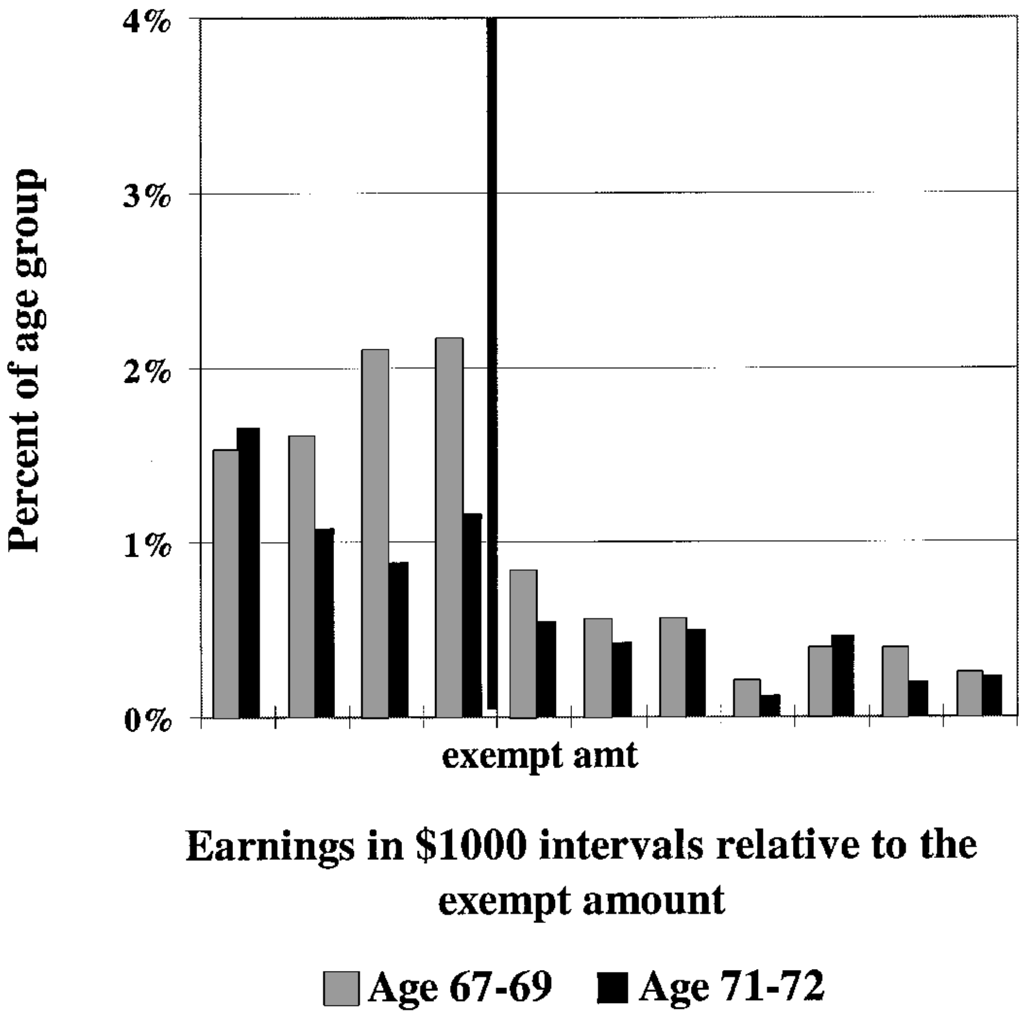
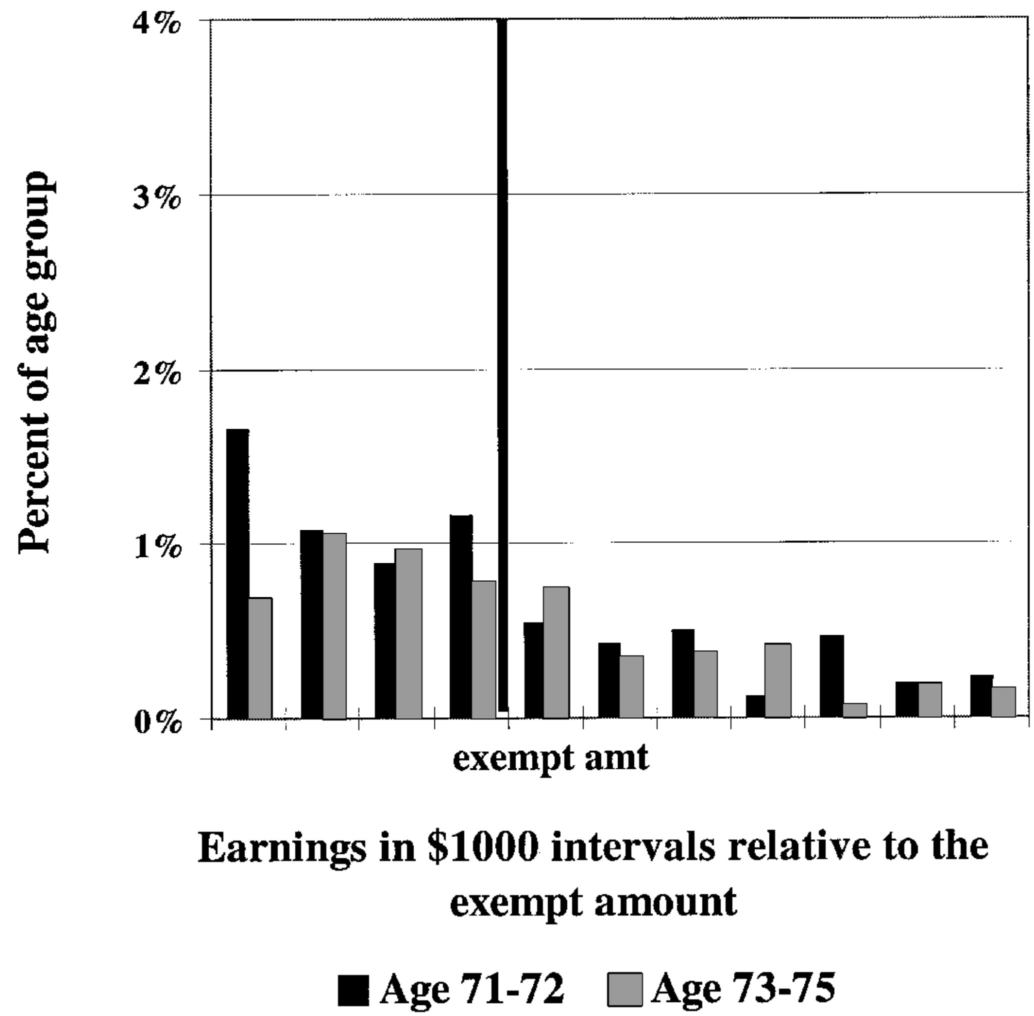


FIGURE 3-D.—EARNINGS DISTRIBUTION, 1984–86



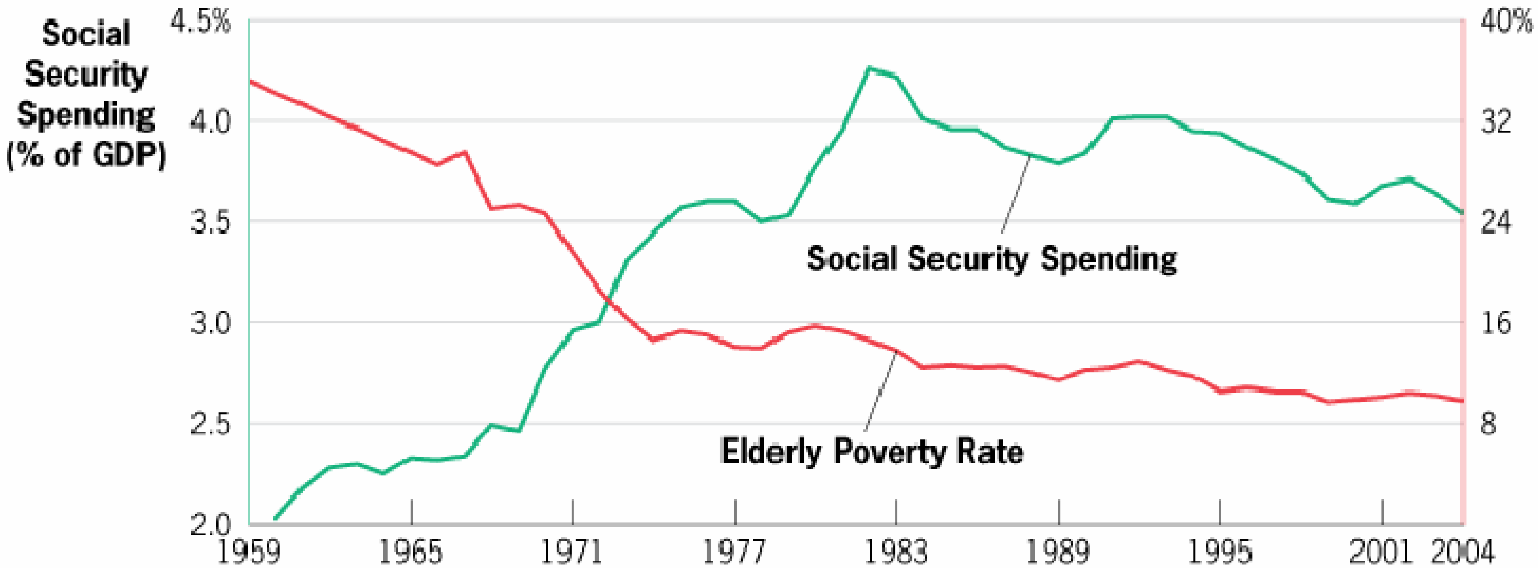
Note: In 1983 the earnings test was eliminated for 70–71 year olds (71–72 year olds in the following March CPS) but was not changed for 62–69 year olds. See Figure 2 note.

Source: Friedberg (2000), p. 56

Consumption-Smoothing Benefits of Social Security

Living Standards of the Elderly

■ FIGURE 13-2



Elderly Poverty and Social Security, 1959–2004 • There is a striking negative correspondence over time between the poverty rates of the elderly (which have fallen) and the size of the Social Security program (which has risen).

Source: U.S. Bureau of the Census (2005b).

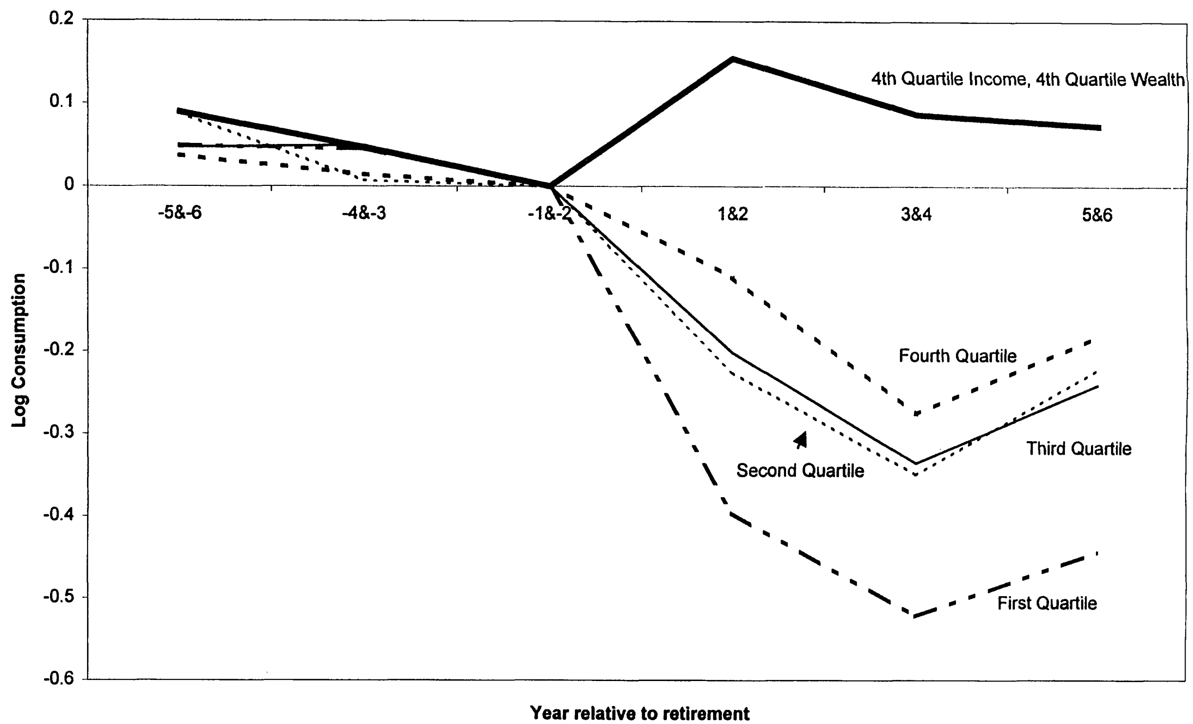


FIGURE 4. CHANGE IN CONSUMPTION AT RETIREMENT, BY WEALTH QUARTILE

Source: Bernheim et al. (2001), p. 847

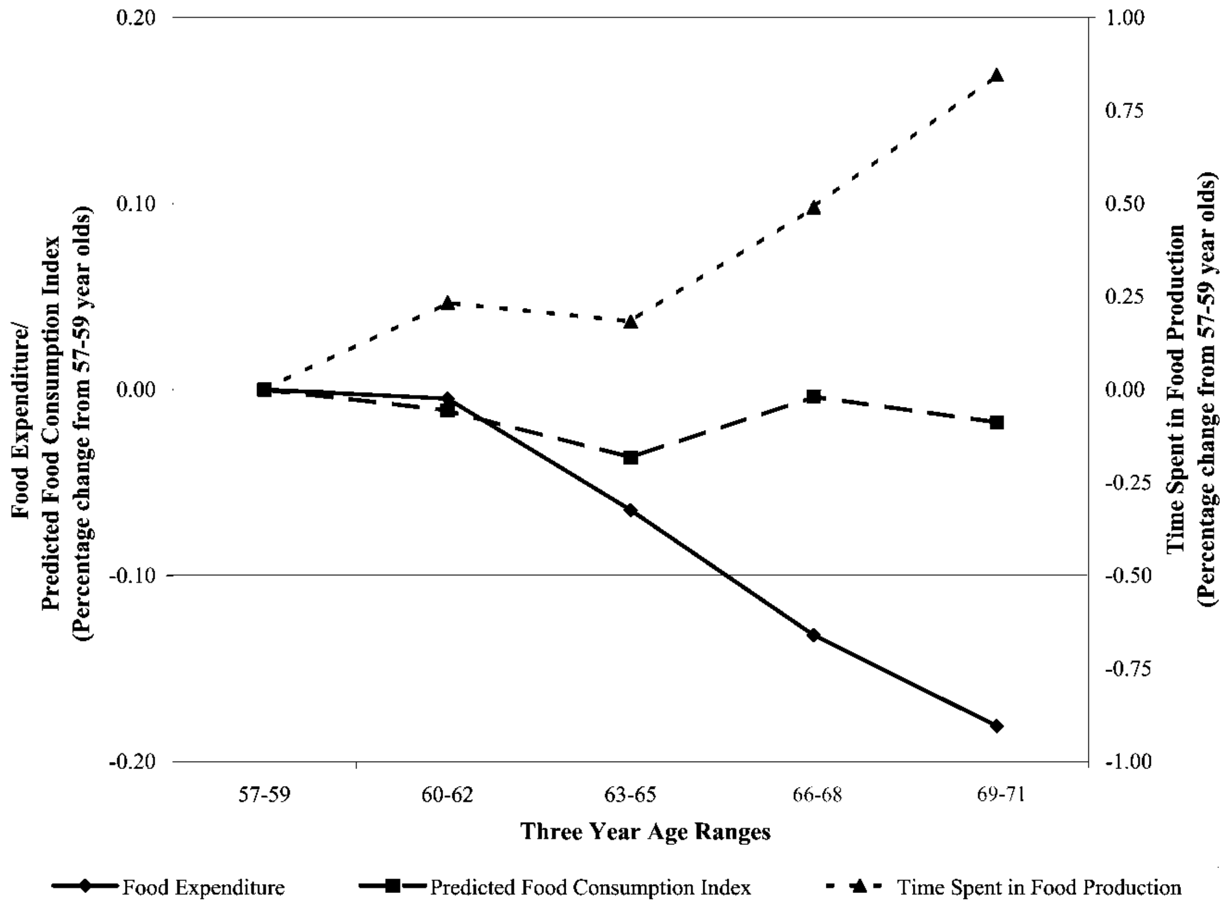


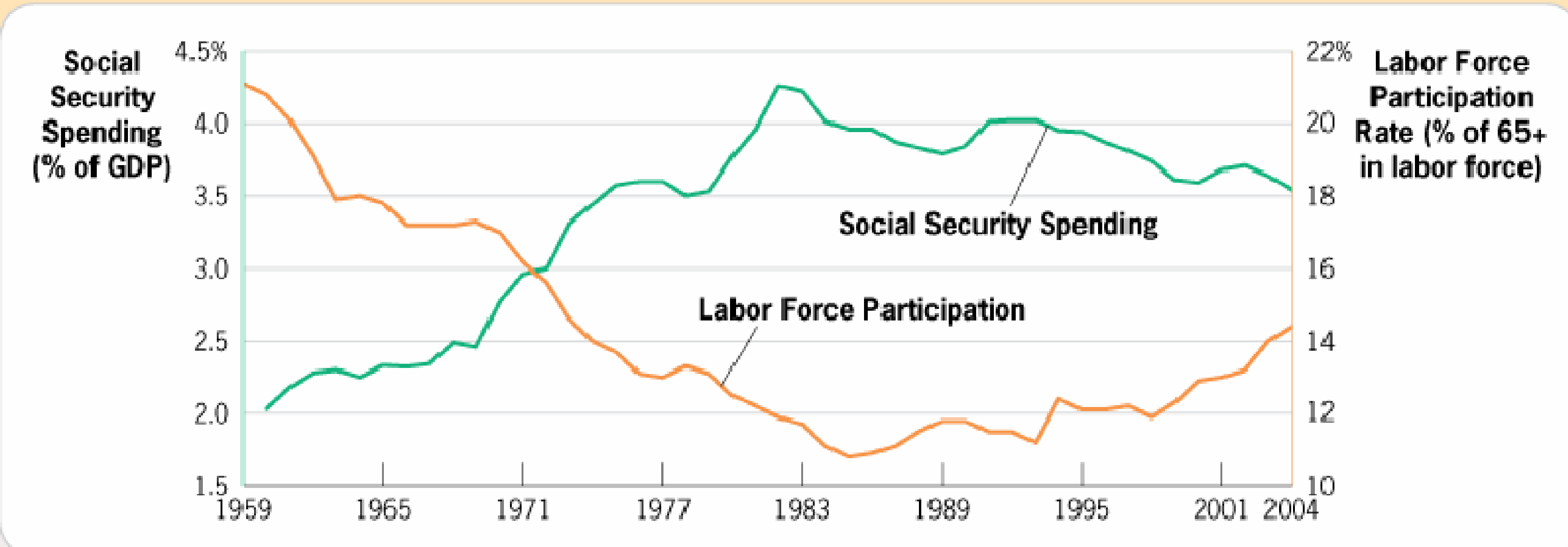
FIG 1.—Percentage change in food expenditure, predicted food consumption index, and time spent on food production for male household heads by three-year age ranges. Data are taken from the pooled 1989–91 and 1994–96 cross sections of the CSFII, excluding the oversample of low-income households. The sample is restricted to male household heads (1,510 households). All series were normalized by the average levels for household heads aged 57–59. All subsequent years are the percentage deviations from the age 57–59 levels. See Sec. IV for details of data and derivation of food consumption index

Source: Aguiar and Hurst (2005), p. 925

Social Security and Retirement

Evidence

■ FIGURE 13-3

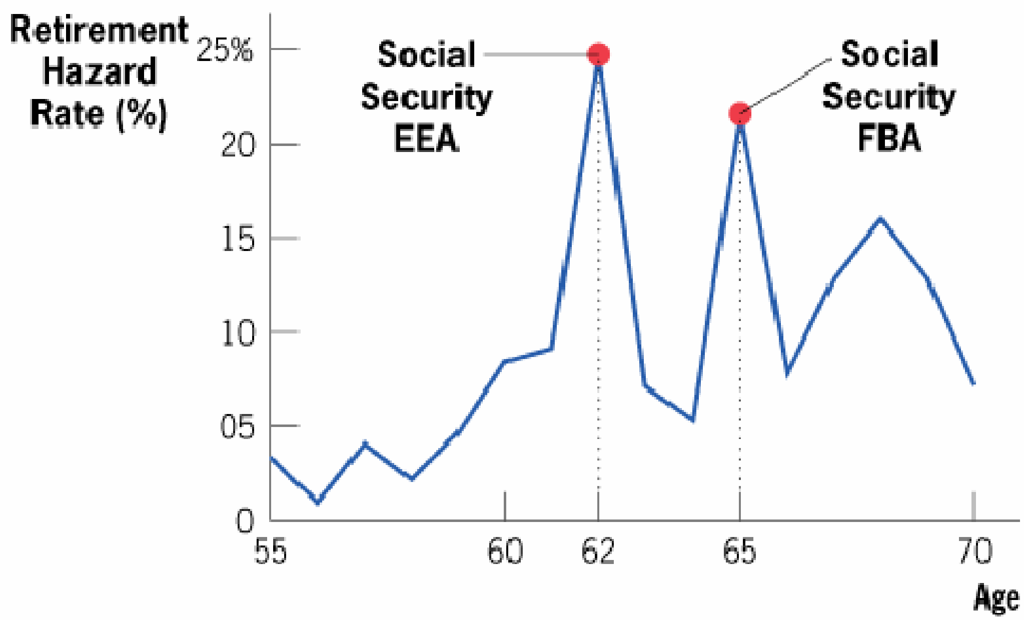


Elderly Work and Social Security, 1959–2004 • There is a striking negative correspondence over time between the labor force participation (LFP) rates of the elderly (which have fallen) and the size of the Social Security program (which has risen).

Source: U.S. Department of Labor (2005b) and the Bureau of Labor Statistics, accessed at http://www.bls.gov/emp/home.htm.

Evidence

■ FIGURE 13-4



Hazard Rate of Retirement for Males in the United States • The male hazard rate, or exit rate at each age given that a man has worked to that age, has a distinct spike at age 62 (the Early Entitlement Age, EEA) and 65 (the Full Benefit Age, FBA), key ages for the Social Security system.

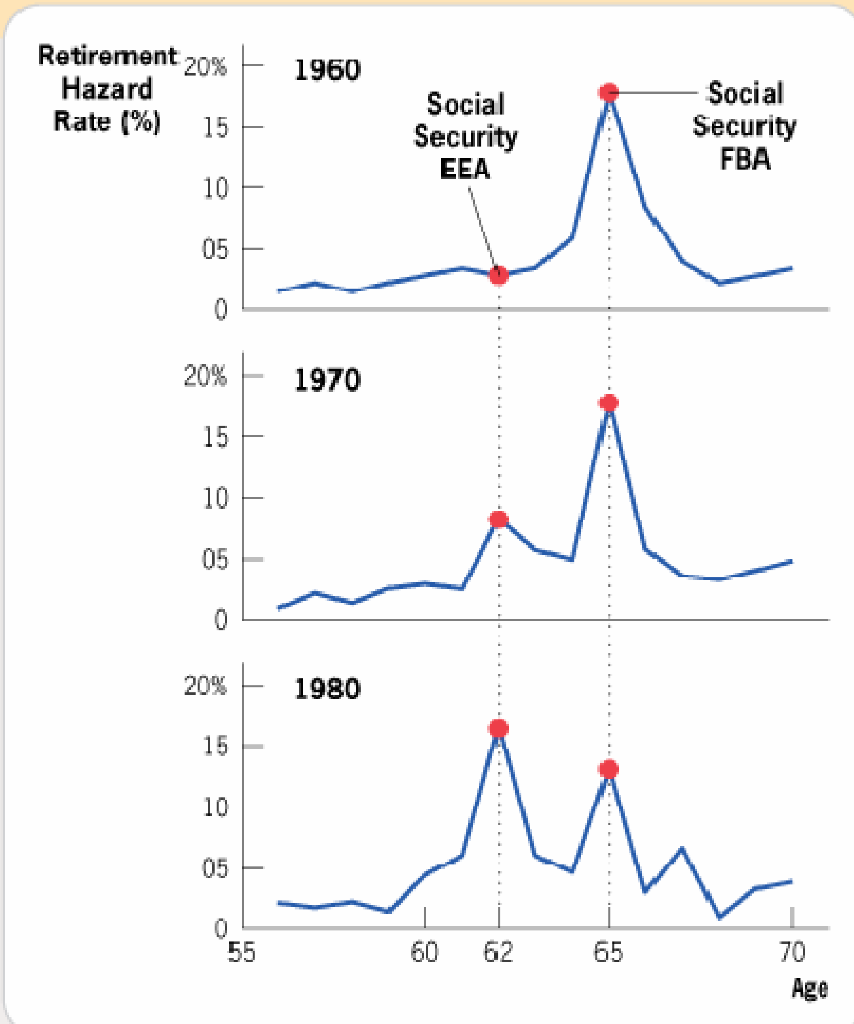
Source: Diamond and Gruber (1999), Figure 11.12.

retirement hazard rate The percentage of workers retiring at a certain age.

Social Security and Retirement

Evidence

■ FIGURE 13-5



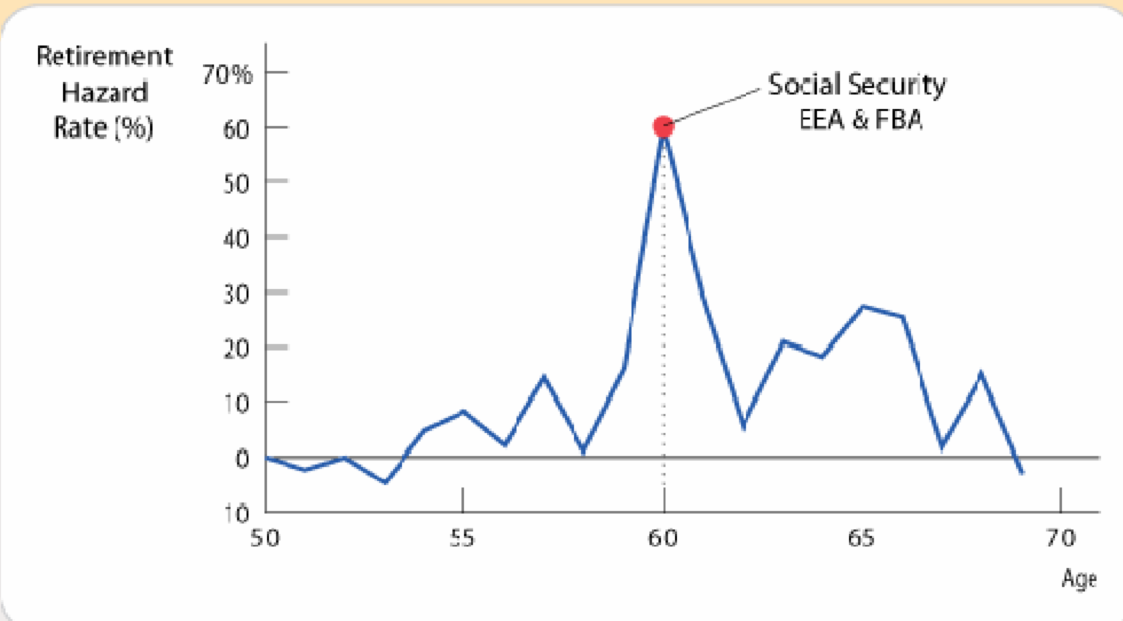
The Evolution of the U.S. Male Retirement Hazard • In 1960, before the EEA of 62 was introduced for men, the hazard rate for men was highest at age 65 (the FBA), with no spike at age 62. By 1970, the spike at 62 had begun to emerge, and by 1980 it was larger than the spike at age 65.

Source: Gruber and Wise (1999), Figure 12

Social Security and Retirement

Evidence

■ FIGURE 13-6



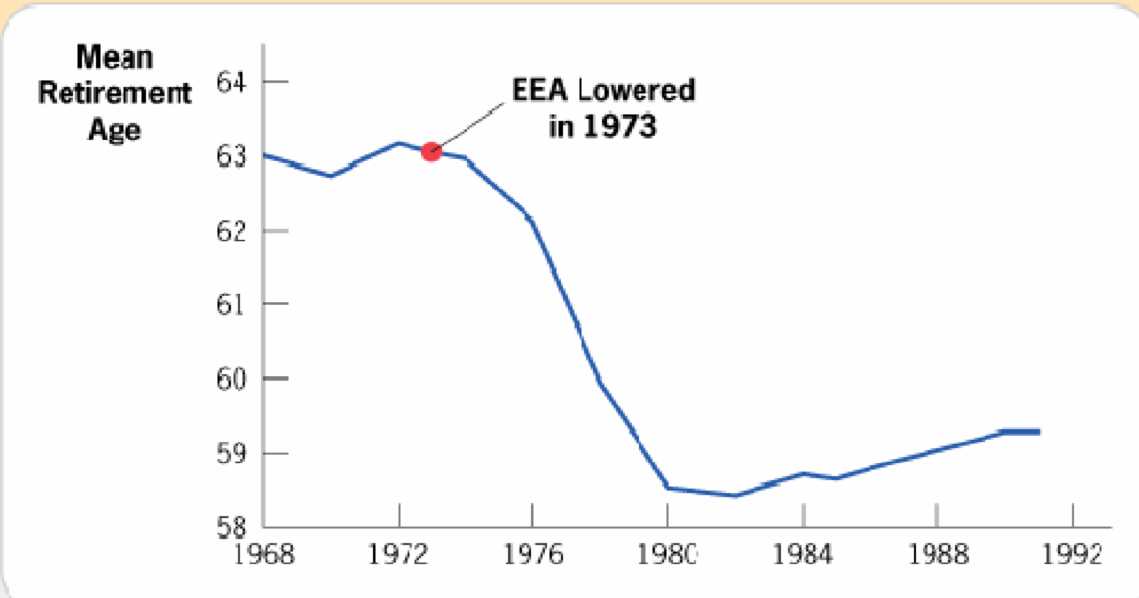
Hazard Rate of Retirement in France • In France, there is an enormous exit rate from the labor force at age 60, which is both the EEA and FBA.

Source: Gruber and Wise (1999), Figure 11.

Social Security and Retirement

Evidence

■ FIGURE 13-7



Change in Average Retirement Age in Germany from 1968 to 1992 • Germany lowered its age of social insurance entitlement by five years (from 65 to 60) in 1973; within seven years, the average age at which individuals retire had fallen from 63 to 58.

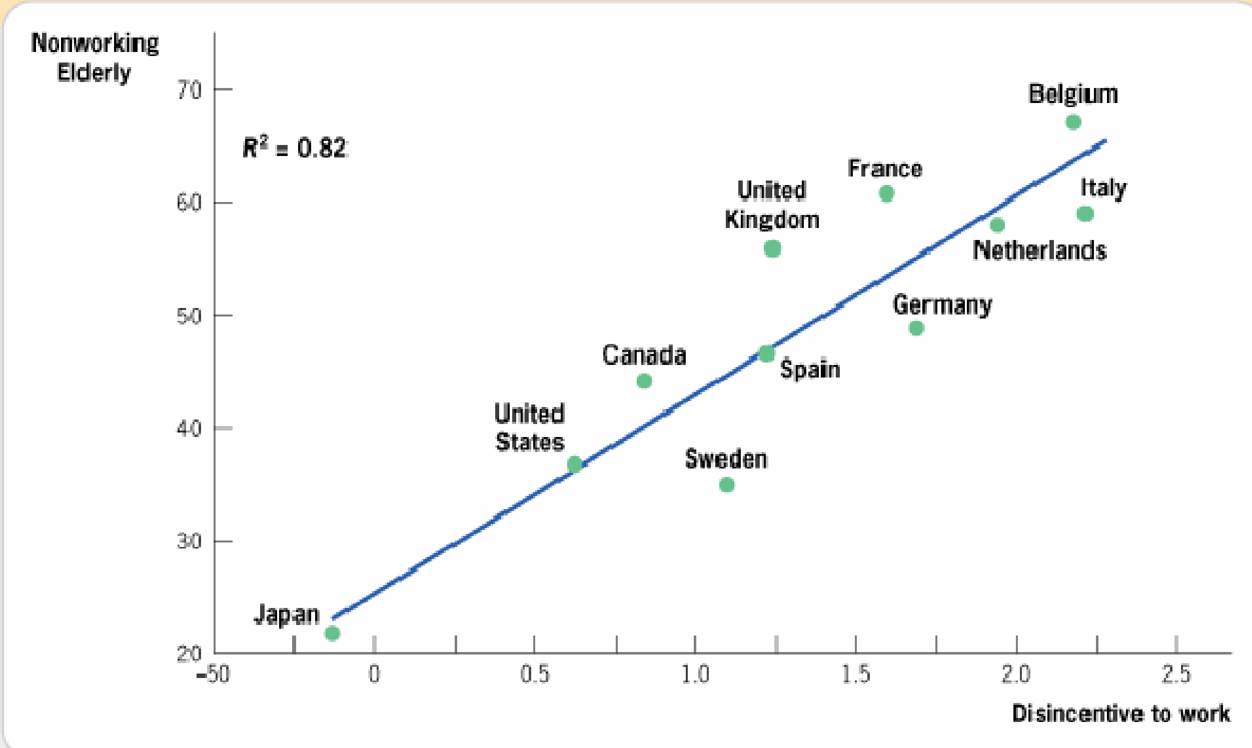
Source: Gruber and Wise (1999), Figure 5.

APPLICATION

Chapter 13 Social Security

Implicit Social Security Taxes and Retirement Behavior

FIGURE 13-8



Implicit Taxes on Work and Nonwork • There is large variation across nations in the social security disincentives to work at older ages. The disincentive to work is measured here as the natural logarithm of the sum of implicit taxes on work at older ages. Those nations with greater disincentives to work tend to have much higher nonwork among older workers.

Source: Gruber and Wise (1999), Figure 17.

TABLE 1—LEAST-SQUARES REGRESSION WITH (ROBUST) STANDARD ERRORS, 1949–2002 (DEPENDENT VARIABLE: MODIFIED PRIMARY ON-BUDGET SURPLUS, S_t^{ON})

	Specification			
Variable	1	2	3	4
S_t^{OFF}	0.524	−0.643	$-2.292^{\dagger}$	$-2.755^{\dagger}$
	(0.736)	(0.688)	(0.877)	(0.649)
GDP_t		$0.449^{\dagger}$	$0.431^{\dagger}$	0.006
		(0.094)	(0.084)	(0.119)
Year (t)			$-0.0036^{\dagger}$	$-0.0043^{\dagger}$
			(0.0008)	(0.00074)
Year^2 (t^2)			$0.000047^{\dagger}$	$0.000066^{\dagger}$
			(0.000012)	(0.000011)
Wages and salaries				$0.582^{\dagger}$
				(0.128)
Intercept term	$-0.019^{\dagger}$	$-0.458^{\dagger}$	$-0.377^{\dagger}$	$-0.256^{\dagger}$
	(0.002)	(0.093)	(0.078)	(0.077)
R^2:	0.01	0.27	0.54	0.69

Notes: Robust standard errors shown in parentheses.
† Statistically significant at the 2-percent level.

Source: Smetters (2004), p. 179

TABLE 2—LEAST-SQUARES REGRESSION WITH (ROBUST) STANDARD ERRORS, DIFFERENT PERIODS (DEPENDENT VARIABLE: MODIFIED PRIMARY ON-BUDGET SURPLUS, S_t^{ON})

Variable	Period: 1949–1969	Period: 1970–2002
S_t^{OFF}	−0.476	−2.83†
	(1.413)	(0.73)
GDP_t	0.208	0.059
	(0.157)	(0.162)
Year (t)	0.001	−0.003
	(0.003)	(0.004)
Year^2 (t^2)	−0.00003	0.00005
	(0.00009)	(0.00004)
Wages and salaries	−0.161	0.737†
	(0.233)	(0.25)
Intercept term	−0.133	−0.417†
	(0.114)	(0.14)

Notes: Standard errors shown in parentheses. Test for structural break at 1970 (Wald test): $P = 0.004$.

† Statistically significant at the 2-percent level.

Source: Smetters (2004), p. 180

Chart 2.
All Social Security disabled beneficiaries in current-payment status, December 1970–2017

The number of disabled beneficiaries has risen from 1,812,786 in 1970 to 10,059,166 in 2017, driven predominately by an increase in the number of disabled workers. The number of disabled adult children has grown slightly, and the number of disabled widow(er)s has remained fairly level. In December 2017, there were 8,695,475 disabled workers; 1,105,405 disabled adult children; and 258,286 disabled widow(er)s receiving disability benefits.

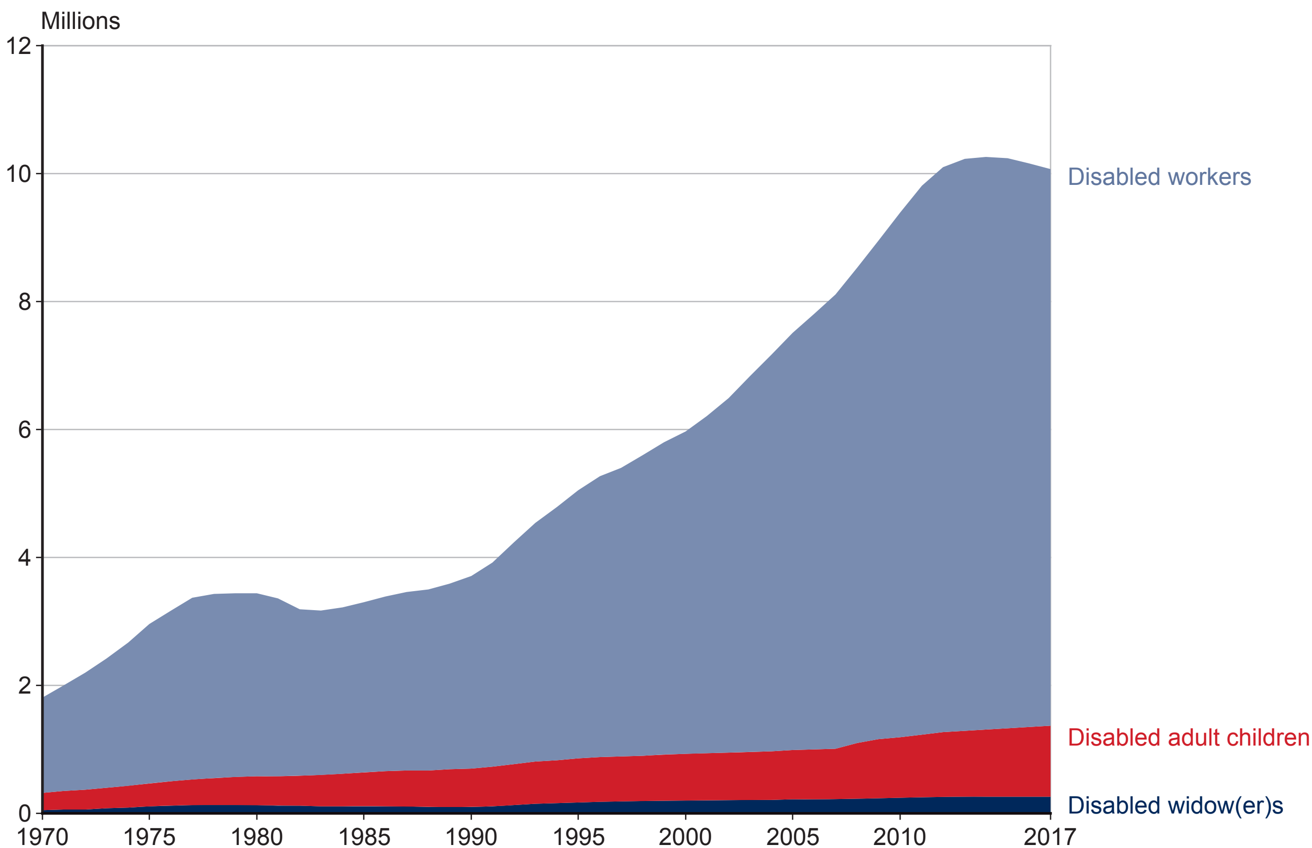
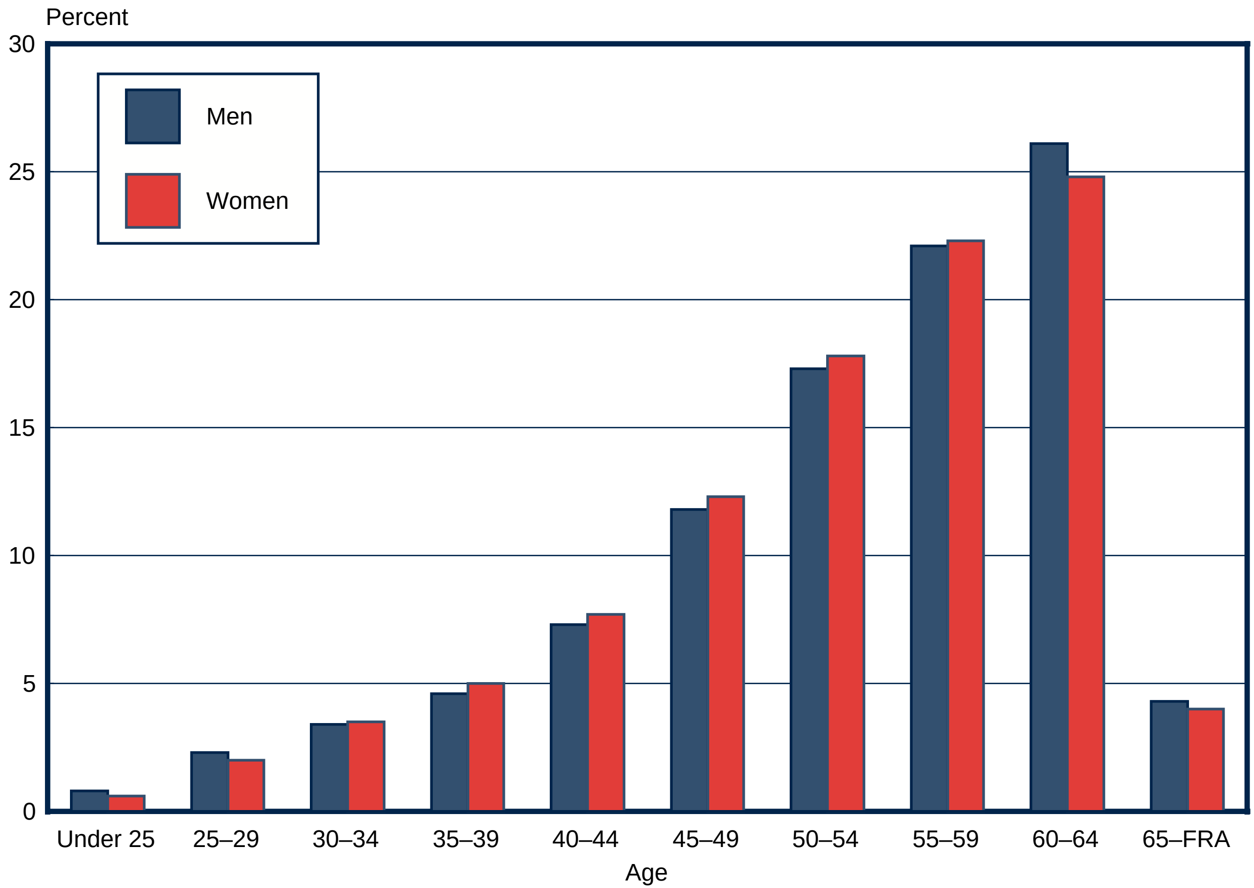


Chart 4.
Age of disabled-worker beneficiaries in current-payment status, by sex, December 2010

Source: SSA DI annual report

The percentage of disabled-worker beneficiaries increases with age for both men and women. In December 2010, the largest percentage of disabled-worker beneficiaries was aged 60–64. Disability benefits convert to retirement benefits when the worker reaches full retirement age, 65–67, depending on the year of birth.



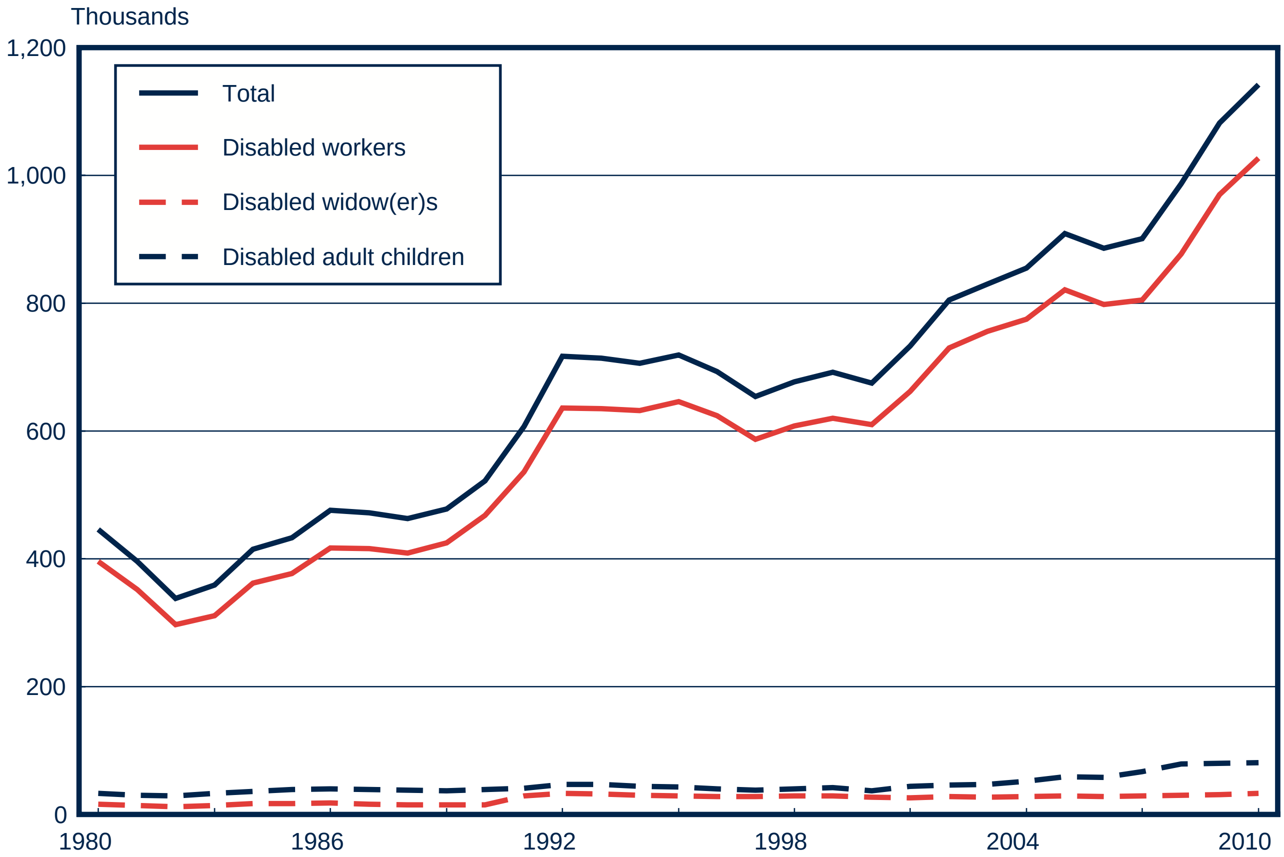
SOURCE: Table 4.

NOTE: FRA = full retirement age.

Chart 8.
Social Security disability awards, 1980–2010

Source: SSA DI annual report

The total number of awards decreased from 1980 through 1982, started to rise in 1983, and began to increase more rapidly in 1990. Awards for disabled-worker benefits have been most pronounced and drive the overall pattern shown in the total line. They increased from a low of 297,131 in 1982 to 636,637 in 1992, were relatively flat from 1992 through 2000, and started to increase again in 2001. There were 1,026,988 worker awards in 2010. Other awards have risen at a much slower rate. Awards to disabled adult children have gradually increased from 33,470 in 1980 to 81,681 in 2010. Awards to disabled widow(er)s have risen from just over 16,000 in 1980 to 33,259 in 2010.

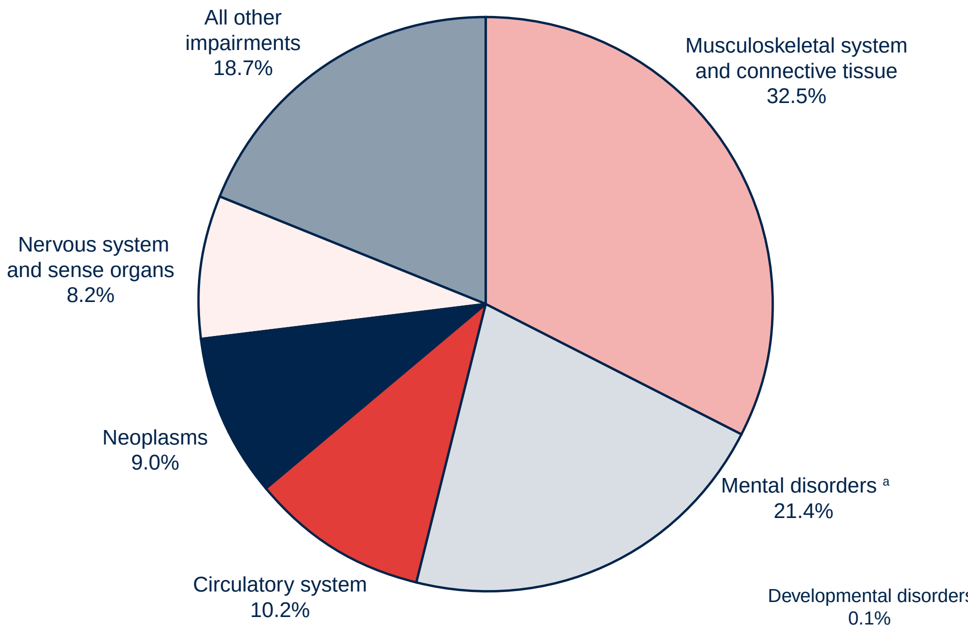


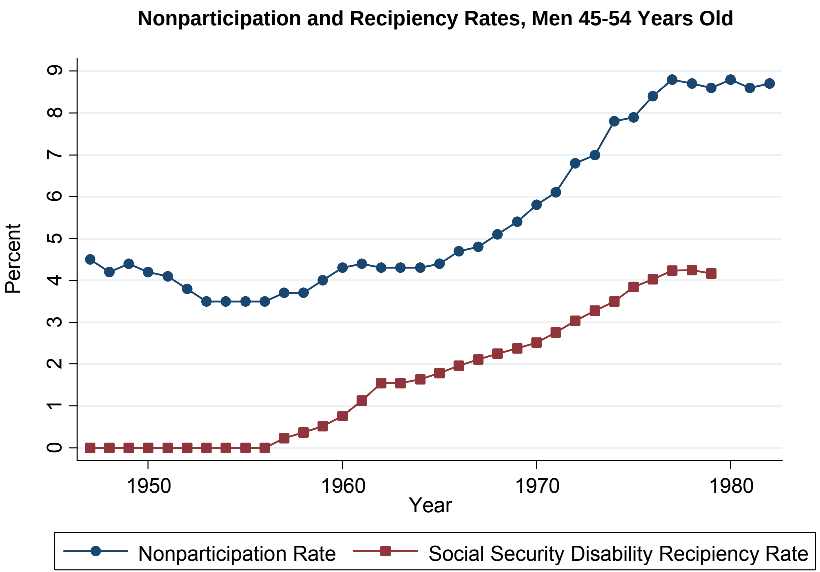
SOURCE: Table 35.

Chart 10.
Disabled-worker awards, by selected diagnostic group, 2010

Source: SSA DI annual report

In 2010, 1,026,988 disabled workers were awarded benefits. Among those awardees, the most common impairment was diseases of the musculoskeletal system and connective tissue (32.5 percent), followed by mental disorders (21.4 percent), circulatory problems (10.2 percent), neoplasms (9.0 percent), and diseases of the nervous system and sense organs (8.2 percent). The remaining 18.7 percent of awardees had other impairments.





Source: Parsons 1984 Table A1

TABLE 1—REASSESSMENTS OF INITIAL SOCIAL SECURITY DETERMINATIONS

A. *Bureau of Disability Insurance Review One Year After Initial Determination (Percentages):*

BDI assessment	Initial determination: Allowance	Initial determination: Denial
Allowance	78.8	$\boxed{21.1}$
Denial	$\boxed{22.5}$	77.5

Note: The sample sizes are 250 initial allowances and 248 initial denials.

Source: Smith and Lilienfeld (1971 p. 195).

TABLE 2—EMPLOYMENT, EARNINGS, AND OTHER CHARACTERISTICS OF REJECTED DISABILITY INSURANCE APPLICANTS

	1972			1978		
	Population	Rejected Applicants	Beneficiaries	Population	Rejected Applicants	Beneficiaries
Labor Supply						
Percent Employed	77.7	32.6	3.2	69.3	28.7	2.3
Percent Worked 71/77	91.9	45.0	7.5	86.7	40.4	5.5
Percent Full Year ($\geq$ 50 Weeks)[a]	76.8	47.4	31.4	83.5	41.2	22.2
Percent Full Time ($\geq$ 35 Hours)[a]	95.4	75.9	25.0	92.4	79.6	38.3
Earnings Among Positive Earners						
Median Annual Earnings, 71/77[b]	\$9000	\$4000	\$700	\$14000	\$5300	\$1000

Source: Bound 1991

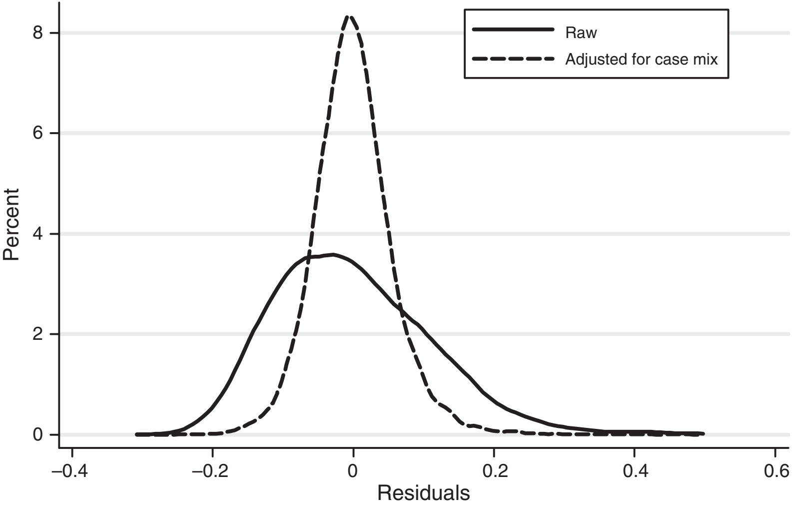


Figure 3. Distribution of Examiner Deviations from DDS Mean Initial Allowance Rate

Note: Caseload characteristics include DDS office, age, preonset earnings, body code, three-digit zip code, terminal illness diagnosis, and decision month.

Source: 2005–2006 DIODS data.

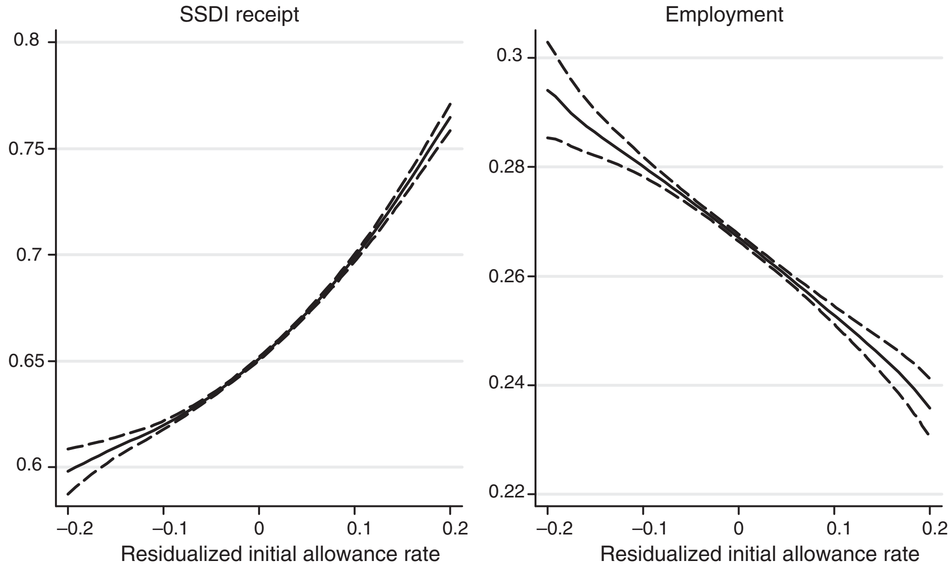


FIGURE 4. SSDI RECEIPT AND LABOR SUPPLY BY INITIAL ALLOWANCE RATE

Notes: Ninety-five percent confidence intervals shown with dashed lines. Employment measured in the second year after the initial decision. Bandwidth is 0.116 for DI and 0.130 for labor force participation.

Source: DIODS data for 2005 and 2006.

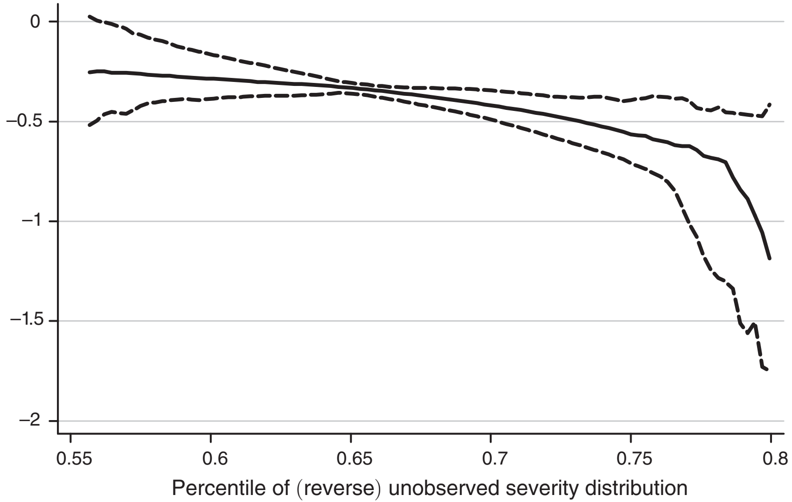
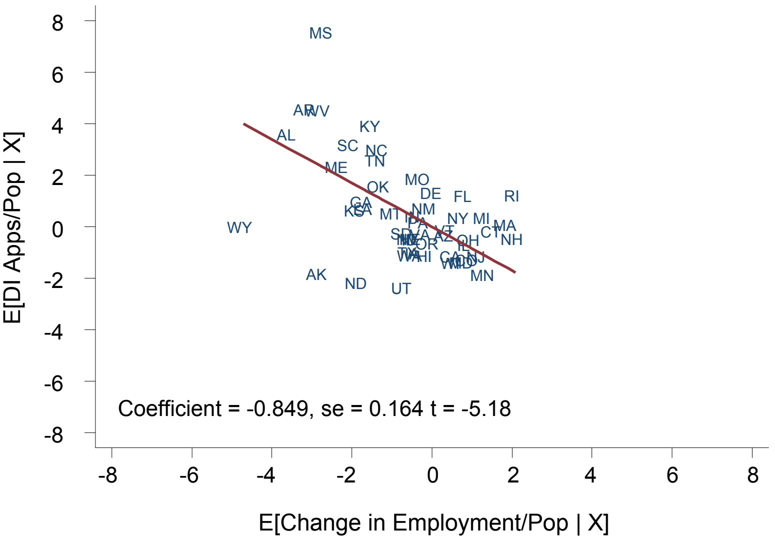


Figure 7. Marginal Treatment Effect on Employment

Notes: Ninety-five percent confidence intervals shown with dashed lines. Bandwidth is 0.084.

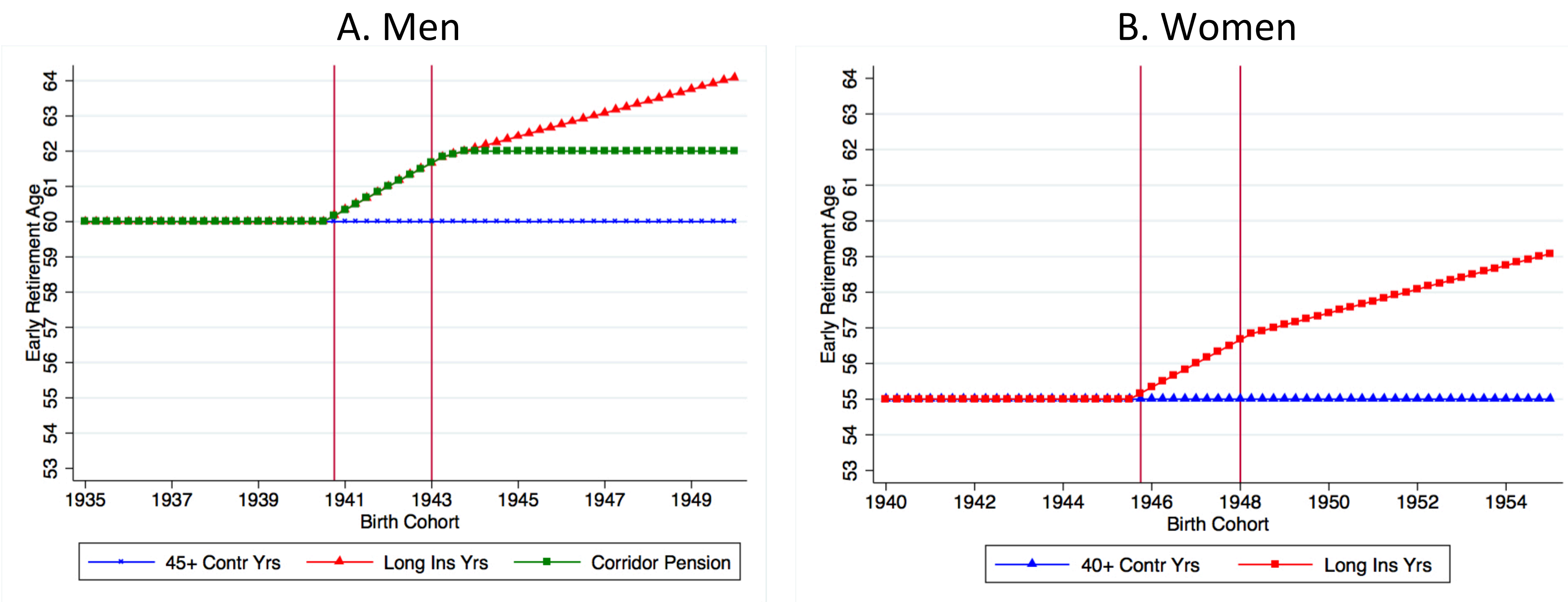
Source: DIODS data for 2005 and 2006.

Employment Shocks and DI Applications: 1993-1998



Source: Autor and Duggan 2003

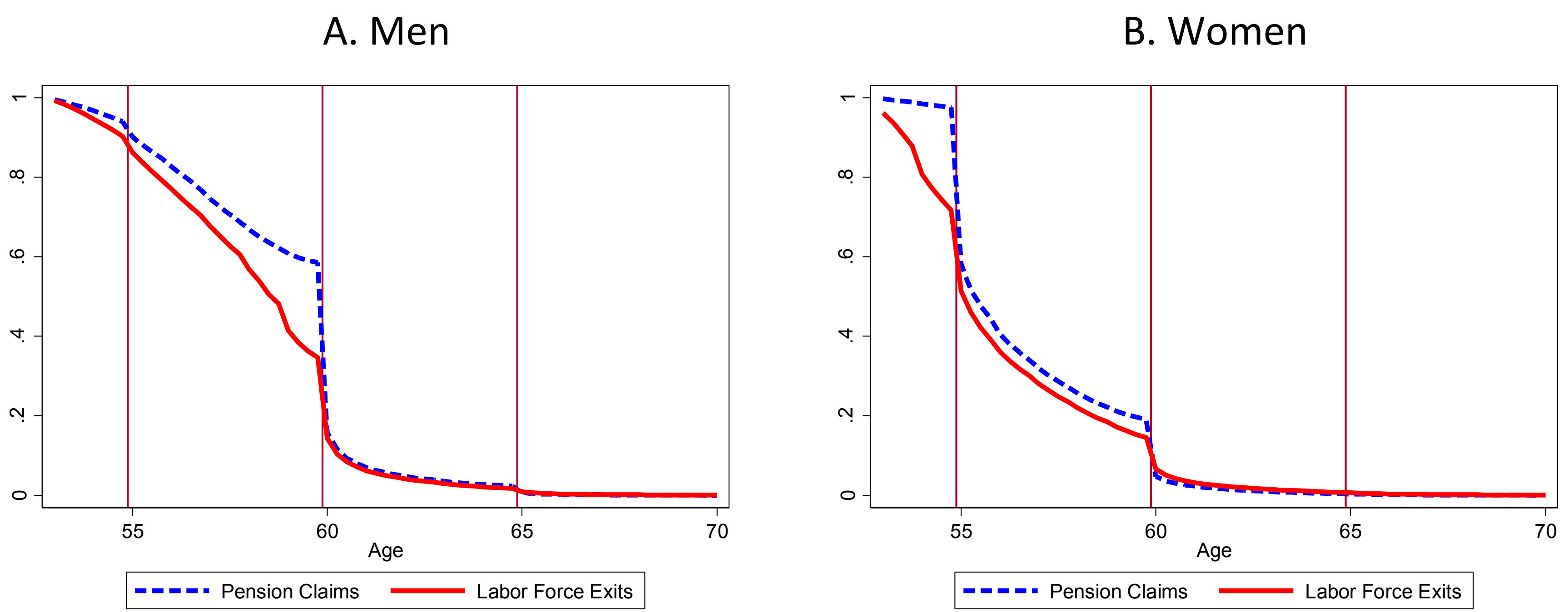
Fig. 1. Early Retirement Ages by Pension Type



Notes: The vertical lines mark the beginning of changes implemented under the 2000 and 2004 pension reforms.

Source: Manoli and Weber '13

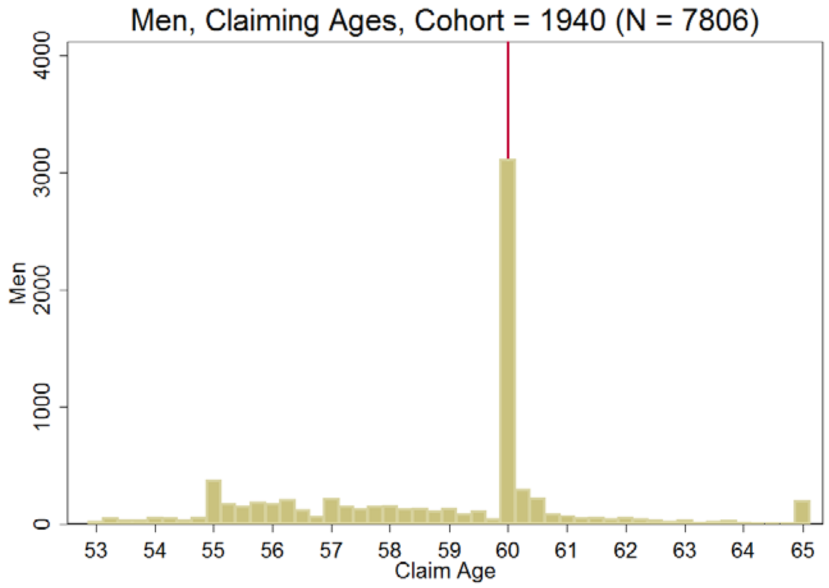
Fig. 2. Pre-Reform Pension Claims & Job Exits

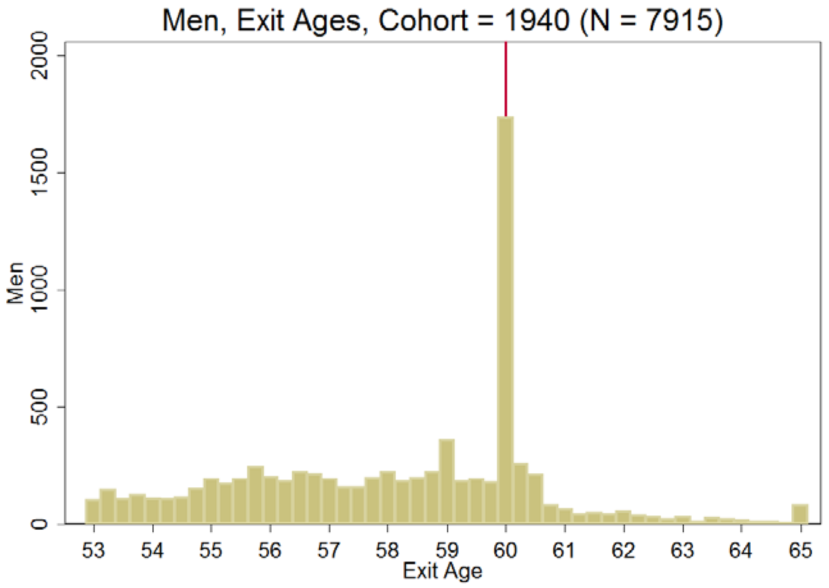


Notes: For computing the survival curves, the sample is restricted to pre-reform birth cohorts (1930 through 1939 for men and 1935 through 1944 for women) and also to individuals for whom a claim is observed prior to age 70. See Table 1 for the full sample restrictions.

Source: Manoli and Weber '13

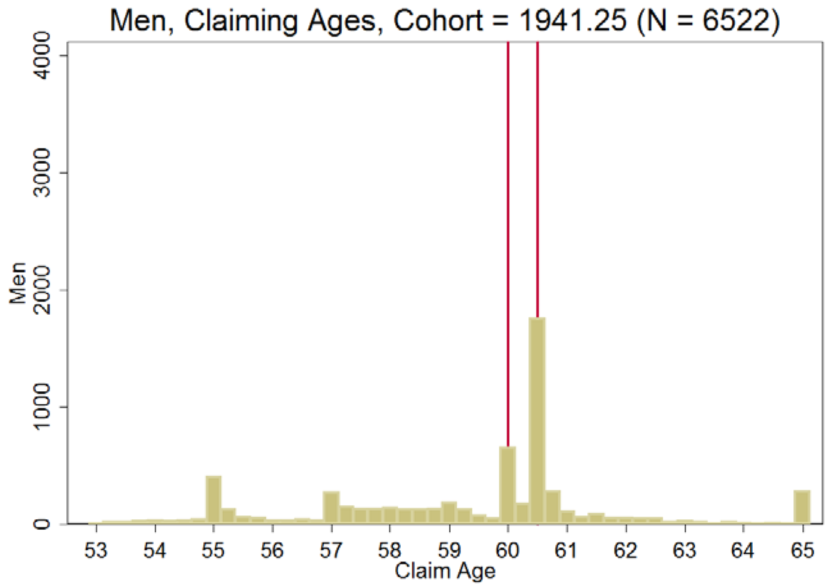
Fig. 5A. Men's Claiming Ages & Exit Ages by Cohort





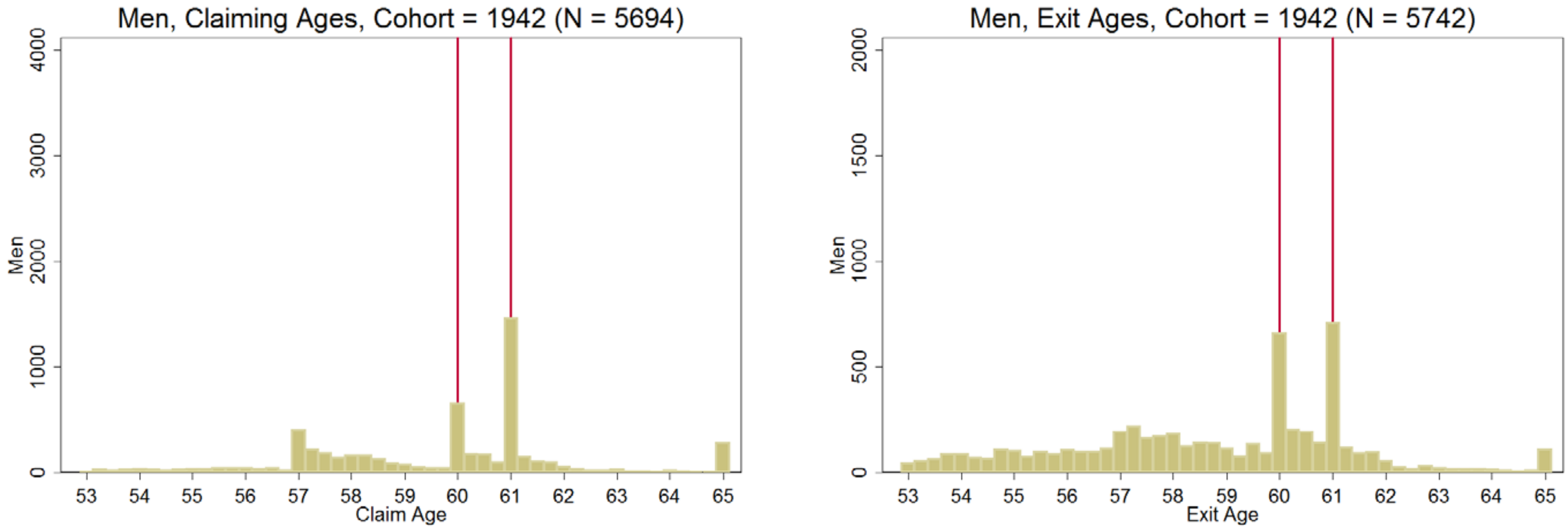
Source: Manoli and Weber '13

Fig. 5A. Men's Claiming Ages & Exit Ages by Cohort



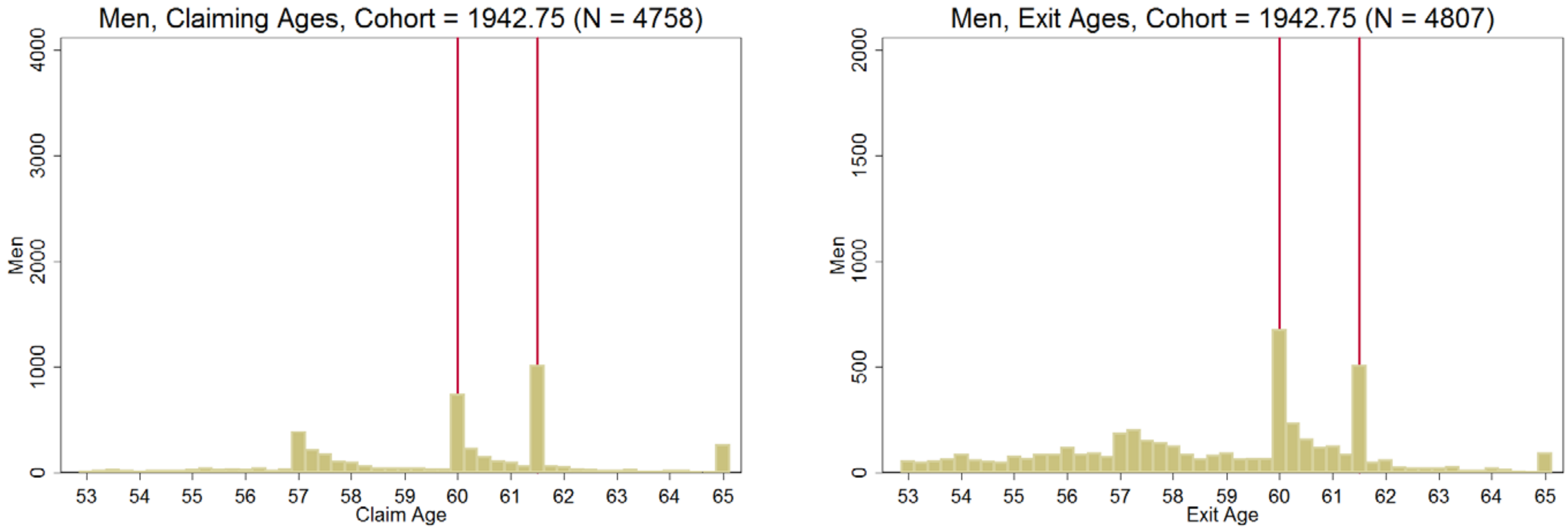
Source: Manoli and Weber '13

Fig. 5A. Men's Claiming Ages & Exit Ages by Cohort



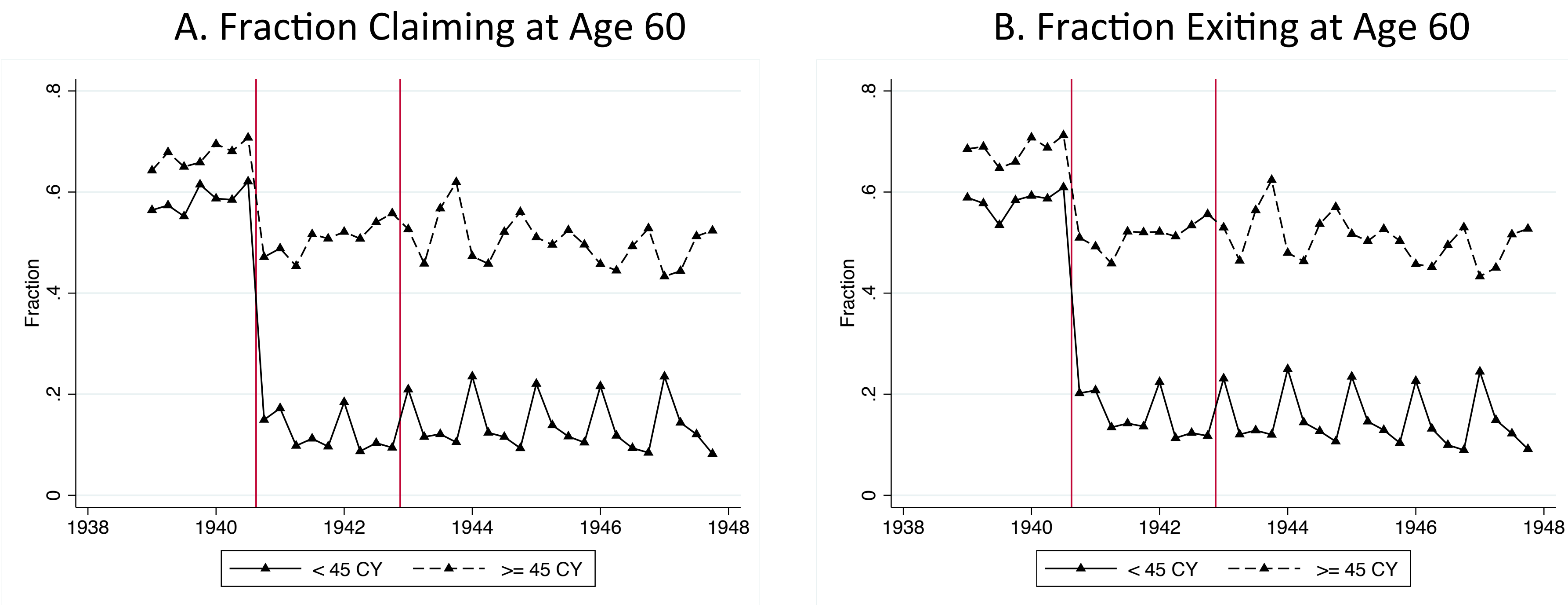
Source: Manoli and Weber '13

Fig. 5A. Men's Claiming Ages & Exit Ages by Cohort



Source: Manoli and Weber '13

Fig. 9. Claiming & Exiting by Birth Cohort & Contribution Years, Men



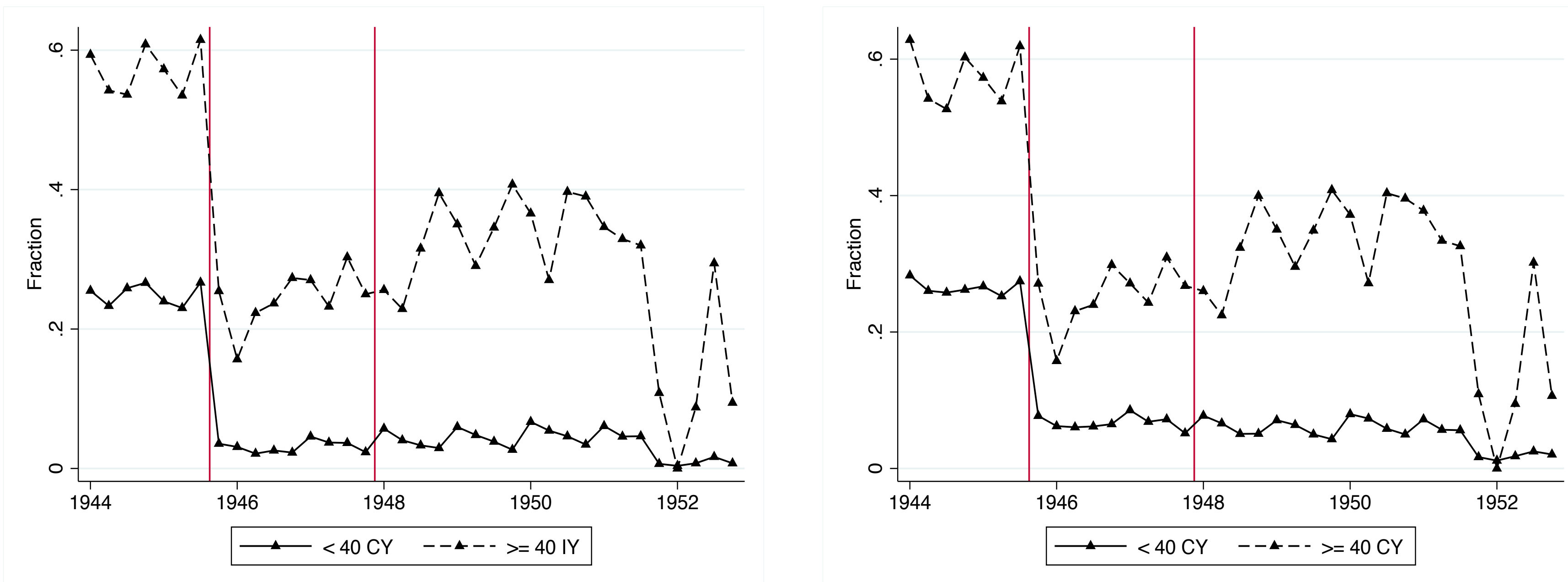
Notes: Each figure plots the fraction individuals still in the labor market who claim pensions or exit jobs by birth cohort. Women with 40 or more contribution years and men with 45 or more contribution years are exempt from the increases in the Early Retirement Ages and can continue to retire at ages 55 and 60 respectively. The sample is restricted to men ages 59 through 62 in birth cohorts 1939 through 1947 and women ages 54 through 57.75 in birth cohorts 1944 through 1952. Observations are censored at the Early Retirement Age specified for each individual.

Source: Manoli and Weber '13

Fig. 9. Claiming & Exiting by Birth Cohort & Contribution Years, Women

C. Fraction Claiming at Age 55

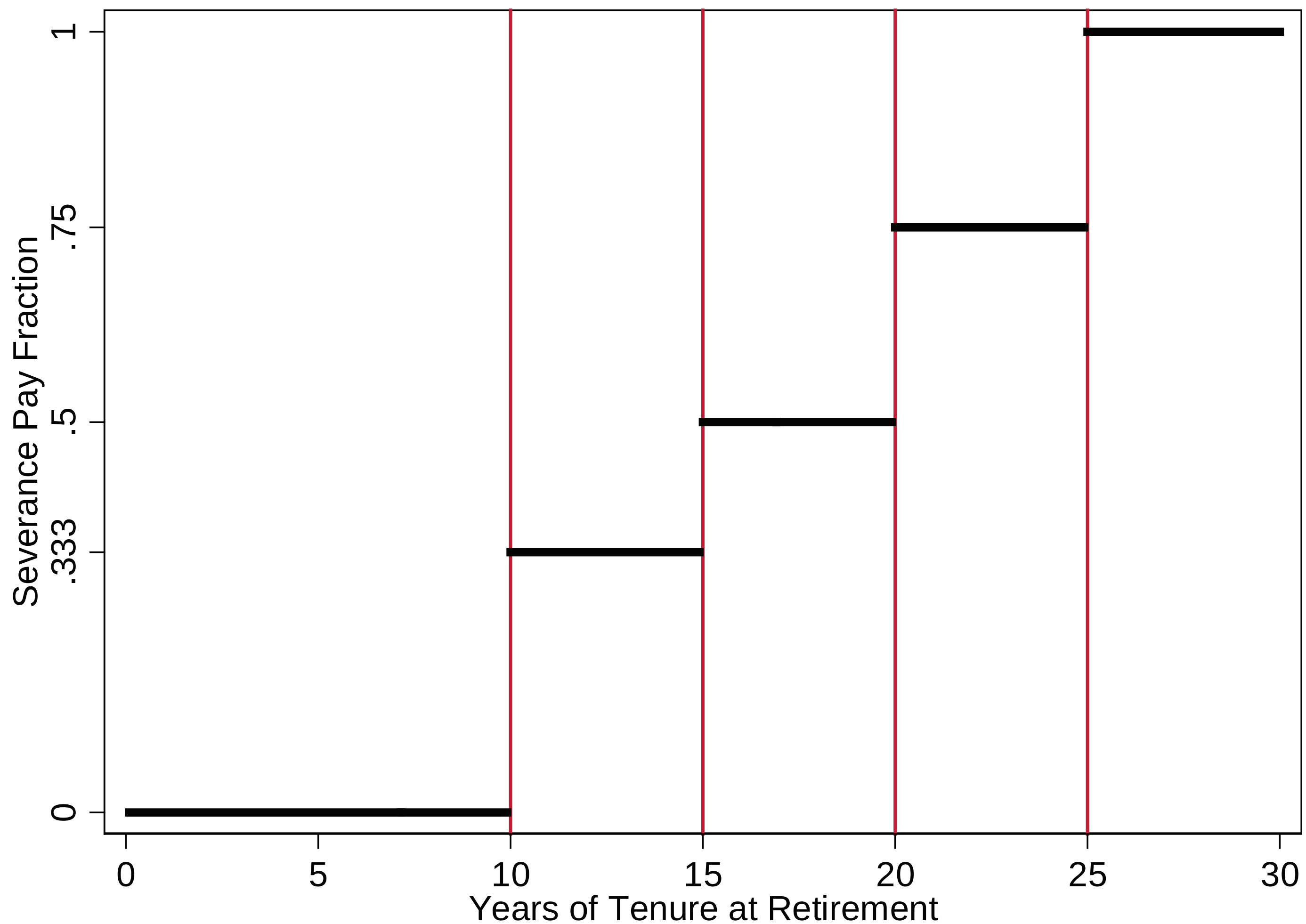
D. Fraction Exiting at Age 55



Notes: Each figure plots the fraction individuals still in the labor market who claim pensions or exit jobs by birth cohort. Women with 40 or more contribution years and men with 45 or more contribution years are exempt from the increases in the Early Retirement Ages and can continue to retire at ages 55 and 60 respectively. The sample is restricted to men ages 59 through 62 in birth cohorts 1939 through 1947 and women ages 54 through 57.75 in birth cohorts 1944 through 1952. Observations are censored at the Early Retirement Age specified for each individual.

Source: Manoli and Weber '13

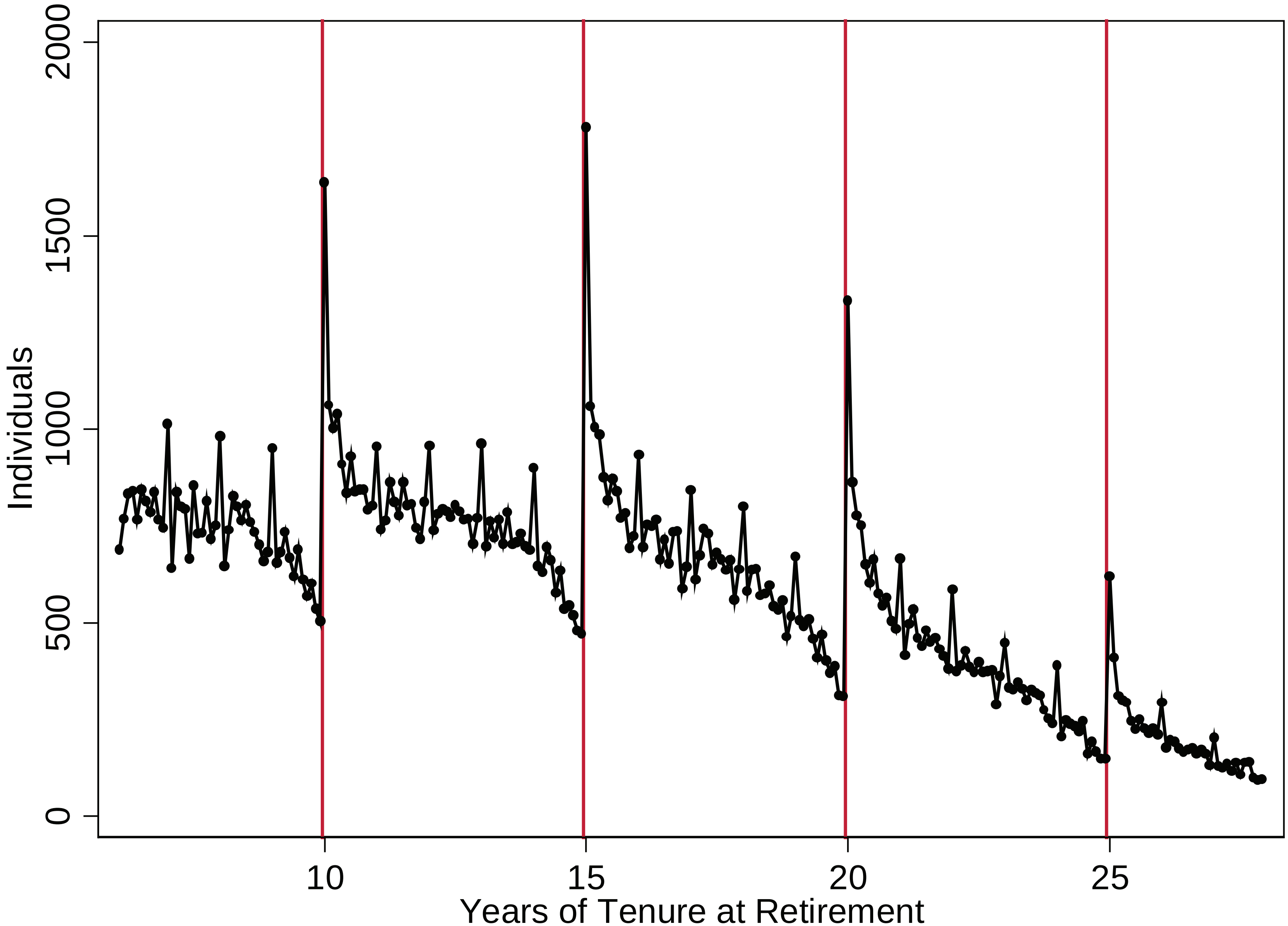
Fig. 1. Payment Amounts based on Tenure at Retirement



Notes: There are two forms of government-mandated retirement benefits in Austria: (1) government-provided pension benefits and (2) employer-provided severance payments. The employer-provided severance payments are made to private sector employees who have accumulated sufficient years of tenure by the time of their retirement. Tenure is defined as uninterrupted employment time with a given employer and retirement is based on claiming a government-provided pension. The payments must be made within 4 weeks of claiming a pension according to the following schedule. If an employee has accumulated at least 10 years of tenure with her employer by the time of retirement, the employer must pay one third of the worker's last year's salary. This fraction increases from one third to one half, three quarters and one at 15, 20 and 25 years of tenure respectively. Since payments are based on an employee's salary, overtime compensation and other non-salary payments are not included when determining the amounts of the payments. Provisions to make these payments come from funds that employers are mandated to hold based on the total number of employees. Severance payments are also made to individuals who are involuntarily separated (i.e. laid off) from their firms if the individuals have accumulated sufficient years of tenure prior to the separation. The only voluntary separation that leads to a severance payment, however, is retirement. Employment protection rules hinder firms from strategically laying off workers to avoid severance payments and there is no evidence on an increased frequency of layoffs before the severance pay thresholds.

Source: Manoli and Weber NBER'11

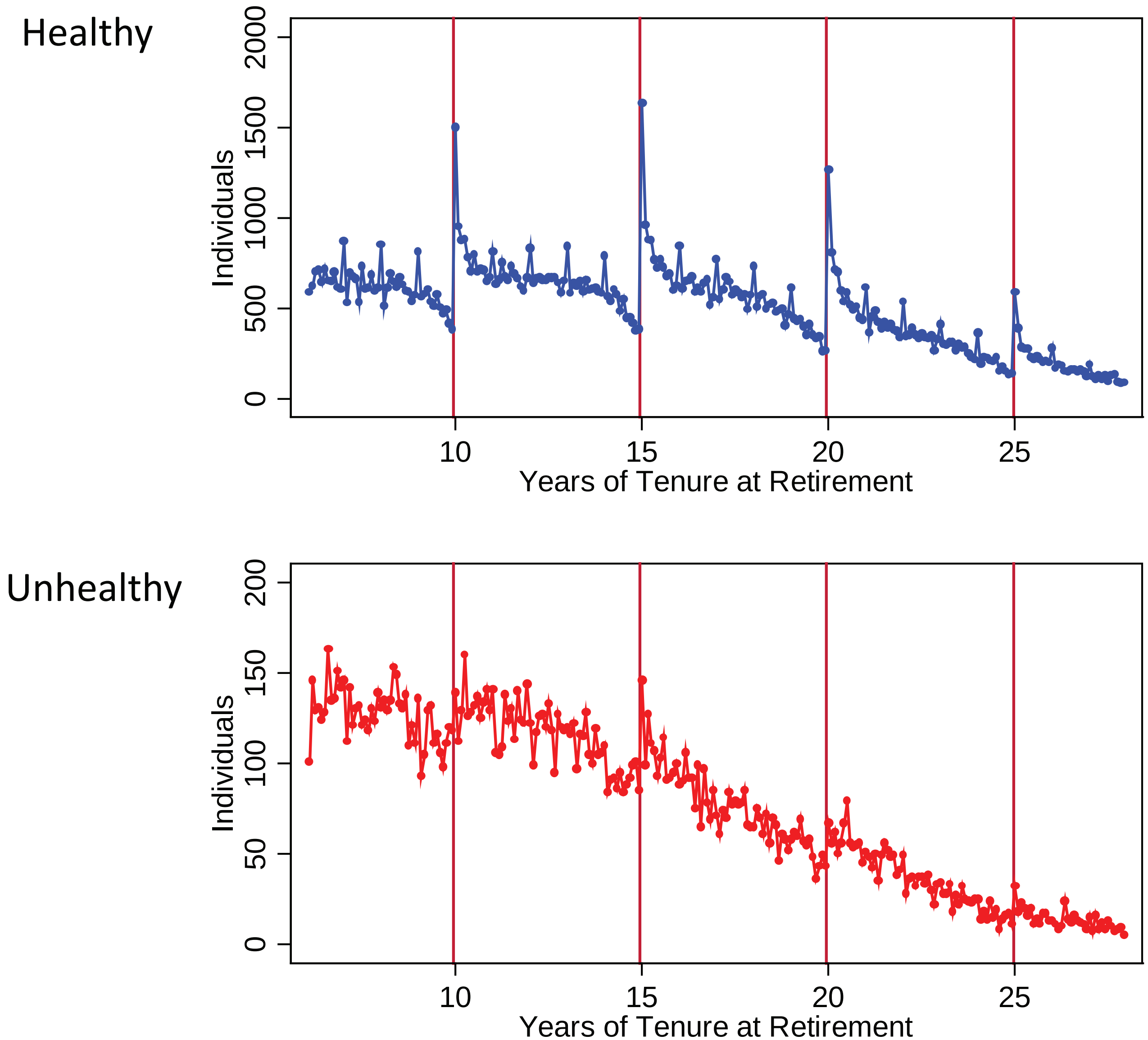
Fig. 3. Distribution of Tenure at Retirement, Full Sample



Notes: This figure plots the distribution of tenure at retirement at a monthly frequency. Each point captures the number of people that retire with tenure greater than the lower number of months, but less than the higher number of months. Tenure at retirement is computed using observed job starting and job ending dates. Since firm-level tenure is only recorded beginning in January 1972, we restrict the sample to individuals with uncensored tenure at retirement (i.e. job starting after January 1972).

Source: Manoli and Weber NBER'11

Fig. 6. Tenure at Retirement by Health Status



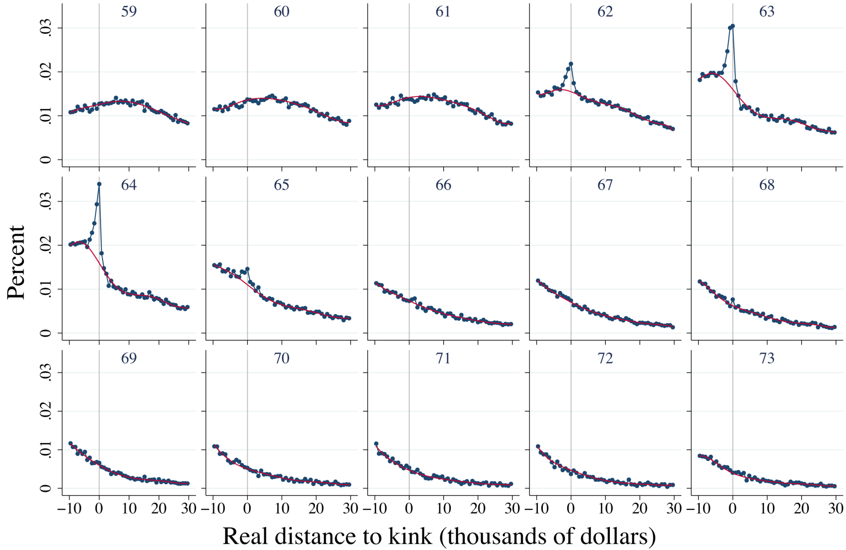
Notes: Health status is measured based on the fraction of time between age 54 and retirement that is spent on sick leave. An individual is classified as unhealthy if his health status is below the median level. The median health status is computed within the sample of individuals with positive sick leave and uncensored tenure at retirement.; this median health status is 0.076.

Source: Manoli and Weber NBER'11

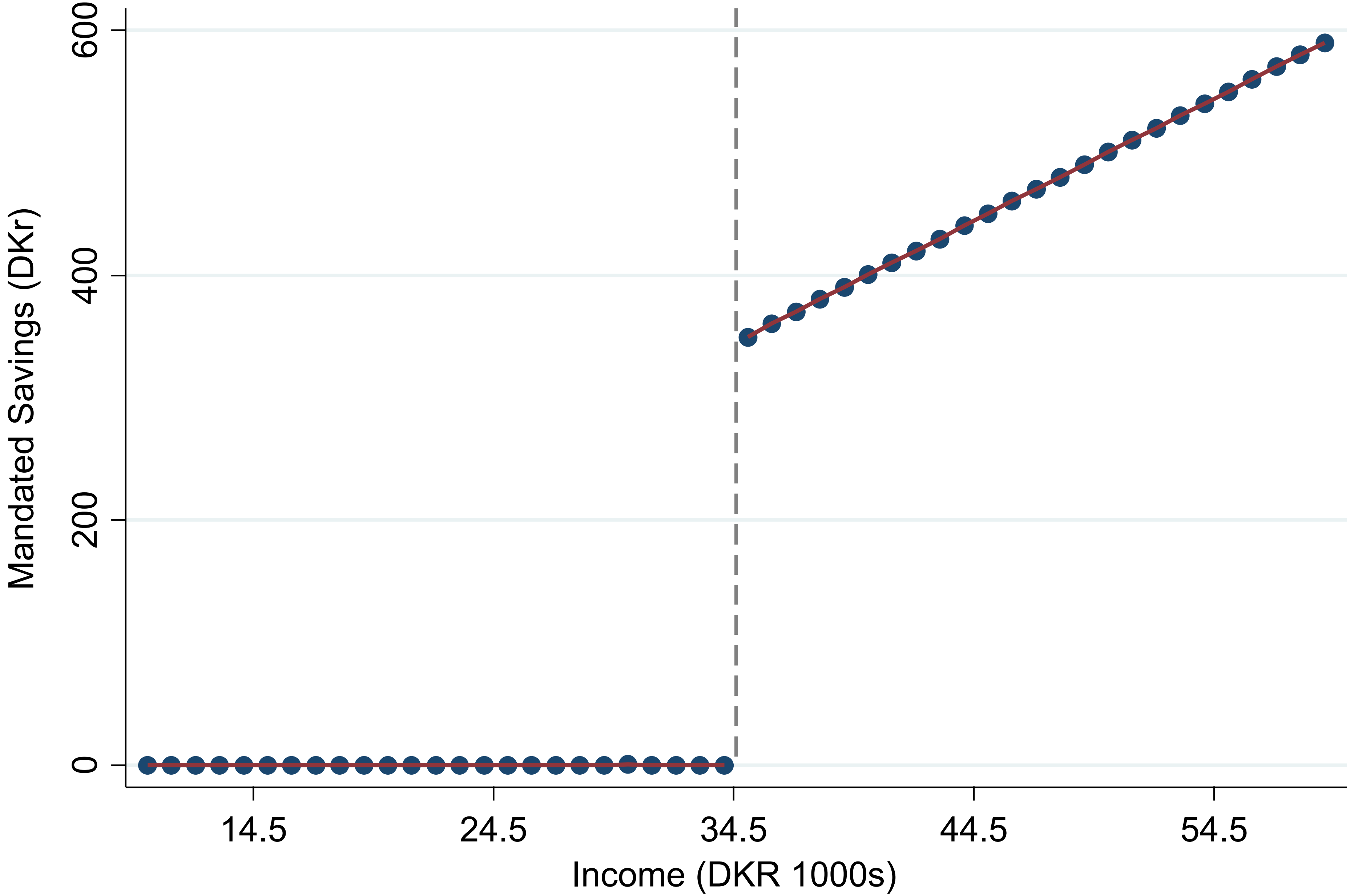
Source: Gelber, Jones, Sacks (2013)

Figure E.6: Adjustment Across Ages: Histograms of Earnings and Normalized Excess Mass, 59-73-year-olds Claiming OASI by Age 65, 2000-2006

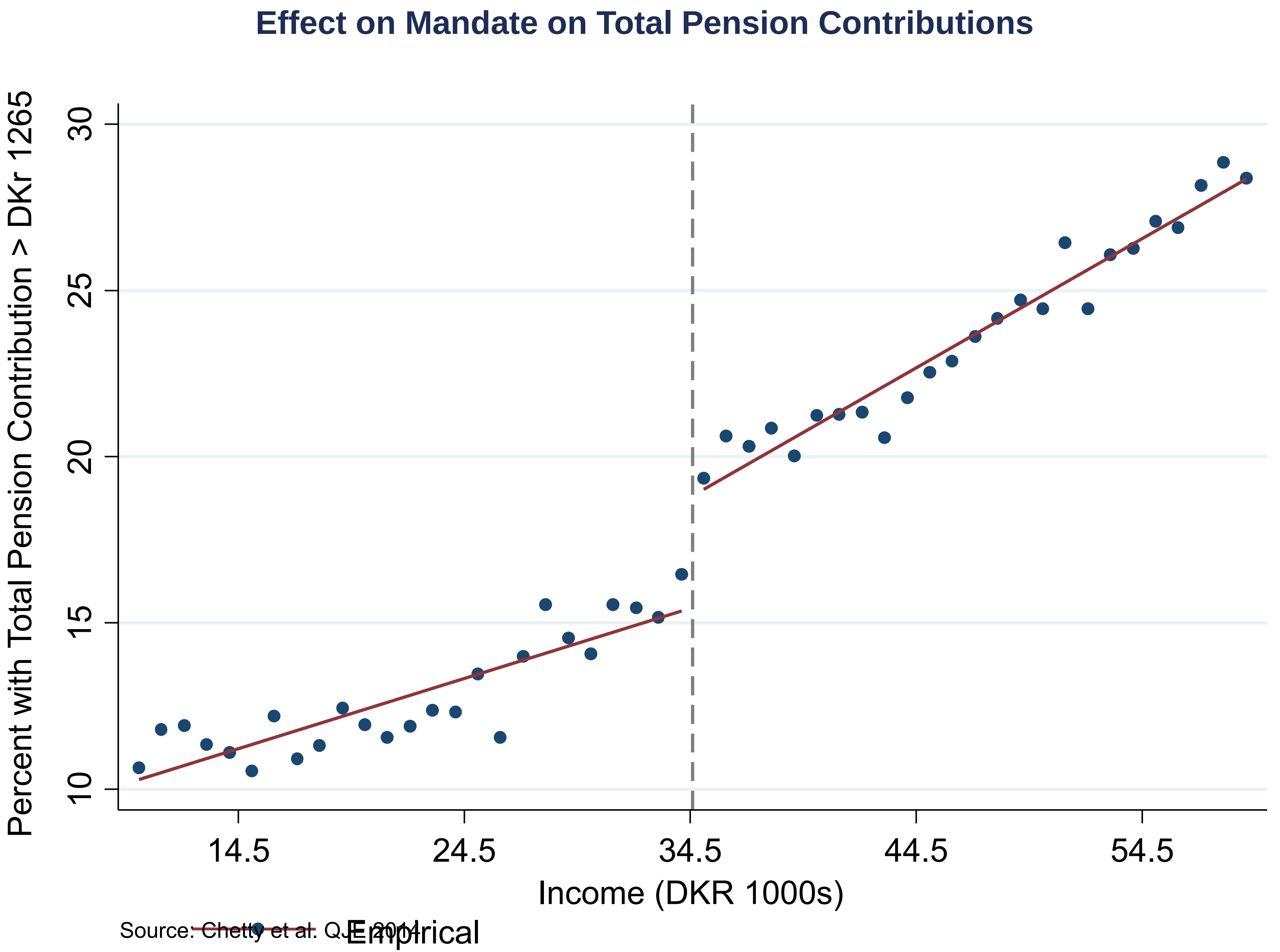
Panel A: Earnings histograms, by age



Mandated Savings (M) Around Eligibility Threshold in 1998

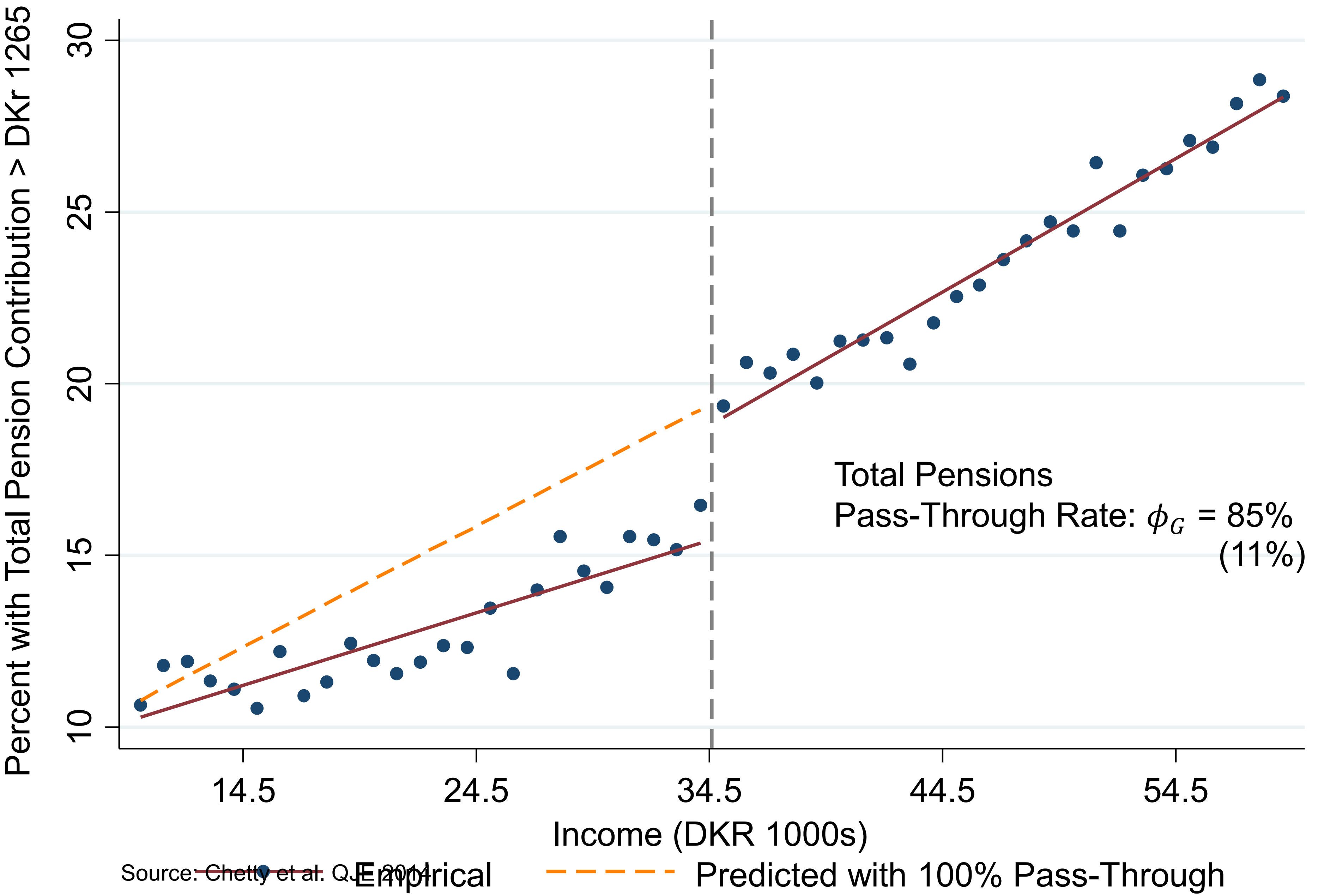


Source: Chetty et al. QJE 2014



Effect on Mandate on Total Pension Contributions
Percent with Total Pension Contribution > DKr 1265
10
15
20
25
30
14.5
24.5
34.5
44.5
54.5
Income (DKR 1000s)
Empirical
Source: Chetty et al. QJE 2014

Effect on Mandate on Total Pension Contributions



Source: Chetty et al. QJE 2014

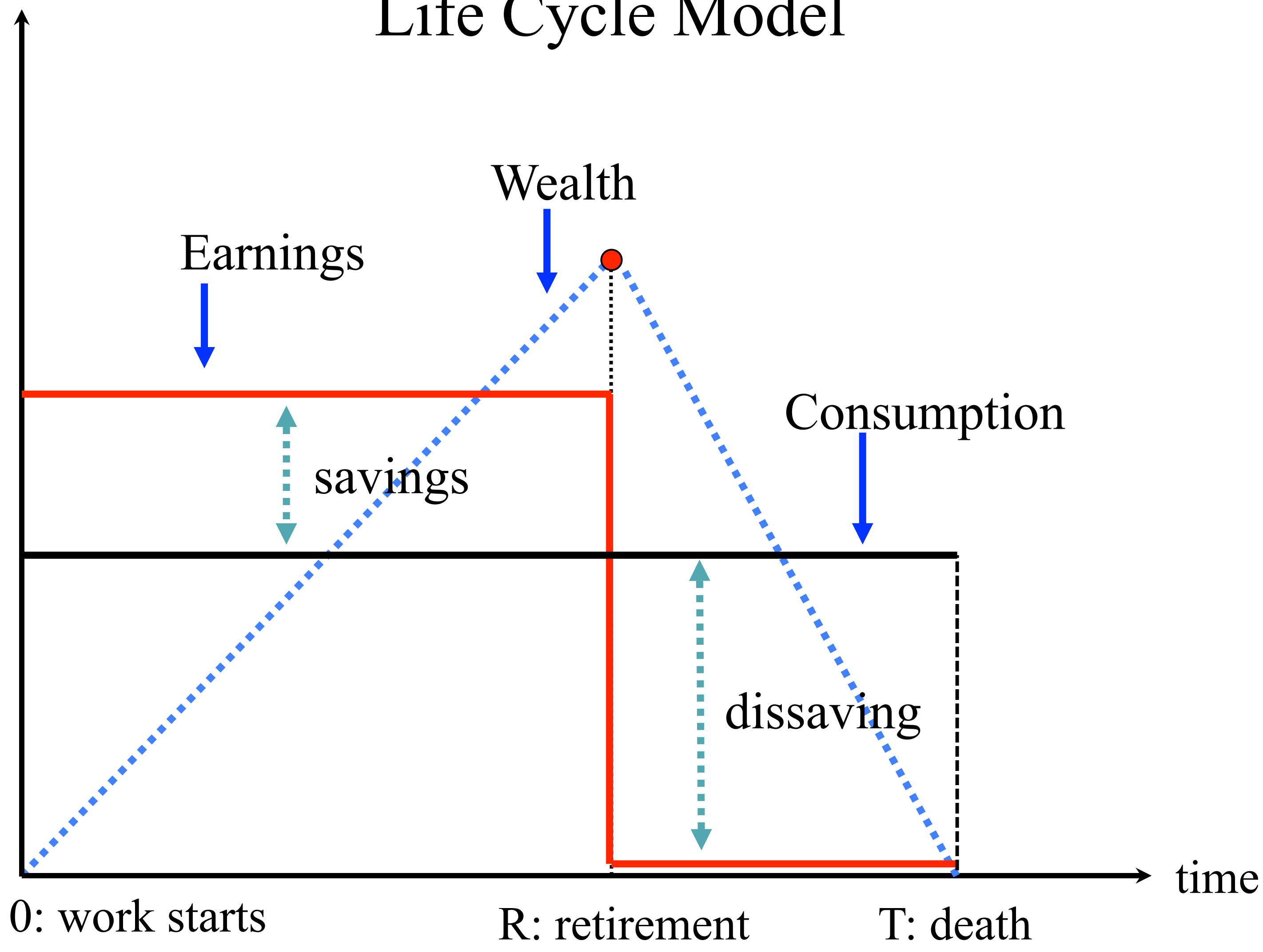

Effect on Mandate on Total Saving
Percent with Total Savings > DKr 1371
40
44
48
52
14.5
24.5
34.5
44.5
54.5
Income (DKR 1000s)
Total Pensions
Pass-Through Rate: ϕ_G = 127%
(36%)
Empirical
Predicted with 100% Pass-Through
Source: Chetty et al. QJE 2014

Mandated Savings Plan: Pass-Through Estimates

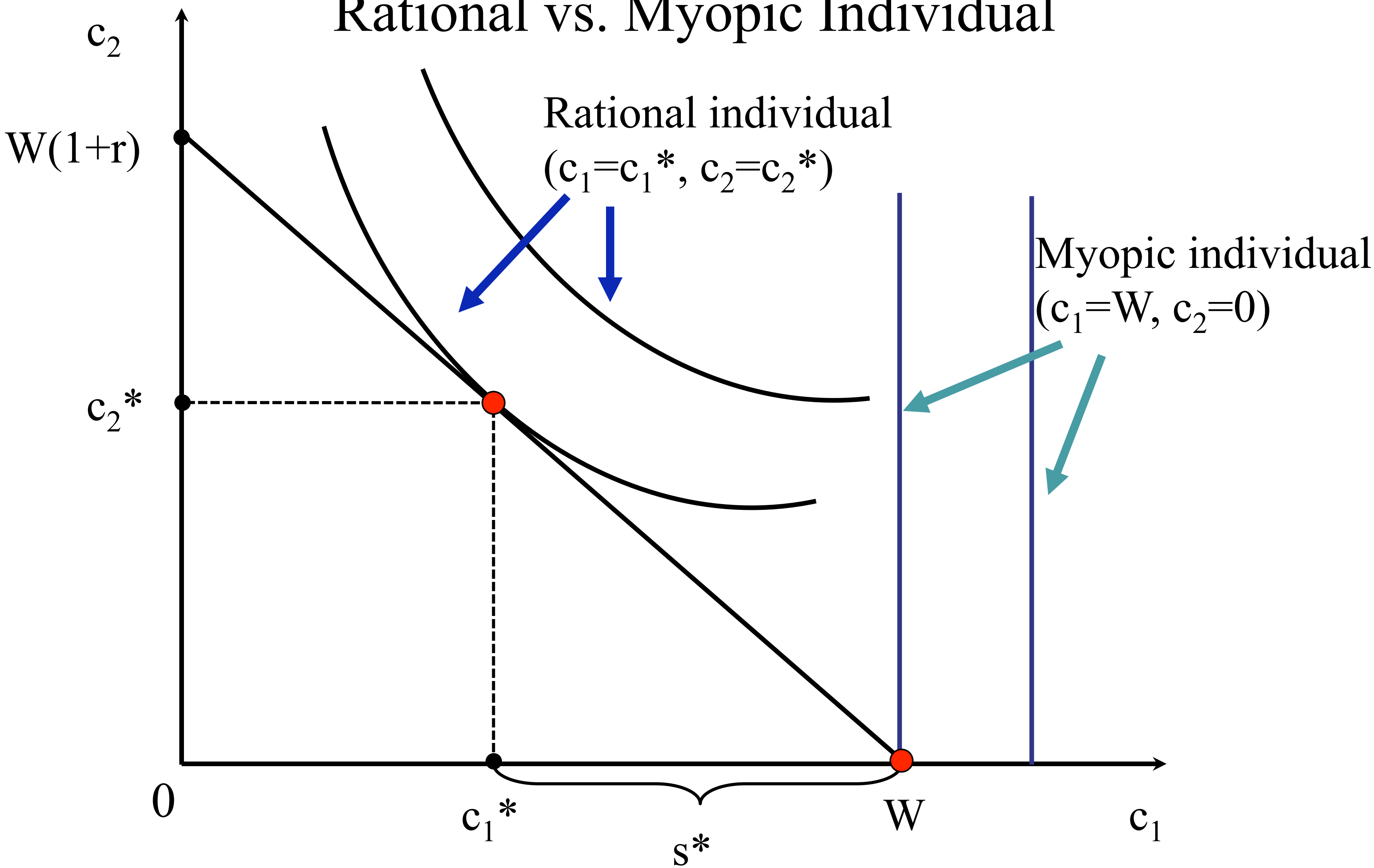
Dep. Var.:	Δ Total Pensions			Total Pension Threshold	Total Saving Threshold	Total Ind. Saving Threshold	Net Saving Threshold
	(1)	(2)	(3)	(4)	(5)	(6)	
Pass-Through Estimate	0.883 (0.204)	1.052 (0.200)	0.801 (0.310)	0.845 (0.113)	1.268 (0.363)	1.336 (0.349)	2.188 (0.587)
Research Design	Linear	Linear	Quadratic	Linear	Linear	Linear	Linear
No. of Obs	35,578	35,578	35,578	158,229	148,380	148,380	128,988

Source: Chetty et al. QJE 2014

Life Cycle Model



Rational vs. Myopic Individual



Adding forced savings $\tau = s^*$

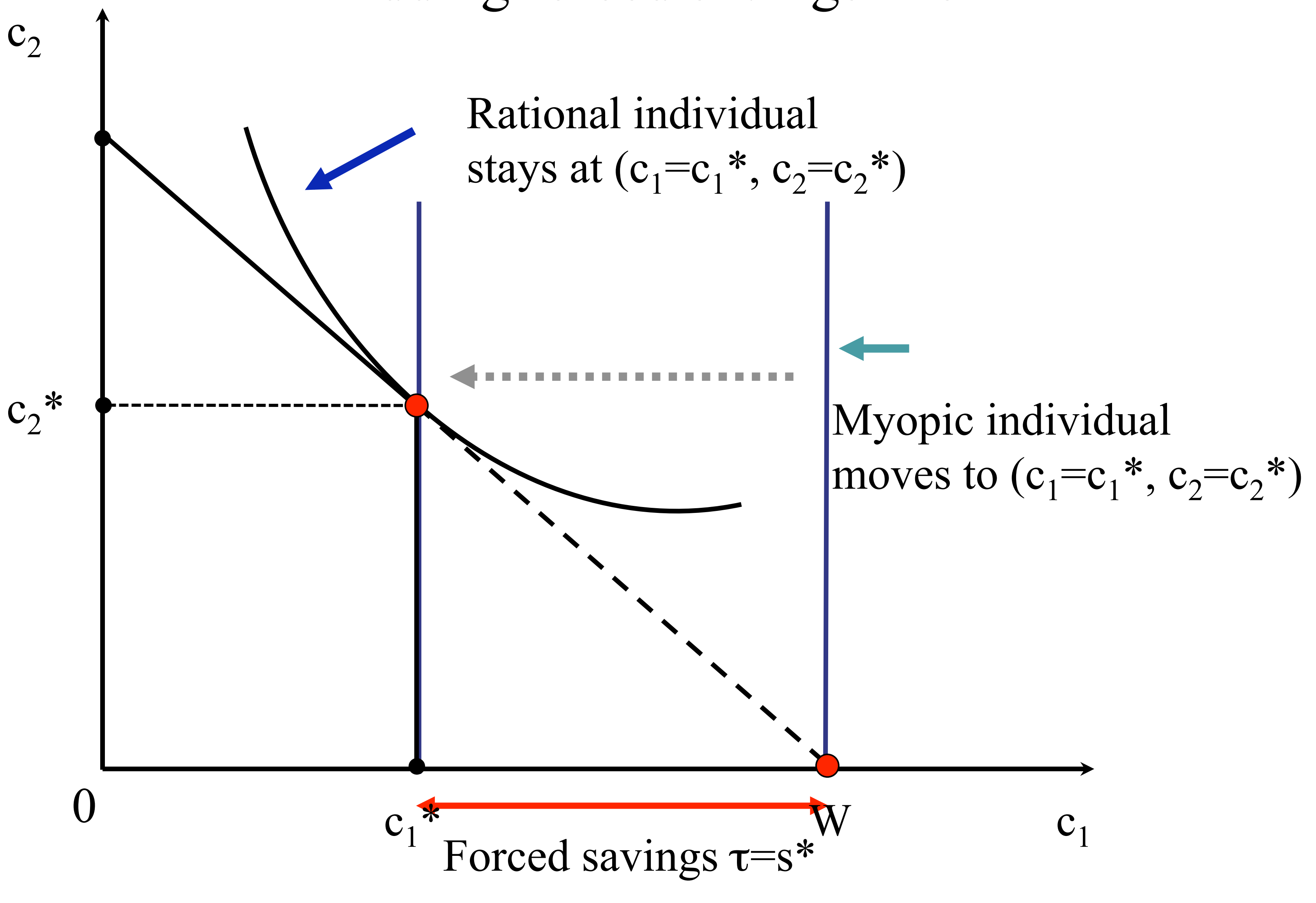
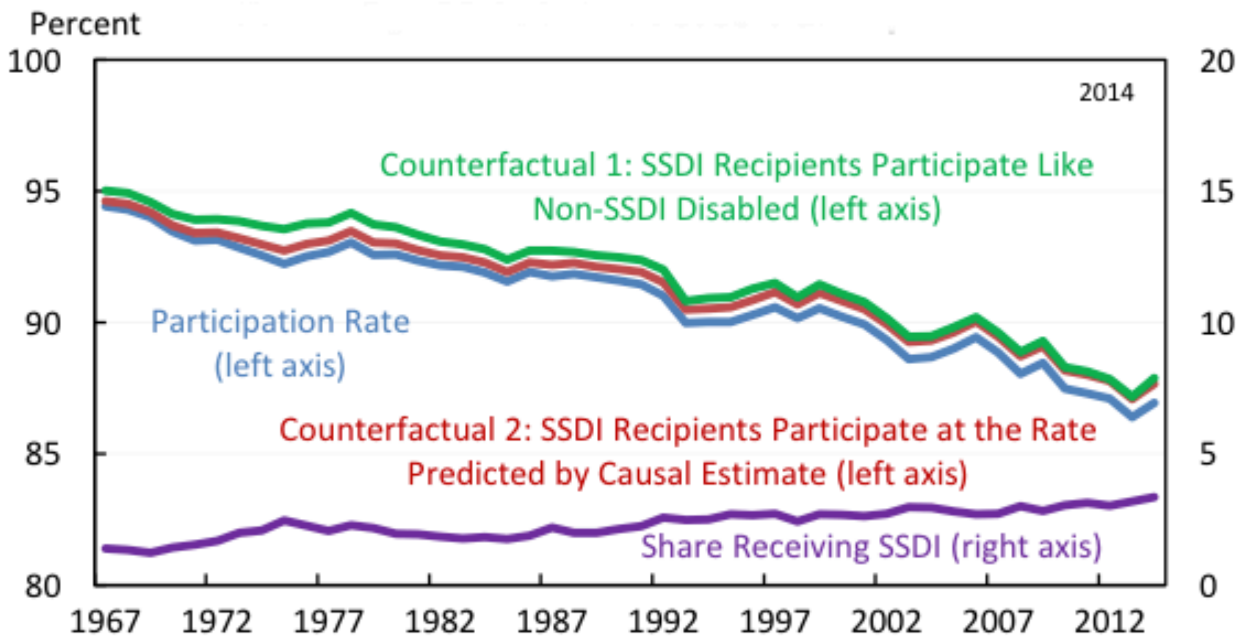


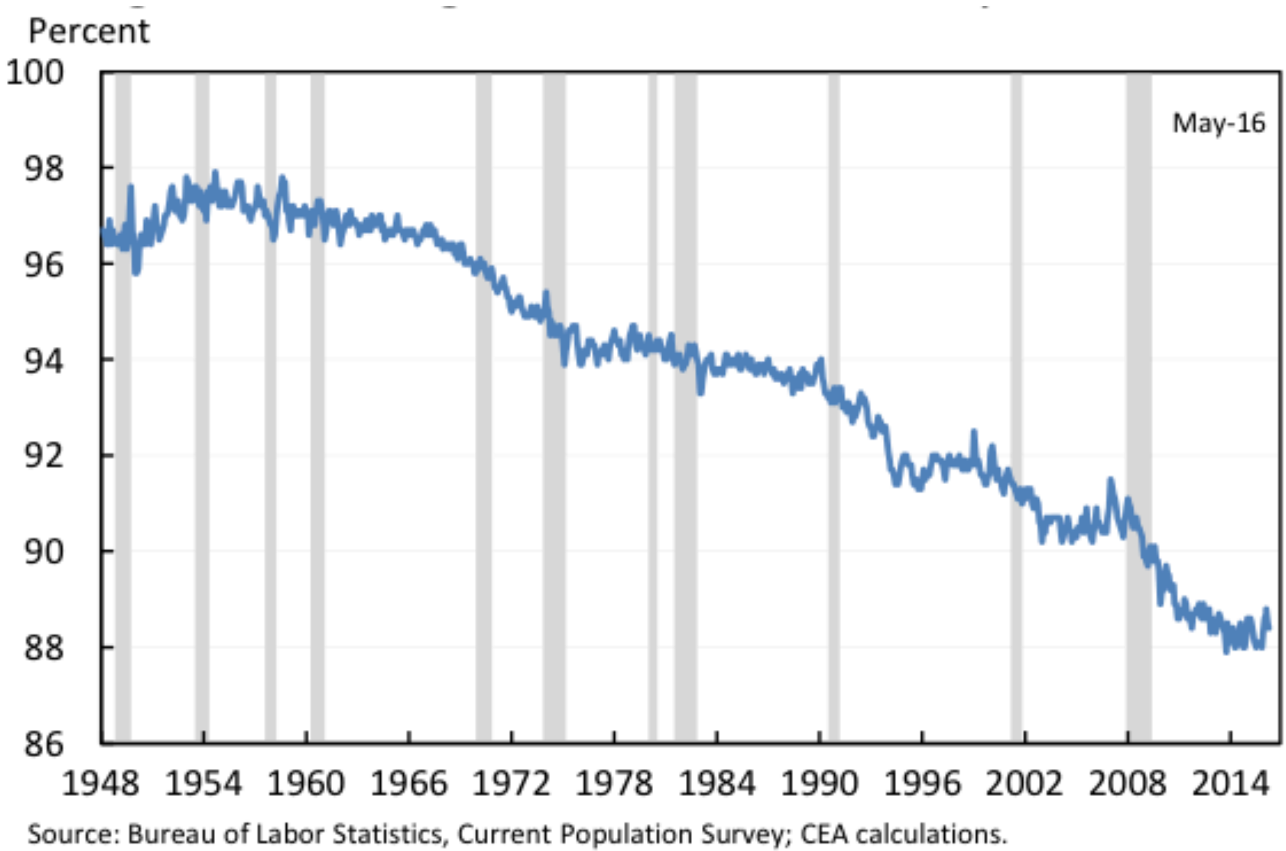
Figure 6. Possible effects of disability on prime-age male labour force participation



Note: Green line participation rate pre-1988 is a linear projection based on the post-1988 series due to a lack of data identifying the disabled before 1988. Participation rates for non-SSDI recipient disabled are age-adjusted using a linear probability model. Red counterfactual based on French and Song (2014).
Source: Bureau of Labor Statistics, Current Population Survey (Annual Social and Economic Supplement); CEA calculations.

Source: Black, Furman, Rackstraw, Rao (2016)

Figure 1. Prime-age male labour force participation rate



Source: Black, Furman, Rackstraw, Rao (2016)

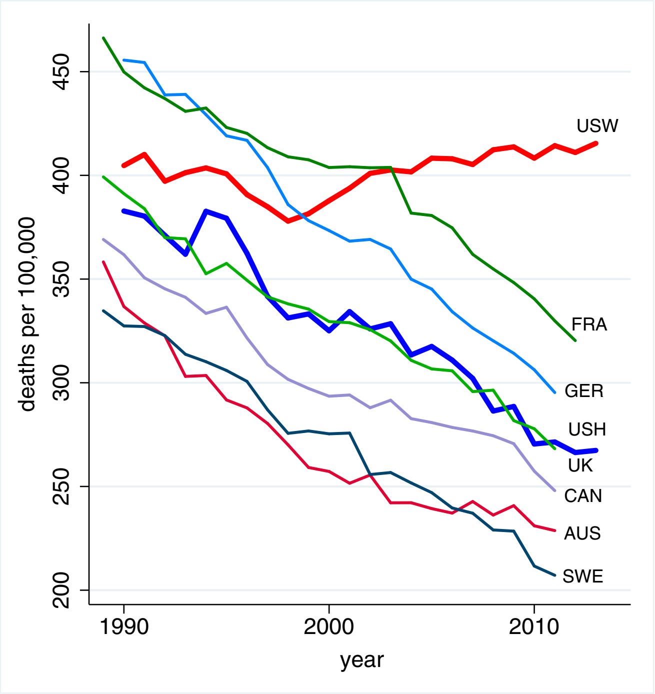
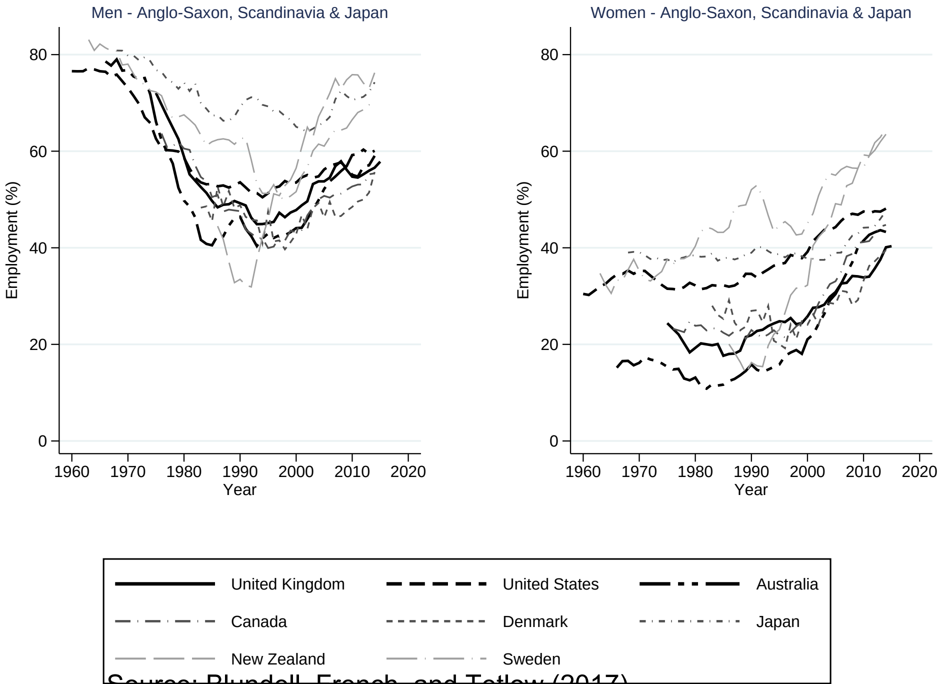


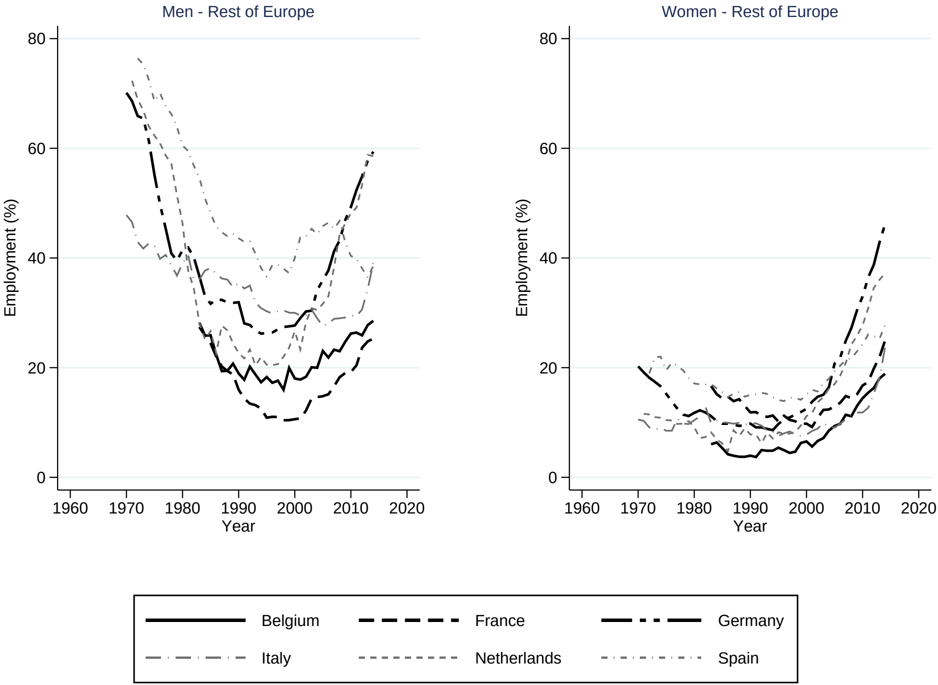
Fig. 1. All-cause mortality, ages 45–54 for US White non-Hispanics (USW), US Hispanics (USH), and six comparison countries: France (FRA), Germany (GER), the United Kingdom (UK), Canada (CAN), Australia (AUS), and Sweden (SWE).

Source: Case and Deaton (2015)

Figure 2.2: Employment of those aged 60–64

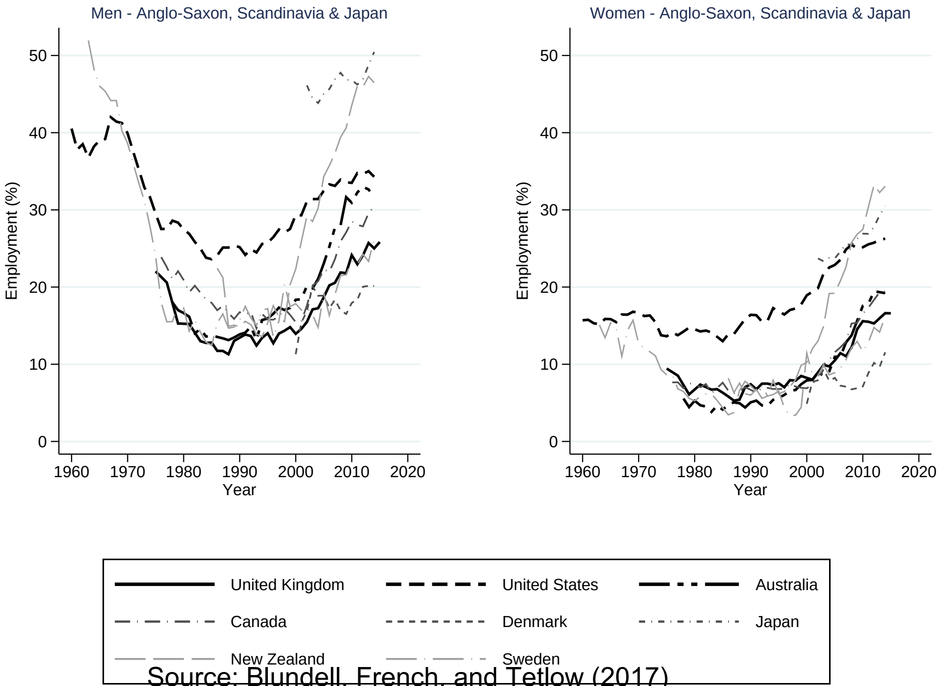


Source: Blundell, French, and Tetlow (2017)

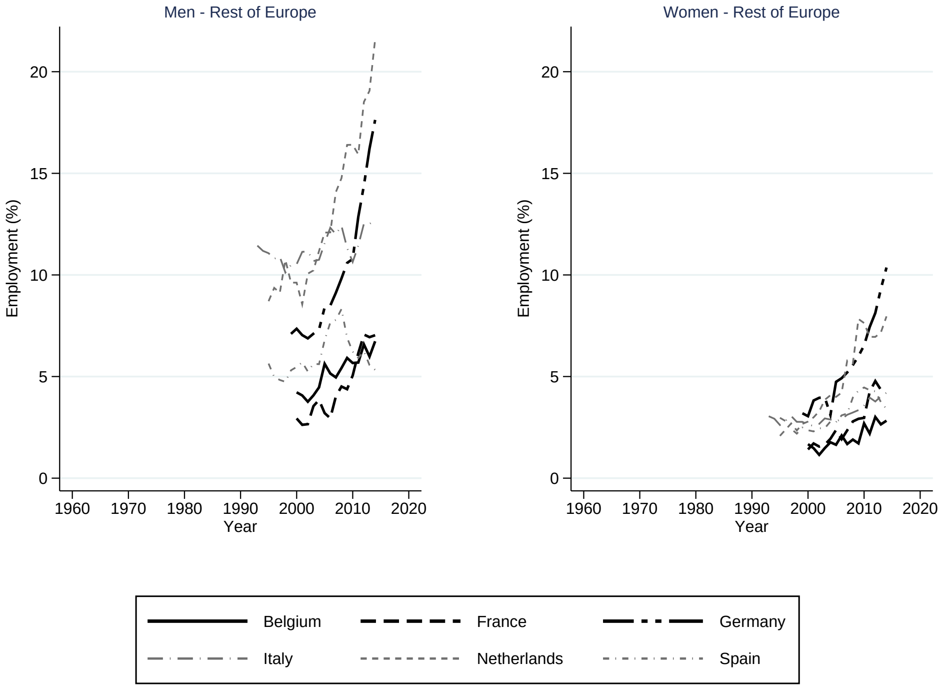


Source: Blundell, French, and Tetlow (2017)

Figure 2.3: Employment of those aged 65–69

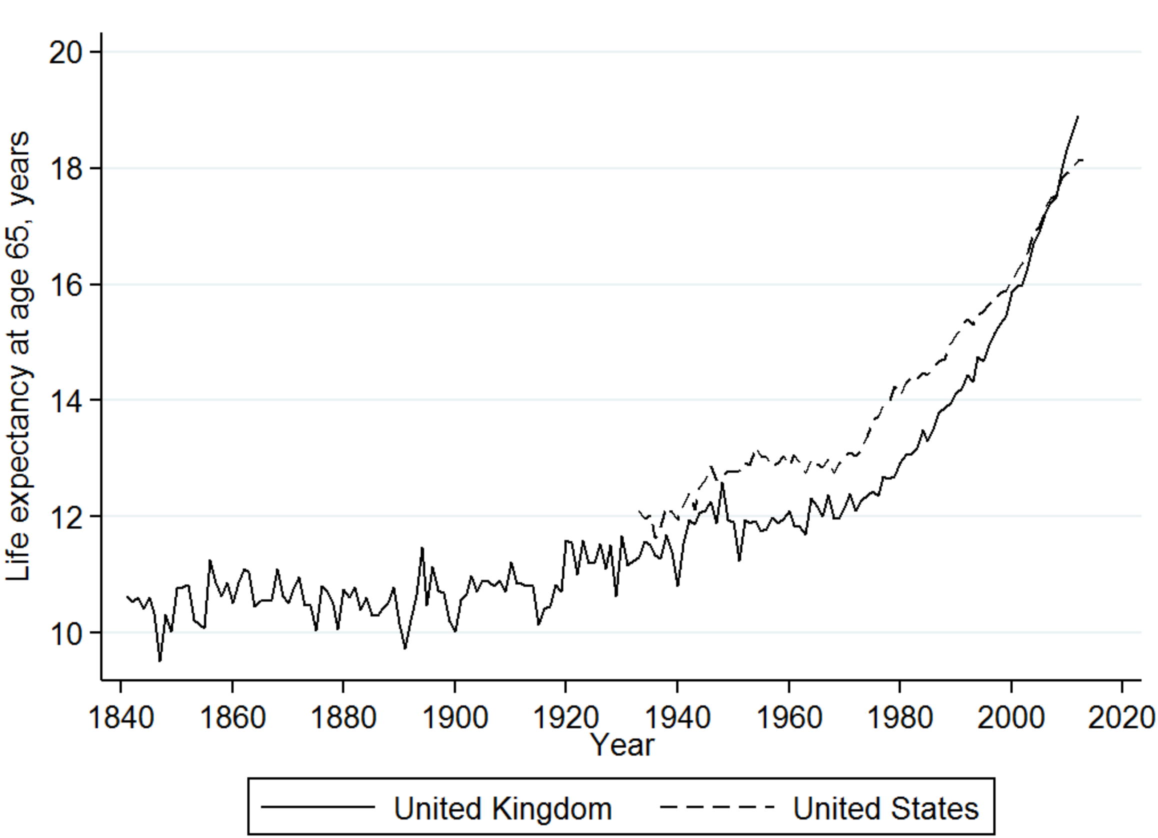


Source: Blundell, French, and Tetlow (2017)



Source: Blundell, French, and Tetlow (2017)

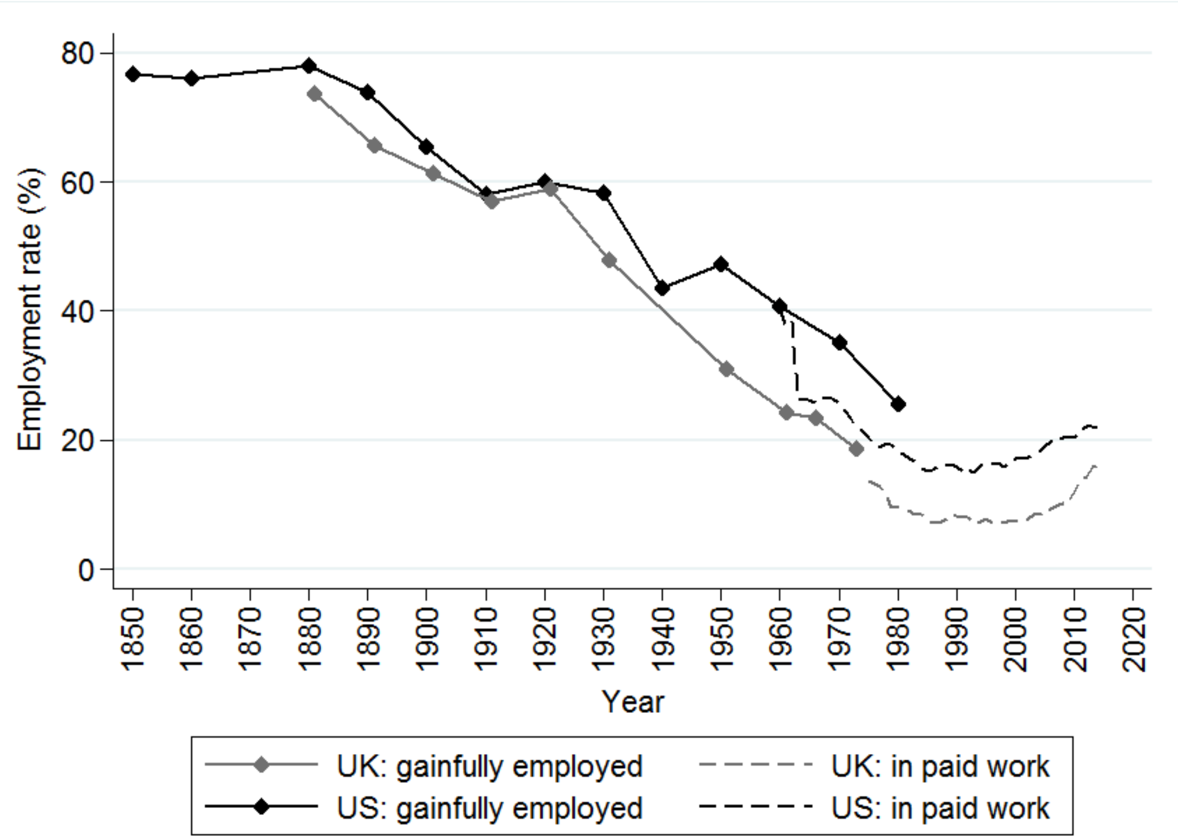
Figure 2.7: Life expectancy of men at age 65 in the UK and the US



Source: UK data from the Office for National Statistics, US data from the Human Mortality Database.

Source: Blundell, French, and Tetlow (2017)

Figure 2.6: Employment rate of men aged 65+ in the UK and the US



Source: Blundell, French, and Tetlow (2017)

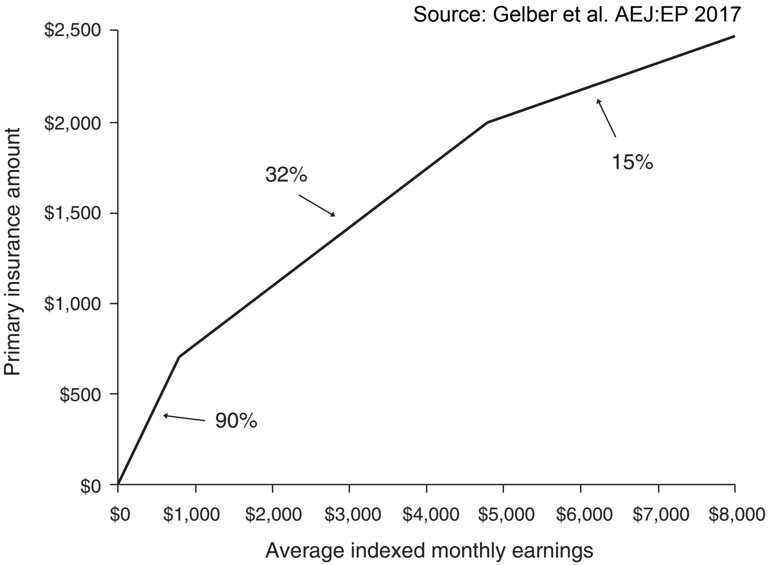


Figure 1. Primary Insurance Amount as a Function of Average Indexed Monthly Earnings

Notes: The figure shows the primary insurance amount (PIA) as a function of average indexed monthly earnings (AIME) in 2013. The percentages are marginal replacement rates.

Source: SSA (2013)

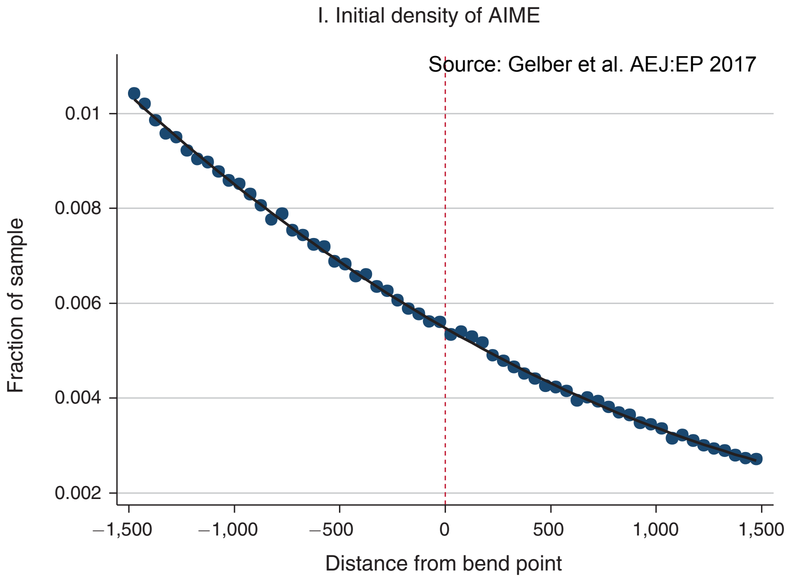


FIGURE 3. SMOOTHNESS OF DENSITY AND PREDETERMINED COVARIATES AROUND THE UPPER BEND POINT (*continued*)

Notes: The figure shows the density of initial AIME in \$50 bins as a function of distance of initial AIME to the upper bend point. The number of observations appears smooth through this bend point, with no sharp change in slope or level. The upper bend point is where the marginal replacement rate in converting AIME to PIA changes from 32 percent to 15 percent. The sample includes DI beneficiaries within \$1,500 of the upper bend point (see the text for other sample restrictions). The fraction of the sample in each bin is calculated by dividing the number of beneficiaries in each bin by the total number of beneficiaries in the sample. The best-fit line is a ninth-order polynomial that parallels the regression presented in Table 2 that minimizes the corrected Akaike Information Criterion (AICc).

Source: The data are from SSA administrative records.

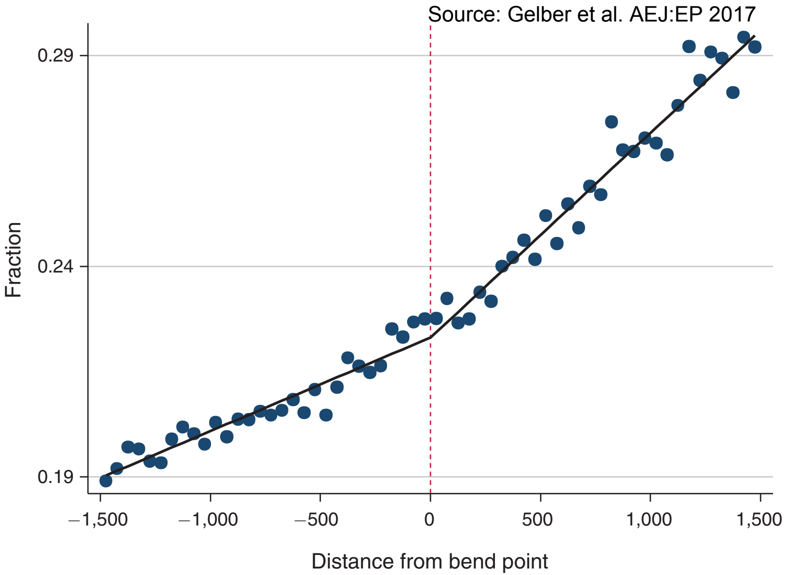


Figure 5. Average Annual Fraction Employed after DI Allowance

Notes: The figure shows the mean fraction of years when a beneficiary has positive annual earnings, over the four years after going on DI (i.e., the mean yearly employment rate over these four years), in \$50 bins, as a function of distance from the bend point. The figure shows that the probability of positive earnings appears to slope upward more steeply above the upper bend point than below it.

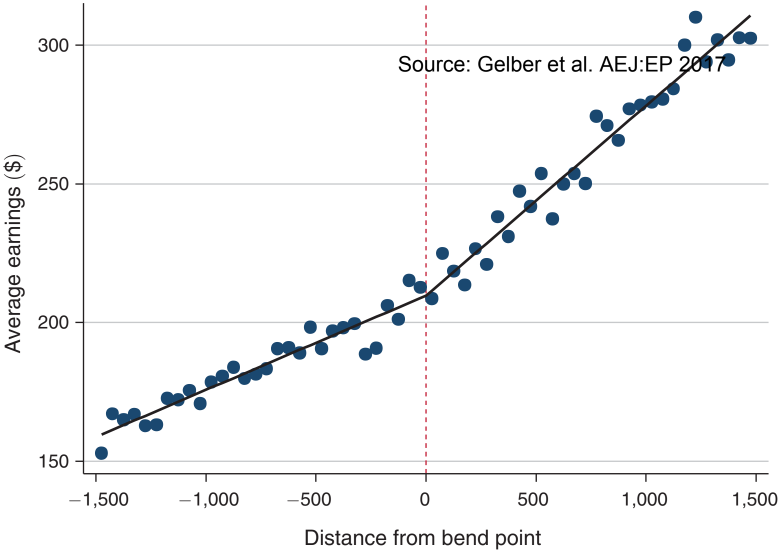
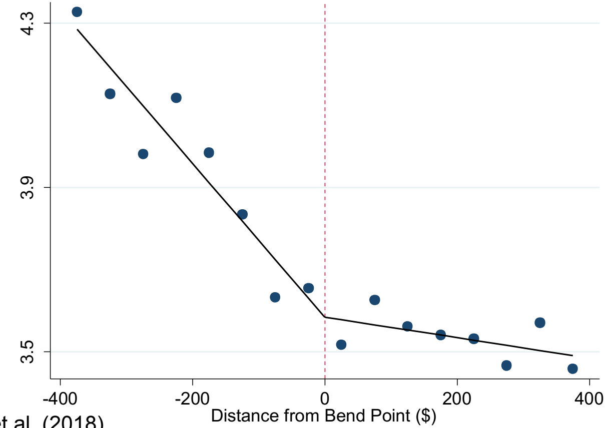


Figure 4. Average Monthly Earnings after DI Allowance

Notes: The figure shows mean monthly earnings in the first four years after going on DI, in $50 bins, as a function of distance of AIME from the bend point, where AIME is measured when applying for DI. The figure shows that mean earnings slope upward more steeply above the upper bend point than below it, with fitted lines that lie close to the data.

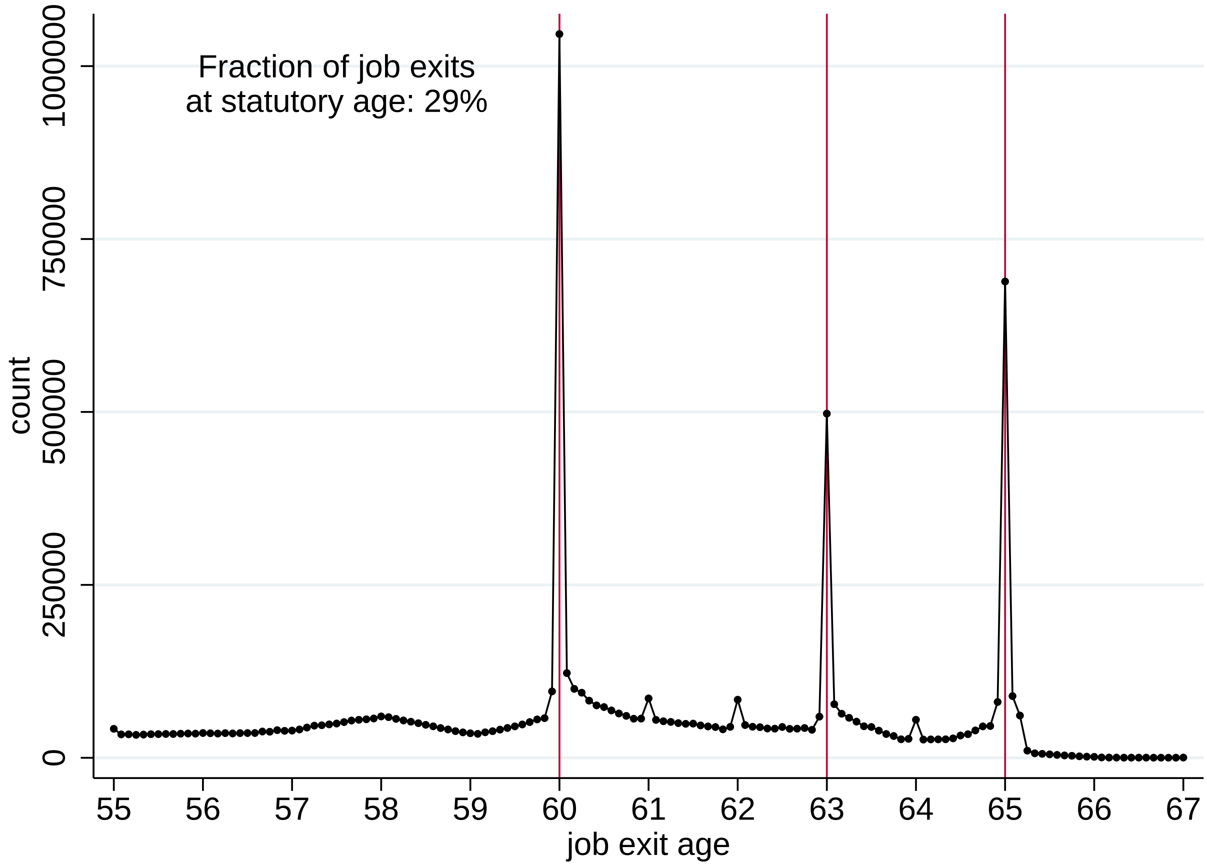
Figure 3. Annual Percent Mortality Rates around the Bend Points

A: Lower bend point



Source: Gelber et al. (2018)

Figure 1: Job Exit Age Distribution (Full Sample)

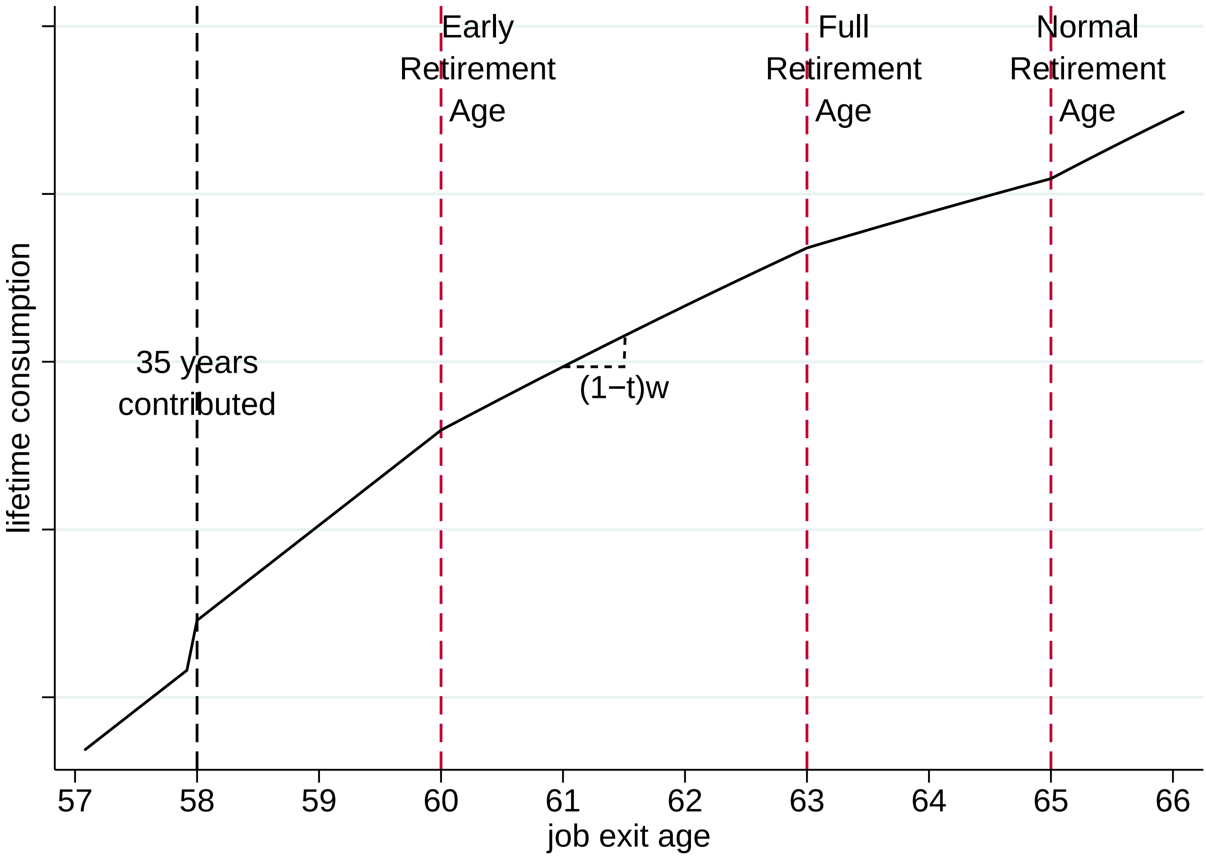


Note: This figure shows the pooled distribution of job exit ages for all workers born between 1933 and 1948. The connected dots show the count of job exits within monthly bins. Vertical red lines indicate the location of main statutory ages throughout the sample period.

Source: Siebold '17

Data source: FDZ-RV - Themenfile SUFRTZN1992-2014XVSBB_Seibold

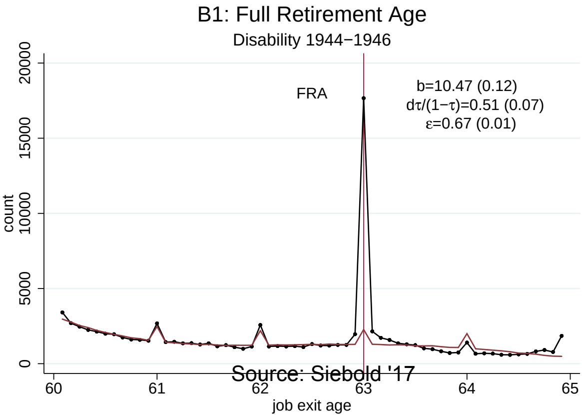
Figure 2: Stylized Lifetime Budget Constraint

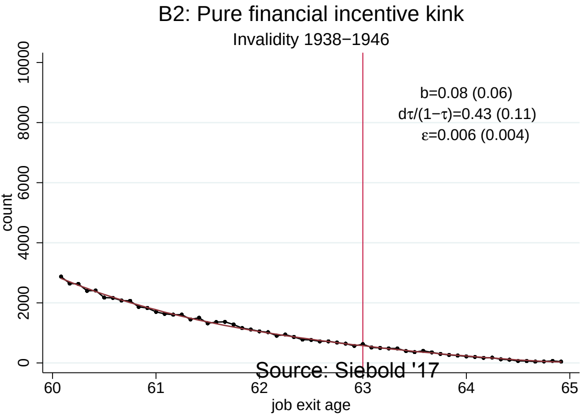


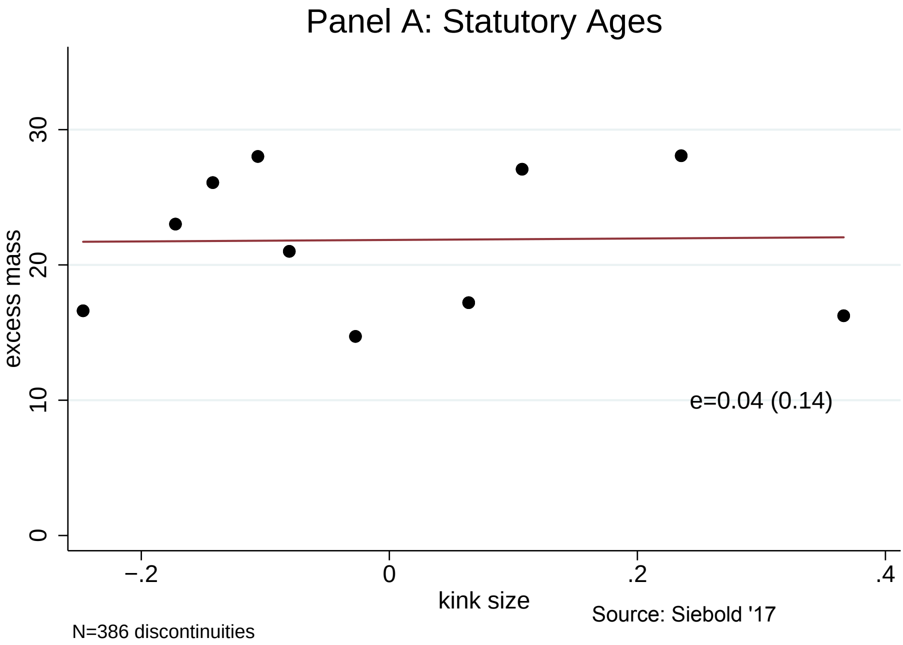
Note: The figure shows a stylized lifetime budget constraint for a worker who faces an Early Retirement Age of 60, a Full Retirement Age of 63 and an Normal Retirement Age of 65, who becomes eligible for a pathway requiring 35 years of contributions at age 58. The slope of the BC is the implicit net wage defined as $w_i^{net} = (1 - \tau_i)w_i$ as shown in section 2.3. The stylized shape of the constraint corresponds to incentives faced by the average worker: On average, workers face a 32% reduction in the implicit net wage ("kink size") at age 60, a 42% reduction at age 63%, and a 21% increase in the implicit net wage at age 65.

Source: Seibold '17

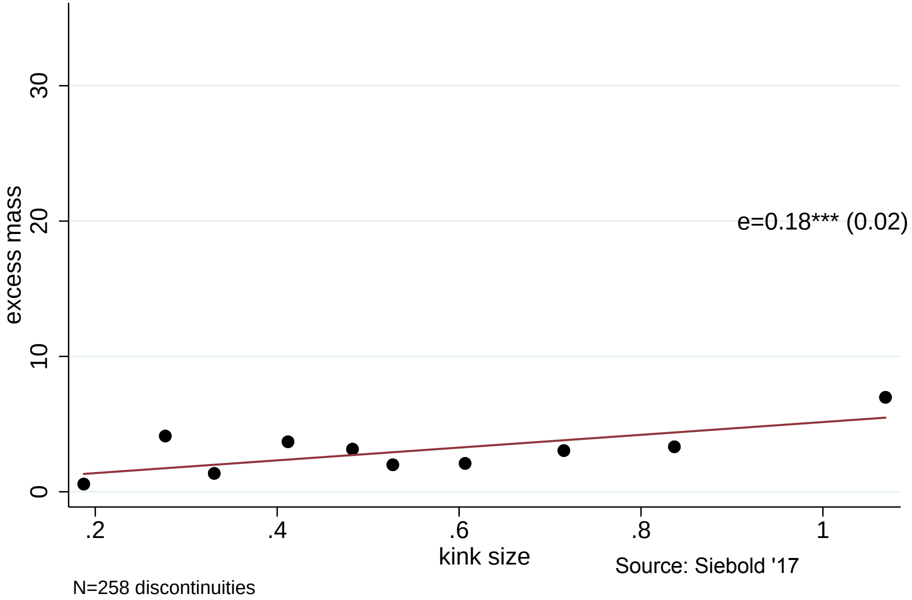
Panel B: Statutory age vs. p

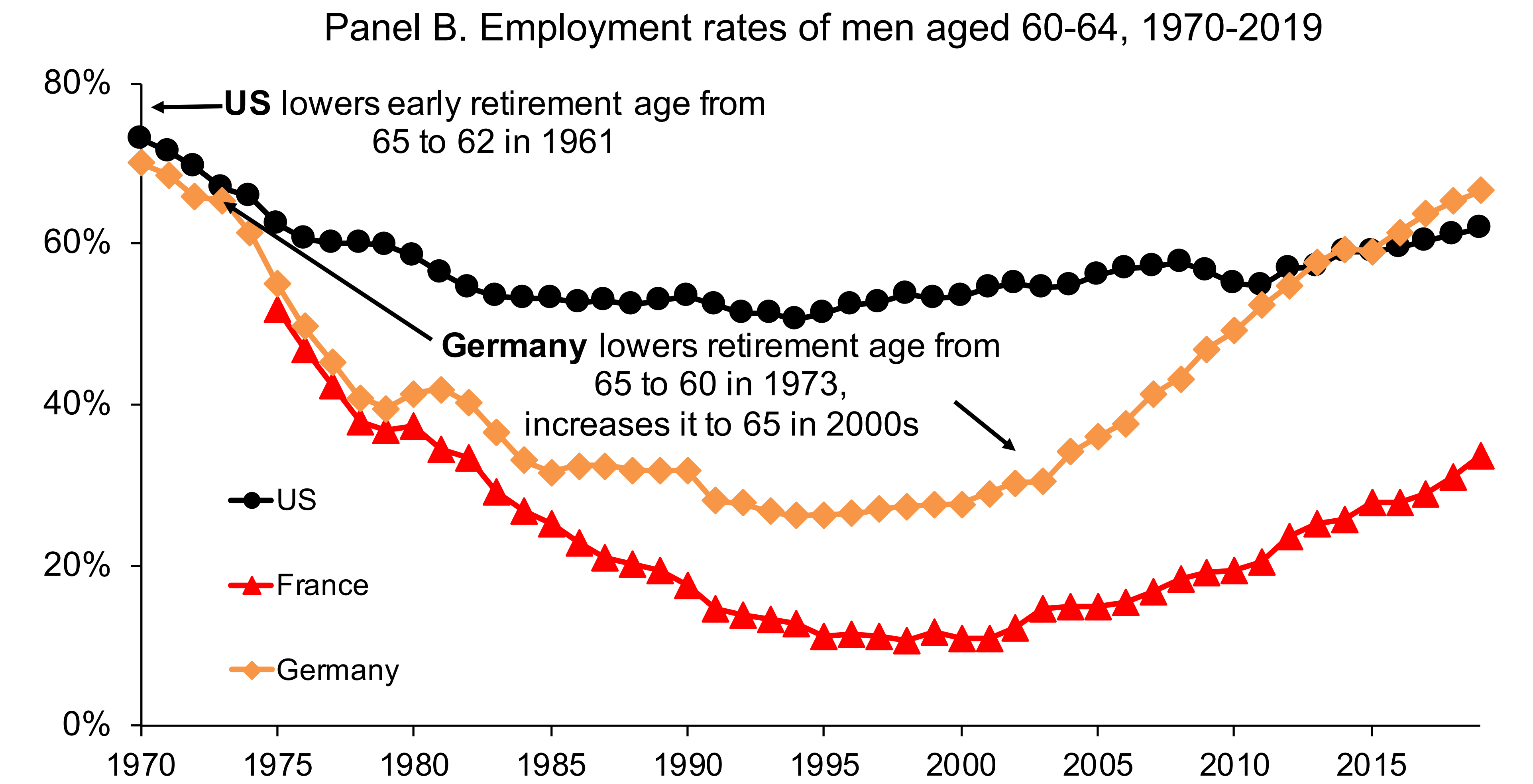



B2: Pure financial incentive kink
Invalidity 1938−1946
b=0.08 (0.06)
dτ/(1−τ)=0.43 (0.11)
ε=0.006 (0.004)
count
0
2000
4000
6000
8000
10000
60
61
62
63
64
65
job exit age
Source: Siebold '17


Panel A: Statutory Ages
excess mass
0
10
20
30
−.2
0
.2
.4
kink size
e=0.04 (0.14)
Source: Siebold '17
N=386 discontinuities

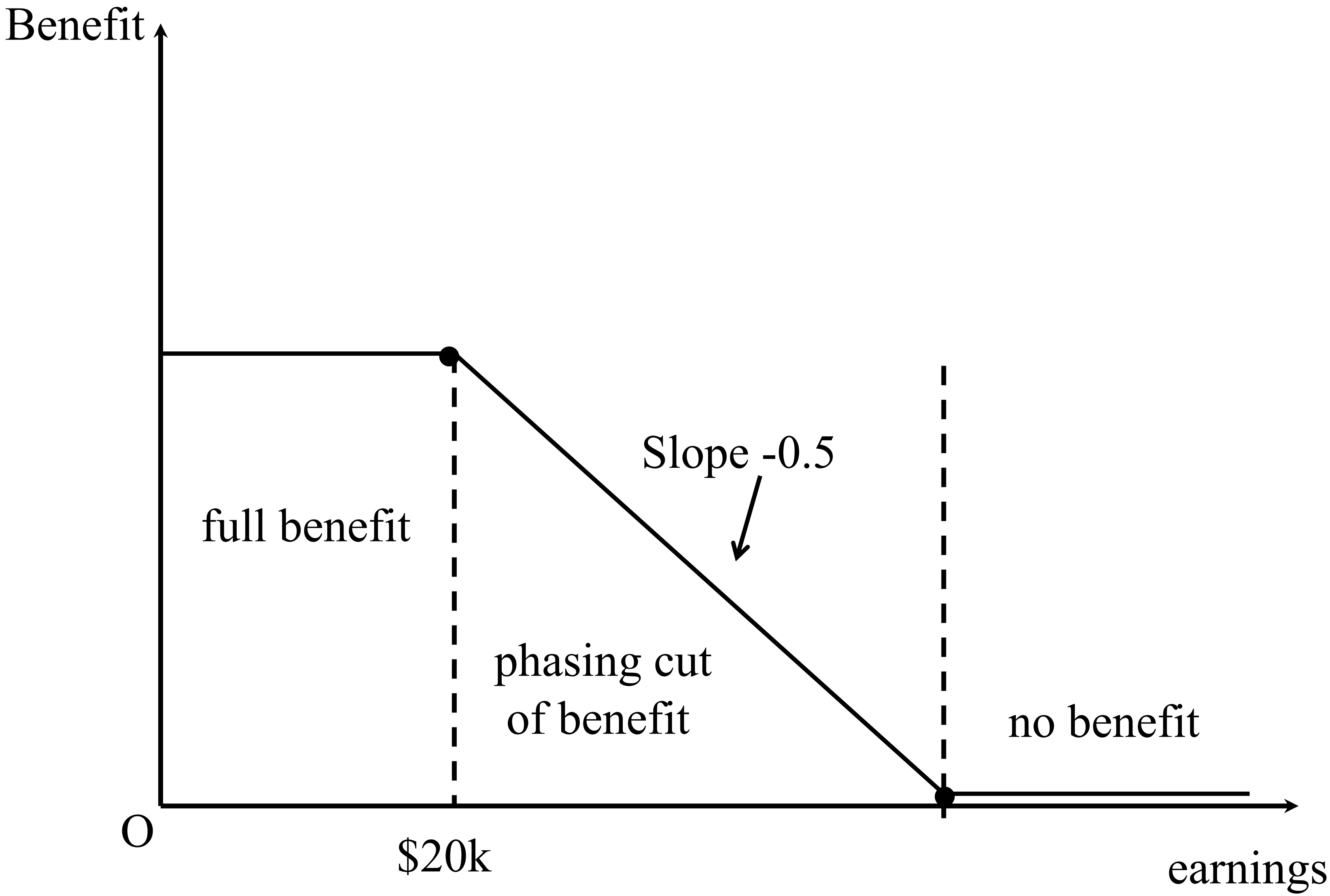
Panel B: Pure financial incentives

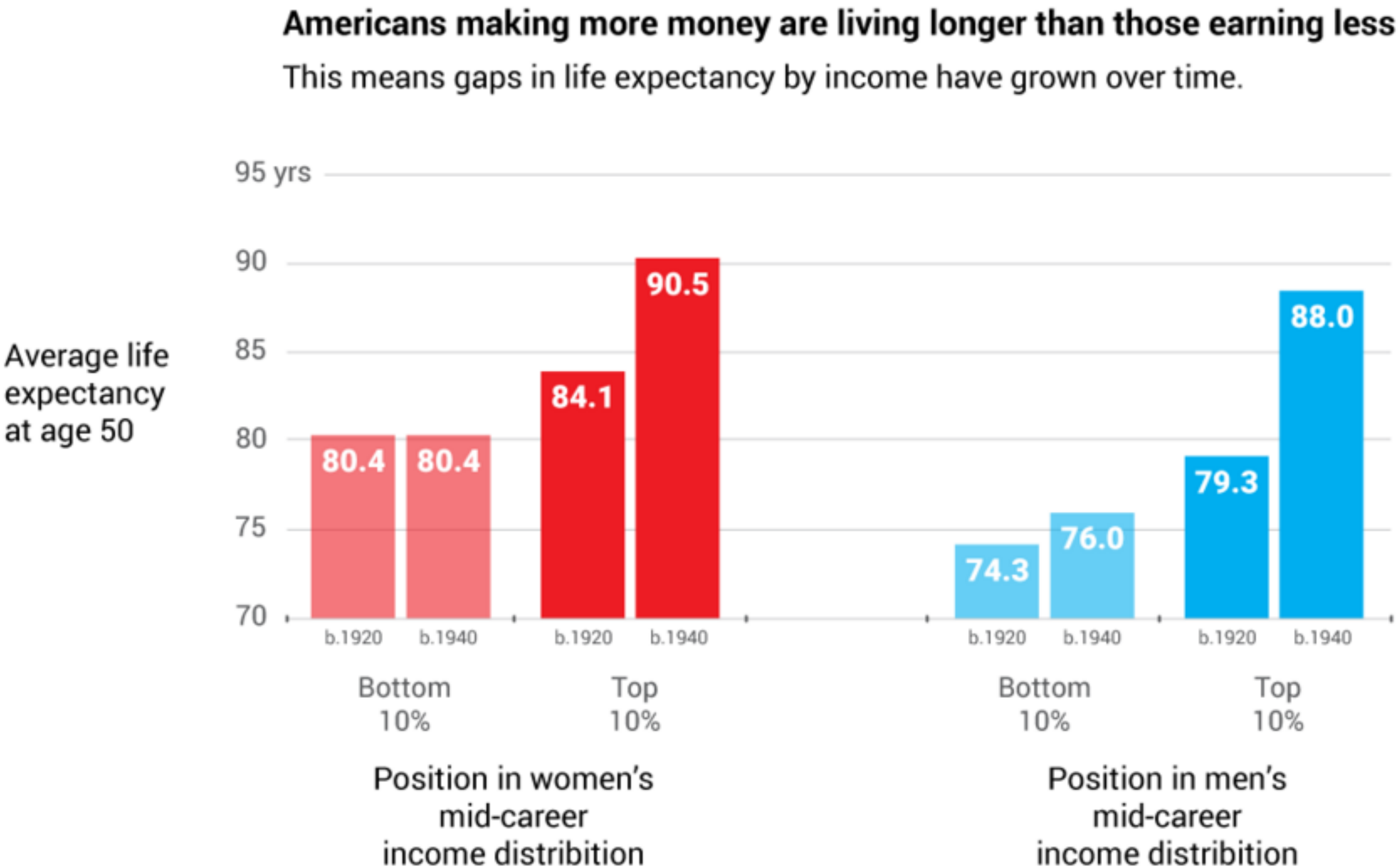




Source: Saez '21 using OECD database

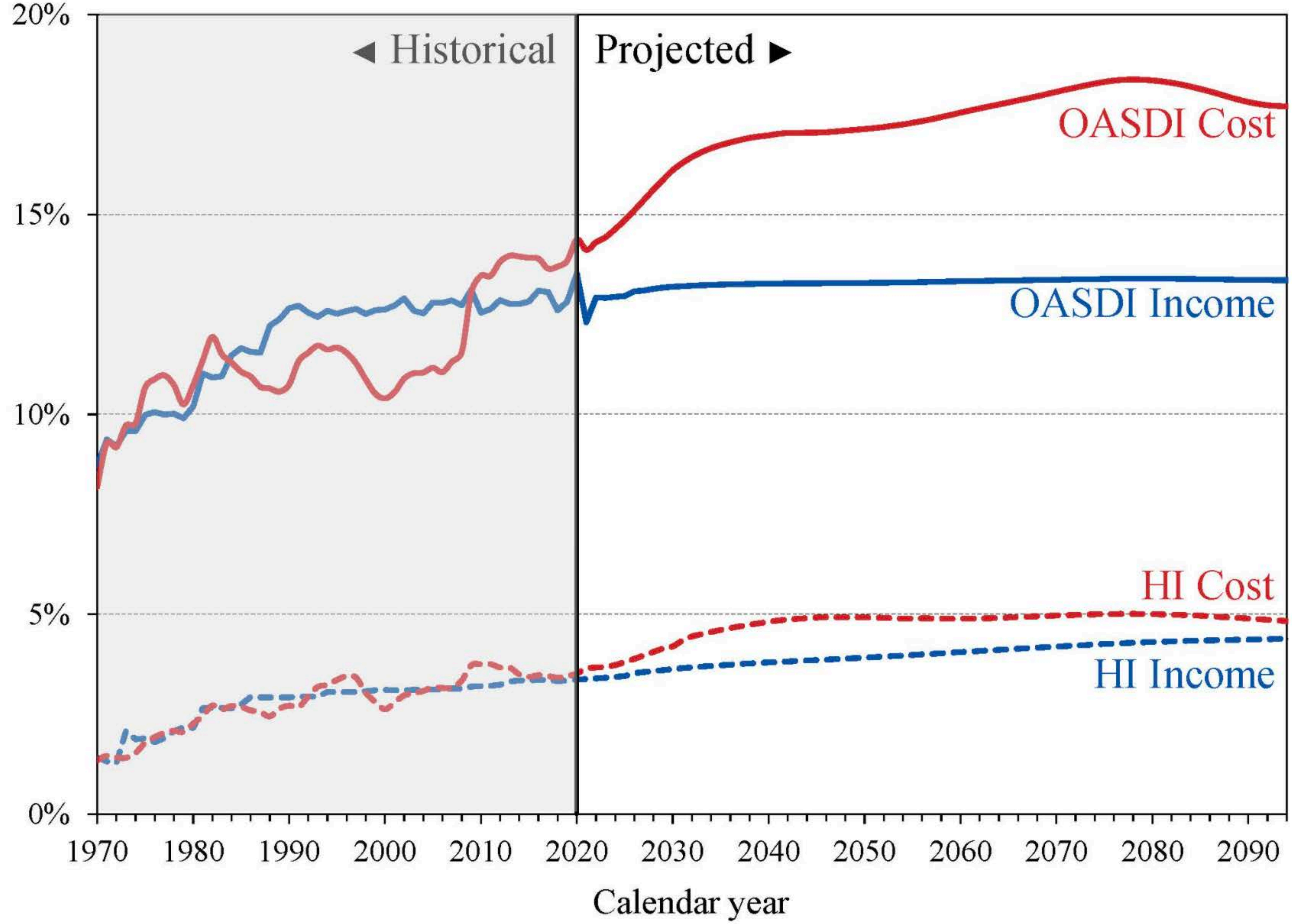
Earning test for Social Security Benefit





Source: Bosworth et al. 2016

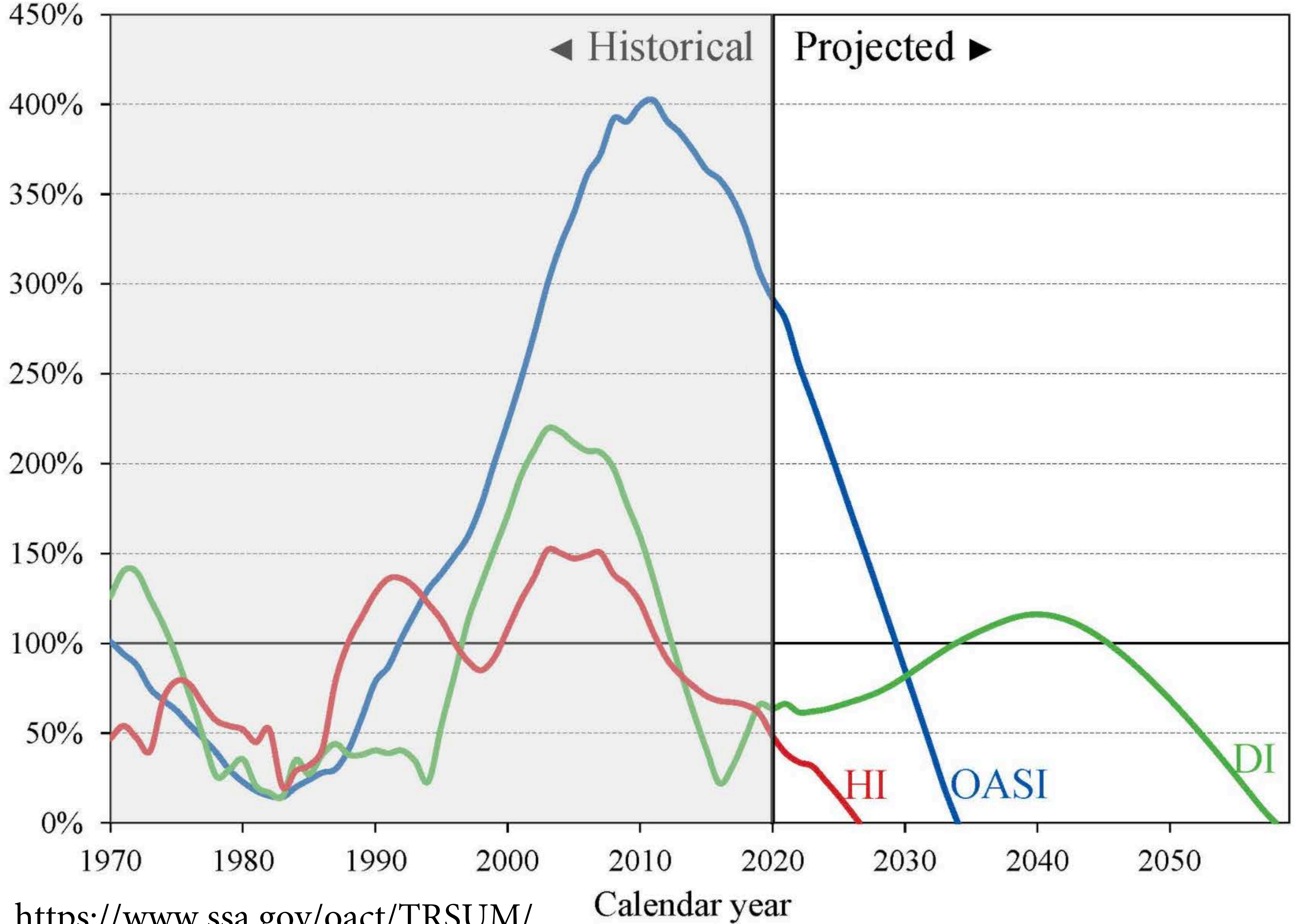
Chart B—OASDI and HI Income and Cost as Percentages of Their Respective Taxable Payrolls



Source: US Social Security Trust Fund https://www.ssa.gov/oact/TRSUM/

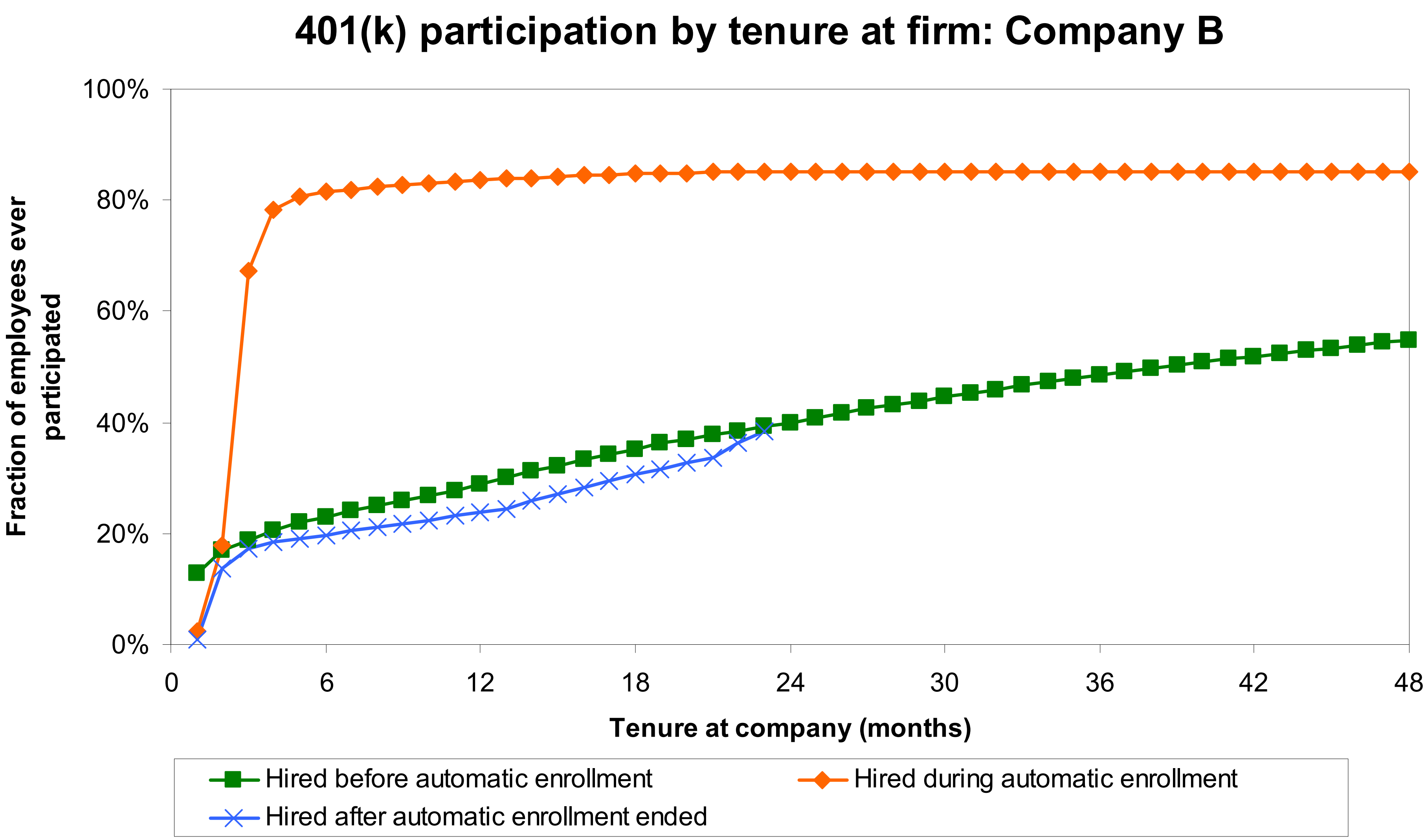
Chart A—OASI, DI, and HI Trust Fund Ratios

[Asset reserves as a percentage of annual cost]



https://www.ssa.gov/oact/TRSUM/

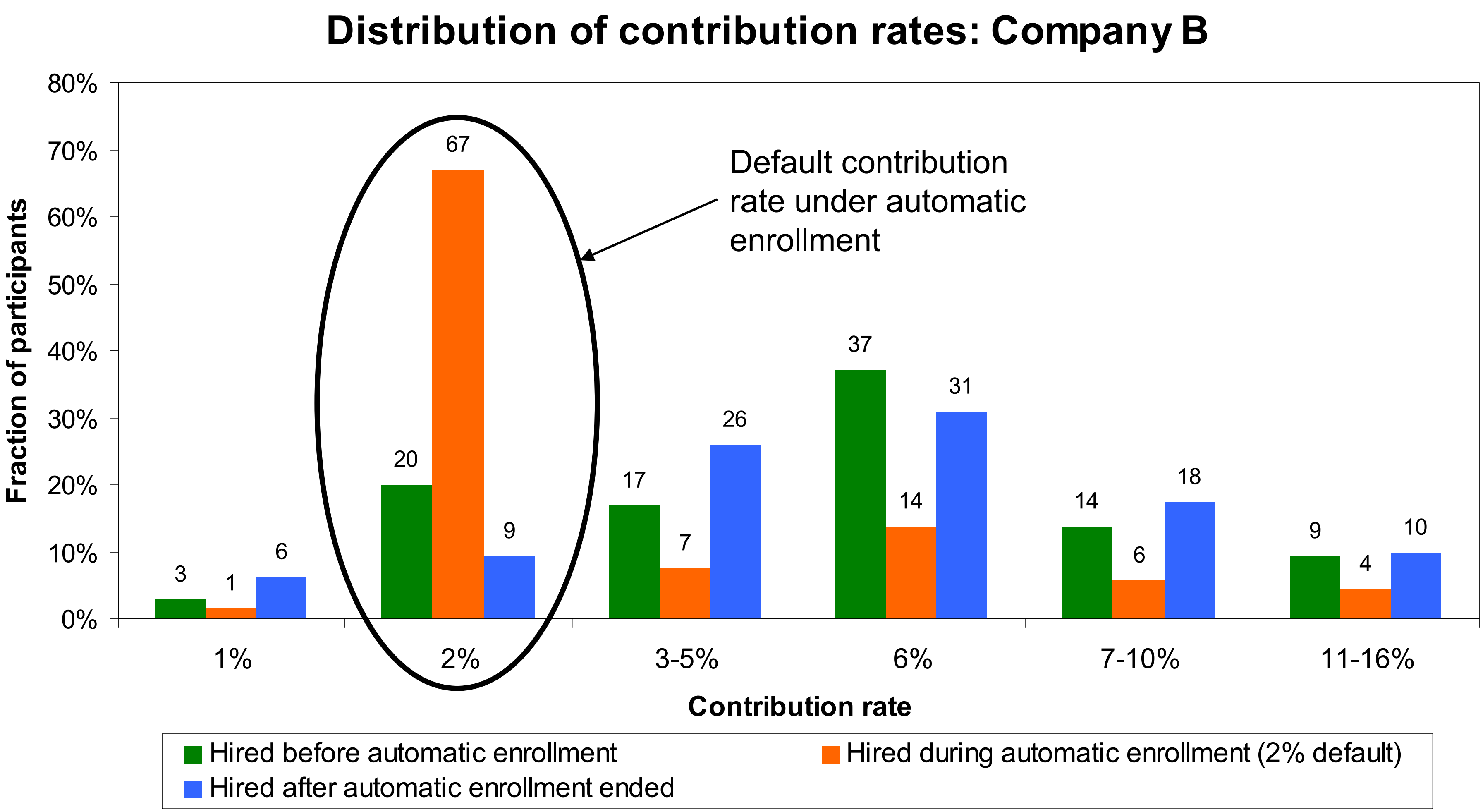
Automatic enrollment dramatically increases participation.



Source: Madrian and Shea (2001)

Automatic enrollment effect

Employees enrolled under automatic enrollment cluster at the default contribution rate.



Source: Madrian and Shea (2001)

The Flypaper Effect in Individual Investor Asset Allocation (Choi, Laibson, Madrian 2007)

Studied a firm that used several different match systems in their 401(k) plan.

I'll discuss two of those regimes today:

Match allocated to employer stock and workers can reallocate

- Call this "default" case (default is employer stock)

Match allocated to an asset actively chosen by workers; workers *required* to make an active designation.

- Call this "no default" case (workers must choose)

Economically, these two systems are identical.

They both allow workers to do whatever the worker wants.

Source: courtesy of David Laibson

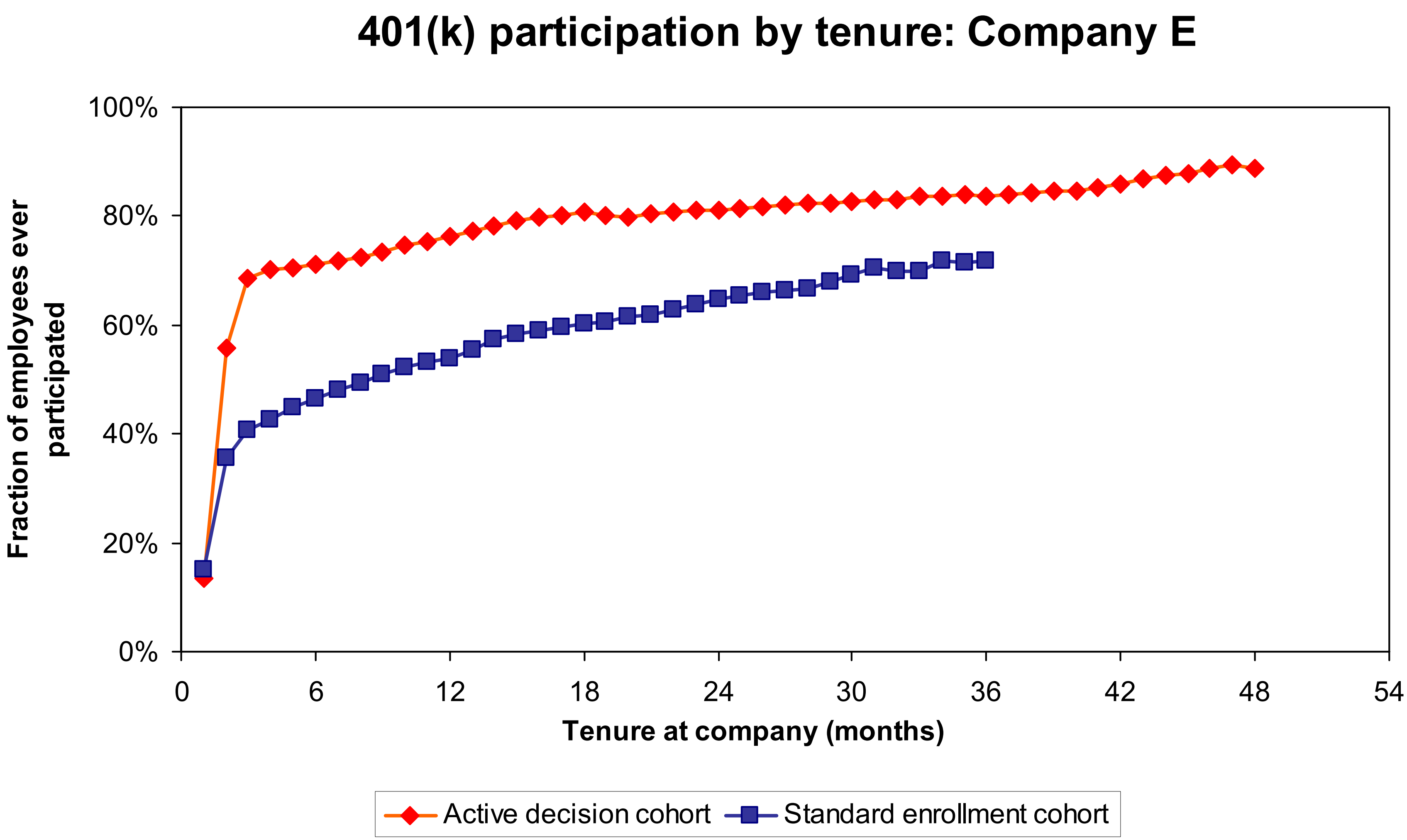
Consequences of the two regimes

	Balances in employer stock	
	Default ES	No Default
Own Balance in Employer Stock	24%	20%
Matching Balance in Employer Stock	94%	27%
Total Balance in Employer Stock	56%	22%

Source: courtesy of David Laibson

Active decision effect on participation

401(k) participation increases substantially when employees are not allowed to be passive about savings.

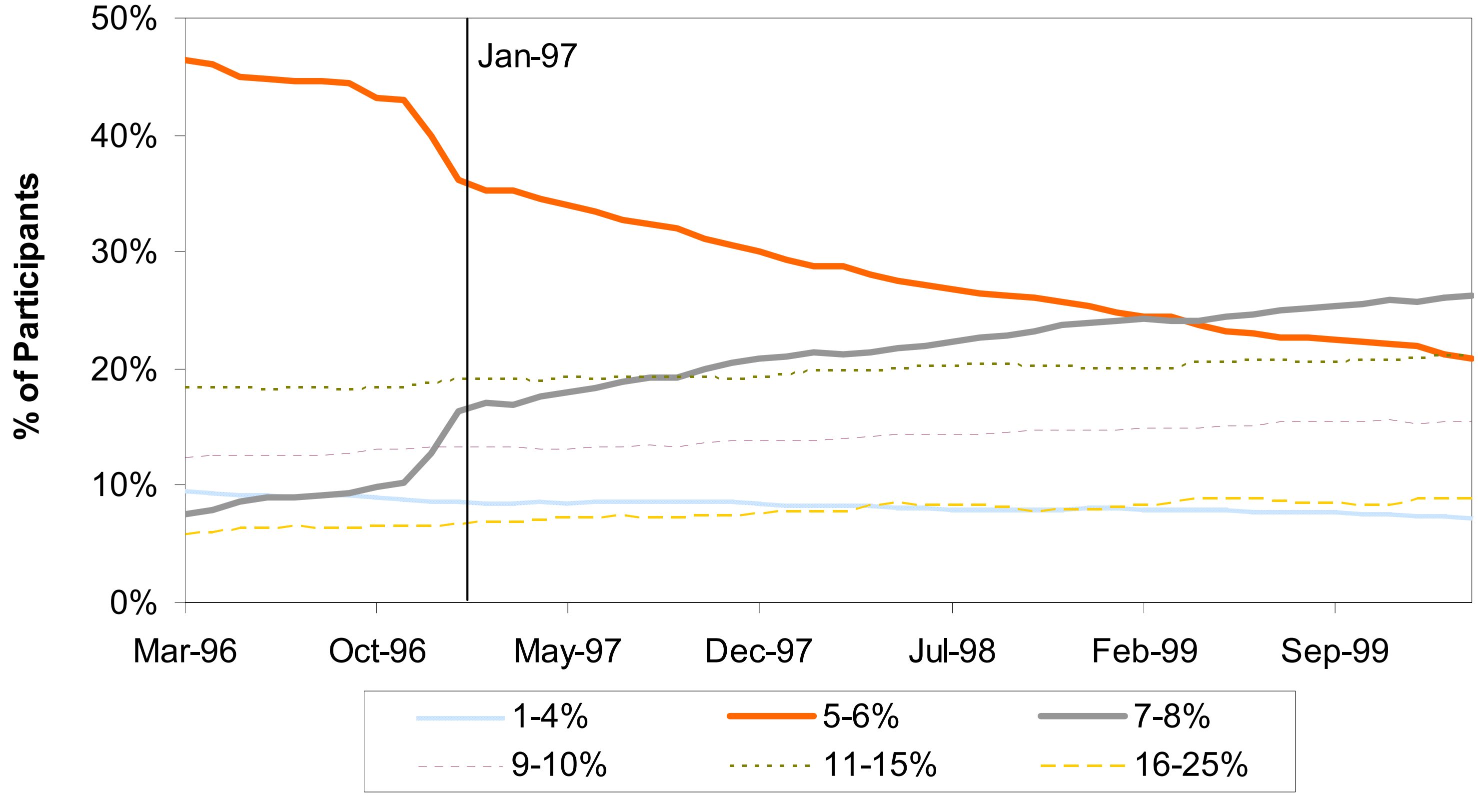


Source: courtesy of David Laibson

Employer match threshold and contribution rates

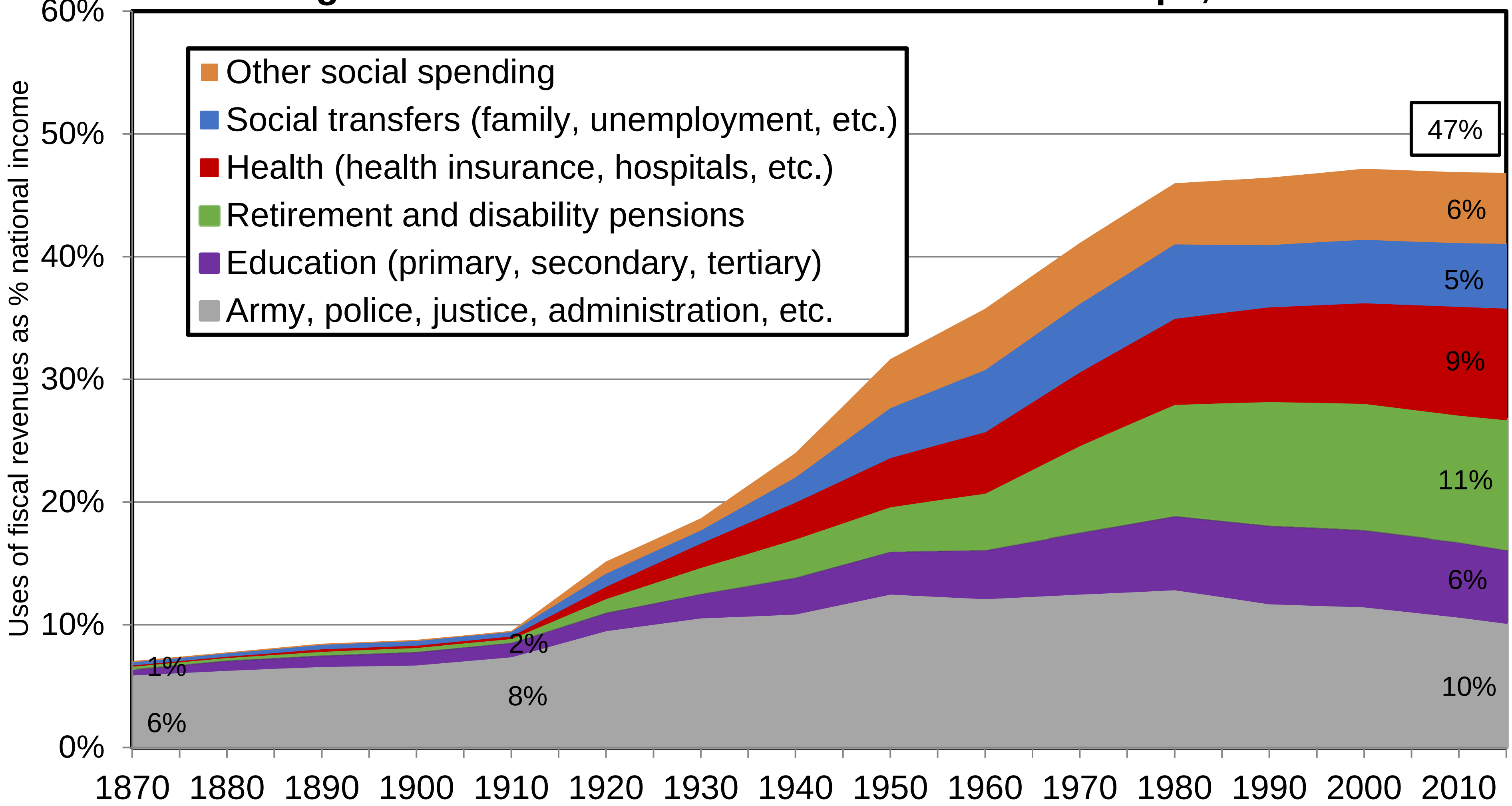
Changing the match threshold caused employees to slowly move from the old threshold to the new threshold.

401(k) contribution rate response to match threshold change: Company G



Source: courtesy of David Laibson

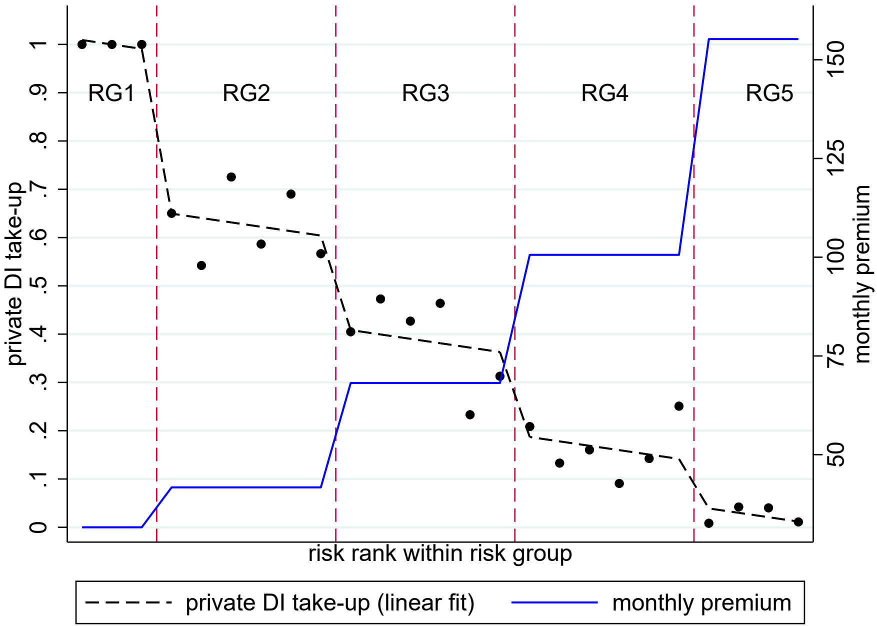
Figure 10.15. The rise of the social State in Europe, 1870-2015



Interpretation. In 2015, fiscal revenues represented 47% of national income on average in Western Europe et were used as follows: 10% of national income for regalian expenditure (army, police, justice, general administration, basic infrastructure: roads, etc.); 6% for education; 11% for pensions; 9% for health; 5% for social transfers (other than pensions); 6% for other social spending (housing, etc.). Before 1914, regalian expenditure absorbed almost all fiscal revenues. **Note.** The evolution depicted here is the average of Germany, France, Britain and Sweden (see figure 10.14). Sources and séries: see piketty.pse.ens.fr/ideology.

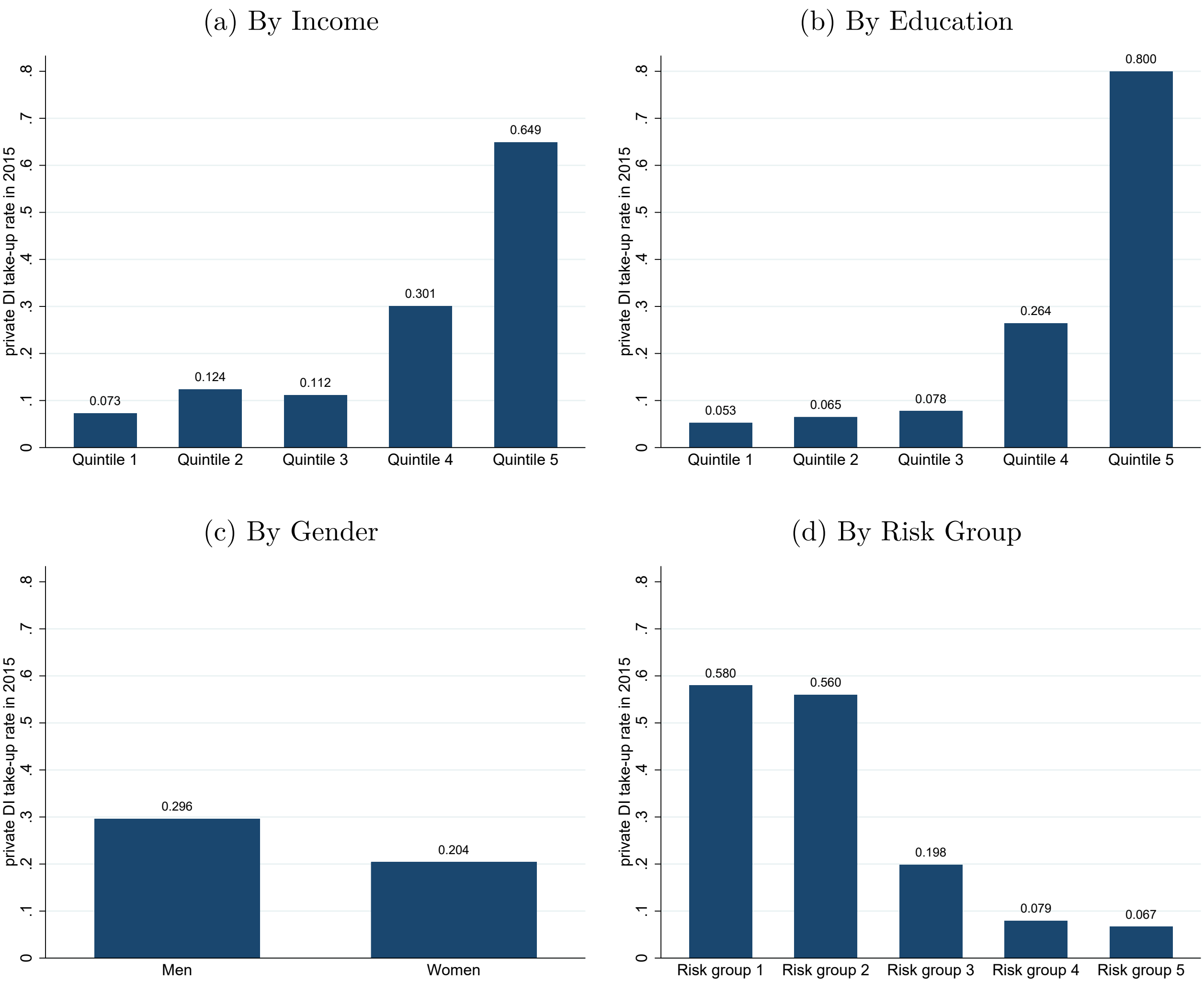
Figure 6: Demand Responses to Insurance Prices

(a) Take-Up vs. Price by Risk Ranks



Source: Seibold, Seitz, Siegloch (2022), private DI take-up in Germany

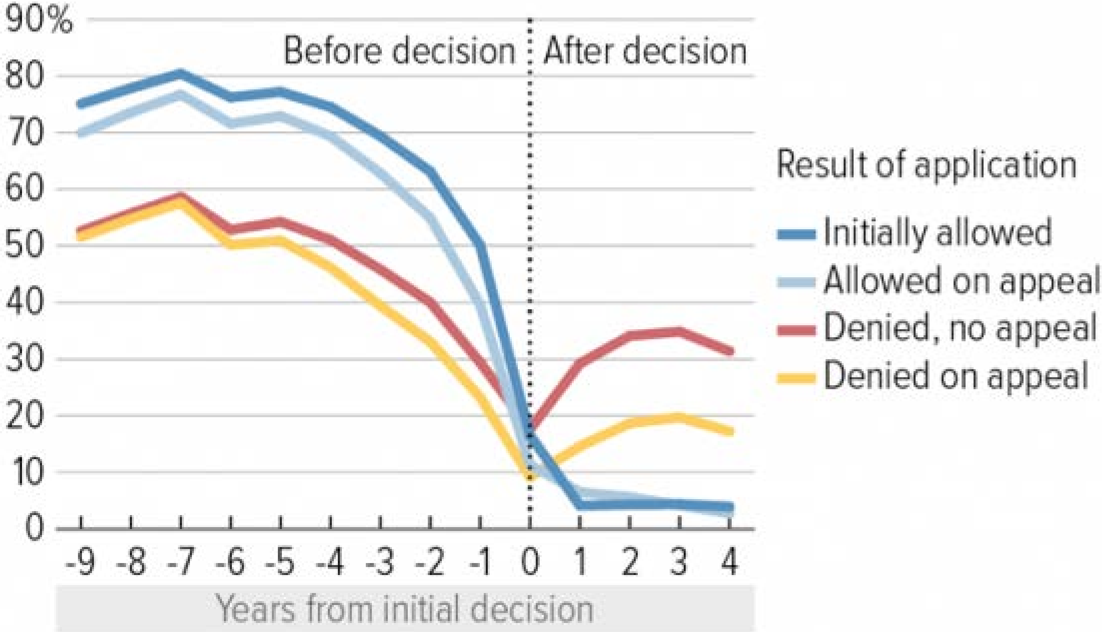
Figure 4: Private DI Take-Up by Observable Characteristics



Notes: The figure shows private DI take-up rates in 2015 by income quintile (Panel a), education quintile (Panel b), gender (Panel c) and risk group (Panel d). In Panel (b), education is defined as years of schooling. Take-up rates are calculated among all cohorts as shown in equation (2).

Disability Insurance Applicants Experience Sharp Drop in Earnings Before Application; Few Work Afterward

Percent of applicants performing substantial gainful activity before and after initial decision



Source: Nicole Maestas, Kathleen Mullen, and Alexander Strand, "Does Disability Insurance Receipt Discourage Work? Using Examiner Assignment to Estimate Causal Effects of SSDI Receipt," Michigan Retirement Research Center Working Paper 2010-241. Additional plot points, through 4 years after decision, courtesy of the authors.