

Lecture 13: Social Security and Retirement

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Spring 2019

RETIREMENT PROBLEM

Life-Cycle: Individuals ability to work declines with aging but individuals continue to live after they are unwilling/unable to work

Standard Life-Cycle Model Prediction: Absent any government program, rational individual would save while working to consume savings while retired [Modigliani life cycle graph]

Optimal saving problem is extremely complex: uncertainty in returns to saving, in life-span, in future ability/opportunities to work, in future tastes/health

In practice: When govt was small \Rightarrow Many people worked till unable to (often till death) and then were taken care of by family members (paygo system not funded) [US elderly poverty rate very high before Social Security]

Life Cycle Model

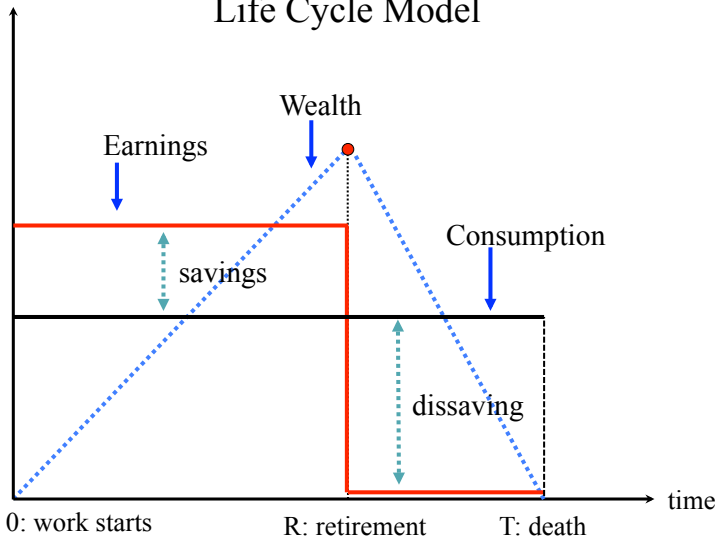
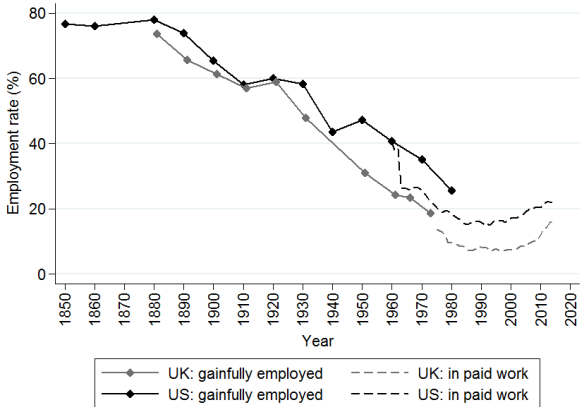
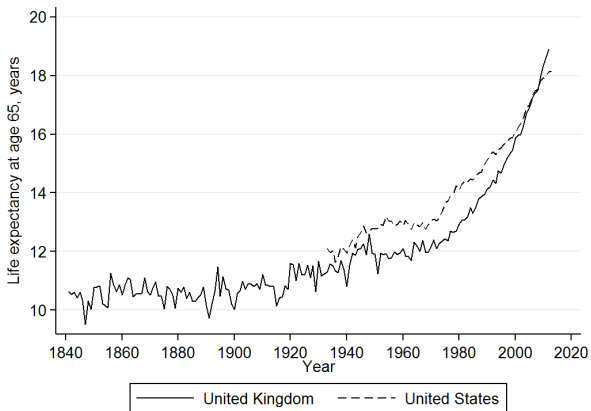


Figure 2.6: Employment rate of men aged 65+ in the UK and the US



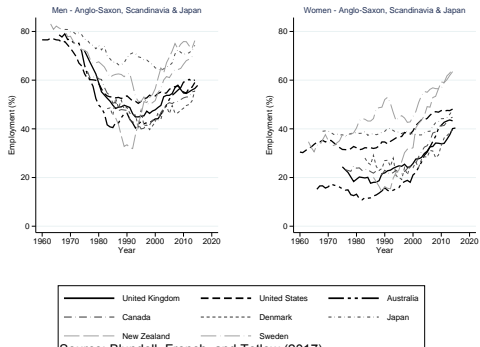
Source: Blundell, French, and Tetlow (2017)

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)

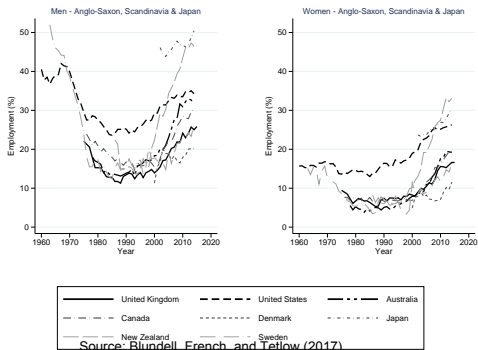
Figure 2.2: Employment of those aged 60–64





Source: Blundell, French, and Tetlow (2017)

Figure 2.3: Employment of those aged 65–69



GOVT INTERVENTION IN RETIREMENT POLICY

Actual Retirement Programs: All OECD countries implement substantial retirement programs (substantial share of GDP around 6-10%, US smaller around 4%)

Started in first part of 20th century and have been growing. Common structure:

Individual pay social security contributions (payroll taxes) while working and receive retirement benefits when they stop working till the end of their life (annuity)

Various types of retirement programs (private or public):

(a) Funded vs. Unfunded, (b) Defined Benefits vs. Defined Contributions, (c) Mandatory vs. Voluntary, (d) Universal vs. Means-tested, (e) Annuitized benefits vs. lumpsum

FUNDED VS. UNFUNDED PROGRAMS

Unfunded (pay-as-you-go): benefits of current retirees are paid out of contributions from current workers [generational link]

current benefits = current contributions

Funded: workers contributions are invested in financial assets and will pay for benefits when they retire [no generational link]

current benefits = past contributions + market returns on past contributions

Defined Contributions vs. Defined Benefits

Defined Contributions (DC): System specifies the level of contributions [e.g., 10% of earnings]. Benefits then depend on level of contributions and returns on contributions.

Defined Benefits (DB): System specifies the level of benefits [e.g., 60% of average earnings during career]. Contributions adjusted to meet required level of benefits.

DC pro: Easier to implement and contributions are not perceived as a “tax”

DC con: Benefits are risky. Risk in benefits worse than risk in contributions [as workers can adjust and absorb shocks more easily than retirees]

EXAMPLES

- 1) Unfunded DB: most public retirement programs (such as Social Security in the US)
- 2) Funded DB: traditional US private employer pension plans [e.g., annual benefits = $2.5\% \times \# \text{ years worked} \times \text{last salary}$], a govt DB retirement program could also be funded [govt invests payroll taxes]
- 3) Funded DC: new US private employer pensions plans [401(k)s]: worker contributes fraction of salary and invests contributions in financial assets.
- 4) Unfunded DC: Notional accounts in some government retirement programs (Sweden): payroll taxes yield fictitious returns and benefits are based on contributions plus this fictitious (notional) return.

WHY SHOULD GOVERNMENT INTERVENE?

1) Individual Failures (MOST IMPORTANT): Individuals would not save adequately for retirement on their own (information and self-control problems).

Paternalism: govt imposes its preferences against individuals ⇒ Individuals should oppose govt program

Behavioral view: individuals understand that they need help and welcome govt intervention

2) Market Failures: Adverse selection in annuitization market

3) Redistribution:

(a) Within Generations: Retirement programs can redistribute based on life-time earnings (instead of annual)

(b) Across Generations: Retirement programs can redistribute across cohorts (so does govt debt)

SOURCES OF RETIREMENT INCOME IN THE US

1) Govt provided retirement benefits (US Social Security): For 2/3 of retirees, SS is more than 50% of income. 1/3 of elderly households depend almost entirely on SS.

2) Home Ownership: 75% of US elderly are homeowners

3) Employer pensions (tax favored): 40-45% of elderly US households have employer pensions. Two types:

a) Traditional: DB and mandatory: **employer** carries full risk [in sharp decline, many in default]

b) New: DC and elective: 401(k)s, **employee** carries full risk

60% of workers have access to empl. pensions, 45% contribute

4) Supplementary individual elective pensions (tax favored): IRAs and Keoghs (Keoghs for the self-employed)

MODEL: MYOPIC SAVERS

1) Some individuals are rational:

$$\max u(c_1) + \delta \cdot u(c_2) \text{ subject to}$$

$$c_1 + s = w \text{ and } c_2 = s \cdot (1 + r), c_1 + c_2/(1 + r) = w \text{ [draw graph]}$$

FOC: $u'(c_2)/u'(c_1) = 1/[(1 + r)\delta]$, let s^* be optimal saving

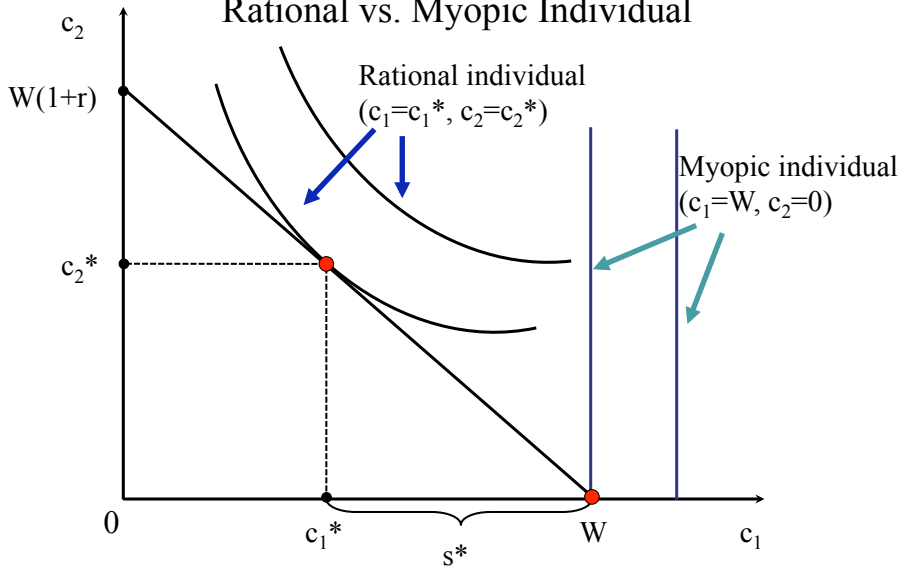
Example: If $\delta = 1$ and $r = 0$ then $s^* = w/2$ and $c_1 = c_2 = w/2$

2) Some individuals are myopic:

$$\max u(c_1) \text{ subject to}$$

$$c_1 + s = w \text{ and } c_2 = s \cdot (1 + r) \Rightarrow c_1 = w \text{ and } s = c_2 = 0$$

Rational vs. Myopic Individual



MODEL: MYOPIC SAVERS

Social welfare is always $u(c_1) + \delta \cdot u(c_2)$

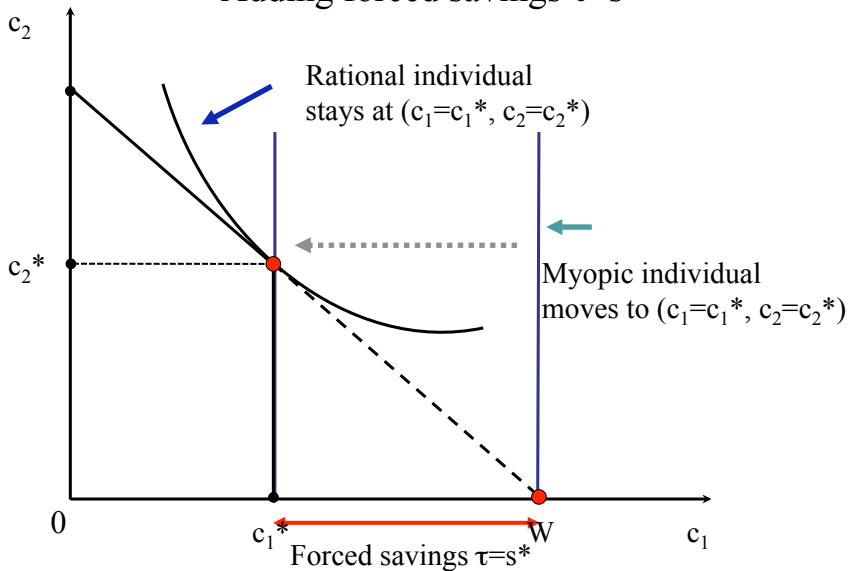
Govt imposes forced saving tax τ such that $\tau = s^*$ and benefits $b = \tau \cdot (1 + r)$. We consider a funded system. Cannot borrow against b [as in current Social Security]

1) Rational individual unaffected: adjusts s one-to-one so that outcome unchanged [rational unaffected as long as $\tau \leq s^*$]: 100% crowding out of private savings by forced savings

2) Myopic individual affected (0% crowding out): new outcome maximizes Social Welfare

Forced savings is a good solution: (a) does not affect responsible individuals, (b) affects the myopic individuals in the socially desired way

Adding forced savings $\tau=s^*$



MODEL: COMMENTS

1) Universal vs. Means-Tested Program: Universal forced savings is better than means-tested program financed by tax on everybody [Samaritan's dilemma]. With means-tested program, 2 drawbacks:

- a) Rational individuals subsidize myopic individuals
- b) Incentives to under-save to get means-tested pension

2) Heterogeneity in w : Forced saving should be proportional to w (as long as govt does not care about redistribution).

FUNDED VS. UNFUNDED SYSTEMS

OLG model with 2 periods (work and retirement). Generation t lives in periods t and $t + 1$, cohort size N_t , wage w_t

1) **Unfunded system:** Free benefits to 1st generation of retirees. For Generation t :

$$\begin{aligned} tax_t &= \tau w_t, \quad ben_t = \tau w_{t+1} N_{t+1} / N_t = \tau w_t (w_{t+1} / w_t) (N_{t+1} / N_t) \Rightarrow \\ ben_t &= tax_t \cdot (1 + g)(1 + n) = tax_t \cdot (1 + \gamma) \end{aligned}$$

All the other generations get return equal to $\gamma \simeq n + g$ where n is population growth and g real wage growth per capita

2) **Funded system:** each generation gets a market return r on contributions: $ben_t = tax_t \cdot (1 + r)$

FUNDED VS. UNFUNDED SYSTEMS

Famous theoretical results:

1) Samuelson JPE'58: In OLG economy with no capital and no way to save (chocolate economy), unfunded system generates **Pareto** improvement because it allows trade across generations [same result with fiat-money]

2) Diamond AER'65: In OLG economy with capital and saving, unfunded pension generates Pareto improvement iff $n + g > r$ (economy is dynamically inefficient and has too much capital)

If $n + g < r$, unfunded pension redistributes from all generations to 1st generation.

FUNDED VS. UNFUNDED SYSTEMS

In practice $r > n + g$ almost everywhere: funded system delivers higher returns because it does not deliver a free lunch to 1st generation

US economy: Annual $n = 1\%$ and $g = 1\%$ [$n + g$ was higher in 1940-1970].

$r = 5 - 6\%$ if r is average return on all capital assets held by households over the long-run

Note that r is much more risky than $n + g$: risk adjusted market rate of return should be lower than average market rate r but still higher than $n + g$

GENERATIONAL ACCOUNTING (skip)

Let $\gamma = n + g$ be the generational growth rate

1) Generation 0 nets:

$$V_0 = -0 \cdot w_0 N_0 + \tau w_1 N_1 / (1 + r) = \tau w_0 N_0 (1 + \gamma) / (1 + r)$$

2) Generation t nets: $V_t = -\tau w_t N_t + \tau w_{t+1} N_{t+1} / (1 + r) = \tau w_0 N_0 (1 + \gamma)^t [-1 + (1 + \gamma) / (1 + r)]$

3) Accounting from period 0: $\sum_{t=0}^{\infty} V_t / (1 + r)^t =$

$$\tau w_0 N_0 \frac{1 + \gamma}{1 + r} + \tau w_0 N_0 \sum_{t=1}^{\infty} \frac{(1 + \gamma)^t}{(1 + r)^t} \left[-1 + \frac{1 + \gamma}{1 + r} \right] = 0$$

No behavioral responses \Rightarrow No net effect

Unfunded vs. Funded is about redistribution across cohorts

Originally: priority was to alleviate old age poverty so most govt started with unfunded system

FUNDED VS. UNFUNDED SYSTEMS

Historical development of pension systems:

- 1) Before 20th century: private pension arrangements are family based (kids take care of aging parents) which is an unfunded system [funded private saving was never a major source of retirement income for the majority of the population]
- 2) 20th century: Governments introduce unfunded pension systems to replace the family based system [workers start paying taxes but no longer have to care for elderly parents]
- 3) Today: some debate on whether government systems should be funded instead of unfunded [social security privatization debate]

With $r \gg n + g$, unfunded system looks like bad deal for current and future generations

SOCIAL SECURITY IN THE US

1) **Financed** by payroll taxes: 6.2% on employee and 6.2% on employer (up to annual cap of \$133,000 in 2019, indexed for wage growth): funds retirement and disability benefits [1.45%+1.45% with no cap funds medicare]

2) **Benefits** based on AIME (average indexed monthly earnings) over the best 35 years of (indexed) taxable earnings

Indexation based on average wage growth

PIA (primary insurance amount) is a piece-wise linear function of AIME:
90% of first \$1000 of AIME, 32% of AIME over \$1000 to \$6,000, 15% of AIME above \$6,000

⇒ Formula is **Redistributive** but this compensates for longevity differences by earnings groups

Average replacement rate around 40% (higher for low earners)

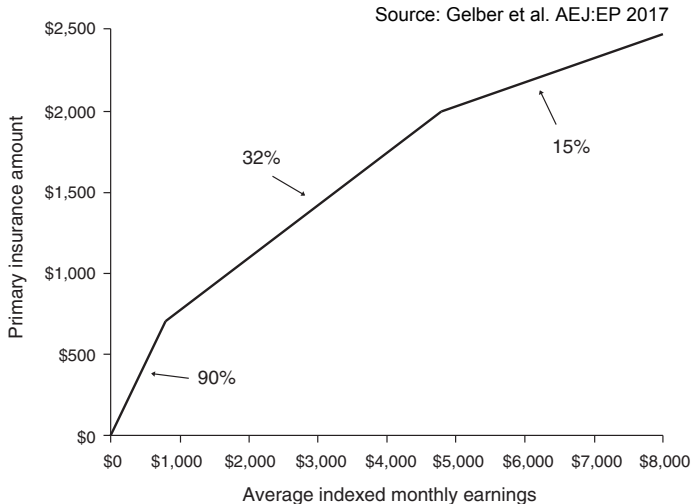


FIGURE 1. PRIMARY INSURANCE AMOUNT AS A FUNCTION OF AVERAGE INDEXED MONTHLY EARNINGS

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)

SOCIAL SECURITY IN THE US

Married couple with PIA_H, PIA_W get maximum of

$1.5 \cdot \max(PIA_H, PIA_W)$ and $PIA_H + PIA_W$.

Surviving spouse gets $\max(PIA_H, PIA_W)$

Divorced spouse is eligible for benefits based on ex-spouse PIA if marriage spell longer than 10 years (no empirical spike in divorces after 10th anniversary though!)

Benefits are fully **annuitized** indexed based on consumer price index (debate about moving to less generous chained CPI)

RETIREMENT AGE IN SS

1) **Normal Retirement Age (NRA):** Currently 66 and increasing slowly from 65 to 67. Get *PIA* when retiring at NRA

2) **Early Retirement Age:** is 62 [Earliest age you can get SS benefits (unless disabled)]. Benefits reduced permanently by 8% if retire 1 year before NRA, 16% if 2 years before NRA, etc. [actuarially fair on average]

3) **Late Retirement:** get permanently higher benefits. Get 8% more permanently if delay by 1 year, 16% for 2 year delay, etc. (actuarially fair). Benefits automatic at age 70.

⇒ Current SS system should not distort retirement age on average (as adjustments are fair) if people understand it

Early retirement age: Availability of benefits seems to have huge effects (inconsistent with standard model with no credit constraints) ⇒ **Liquidity Effects**

KEY QUESTIONS IN THE LITERATURE ABOUT SOCIAL SECURITY

1) How does Social Security affect private savings?

2) How does Social Security affect retirement?

(surveys by Lumsdaine-Mitchell 1999 and Blundell-French-Tetlow 2017)

3) Funding problems: Social Security Reform and Privatization

SOCIAL SECURITY AND SAVINGS

Four approaches:

- 1) Aggregate Time series within a country [Feldstein JPE'74]
- 2) Micro-cross sectional [Feldstein and Pellochio '79]
- 3) Cross-country [Barro-McDonald JpubE'79]
- 4) Reform based within a country [Attanasio- Brugiavinni QJE '03 for Italy, Attanasio and Rohwedder AER'03 for the UK]

First 3 approaches are weak in terms of identification with mixed evidence (see Page, CBO'98 extensive survey).

Last approach is much more promising and could be extended to other countries

Next Steps

US: use private sector DB plans or DB reforms (like freezes) and see whether workers adjust their own savings to changes in their retirement plans (not easy to get the data but identification would be better).

Outside US: cohort based reforms that are not phased-in slowly are best (allow to do RDD), even better if reforms affect different regimes differently (public vs private sector workers).

Main difficulty is getting good savings data (few administrative data records all wealth sources, have to rely on smaller and noisier survey data)

Chetty et al. QJE14 in Denmark recently makes good progress

Chetty et al. QJE 2014: Govt mandated Saving

With Danish administrative data, can observe earnings, income (linked to firms) as well as savings (both retirement savings and other financial savings)

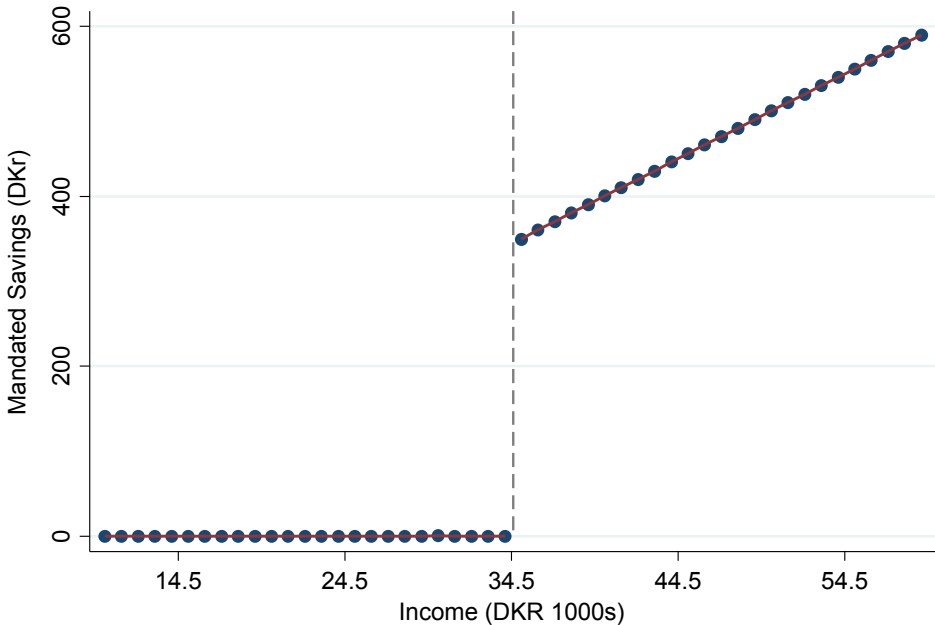
In Denmark, starting in 1998, firms are mandated (by govt) to make automatic retirement contributions to workers' retirement savings accounts of 1% of earnings when earnings crosses some threshold (34.5K DKr)

⇒ Generates a discontinuity by earnings levels: can use a **Regression Discontinuity Design**

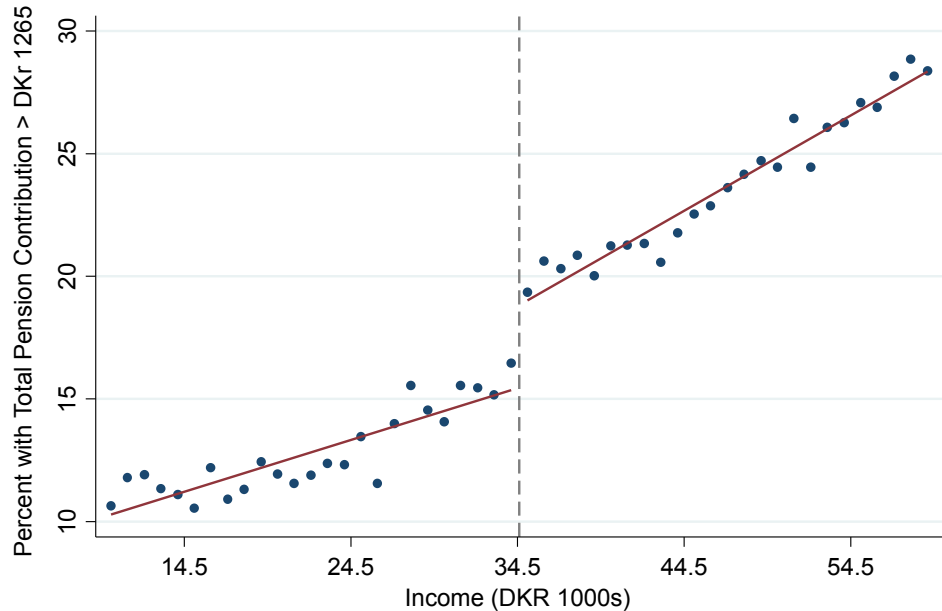
Main finding: \$1 contribution to mandatory savings plan → \$1 increase in pensions and total savings

No offset of the forced contribution with reduced savings

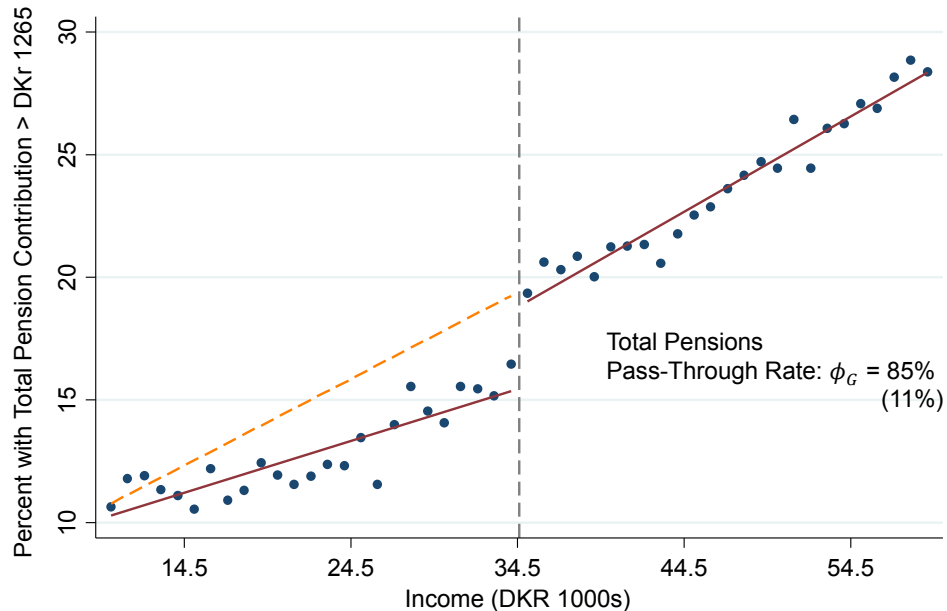
Mandated Savings (M) Around Eligibility Threshold in 1998



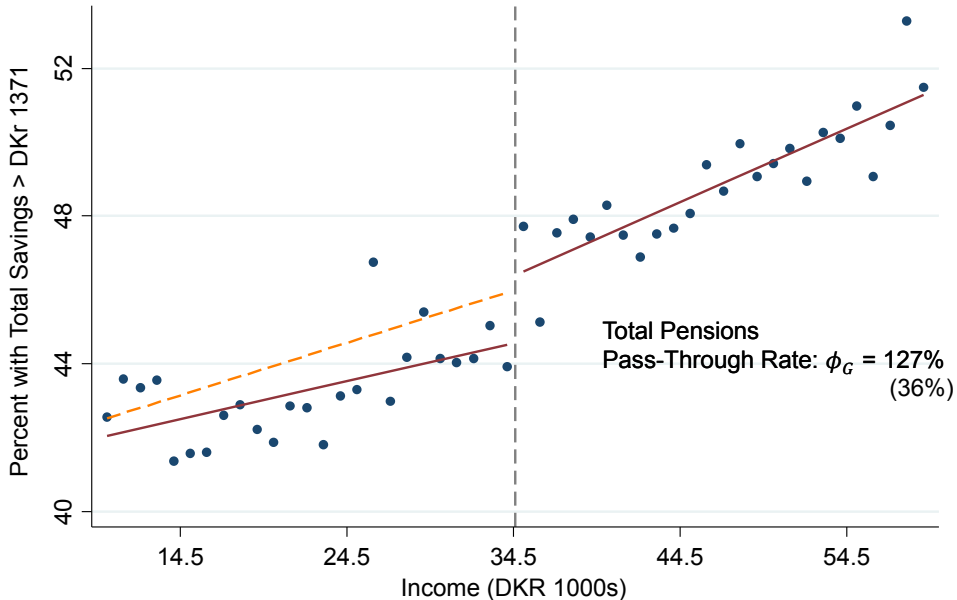
Effect on Mandate on Total Pension Contributions



Effect on Mandate on Total Pension Contributions



Effect on Mandate on Total Saving



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

Evidence for Myopia and adequate savings

- 1) Diamond JpubE 1977: old age poverty has fallen as SS expanded (Gruber book graph). Poverty for other groups has not fallen nearly as much
- 2) Fall in consumption **at** retirement: Bernheim, Skinner, Weinberg (2001) show that drop in consumption is significant and sharply correlated with wealth [consistent with myopia]
- 3) Countervailing view: Scholz et al. JPE '06 develops micro-model of rational savings with uncertainty. With reasonable parameters, 80% of families over-save, 20% under-save [optimal savings is low given SS, DB, Medicaid asset tests]

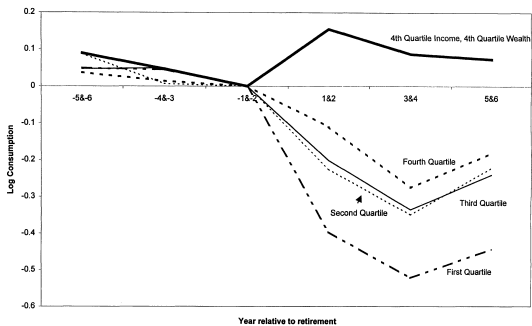


FIGURE 4. CHANGE IN CONSUMPTION AT RETIREMENT, BY WEALTH QUARTILE

Consumption drop at retirement: Aguiar-Hurst JPE' 05

Starting point: Empirically, consumption falls with retirement...but studies use expenditures as measure of consumption

Aguiar-Hurst JPE05 shows that it is important to differentiate between consumption and expenditures. Further, the paper provides new information on the complementarity of consumption and leisure after retirement.

- 1) Confirm that expenditure on food falls by 17% at retirement but
- 2) Time spent on home production rises by 60%
- 3) All measures of caloric intake, vitamin intake, meat quality, etc. do not drop at retirement (find that caloric intake falls when getting unemployed, hard to believe but suggestive)

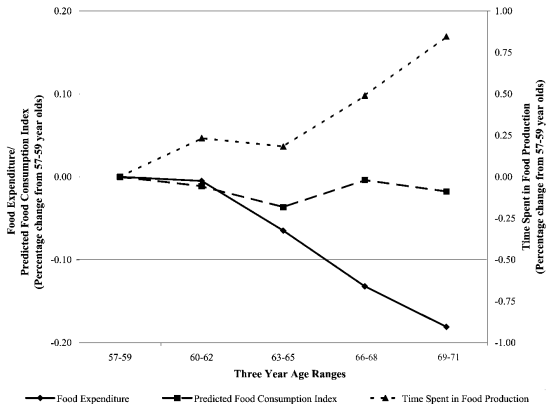


FIG 1.—Percentage change in food expenditure, predicted food consumption index, and time spent on food production for male household heads by three-year age ranges. Data are taken from the pooled 1989–91 and 1994–96 cross sections of the CSFII, excluding the oversample of low-income households. The sample 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

SOCIAL SECURITY AND RETIREMENT: THEORY

Three key elements of a social security system may affect retirement behavior:

1) Availability of benefits at **Early Retirement Age (ERA)**: (62 in US)

Those effects arise because of (a) liquidity constraints, (b) self-control problems, (c) focal point norm

2) Earnings-test after claiming benefits

3) Non-actuarially fair adjustments of benefits for those retiring after the ERA:

If benefits are not adjusted in a fair way, they can create a huge implicit tax on work (US used to have very little adjustment)

Social Security and Retirement: Early retirement age

Conceptually early retirement age can be seen as a device to force myopic people to keep working

(a) Rational individual: Wants to retire at age 60 but benefits not available till age 62=ERA. Rational individual saves ex-ante to fund retirement at age 60-61 out of savings before getting benefits at age 62.

⇒ ERA does not affect the rational person [if she can perfectly forecast retirement age]

(b) Myopic person: Person cannot resist retiring once benefits are available. Myopic person will typically have no savings so cannot retire before ERA.

⇒ ERA affects positively the myopic person to prevent her from retiring too early (optimal ERA analysis yet to be done)

Social Security and Retirement: Implicit tax

Theory [next graph is from Germany]: life-time budget constraint: Live T years, work R years and retire $T - R$ years.

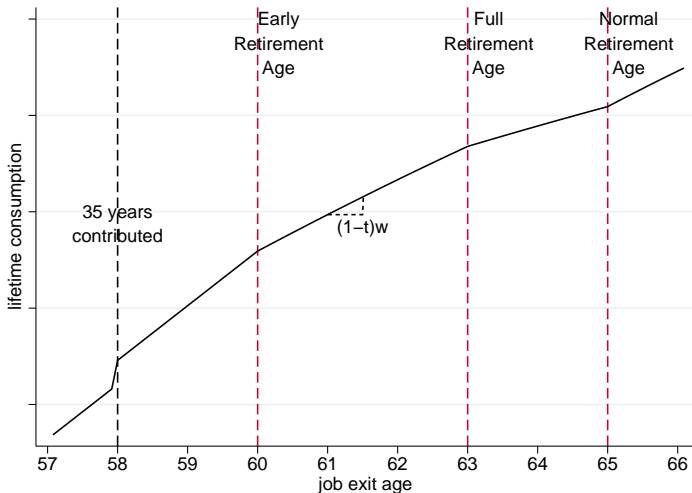
C life-time consumption and R retirement age. With constant wage w and interest rate $r = 0$: $C = w \cdot R$

With a fair retirement program: $w - \tau$ when working and $b(R) = \tau R / (T - R)$, then $C = (w - \tau)R + b(T - R) = wR$

⇒ No effect on lifetime budget constraint

⇒ Actuarially fair system does not affect retirement age [with no uncertainty, no myopia, and no credit constraints]

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 50% reduction in the implicit net wage at age 65.

Social Security and Retirement

Retirement systems are not actuarially fair in general:

Benefits $b(R)$

Life-time consumption: $C = (w - \tau)R + (T - R)b(R)$

$$dC/dR = w - \tau - b + (T - R)b'(R)$$

Distort both slope and levels: substitution and wealth effects ($dC/dR = w \Rightarrow$ system is actuarially fair)

Implicit tax rate of retirement program: $t = [w - dC/dR]/w$:

If you delay retirement by 1 year, your PDV of consumption increases by $dC/dR = w \cdot (1 - t)$ [fair has $t = 0$]

Social Security and Retirement

Some European systems had $b'(R) = 0$ (no adjustment of benefits)

$\Rightarrow dC/dR = w - \tau - b$ If $b = 0.6 \cdot w$ and $\tau = .15 \cdot w$, then
 $dC/dR = w \cdot (1 - 0.75) \Rightarrow$ enormous implicit tax $t = 75\%$

United States now has $b'(R) = .08$ (8% adjustment per year) which is about actuarially fair

Retirement Hazard Spikes

Retirement hazard at age t is the fraction of people who retire at age t among those still working at age $t - 1$

Retirement spike at Early Retirement Age of 62 very clear and convincing: spike moves from 65 to 62 when the ERA was reduced from 65 to 62

⇒ Suggests strong liquidity effects / non-rational behavior [outside the lifetime constraint model]

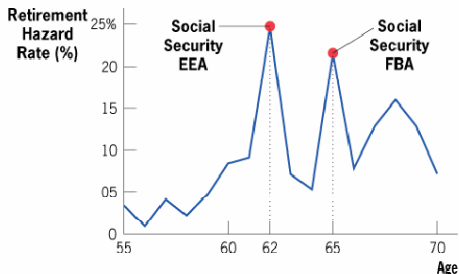
Evidence from other countries also shows strong spike effects

Note: those macro-level studies do not always define carefully retirement: claiming benefits vs. stopping to work. Stopping to work is fuzzy.

13.3 Social Security and Retirement

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.

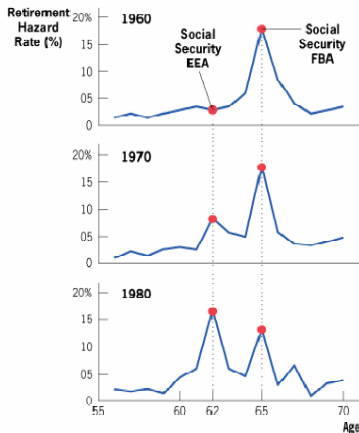
Source: Diamond and Gruber (1999), Figure 11.12.

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

13.3 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: Gauthier and Wise (1999), Figure 12

Early Retirement Age effect on Retirement

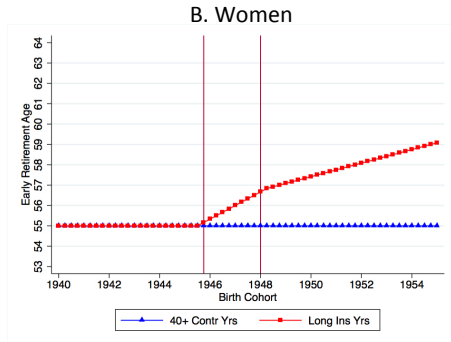
Best evidence from Manoli-Weber (2016b). Austria changed the ERA by cohorts for those with less than 45+ contribution years (40+ for women)

Men goes from 60 to 62, Women goes from 55 to 57 (based on birth quarter)

Use population admin data on benefits claims and work. Sample is everybody working at age 53.

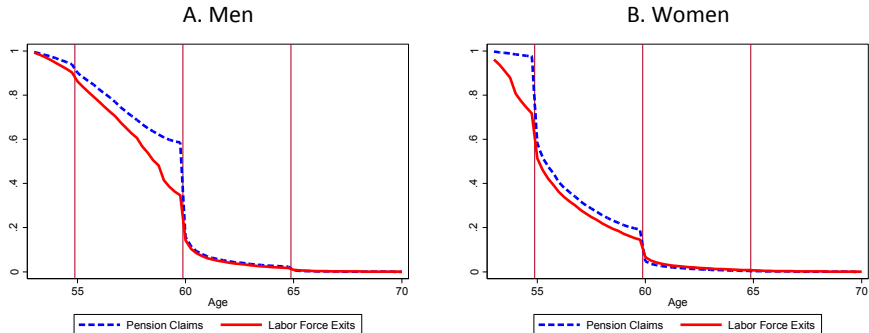
- 1) Very strong effect on claiming age (benefits claiming)
- 2) Strong effect on retirement decision (work behavior)
- 3) Evidence of spillover effects on groups not affected [men (women) with 45+ (40+) contribution years]

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.

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.

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

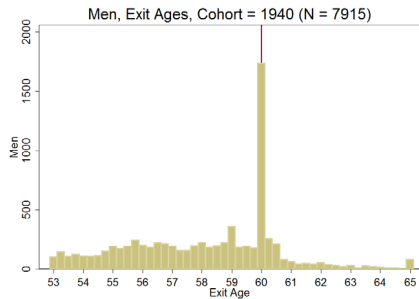
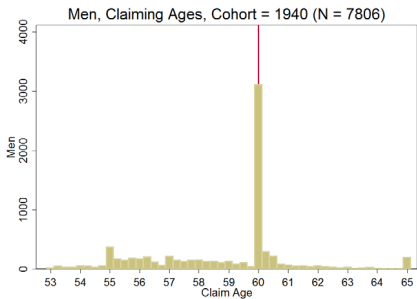


Fig. 5A. Men's Claiming Ages & Exit Ages by Cohort

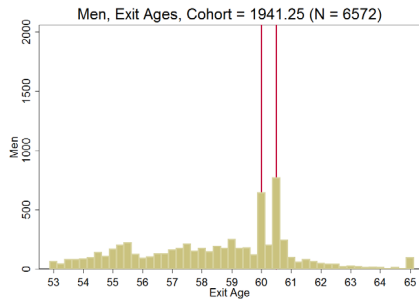
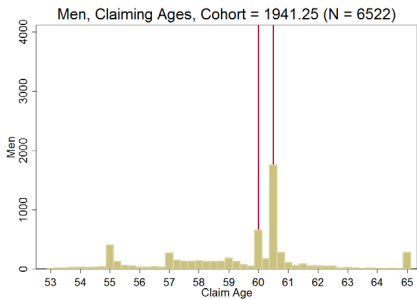


Fig. 5A. Men's Claiming Ages & Exit Ages by Cohort

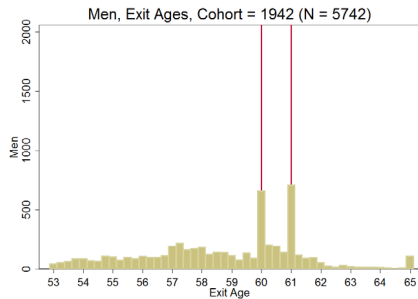
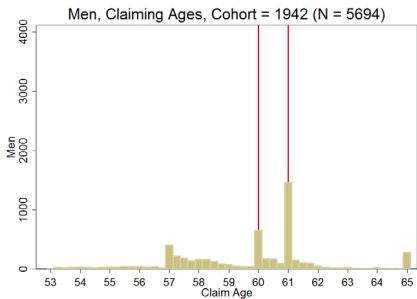
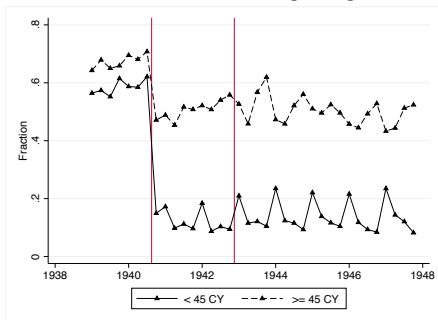
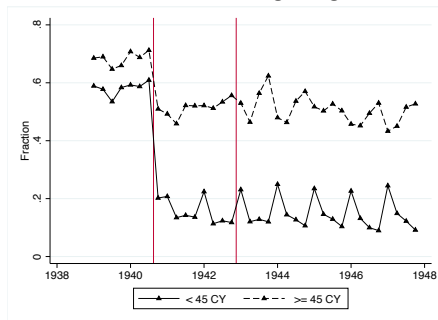


Fig. 9. Claiming & Exiting by Birth Cohort & Contribution Years, Men

A. Fraction Claiming at Age 60



B. Fraction Exiting at Age 60

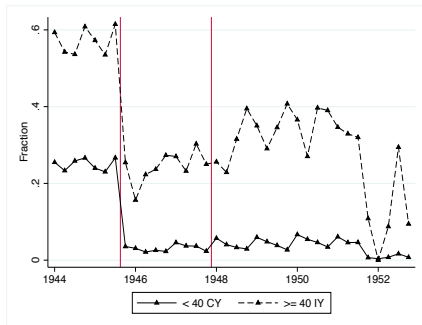


Notes: Each figure plots the fraction individuals still in the labor market who claim pensions or exit jobs by birth cohort. Women with 40 or more contribution years and men with 45 or more contribution years are exempt from the increases in the Early Retirement Ages and can continue to retire at ages 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.

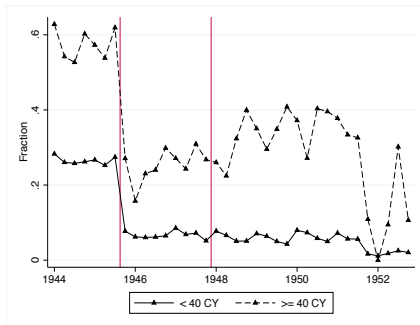
Source: Mañón and Weber 13

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: Mañor and Weber 13

Focal points and social norms

SS programs have a normal retirement age (NRA) but such NRAs are not always associated with real economic incentives (e.g. US SS is actuarially fair so NRA should be irrelevant)

Siebold '17 shows that in Germany, 30% of workers retire at statutory retirement ages even with no specific underlying economic incentives and not option by default

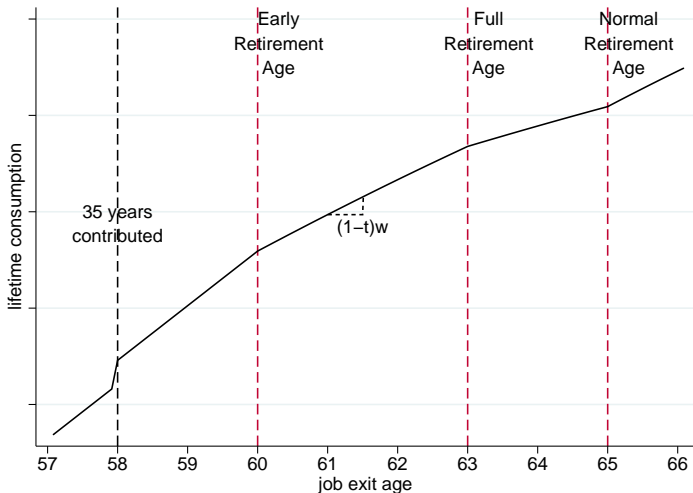
Siebold '17 shows that statutory age bunching much larger than bunching around kinks of lifetime budget constraints created by retirement system

⇒ Cannot be explained within standard model

⇒ NRA perceived as a social injunction obeyed by workers

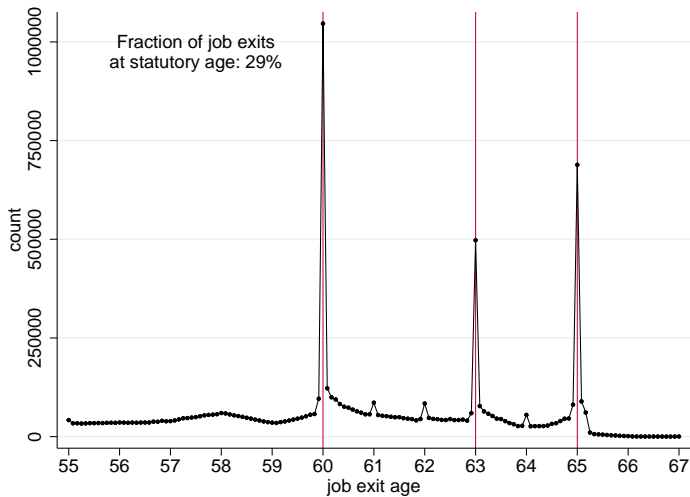
⇒ Nominal NRAs can potentially be a powerful govt tool to change the retirement age

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 50% reduction in the implicit net wage at age 65.

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_Siebold*

SOCIAL SECURITY REFORM: PROBLEMS WITH CURRENT SYSTEM

Rate of return $n + g$ has declined from over 3% to about 2% due to:

1) Demographics: n : Retirement of baby boom large cohorts born 1945–1965: 1995: 3.3 workers per beneficiary, 2030: 2 workers per beneficiaries

Due to (a) fall in fertility, (b) increased longevity at retirement age (note bottom half earners have made no life expectancy gains over last 2 decades while top half have gained).

2) Growth: g : Slower productivity growth since 1975 (g has fallen from 2% to 1%)

System requires adjusting taxes or benefits to remain in balance.

1983 GREENSPAN COMMISSION

Demographic changes are predictable, so 1st reform was implemented in 1983 (designed to solve budget problems over next 75 years)

- 1) Increased payroll taxes to build a trust-fund
- 2) Increased retirement age in the future (from age 65 to 67)

Trust fund invested in Treasury Bills (Fed gov debt):

$$TF_{t+1} = TF_t \cdot (1 + i) + SSTax_t - SSBen_t$$

Trust fund peaked at \$2.8T in 2013 and now declines and will be exhausted by 2034, taxes will then cover about 75% of promised benefits

Requires additional adjustment: can fix it for next 75 years by increasing payroll tax rate now by 1.7 percentage points or wait till 2035 and then increase tax by 3.5 pp.

SOCIAL SECURITY REFORM OPTIONS

- 1) Increased contributions: increase tax rate or earnings cap [eliminating cap entirely would likely produce income shifting]
- 2) Reduce benefits: straight cut not politically feasible: a) Index NRA on life expectancy, b) Index benefits using chained CPI instead of regular CPI, c) Make benefits fully taxable
- 3) Means-tested benefits: bad for savings incentives and could make program politically unstable [a program for the poor is a poor program].
- 4) Invest Trust Fund in higher yield assets (such as stock-market, as proposed by Clinton in 1990s). Advantage: higher return on average and govt can be a long-term investor. Issue: Lobbying and corruption in investment choices, investment choices could be left to independent board
- 5) Major reform: privatization

SOCIAL SECURITY PRIVATIZATION

Two components:

- 1) Funding the system
- 2) Replace DB by DC:

benefits = past contributions + market return

Main proponent: Feldstein, main critic: Diamond

Pros: get higher return on contributions $r > n + g$, increase K stock and future wages

Some countries such as Chile, Mexico, UK have privatized (partly) their systems

SOCIAL SECURITY PRIVATIZATION ACCOUNTING

Exactly the reverse of pay-as-you-go calculations:

- 1) First generation loses as they need to fund current retirees and own contributions. All future generations gain [generational redistribution]
- 2) If govt increases debt to pay for current retirees: future generations get higher return on contributions but need to re-pay higher govt debt \Rightarrow Complete wash for all generations

tax to pay debt interest = returns on funded contributions - returns on paygo contributions

\Rightarrow Only way funding generates real changes is by hurting some transitional generations which have to double pay

Feldstein calculations look better bc $r_{\text{contributions}} \gg r_{\text{govt debt}}$

Should govt exploit this equity-premium opportunity?

ADDITIONAL PRIVATIZATION ISSUES

- 1) Risk:** individuals bear investment risk (stock market fluctuates too much relative to economy) and cannot count on defined level of benefits [⇒ Privatization needs to include minimum pension provision]
- 2) Annuitization:** hard to impose in privatized system bc of political constraints. ⇒ Some people will exhaust benefits before death and be poor in very old age [looming problem with 401(k) system]
- 3) Lack of financial literacy:** Individuals do not know how to invest. Complicated choice, govt can do it for people more efficiently
- 4) Administrative costs:** privatized systems (Chile, UK) admin costs very high (1% of assets) due to wasteful advertisement by private mutual funds [SS has very low admin costs]

Notional Accounts System: Sweden and Italy

- 1) Benefits = Contribution + fictitious return set by govt
- 2) Return in Sweden depends on life expectancy, population growth, wage growth to insure financial stability: return rates are low ($n + g$) but stable [in Italy, return=GDP growth]
- 3) System unfunded so no transitional sacrifice
- 4) Individuals understand link bt contributions and benefits
- 5) Mandatory annuitization based on cohort-life expectancy
- 6) Individuals can choose retirement age freely (system is almost actuarially fair)
- 7) Could add minimum pension and incentives to contribute more through savings (e.g., matching incentives)

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