LECTURE: SOCIAL SECURITY AND RETIREMENT

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OUTLINE OF LECTURE:

1. Important background on SS and retirement; trends
2. Economics: How does SS affect retirement?
3. Key Measurement Issues: Social Security Wealth, Social Security Accruals, Retirement
4. Identification strategies taken in the literature: Krueger & Pischke *Notch paper*, Friedberg *Kinks*, Gruber and Wise *Cross Country Analysis*

SOCIAL SECURITY AND RETIREMENT

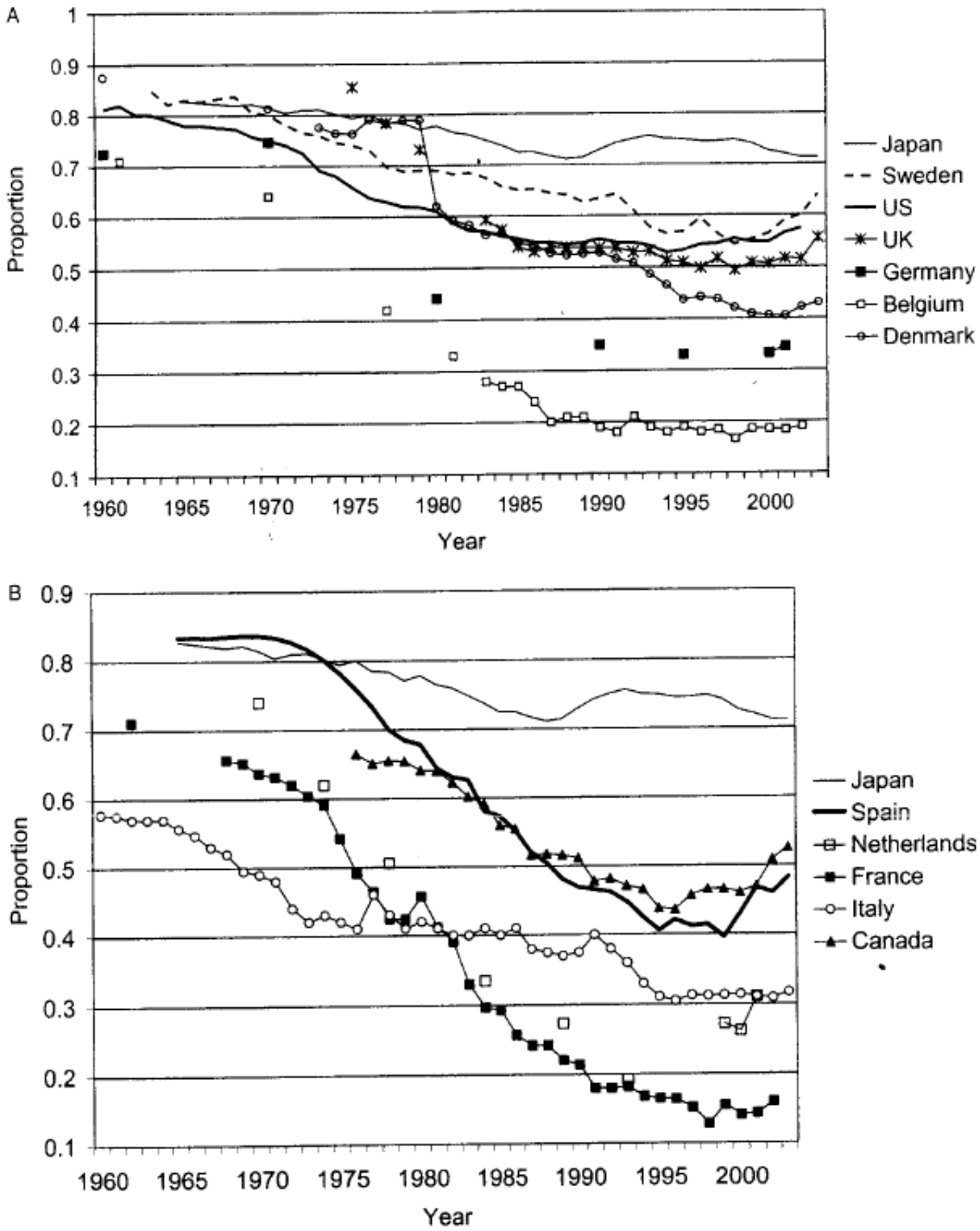
Background/Facts

1. Labor Force Participation of men is decreasing (65+) in US and Europe
2. Life expectancy is increasing
3. Social Security and pensions represent a huge % of the wealth of retirees
4. Social Security benefits have become more generous since 1950, as has the % of people covered
5. Private pensions are increasing
6. Early SS collection has increased (Feldstein & Liebman handbook chapter)

	1965 (3 yrs before SS benefits were available at age 62)	1999
% SS claims at 62	23%	59%
% SS claims 65	23%	16%
% SS claims >65	36%	7%

Some more facts (From Krueger and Meyer's handbook chapter on Social Insurance)

In 1998
-- 90 percent 65+ received SS
-- For 18 percent of beneficiary families, SS was the sole source of income
-- For 63 percent of families it was responsible for more than half of family income.
-- SS benefits accounted for 38 percent of aggregate income of the elderly population, nearly twice as much as labor earnings.
-- The poverty rate among older individuals has fallen substantially since the advent of Social Security. It is now 9%, but excluding SS income, an additional 39 percent of beneficiaries would have income below the poverty line.



(From Gruber and Wise)

Fig. I.27 LFP trends for men 60 to 64, updated

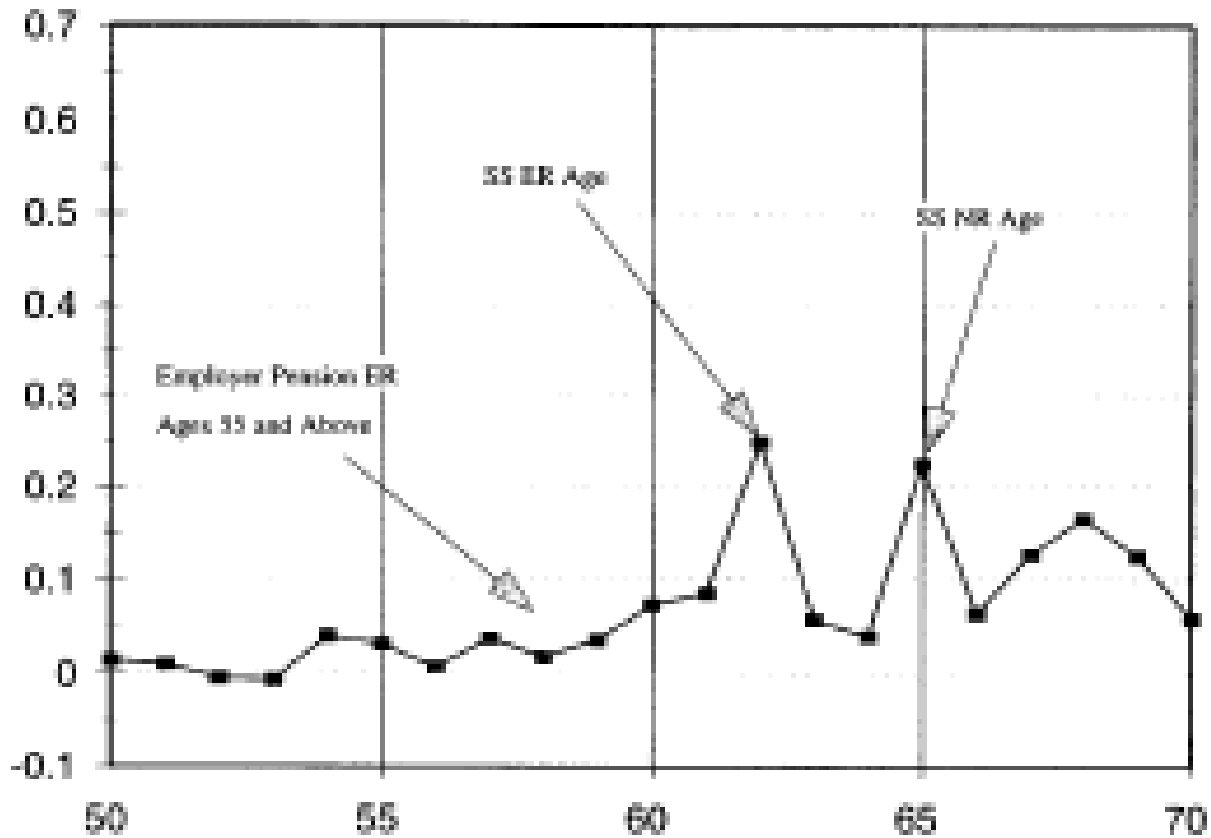


Fig. 13 Hazard rates for the United States
Note: ER = early retirement; NR = normal retirement; SS = social security.

(From Gruber and Wise)

<u>Explanations for declining labor force participation rates</u>

1. *Non Social Security reasons*

    decreasing opportunities for older workers

    growth of private pensions

    (note: both of these create wealth/income effects)

2. *Social Security*

    introduction and expansion

    adjustment for retirees at 62 is not actuarially fair for all $r > 0$

Very large literature focuses on role played by SS in falling LFP rates. SS is a natural candidate because:

During the time of falling LFP, benefits and coverage in SS were rising

Economic Framework: How can Social Security alter retirement?
(*Liebman and Feldstien)*

Channels through which SS affects retirement:
A central assumption in economic models of retirement is that an individual will retire when the value of the financial rewards to postponing retirement are just offset by the loss in utility that results from the shorter period of post-retirement leisure.

1. Myopic or liquidity-constrained individuals
Mandatory Social Security system will transfer $ from working years to retirement years, creating an income effect to consume more leisure later in life.
Note: the creation or expansion of Social Security (windfall) has similar income effect.

2. Social Security systems are "event-conditioned" in classic social insurance sense. Benefits only available after an event (retirement) occurs.
These alter retirement incentives because the pdv of lifetime benefits is NOT independent of the choice of retirement date.

3. Unanticipated increases in benefits that are granted close to retirement age (common in 1970s when Congress adjusted benefits on an ad hoc basis) would be expected to have a particularly large effect on retirement because individuals would not have adjusted their earlier consumption and work plans.

4. Social Security Programs may affect social conventions about retirement. May impact private pensions, firms' choices of mandatory retirement age

5. If SS is better than actuarially fair, then the lifetime budget constraint shifts out. This, through a "lifetime income effect", leads to more leisure (earlier retirement).

Possible reasons for spike at age 62?

(1) Actuarial unfairness built into the system penalizing work past age 62, so that there is a “tax” effect that leads workers to leave at that age.

(2) Workers are liquidity constrained; they would like to retire before age 62, but cannot because they are unable to borrow against their SS benefits and have no other source of retirement support.

(3) Workers are myopic or information constrained; they either do not understand or do not appreciate the actuarial incentives for additional work past age 62, so they retire as soon as benefits become available.

<u>Concepts/Definitions</u> (Note: Same concepts can be defined for private pensions.)

<u>Social Security Wealth</u> (Feldstein)
Definition: PDV of stream of benefits you are entitled given your work history, and given a retirement age R. This is gross SSW.

$$SSW(R) = \sum_{t=R}^{T} \frac{B(R,t)}{(1+r)^{t-R}}$$

Can be adjusted for uncertain lifetime, by using survival probabilities.
Net SSW is defined similarly but is net of taxes yet to be paid in.

<u>Social Security Accrual</u>
Definition: Gain to SSW from postponing retirement by one year (from R-1 to R).

$$SSA(R) = SSW(R) - SSW(R-1) * (1+r)$$

<u>Option Value (Stock and Wise)</u>
Generalizes one year accrual to compare value of retiring today to the MAXIMUM SSW+pdv(earnings) from retiring at some point in the future.

How do social security rules affect B, SSW, SSA?

R < 62 No benefits available until age 62
0's averaged in AIME. So as R increases toward 62, fewer 0s are averaged in, so SSW smoothly increases toward 62.
SSW ↑, SSA>0

62 < R < 65 B(R) = .8*(PIA) in 62
= 1.0*(PIA) in 65
If there's no change in earnings, then (by construction) for people with average life expectancy SSW does not change between 62 and 65. For someone with a longer (shorter) than average life expectancy, SSW would increase (decrease) with R.
SSW ↑↓, SSA ?

R > 65 B(R) may change if AIME increases due to extra years of work at high earnings level. But you lose benefits available at age 65, leading to a decrease in your SSW. Actuarially unfair so incentive to retire at 65. [Also eligibility for Medicare at 65]
SSW ↓, SSA<0

EMPIRICAL LITERATURE ON SS AND RETIREMENT

Familiar identification problem: One SS program, no variation in law except over time. Depends on work history (endogenous to retirement)

- Early literature employs a wide range of empirical techniques (nonlinear budget set, reduced form, hazard models) and wide range of estimates. Great sensitivity to specification and controls.

Gruber and Wise (1999). International comparison

- highly regarded study using 15+ countries
- use cross-country variation in availability of early retirement in SS programs, and implied tax for continuing work beyond early retirement age
- *unused capacity* (% of men 55-65 not in labor force) and *tax force* (implied cumulative SS tax rates on work from early retirement age through age 69)

  tax rate=SSA/wages
- Figures show strong connection between incentives for early retirement and low LFP rates
- Detailed individual country studies reveal consistent effects
- Initial eligibility date leads to large spike in retirement (people constrained below by eligibility date?)
- Caution: could be that the SS rules followed the trends in LFP rates. Not necessarily causally identifying SS impacts.

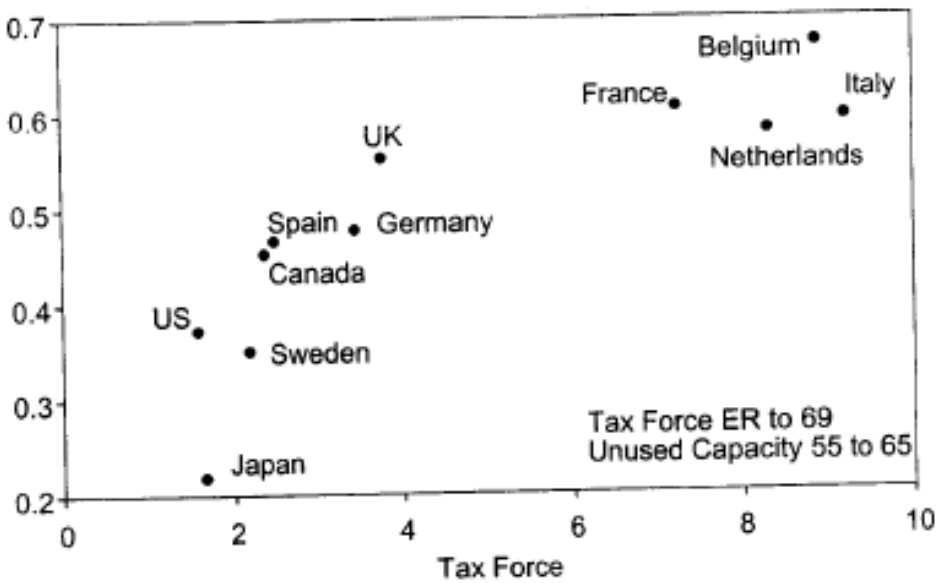


Fig. I.7 Unused capacity versus tax force to retire

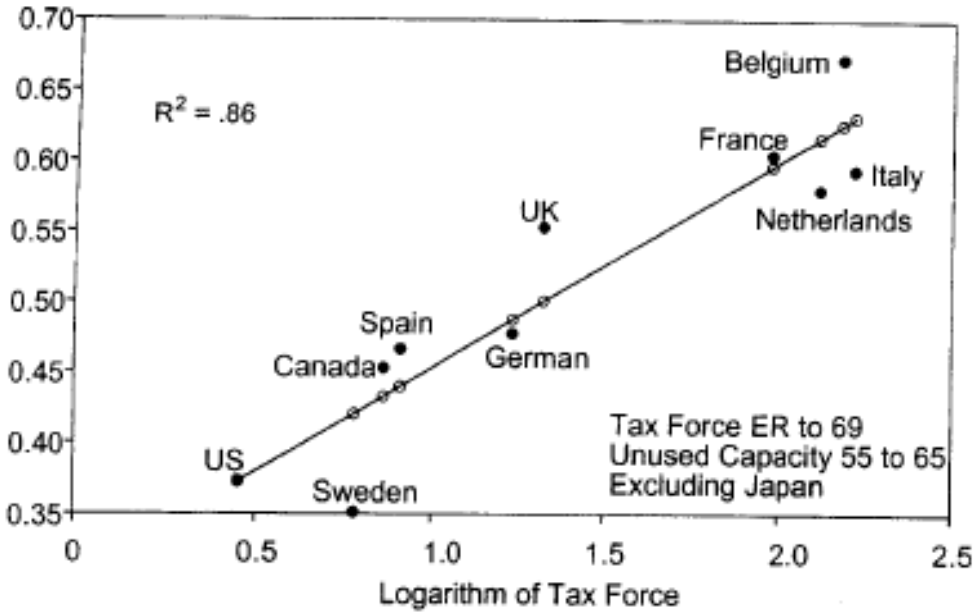


Fig. I.8 Unused capacity versus tax force to retire

Krueger + Pischke "The Effect of Social Security on Labor Supply: A Cohort Analysis of the Notch Generation," JOLE 1992

-- First paper to think about valid source of variation in SS benefits. Prior literature was criticized for using endogenous measures
-- quasi-experimental analysis of this policy expansion

"Notch" experiment / 1977 SS amendments

- Large unanticipated reduction in generosity of social security benefits for cohort born in 1917-1921, relative to earlier birth cohorts.
- First "break" in increasing trend in SS benefits; cohort level variation in benefits.
- Law prior to 1972:
  - SS Benefits based on average nominal monthly earnings (AME).
  - Benefits were adjusted for inflation with legislated changes (e.g. 1967, 1969, 1971)

- 1972 Amendments:
  - Intention to adjust benefits automatically for changes in COL
  - Mistake in design led to *double indexation* (or over compensation for changes in COL). The mistake was because both AME and replacement rate formula were linked to nominal earnings.
  - This double indexation impacted the PIA for those who were not yet retired. Once retired, benefits were (correctly) single adjusted for changes in COL.
- 1977 Amendments:
  - Eliminate *double indexation* in 1972 law; Replaced AME with AIME.
  - Wage ranges in benefit formula (PIA) are adjusted each year for changes in COL, but replacement rate is constant.
  - To counter over-generosity earlier they ↓ PIA
  - The new rules grandfathered in those age 61 or greater in 1977.
  - These new rules phased in over 5 year birth cohort→ those 56-60 in 1977 → those born in 1917-1921. [The notch babies..]
  - Result: ↓↓ benefits for birth cohorts 1917-1921 relative to those born 1915-1916 (Figure 1 & 2)
  - Because inflation was high in 1970s, the post-20 cohort caught up in benefits.

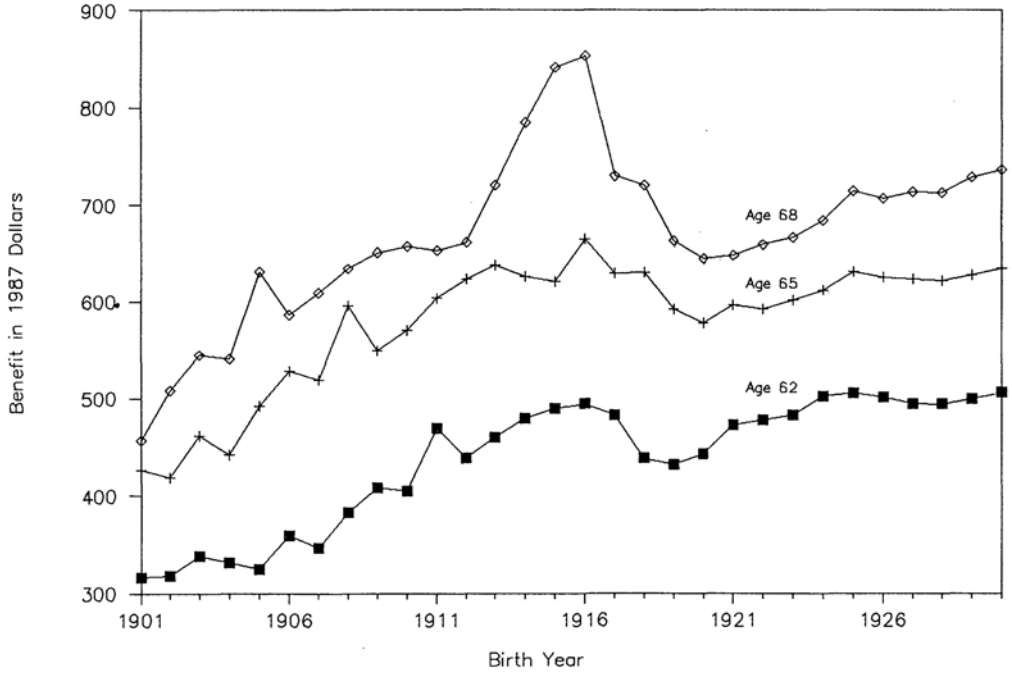


FIG. 1.—Monthly Social Security benefits for selected retirement ages

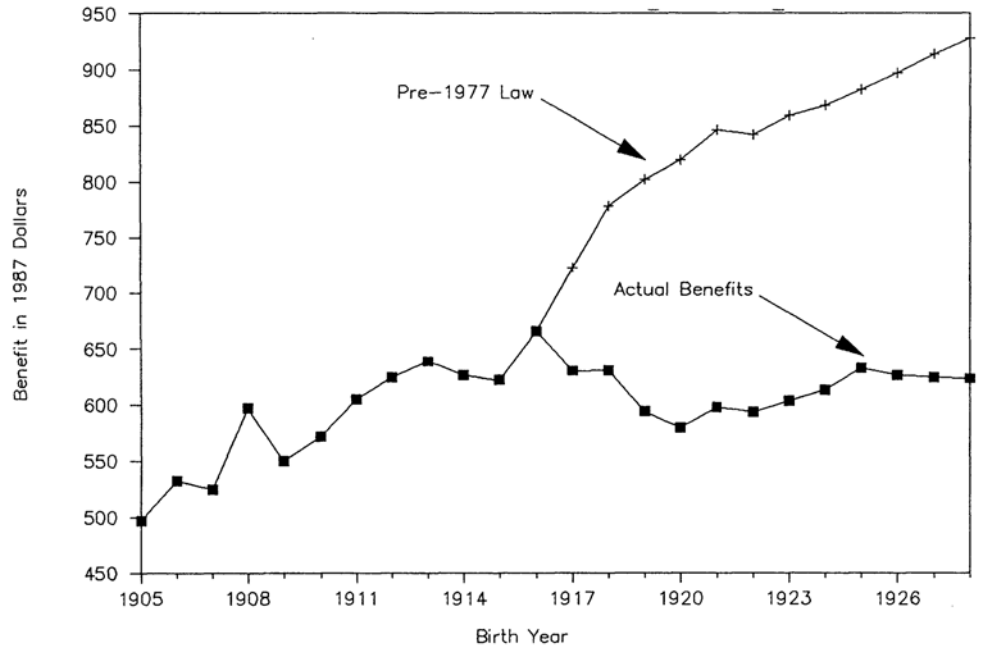


FIG. 2.—Monthly Social Security benefits, average worker retiring at age 65

Why is this a good experiment?

- o changes in benefit formula happened relatively late in life so perhaps not able to alter pre-retirement decisions
- o benefit changes affecting the notch were well publicized. So we should see an impact on retirement and labor supply.
- o Benefits were on average 13 % lower for those in notch compared to those near (before) notch.
- o Variation by age within cohort as well.
- o General Strategy in Paper: Compare the retirement behavior of those subject to the "notch" to nearby cohorts who were unaffected. Synthetic cohort panel data analysis.

Data

- No micro level *panel data* with appropriate cohort coverage is available.
- Create synthetic panel using CPS 1976-1988
  - Sample selection: Men ages 60-68, birth cohort 1917-1921, plus nearby ones
  - Create demographic cells: single year of birth X single year of age. (Note that age is measured as of survey week and thus there is measurement error in year of birth.)
- DEP VAR: Three measures of labor force participation:
  - LFP in survey week
  - self-reported retirement status in survey week
  - weeks worked last calendar year
- KEY INDEP VAR:
  - SSW for cohort X age cell. Problem is that they do not observe the earnings history that they need for each birth cohort. Instead they assume each worker earned the average taxable earning in each year of working life. (weak)
  - G: Change in SSW from postponing retirement by one year from age a to a+1: $G_{c,a} = SSW_{c,a+1} /(1+r)SSW_{c,a}$

Empirical Model

$$y_{a,c} = \alpha + \beta \ln SSW_{c,a} + \gamma \ln G_{c,a} + \delta_a + \xi_t + e_{ac}$$

- linear model for log weeks worked, log odds ratio [ln(p/1-p)] for LFP and retirement status.
- expectations: $\beta<0$ (income effect), $\gamma>0$ (delaying effect)

Results

- Table 4: Specification test. Estimate model on pre-notch cohorts and show that results are similar to the literature. Negative coef on SSW (expected), and negative coef on SSW growth (unexpected). Illustrates that time series correlation is spurious. (With time effects results are insig). The estimates of the age dummies in Table 4 also shows that there is a spike 62 and 65 ("unexplained by SSW and G; liquidity contstrained?)

Table 5
The Effect of the 1977 Amendments to the Social Security Act on Male Labor Supply

	Dependent Variable								
	Log-Odds Ratio LFP Rate			Log-Odds Ratio Proportion Retired			Log Weeks Worked		
Independent Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Covered by 1977 amendments (1 = yes)	−.212	−.022	−.008	.287	.046	.007	−.111	−.036	−.044
	(.023)	(.033)	(.034)	(.026)	(.034)	(.032)	(.013)	(.019)	(.019)
Mandatory retirement dummy*	...	...	−.070	...	...	.196	...	...	.035
			(.050)			(.041)			(.022)
12 year dummy variables	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
8 age dummy variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	.977	.986	.986	.978	.987	.989	.999	.999	.999

Table 5: Basic DD model; dummy for covered being in notch generation.

$$y_{a,c} = \alpha + \beta\, COV77_{ac} + \delta_a + \xi_t + e_{ac}$$

where COV77= 1 if cohort>=1917 (I think)

sample: age 60-68, years 76-88 → cohorts 1908-1928

Negative association between COV77 and labor supply, but goes away with age and year dummies.

Is this just capturing the secular reduction in labor supply across cohorts?

Table 6
The Effect of Social Security on the Log-Odds Ratio of the Labor Force Participation Rate of Older Men in the Notch Period

	Sample					
	1976–88		Notch Period*		1976–88	
Independent Variable	(1)	(2)	(3)	(4)	(5)	(6)
Log Social Security wealth	−.199	−.191	.178	.105	.004	.036
	(.231)	(.223)	(.268)	(.265)	(.166)	(.173)
Growth of Social Security wealth	. . .	1.562	. . .	1.318	. . .	.546
		(.503)		(.711)		(.787)
Mandatory retirement dummy	.124	.170	. . .	. . .	−.072	−.084
	(.055)	(.055)			(.047)	(.050)
8 age dummy variables	Yes	Yes	Yes	Yes	Yes	Yes
12 year dummy variables	No	No	No	No	Yes	Yes
σ_ε	.148	.143	.120	.117	.093	.094
F-statistic† [*p* value]	. . .	. . .	2.899	2.390	. . .	. . .
			[.003]	[.014]		
Sample size	117	117	51	51	117	117

NOTE.—Equations also include an intercept. Standard errors are shown in parentheses. The mean labor force participation rate for cols. 1, 2, 5, and 6 is .453, and .457 for cols. 3 and 4.

* The notch period consists of observations from cohorts born between 1916 and 1921.

† *F*-statistic for Chow test of parameter constancy between the sample composed of the notch cohorts and the sample composed of the other cohorts.

Main estimates.

Columns 1-2: Expected effects

Problem is you are identifying model (in part) off of period of growth in SS that may be correlated with trends.

Columns 3-4: limiting sample to notch and near pre-notch cohorts

Much smaller effects than using non-notch variation. Low power.

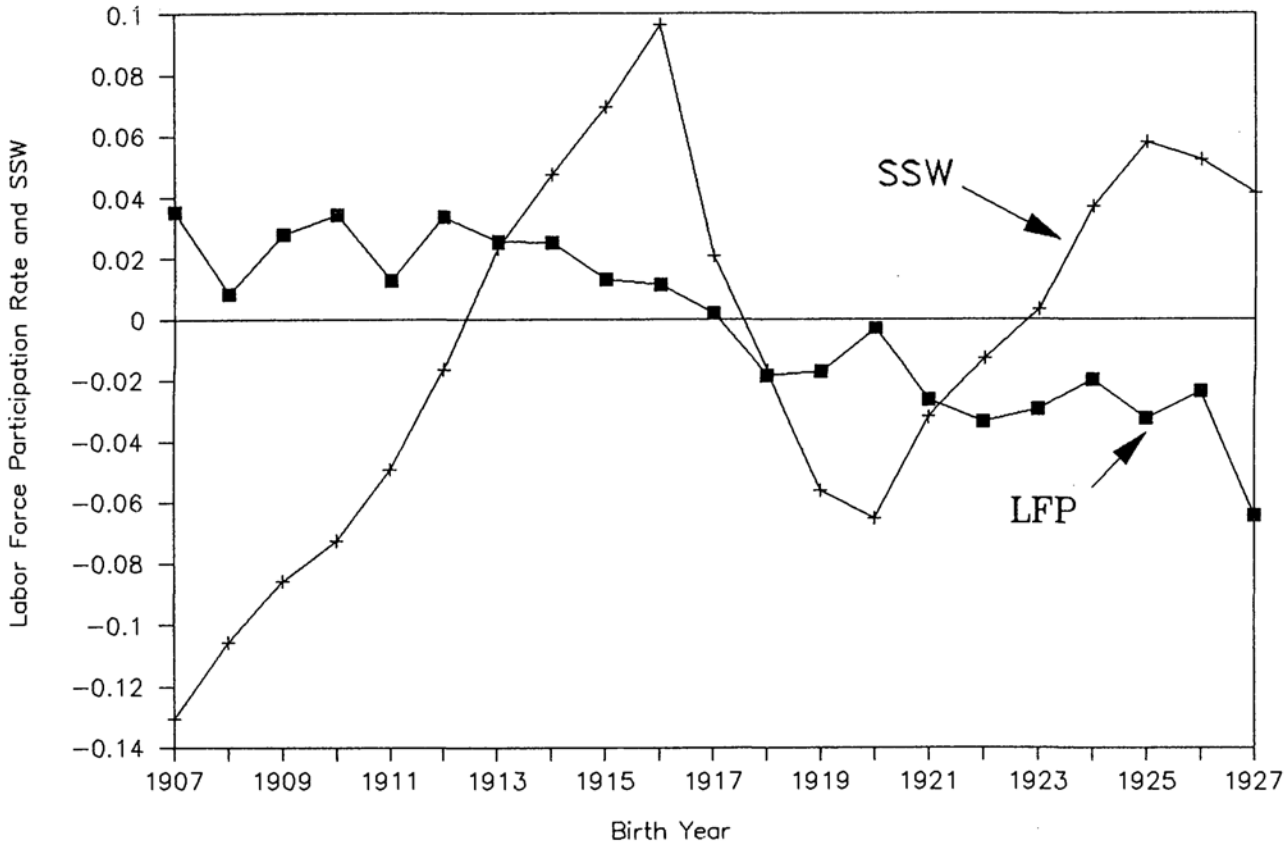


Figure 4 shows the non-result quite clearly.

Often cited conclusion from this paper: SS has little effect on retirement.

Comments

- Why no effect?
  - Anticipated policy, offset by private pension, SS small in lifetime wealth for average worker (?)
- Good idea but not implemented very convincingly
- Data limitations
  - Can not make maximum use of the experiment because of aggregate analysis (average earnings)
  - Measurement error in age
  - Synthetic cohort means that you can not look for panel data predictions
  - Paper is ripe for re-analysis. Possible to use Census data center sensitive data with panel of social security earnings records.
- Empirical model: The DD estimates are too crude. Perhaps use regression discontinuity design instead? Using too wide a cohort range?
- However, Figure 4 is rather convincing (unless average is missing something) that there is no effect of SS.
- Other papers have used this variation to identify impacts on downstream outcomes (e.g. health and mortality) given the "shock" to income without a change in labor supply.

Friedberg "Effects of the Social Security Earnings Test" RESTAT 2000

Current law:
The *retirement earnings test* applies only to people below normal retirement age (NRA), which ranges from age 65 to 67 depending on year of birth. Social Security withholds benefits if your earnings exceed a certain level. These exempt amounts generally increase annually with increases in the national average wage index.

We withhold $1 in benefits for every $2 of earnings in excess of the lower exempt amount. We withhold $1 in benefits for every $3 of earnings in excess of the higher exempt amount.

In 2008: Exempt amount if 2008 is one year prior to NRA = $13,560
Exempt amount if 2008 is NRA year (or later)=$36,120

History

Introduced in 1939, idea was to give strong incentive to get elderly out of the labor force

TABLE 1.—THE EARNINGS TEST RULES IN 1998

	62-64 Year Olds	65-69 Year Olds
Exempt amount	$9,120	$14,500
Tax rate	50%	33%

Changes in the Earnings Test Rules

Year	What Changed	Ages Affected	Ages Not Affected
1978	Raised exempt amount about 25%	65–71	62–64
1983	Eliminated the earnings test	70–71	62–69
1990	Lowered tax rate to 33%	65–69	62–64
1996	Raised exempt amount to $30,000 by 2002	65–69	62–64
2000+	Rules for 62–64 year olds will be extended as the normal retirement age rises from 65 to 67.	65–66	62–64, 67–69

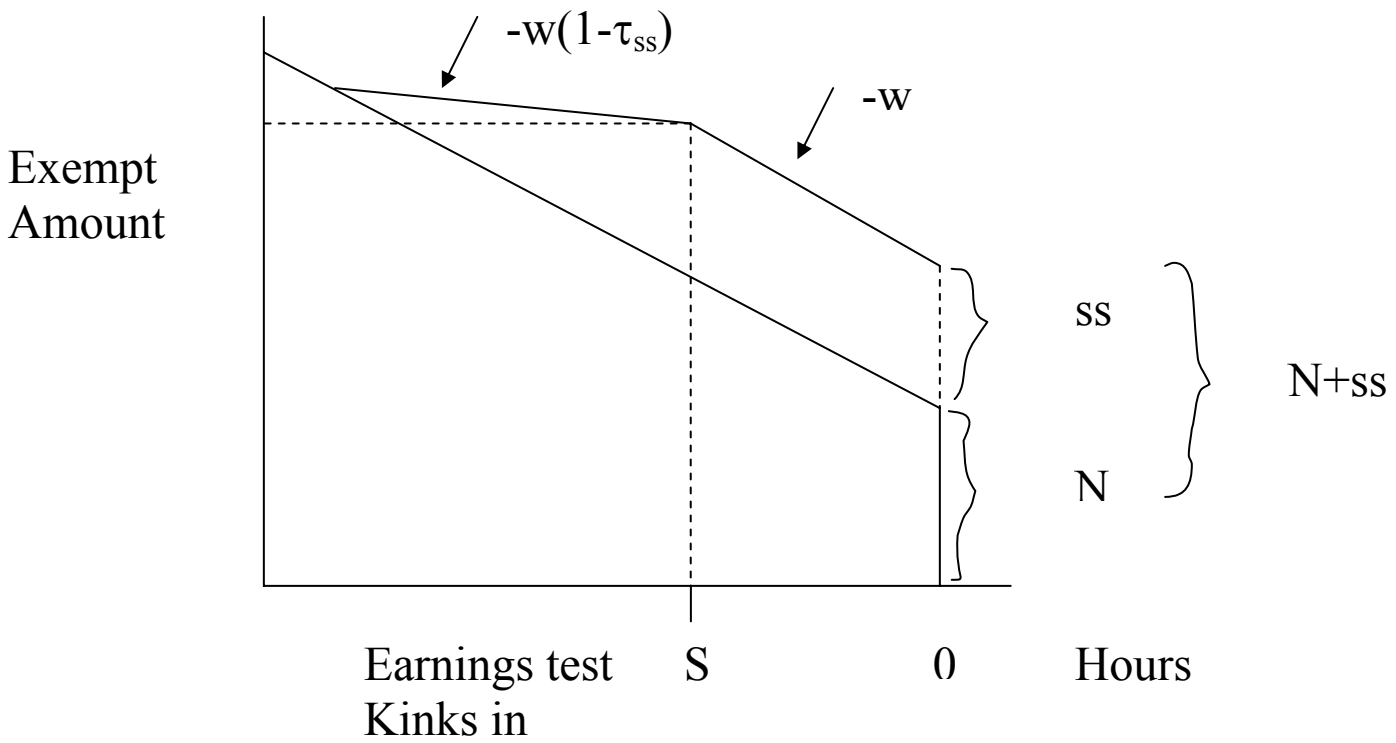
History

How it works:

E < exempt amount $\Rightarrow$ receive SS benefit in full
E > exempt amount $\Rightarrow$ SS benefit = full benefit $- t_{ss}E$

This applies only after you have applied for retirement, and are receiving benefits

Basic Budget Constraint for elderly SS recep.



Empirical implications:

-cluster at convex kink

-no clustering at nonconvex kink

-$\downarrow t_{ss} \Rightarrow$ reduction in H from income effect and increase in H from substitution effect

-$\uparrow$exempt amount $\rightarrow$ income effect at high hrs (reduction in H) and substitution effect (increase in H)

Data: March CPS

<u>Descriptive Evidence:</u> The paper is most cited for the descriptive evidence on clustering near the kinks.

FIGURE 2-A.—EARNINGS DISTRIBUTION, 1975–77

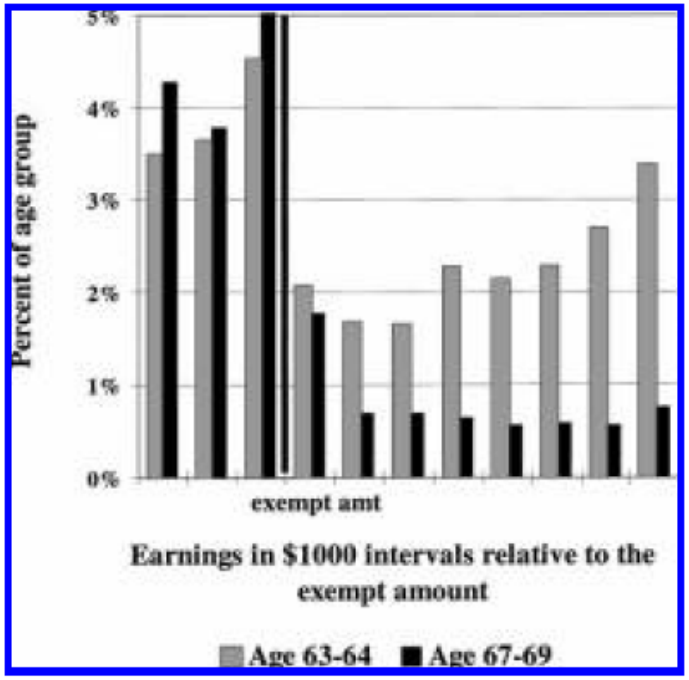


Figure 2 focuses on the *1978 change:*
Raised exempt amount by 25% for those 65-71 (no change 62-64)

BEFORE 1978 CHANGE

FIGURE 2-B.—EARNINGS DISTRIBUTION, 1979–81

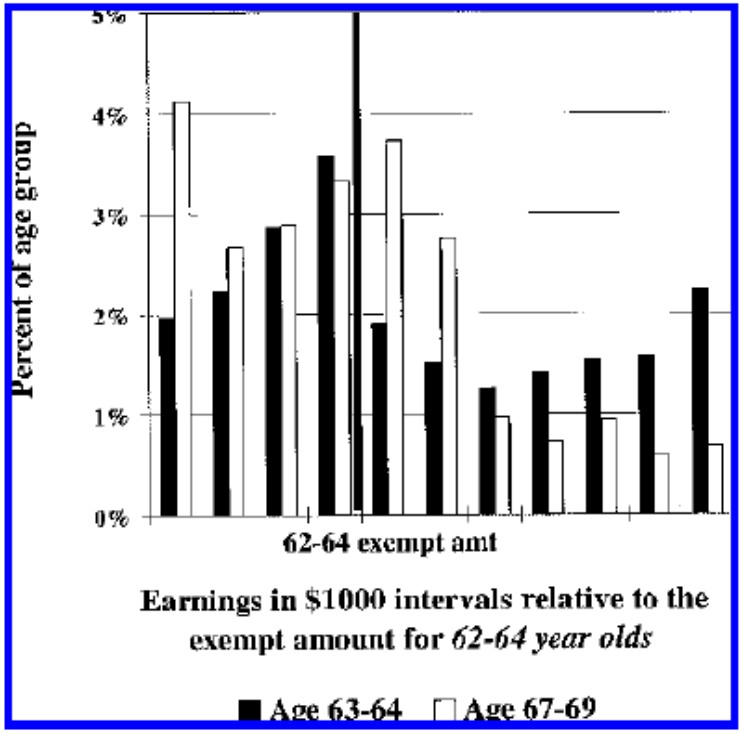
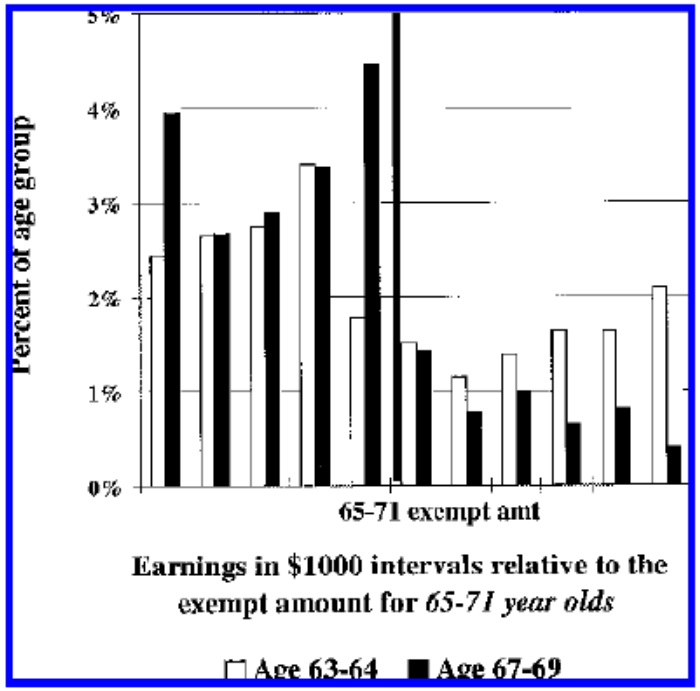


FIGURE 2-C.—EARNINGS DISTRIBUTION, 1979–81



AFTER 1978

Separate graph showing two different exempt amounts
(would have been cleaner to combine in one)

Compelling visual evidence that people know about the earnings test and respond as expected.

Similar results for changes in 1983 and 1990.

The paper also estimates a structural model of labor supply in the presence of kinked linear budget set.

Results: uncompensated wage elasticity=0.34 and income elasticity= -0.8 (large)
Simulations: show that eliminate earnings test or increasing exempt amount leads to large increase in hours.

Stock and Wise *Option Value Paper*
-- First to implement a forward looking model of retirement. Continue to work if the expected value of retirement in the future is worth more than the value of retiring now. The model allows expectations about future events to be updated, as individuals age.
-- Very influential paper
-- I think there is agreement that this is the right economic model. However, not all folks agree with the structural approach that was taken by Stock and Wise. Other papers have tried to use the option value in a more reduced form setting.
-- Challenge: comparing utility of work vs retirement using option value model requires saying something about disutility of leisure which (somehow) requires some structure—utility.

Samwick (1998 JPUBE)
Takes G* with given parameter estimates
Calculates G* for sample given different earnings, pension, SS
Compares accrual model to option value model
Option value model does better but still can not explain the spikes in the hazard

Coile and Gruber (NBER WP 7830)
Similar to Samwick but use better data—HRS
Address endogeneity of option value (depending on prior earnings)
Forward looking models do better; controlling richly for earnings is important; still age spikes

Evolution of the (SS/pension) literature:

A large literature has been concerned with estimating the impact of private and public pensions on retirement behavior. Over a long period of time, researchers have used different measures to capture the financial incentives in pension programs. The chronology of measurement goes something like this:

1. Social security benefits if you retired today (or at standardized age)
2. Social security wealth (SSW). Comparative statics of SSW:
   - Windfall increase in SSW→ pure income effect , work less, retire earlier
   - More generally if
     - If age < 65. Ambiguous (Income effect – earlier retirement, Substitution effect or higher return to working one more year– later retirement)
     - If age > 65. Earlier retirement (income and substitution effects both negative)
3. Social security accrual (SSA)—Gains to SSW from postponing retirement by one year (from r-1 to r). Comparative statics:
   - Higher SSA, the greater the gain to postponing retirement → delay retirement
4. Option value—Generalizes the SSA approach to look further in the future than one period. By delaying retirement this year, you retain the possibility of retiring in a later year if it is advantageous to do so. Individual compares SSW if retire today to the SSW of retiring at each future year (up to some maximum age).

   Option value of retirement = SSW today – SSW at age that maximizes SSW.

   Comparative statics: higher the option value, the more likely you are to retire today.

How different the results in your option value model vs accrual are will depend on the nature of the pension formula. If there is a large nonlinearity at some future date (e.g. you get a bonus if you stay past 65) then looking only 1 year forward can be very misleading. If, however, the pension formula is smooth and linear, say, then it will matter less.