Lecture 5: Redistribution and well-being

Antoine Bozio

Paris School of Economics (PSE)
École des hautes études en sciences sociales (EHESS)

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Introduction

- **Objectives of pension systems**
  - To prevent poverty at old age
  - To redistribute across cohorts
  - To reduce lifetime inequality

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- **Objectives of pension systems**
  - To prevent poverty at old age
  - To redistribute across cohorts
  - To reduce lifetime inequality
- **Assessment**
  - Poverty
  - Lifetime income redistribution
  - Health status
  - Gender

Outline of the lecture

I. **Redistribution**
   1. Differential life expectancy
   2. Elderly poverty
   3. Redistribution across cohorts
   4. Within cohort redistribution

II. **Health, mortality and well-being**
   1. Impact of health on retirement
   2. Impact of retirement on health

III. **Gender and family issues**
   1. Gender issues
   2. Kids and pensions

I. Redistribution

1. Differential life expectancy
2. Elderly poverty
3. Redistribution across cohorts
4. Within cohort redistribution

Differential life expectancy

- **Reminder**
  - Any pension system insures against the risk of living long
  - It redistributes ex post from those who die early to those who die late
  - It would be an insurance if mortality was completely random

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  - Any pension system insures against the risk of living long
  - It redistributes ex post from those who die early to those who die late
  - It would be an insurance if mortality was completely random
- **Large social inequalities in life expectancy**
  - Socio-economic occupations have wide difference in mortality patterns
  - Evidence is scarce and fragile, but compelling in many countries

Differential life expectancy

- **Measurement issues**
  - Need data on death rate and socio-economic status
  - Socio-economic status change over long period of time
    e.g., educated workers represent a larger share of population
  - Small sample issues at older ages

Differential life expectancy

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  - Need data on death rate and socio-economic status
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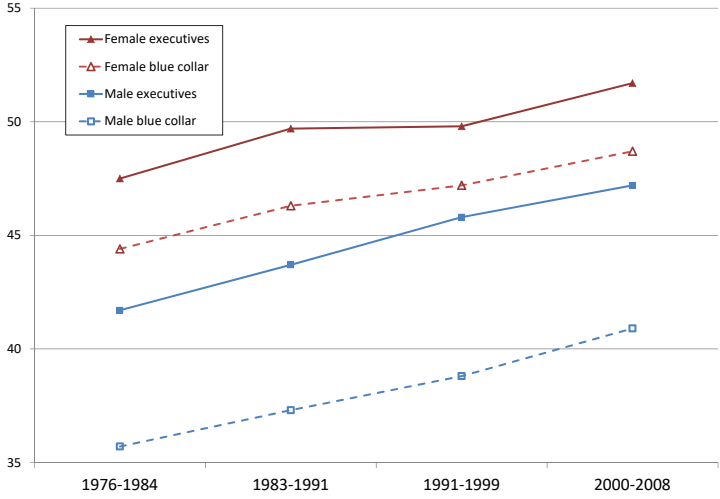
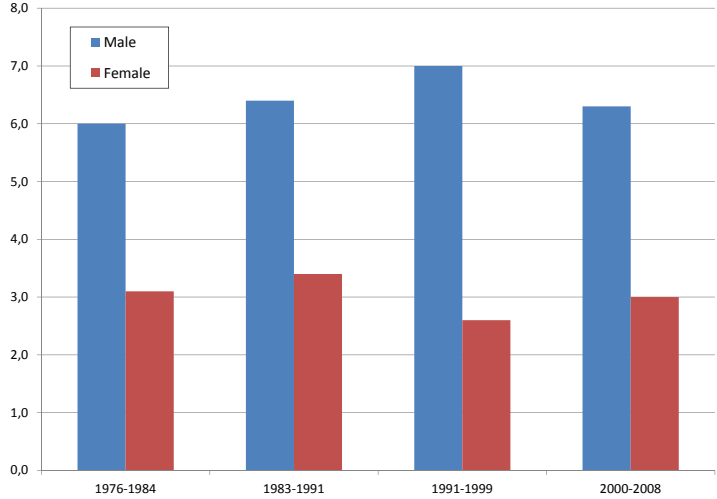
    e.g., educated workers represent a larger share of population
  - Small sample issues at older ages
- **Data sources**
  - Census data mostly
  - In France *Échantillon démographique permanent* is panel data from census data for sub-sample of population

Figure 1 – Life expectancy at age 35 for executives and manual workers



Source : Blanpain and Chardon (2011), Fig. 1 ; data from *Échantillon démographique permanent*, Insee.

Figure 2 – Difference of life expectancy at age 35 over time



SOURCE : Blanpain and Chardon (2011) ; data from *Échantillon démographique permanent*, Insee.

Differential life expectancy

- **Probability to die before a given age**
  - Life expectancy highly dependent from death rates at older ages (with few observations)
  - Probability of death before given age is more robust

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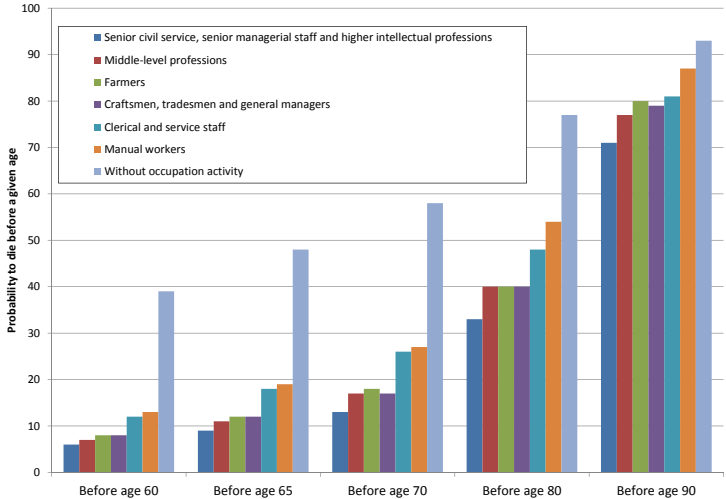
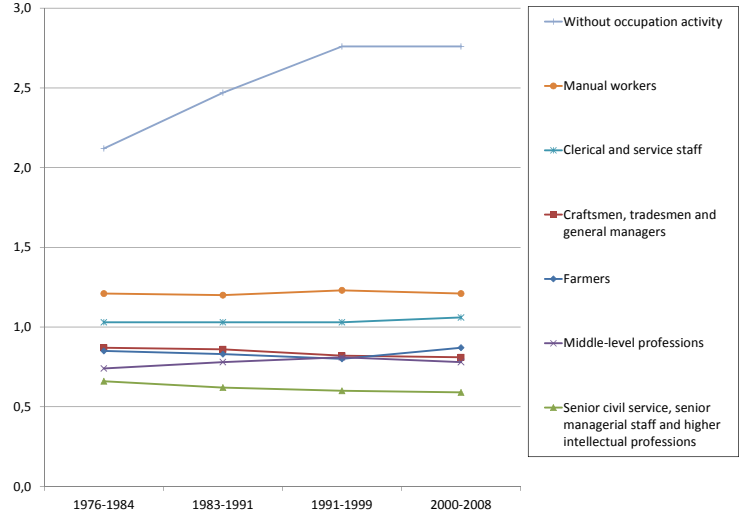
  - Probability of death before given age is more robust
- **Standard Mortality Rates (SMR)**
  - SMR is the risk of dying by characteristic chosen relative to a reference group
  - $SMR > 1$ means that this group has higher mortality risk compared to reference group

Figure 3 – Probability to die before a given age by socio-economic status



SOURCE : Blanpain and Chardon (2011) ; data from *Échantillon démographique permanent*, Insee.

Figure 4 – Standard mortality rates by socio-economic status



SOURCE : Blanpain and Chardon (2011) ; data from *Échantillon démographique permanent*, Insee.

Differential life expectancy

- **Blanpain (2018)**
  - Administrative data from *Échantillon démographique permanent* (EDP)
    - panel data for 1% of French residents
    - matched data from civil registry, tax data, social security
  - Life expectancy by disposable income
  - Much more precise estimates of heterogeneity

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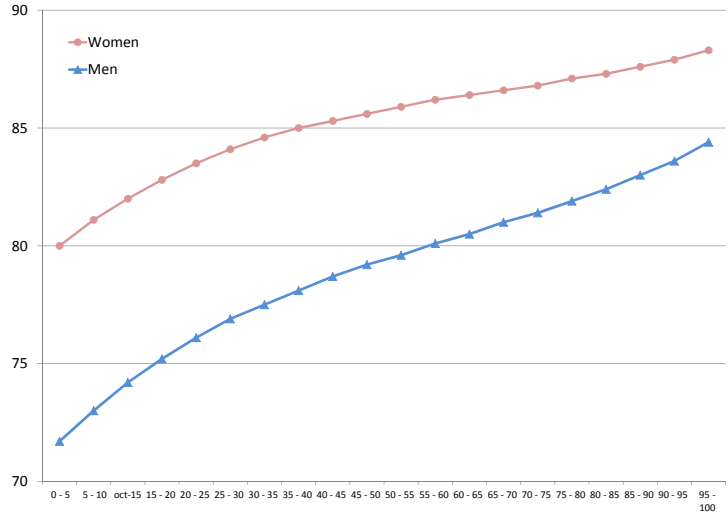
- **Results**
  - Male P95 vs P5 : 84.4 vs 71.7 years
    diff : 13 years
  - Female P95 vs P5 : 88.3 vs 80.0 years
    diff : 8 years

Figure 5 – Life expectancy at birth according to disposable income ventile



Source : Blanpain (2018), Insee.

Figure 6 – Relative death risk by observed characteristics

Ensemble	
Sexe	
Femme	*Réf.*
Homme	1.67 ***
Age	
35 ans	0.16 ***
...	
55 ans	*Réf.*
...	
100 ans	106 ***
Région de résidence	
Ile-de-France	0.94 ***
Occitanie	0.97
Provence-Alpes-Côte d'Azur	0.99
Pays de la Loire	0.99
Auvergne-Rhône-Alpes	*Réf.*
Nouvelle Aquitaine	1.01
Centre-Val de Loire	1.01
Bourgogne-Franche-Comté	1.02
Bretagne	1.11 ***
Grand Est	1.13 ***
Normandie	1.16 ***
Hauts-de-France	1.22 ***

Ensemble	
Sexe	
Femme	*Réf.*
Homme	1.81 ***
Age	
35 ans	0.17 ***
...	
55 ans	*Réf.*
...	
100 ans	100 ***
Région de résidence	
Occitanie	0.94 ***
Pays de la Loire	0.95 *
Nouvelle-Aquitaine	0.98
Centre-Val de Loire	0.99
Bourgogne-Franche-Comté	0.99
Provence-Alpes-Côte d'Azur	1.00
Auvergne-Rhône-Alpes	*Réf.*
Ile-de-France	1.06 **
Bretagne	1.08 ***
Grand Est	1.10 ***
Normandie	1.11 ***
Hauts-de-France	1.14 ***
Niveau de vie	
0 - 5 %	1.40 ***
5 - 10 %	1.39 ***
10 - 15 %	1.28 ***
15 - 20 %	1.23 ***
20 - 25 %	1.08 **
25 - 30 %	1.05
30 - 35 %	1.04
35 - 40 %	0.98
40 - 45 %	Ref.
45 - 50 %	0.95
50 - 55 %	0.95
55 - 60 %	0.95
60 - 65 %	0.91 ***
65 - 70 %	0.92 **
70 - 75 %	0.88 ***
75 - 80 %	0.87 ***
80 - 85 %	0.86 ***
85 - 90 %	0.85 ***
90 - 95 %	0.81 ***
95 - 100 %	0.78 ***
Diplôme	
Sans diplôme	1.12 ***
Brevet, CEP	0.99
CAP, BEP	*Ref.*
Baccalauréat	0.92 ***
Supérieur au baccalauréat	0.86 ***
Catégorie sociale	
Inactif non retraité	1.31 ***
Ouvrier	1.08 ***
Employé	*Ref.*
Profession intermédiaire	0.86
Agriculteur	0.96**
Artisan, commerçant, chef d'entreprise	0.90 ***
Cadre	0.87 ***

SOURCE : Blanpain (2018), Insee.

Differential life expectancy

- **Chetty, Stepner, Abraham, et al. (JAMA, 2016)**
  - Using tax records for the U.S. population (1999–2014)
  - 1.4 billions observations !
  - Life expectancy by income, over time and across areas

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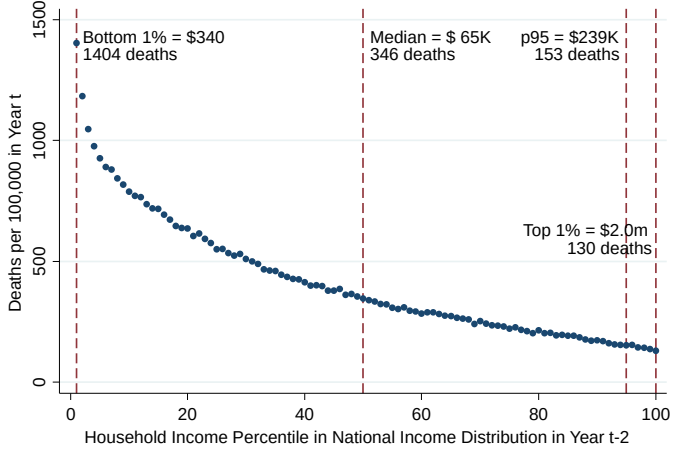
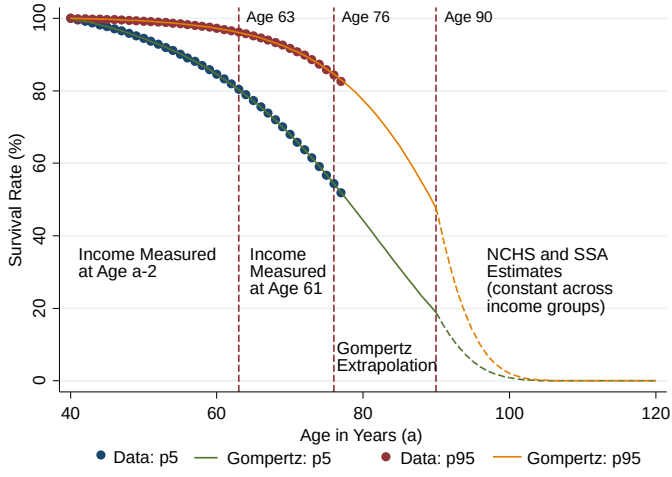
- **Methodology**
  - Aim : Estimating expected age of death conditional on income at age 40
  - Need death rates conditional on income at age 40 : $q|y_{40}$
  - $q|y_{40}$ not observed after age 55 (15 years of data)
    (i) Calculate $q|y_a$ for all ages
    (ii) Use age profile of $q|y_a$ to estimate Gompertz models
    (iii) Adjust for racial differences in mortality rates

Figure 7 – Annual Mortality Rates vs. Household Income Percentile (Men Aged 50-54, Pooling 2001-2014)



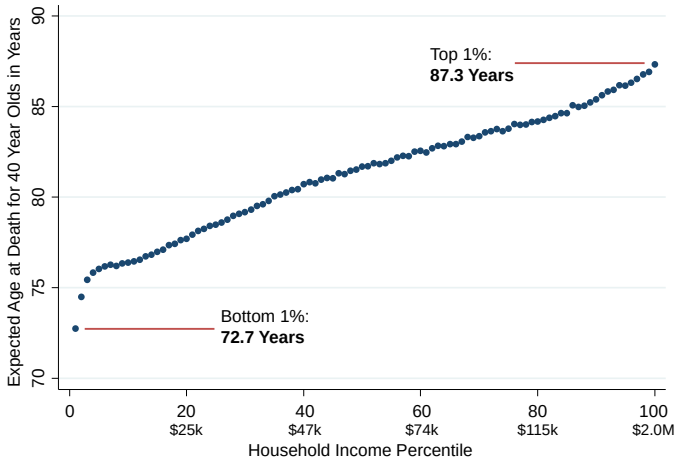
Source : Chetty, et al. (2016).

Figure 8 – Survival Curves for Men at 5th and 95th Percentiles



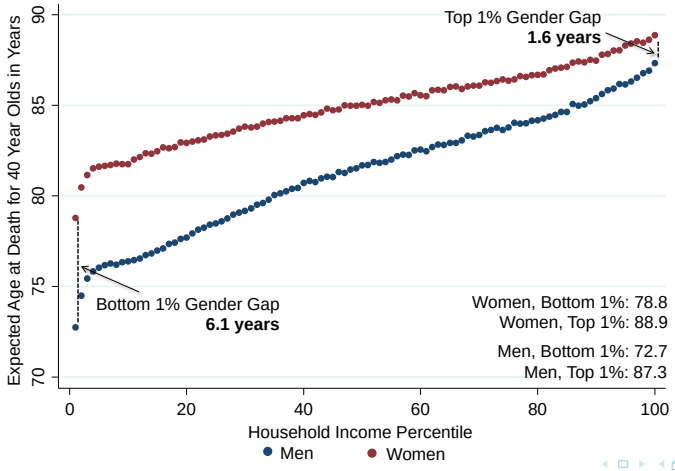
SOURCE : Chetty, et al. (2016), Fig. 1.B, p. 1752.

Figure 9 – Expected Age at Death vs. Household Income Percentile (Men at Age 40)



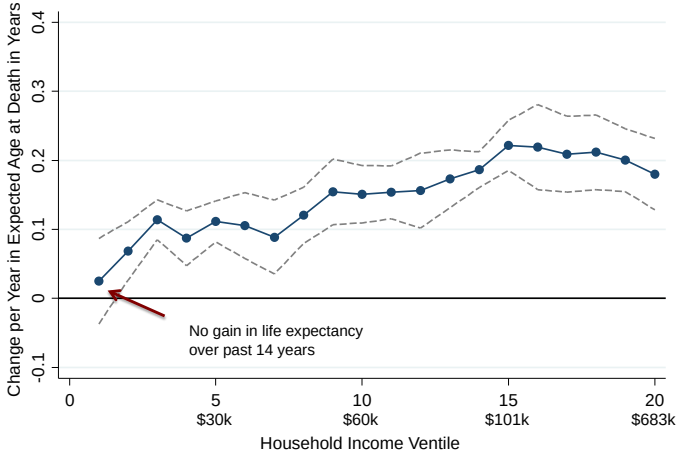
Source : Chetty, et al. (2016).

Figure 10 – Expected Age at Death vs. Household Income Percentile (By Gender at Age 40)



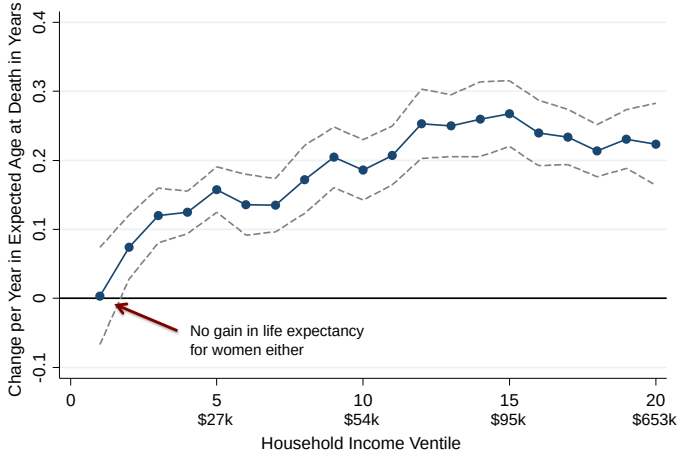
Source : Chetty, et al. (2016).

Figure 11 – Change in Life Expectancy Per Year by Income Ventile, Men



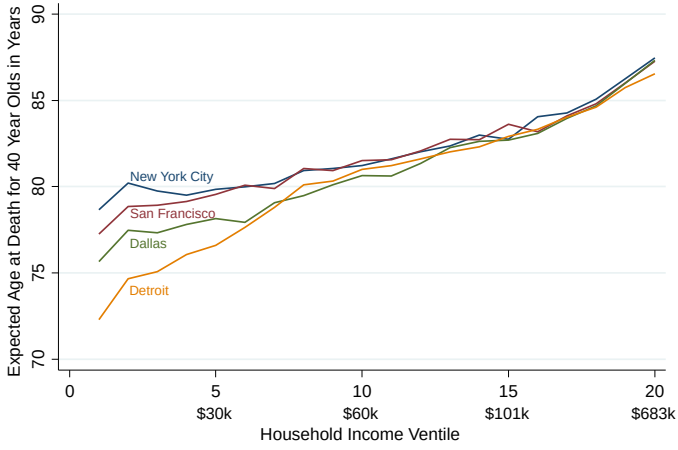
SOURCE : Chetty, et al. (2016).

Figure 12 – Change in Life Expectancy Per Year by Income Ventile, Women



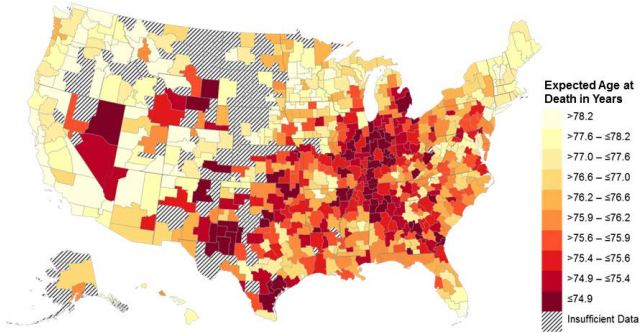
Source : Chetty, et al. (2016).

Figure 13 – Race-Adjusted Expected Age at Death vs. Household Income for Men in Selected Major Cities



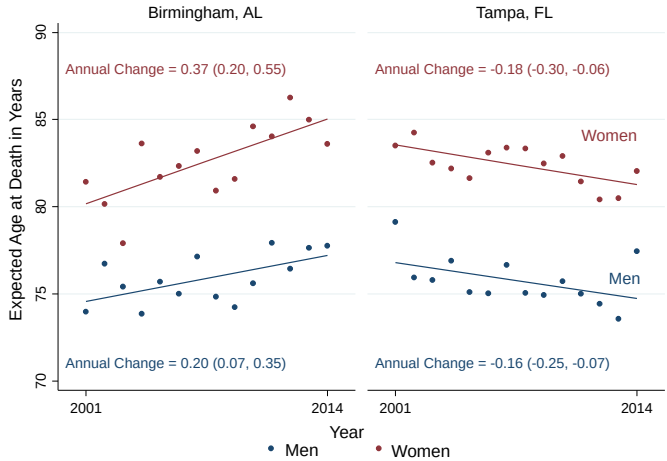
Source : Chetty, et al. (2016).

Figure 14 – Race-Adjusted Expected Age at Death for 40 Year Old Men Bottom Quartile of U.S. Income Distribution



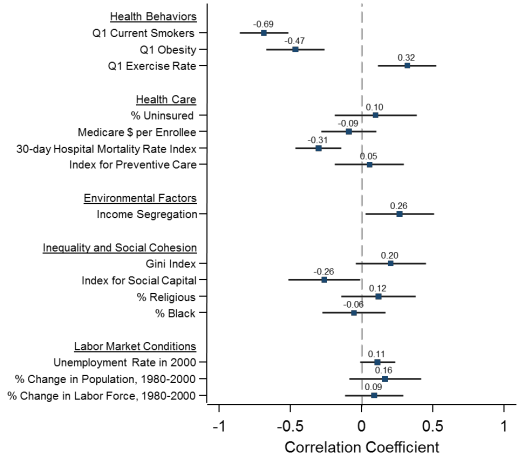
Source : Chetty, et al. (2016).

Figure 15 – Change in Race-Adjusted Expected Age at Death in Bottom Quartile



Source : Chetty, et al. (2016).

Figure 16 – Correlations of Expected Age at Death with Health and Social Factors For Individuals in Bottom Quartile of Income Distribution



SOURCE : Chetty, et al. (2016).

Chetty, Stepner, Abraham, et al. (2016)

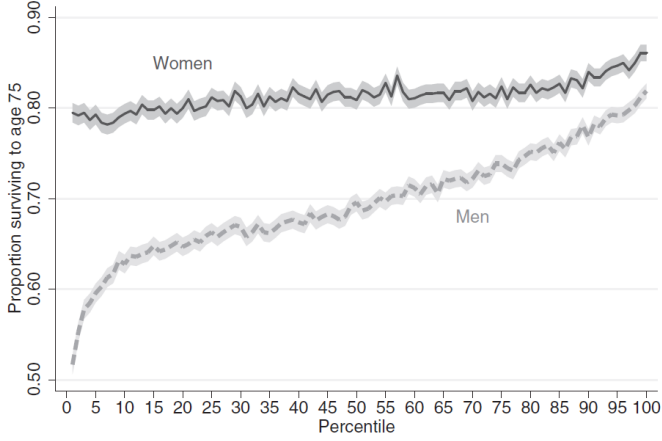
- **Results**
  - Inequality in life expectancy in the U.S. is large and growing
  - Low-income people in affluent, educated cities live longer (and have healthier behaviors)
  - Health behaviors at local level likely to be important

Chetty, Stepner, Abraham, et al. (2016)

- **Results**
  - Inequality in life expectancy in the U.S. is large and growing
  - Low-income people in affluent, educated cities live longer (and have healthier behaviors)
  - Health behaviors at local level likely to be important
- **Why this might be the case ?**
  - Spillovers from rich to poor : regulation, public revenues/transfers
  - Exposure to people with healthier behaviors
  - Sorting : low-income people who live in expensive cities are a selected group with different characteristics

Canada : Milligan and Schirle (2021)

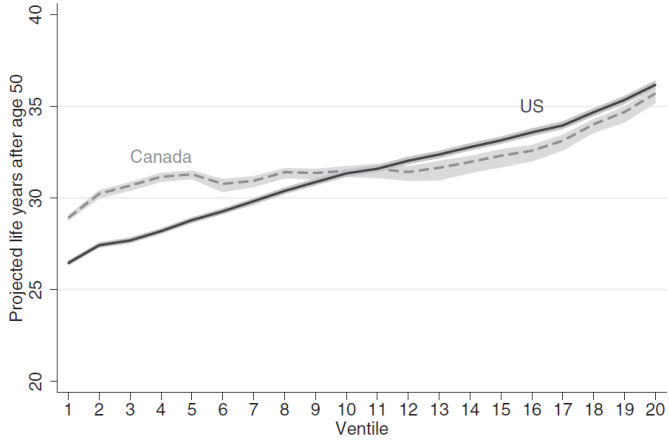
Figure 17 – Survival to age 75, by earnings percentile



Source : Milligan and Schirle (2021).

Canada : Milligan and Schirle (2021)

Figure 18 – Canada and United States period-longevity gradients, 2001–2014



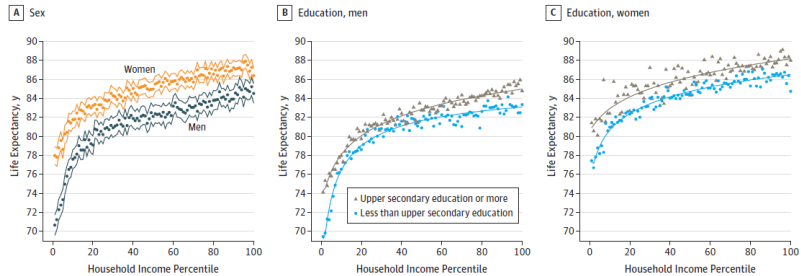
SOURCE : Milligan and Schirle (2021).

Norway : Kinge, et al. (JAMA, 2019)

- **Data**
  - Norwegian register data on population, death registry, cause of death and education
  - 3 million Norwegians aged 40 and above from 2005 to 2015
- **Methodology**
  - Similar to Chetty et al. (2016) to compare to the U.S.
  - Assess the cause of death differences

Norway : Kinge, et al. (JAMA, 2019)

Figure 19 – Life Expectancy by Income and Education Level in Norway, 2011–2015

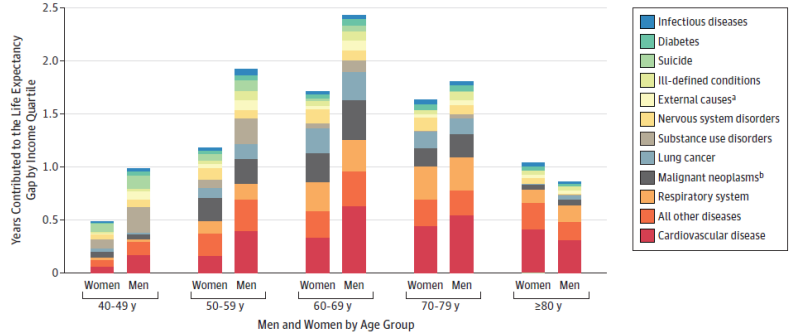


SOURCE : Kinge et al. (2019), Fig. 1, p. 1918.

- Men P1 vP99 : 70.6 vs 84.4 years = Diff. 13.8 years
- Women P1 vP99 : 78.0 vs 86.4 years = Diff. 8.4 years

Norway : Kinge, et al. (JAMA, 2019)

Figure 20 – Gaps in Life Expectancy Between the Highest and Lowest Income Quartiles by Age and Causes of Death in Norway, 2011–2015

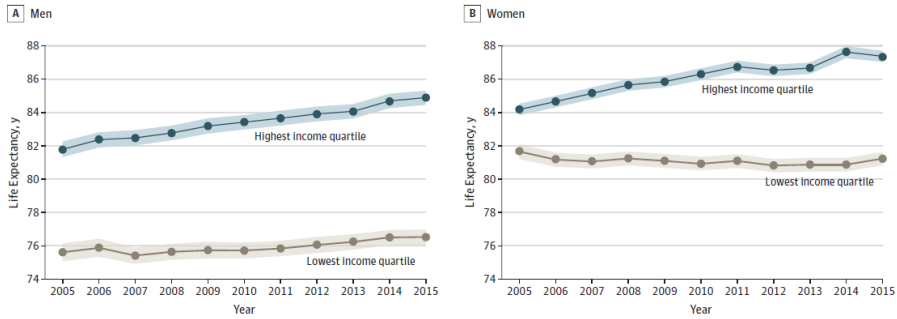


SOURCE : Kinge et al. (2019), Fig. 3, p. 1919.

- Deaths from cardiovascular disease contributed most to the gap in life expectancy, followed by cancers (including lung cancer)

Norway : Kinge, et al. (JAMA, 2019)

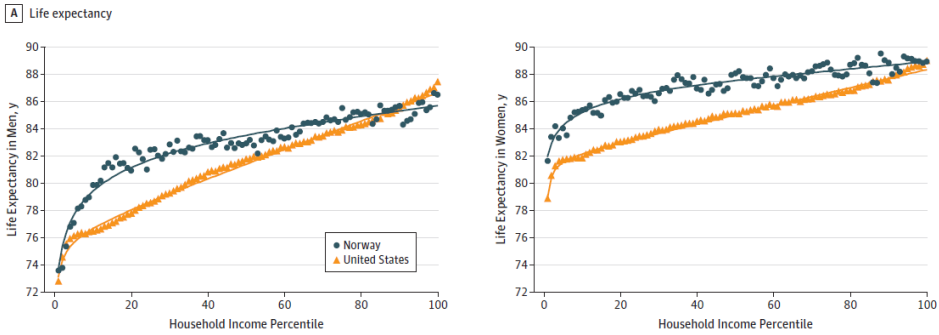
Figure 21 – Annual Life Expectancy for the Highest and Lowest Income Quartiles in Norway, 2005–2015



SOURCE : Kinge et al. (2019), Fig. 4, p. 1920.

Norway : Kinge, et al. (JAMA, 2019)

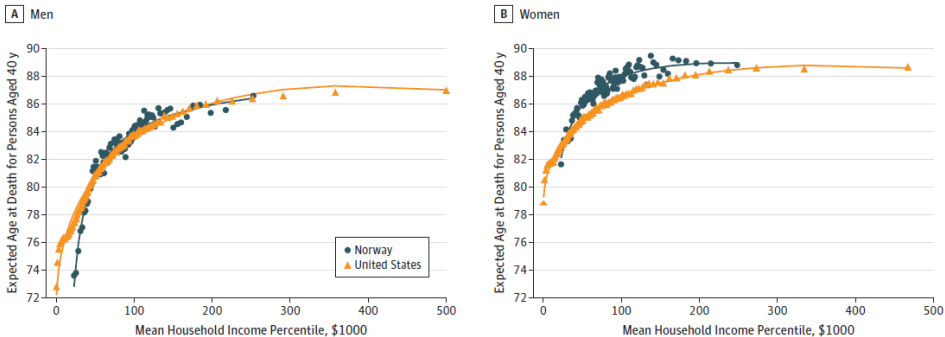
Figure 22 – Life Expectancy by Income in Norway vs the United States



SOURCE : Kinge et al. (2019), Fig. 6.A, p. 1922.

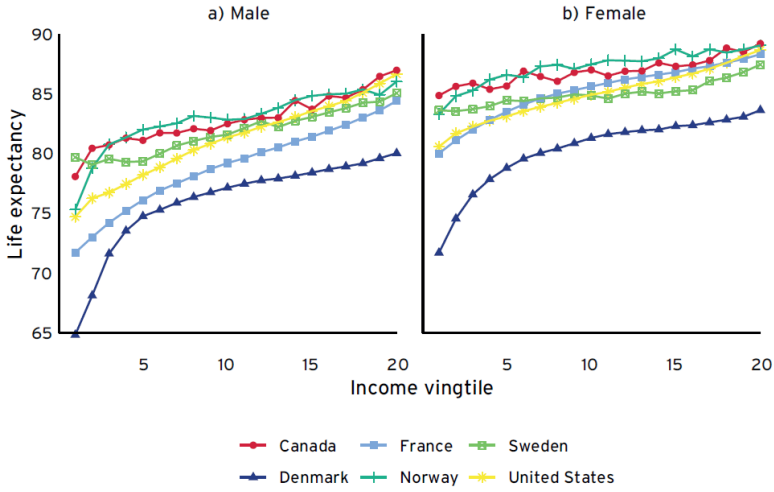
Norway : Kinge, et al. (JAMA, 2019)

Figure 23 – Life Expectancy by Income in US Dollars in Norway and the United States, 2001–2014



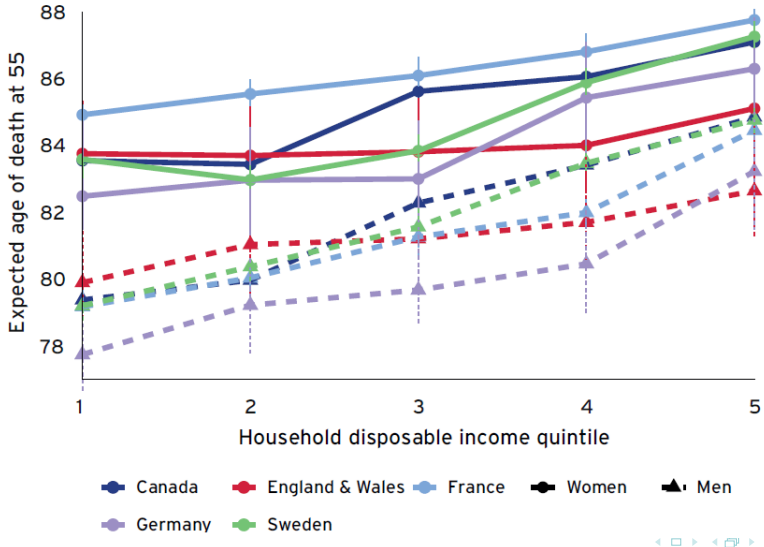
SOURCE : Kinge et al. (2019), Fig. 7, p. 1923.

Figure 24 – Relationship between income and life-expectancy across countries



Source : Bozio et al. (2024), Fig. 1, p. 59. Source for each country : Chetty et al. (2016) for the United States, Blanpain (2018) for France, Kreiner et al. (2019) for Denmark, Kinge et al. (2019) for Norway, Hagen et al. (2024) for Sweden.

Figure 25 – Consistent cross-country comparison



SOURCE : Bozio et al. (2024), Fig. 2, p. 59.

Elderly poverty

- **Measuring elderly poverty**
  - Absolute amount of income relative to needs
    e.g., U.S. federal poverty line
  - Disposable income as a share of median income
    e.g., OECD 50% of median income

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- **Depends on living arrangements**
  - Poverty leads to cohabiting with children
  - Impact on the measurement of poverty (Deaton and Paxson, 1998)

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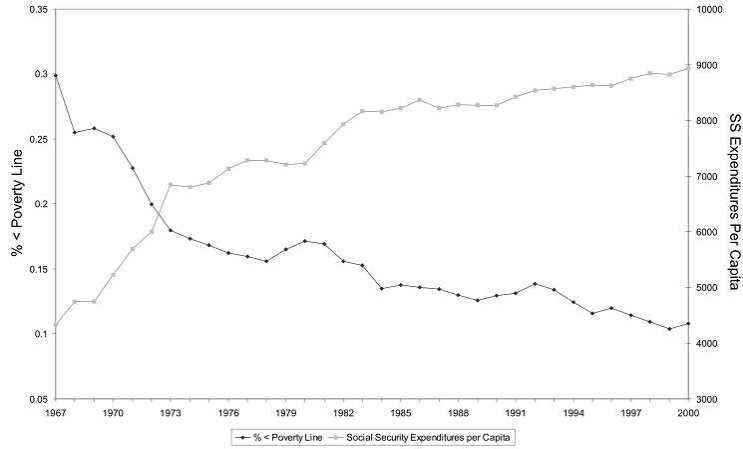
  - Poverty leads to cohabiting with children
  - Impact on the measurement of poverty (Deaton and Paxson, 1998)
- **Historically : the Old and Sick**
  - Poverty was predominantly among the elderly
  - Hence the development of pensions
  - Have pension spending reduced elderly poverty ?

Figure 26 – Elderly poverty rate vs public pension spending per capita (U.S.)



SOURCE : Engelhardt and Gruber (2004), Fig. 1.

Elderly poverty

- **Engelhardt and Gruber (2004)**
  - Decline in elderly poverty in the U.S.
  - Correlation with development of Social Security

Elderly poverty

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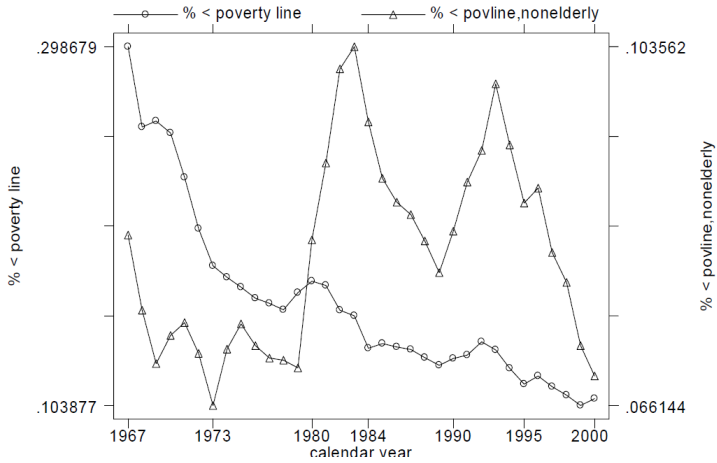
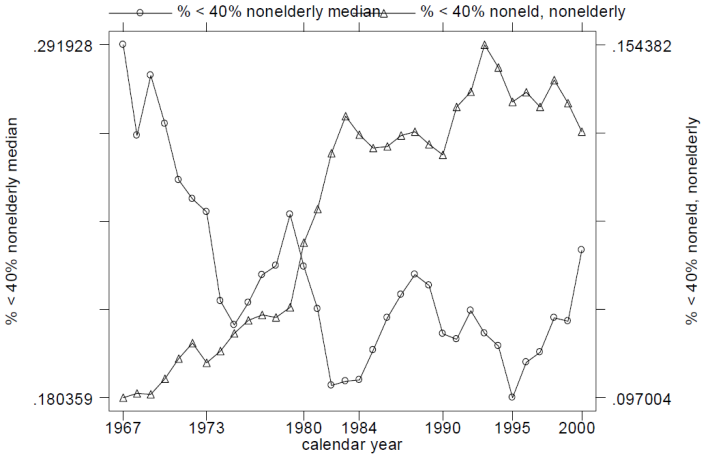
  - Decline in elderly poverty in the U.S.
  - Correlation with development of Social Security
- **Analysis of aggregate trends**
  1. Decline in relative elderly poverty rate ended in the early 1980s, income inequality has increased since then for all ;
  2. Poverty rates are strongly cyclical for the non-elderly but not for the elderly ;
  3. Decline in elderly poverty has been larger for married couples than for other groups

Figure 27 – Absolute Poverty Rate – elderly vs non-elderly



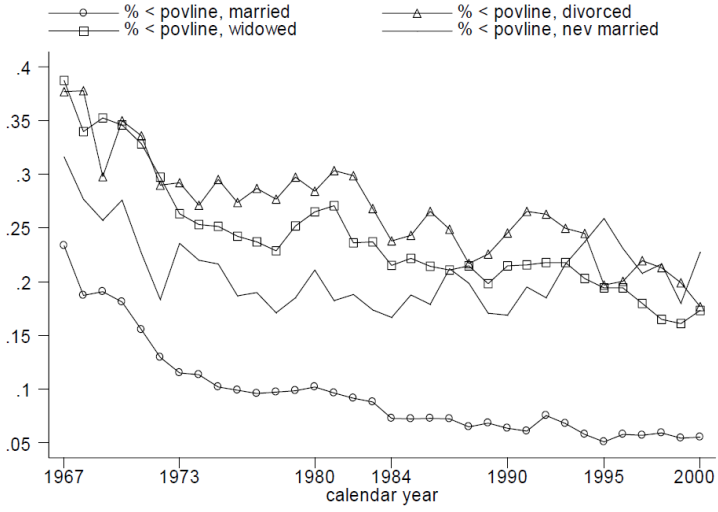
SOURCE : Engelhardt and Gruber (2004), Fig. 3.

Figure 28 – Relative Poverty Rate – elderly vs non-elderly



NOTE : *o* elderly relative poverty rate, △ non-elderly relative poverty rate ; both measures relative to 40% of median income of non-elderly population
SOURCE : Engelhardt and Gruber (2004), Fig. 4.

Figure 29 – Elderly poverty rate by marital status



SOURCE : Engelhardt and Gruber (2004), Fig. 9.

Elderly poverty

- **Causal impact of Social Security**
  - Difficult to establish
  - Behavioural responses (labour supply, savings, etc.) make the counterfactual difficult to ascertain

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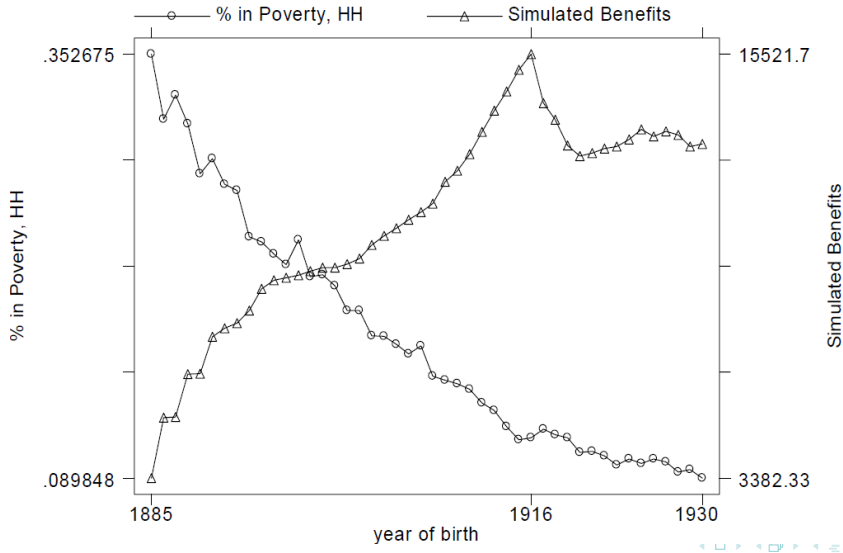
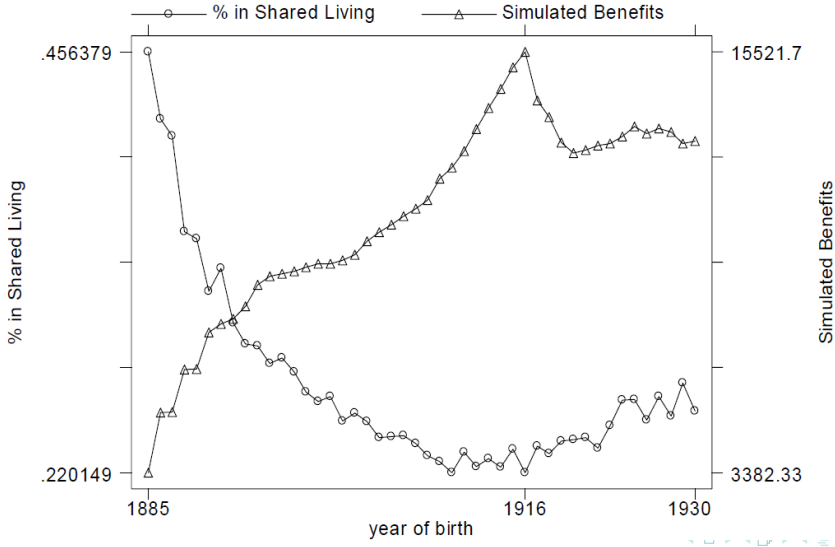
- **Using Social Security Notch**
  - Notch cohort (born in 1916 vs 1917)
  - A $1,000 increase in SS benefits is associated with a 2-3 ppt reduction in poverty rates for elderly households
  - Big effects detected on living arrangement of elderly (Engelhardt, Gruber and Perry, JHR 2005)

Figure 30 – SS benefit vs elderly poverty



Source : Engelhardt and Gruber (2004).

Figure 31 – SS benefit vs shared living arrangement



Source : Engelhardt and Gruber (2004), Fig. 12.

Elderly poverty

- **Evidence from France**
  - High poverty rate of elderly post WWII
  - Contributory public pension with initially limited redistribution

Elderly poverty

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Elderly poverty

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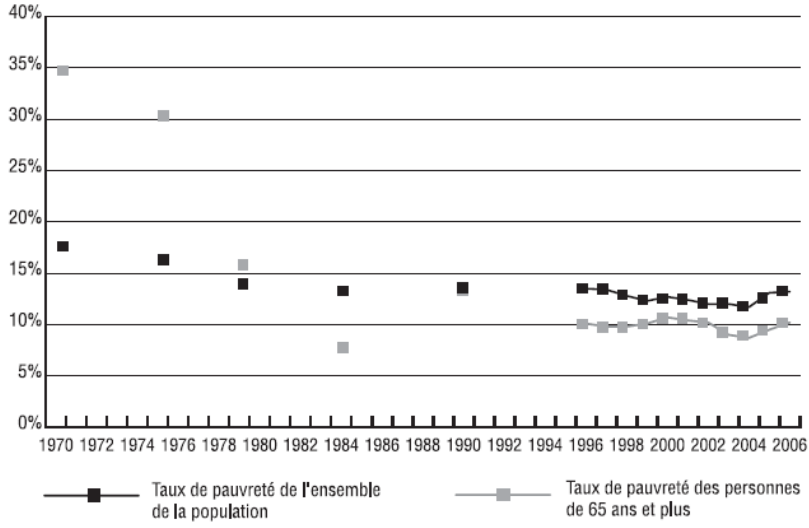
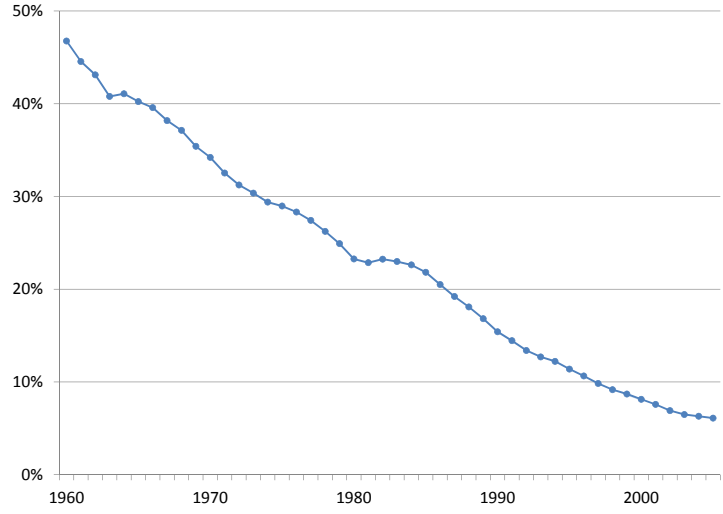
  - Funded by *vignette automobile* (tax on car)
  - Large decrease over time of beneficiaries of minimum pension
- **Low poverty rate of French elderly**
  - Large drop in elderly poverty
  - Today lower poverty rate than population
  - Youth more likely to be in poverty

Figure 32 – Poverty rate of 65+ vs all population (France)



Source : Augris and Bac (2008) ≪ Evolution de la pauvreté des personnes âgées et minimum vieillesse ≫, *Retraite et Société*, No. 56, [web link].

Figure 33 – Share of French elderly (65+) on minimum pension



Source : DREES (2009) and own's computation.

Redistribution across cohorts

- **Social Security money's worth**
  - How much return through benefit compared to pension contributions
  - Measurement of redistribution carried out by pension systems

Redistribution across cohorts

- **Social Security money's worth**
  - How much return through benefit compared to pension contributions
  - Measurement of redistribution carried out by pension systems
- **Different measures (Leimer, 1995)**
  1. Internal rate of return
  2. Lifetime transfer
  3. Benefit/tax ratio

Redistribution across cohorts

- **Internal rate of return**
  - Rate of return that equalizes the tax paid and the benefit received.
  - NF_t net real flow at date t, $\pi(t/a)$ survival probability in t conditioned on having survived in a, T maximum life expectancy
  - ρ internal rate of return

$$\sum_{t=0}^{T} \frac{\pi(t/t-1)NF_t}{(1+\rho)^t} = 0$$

- **Pros and cons**
  - Easily comparable rate
  - Does not take into account the size of the transfer
    e.g., 1 euro of benefit for no tax means infinite ρ

Redistribution across cohorts

- **Lifetime transfers**
  - Discounted net transfer from public pensions
  - $TRANS_i$ lifetime net transfer for cohort i
  - $CONT_{t,i}$ contributions paid at date t
  - $PENS_{t,i}$ pensions received at date t, n date of retirement r_t discount rate t

$$TRANS_i = -\sum_{t=0}^{n-1} \frac{\pi CONT_t}{\prod_{j=0}^{t}(1+r_j)} + \sum_{t=n}^{T} \frac{\pi PENS_t}{\prod_{j=0}^{t}(1+r_j)}$$

- **Pros and cons**
  - Relate the size of the transfer to the amount paid/received
  - Depends on the discount rate chosen

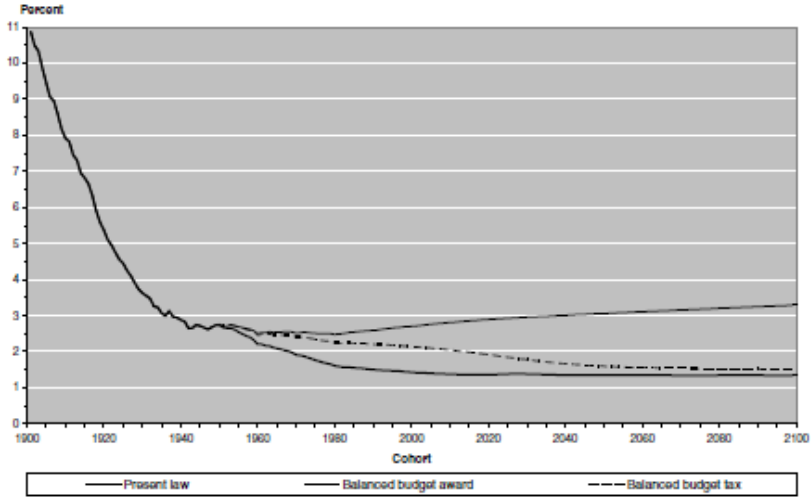
Redistribution across cohorts

- **Benefit/tax ratio**
  - Close to lifetime transfer but expressed as ratio
  - BT_i benefit/tax ratio for cohort i
  - $CONT_{t,i}$ contributions paid at date t
  - $PENS_{t,i}$ pensions received at date t, n date of retirement r_t discount rate t

$$BT_i = \frac{\sum_{t=n}^{T} \frac{\pi(t-i/t-i-1)PENS_t}{(1+r_t)^t}}{\sum_{t=0}^{n-1} \frac{\pi(t-i/t-i-1)CONT_t}{(1+r_t)^t}}$$

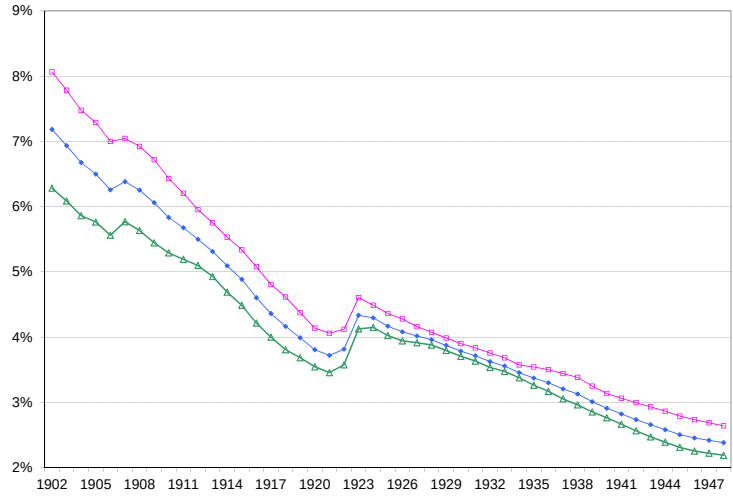
- **Pros and cons**
  - BT above 1 means net receiver, below 1 net contributor
  - Depends on the discount rate chosen

Figure 34 – Internal rate of return (U.S.)



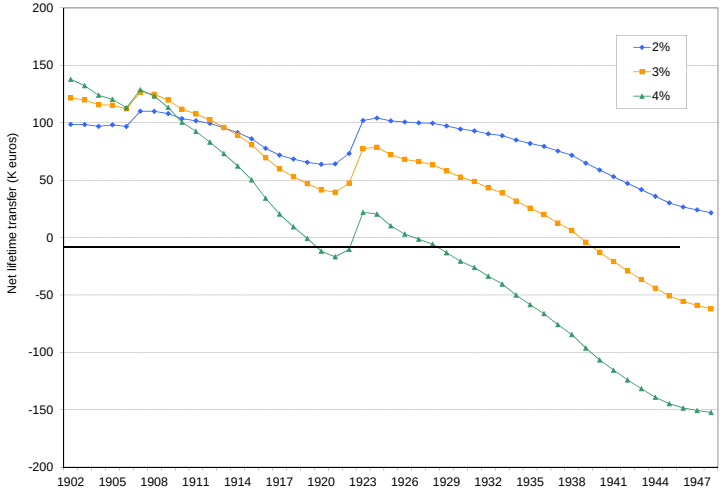
SOURCE : Leimer (2007), Fig. 2.

Figure 35 – Internal rate of return (private sector, France)



Legend : △ Men ♦ All □ Women
Source : Bozio (2006), Fig. 7.1, p. 281.

Figure 36 – Lifetime net transfers by discount rate (private sector, France)



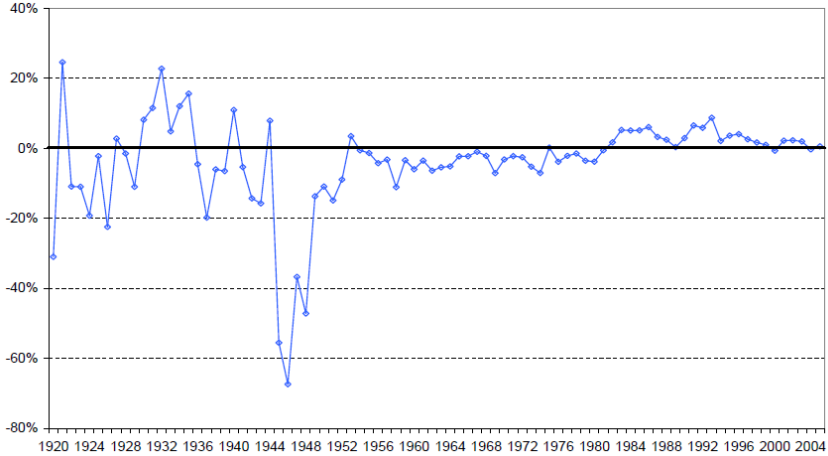
Source : Bozio (2006), Fig. 7.4, p. 228.

Table 1 – Stylised model for pay-as-you go system

	Age 1	Age 2	Age 3	Age 4	Age 5
date 1	0	0	0	0	0
date 2	0	0	0	0	0
date 3	0	0	0	0	0
date 4	0	0	0	0	0
date 5	-15	-15	-15	-15	60
date 6	-15	-15	-15	-15	60
date 7	-15	-15	-15	-15	60
date 8	-15	-15	-15	-15	60
date 9	-15	-15	-15	-15	60
date 10	-15	-15	-15	-15	60
date 11	-15	-15	-15	-15	60
date 12	-15	-15	-15	-15	60

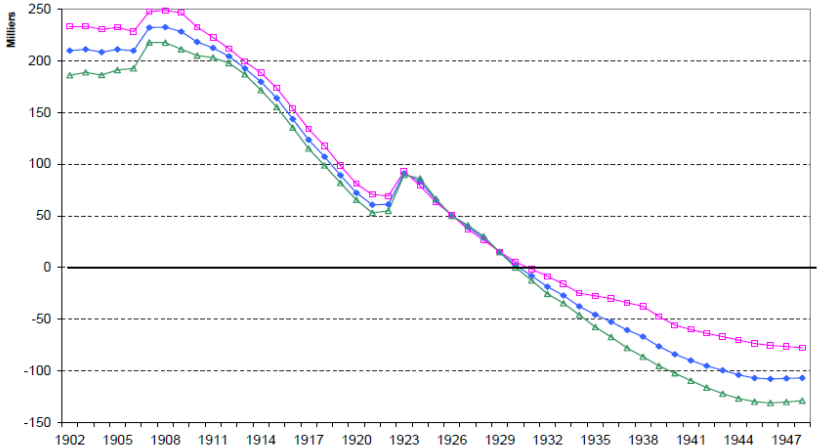
	Wage	100
	Replacement rate	71%
	Transfer disc. rate 2 %	**IRR**
Cohort 1	60,0	
Cohort 2	44,7	300%
Cohort 3	29,1	56%
Cohort 4	13,2	15%
Cohort 5	-3,1	0%
Cohort 6	-3,1	0%
Cohort 7	-3,1	0%
Cohort 8	-3,1	0%

Figure 37 – Interest rate vs growth rate (France)



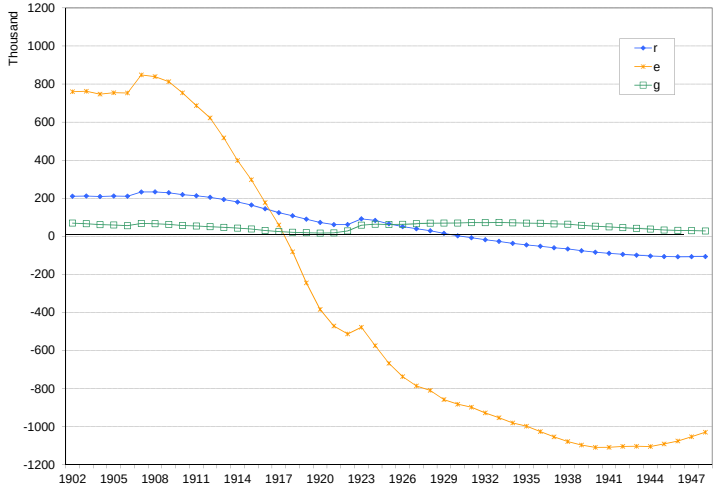
Source : Bozio (2006), Fig. E1, p. 381.

Figure 38 – Lifetime net transfers (private sector, France)



Legend : △ Men ♦ All □ Women.
Note : lifetime net transfers computed using r, the risk-free interest rate.
Source : Bozio (2006), Fig. 7.6, p. 288.

Figure 39 – Lifetime net transfers by discount rate (private sector, France)



Source : Bozio (2006), Fig. 7.7, p. 232.

Redistribution across cohorts

- **Redistribution across cohorts**
  - Large transfers towards older generations
  - Nature of pay-as-you-go pensions
  - But also poor returns of capital market for most of 20th c.
  - Progressive expansion of pay-as-you-go transfers
  - Largely the intention of policymakers

Redistribution across cohorts

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  - Large transfers towards older generations
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  - But also poor returns of capital market for most of 20th c.
  - Progressive expansion of pay-as-you-go transfers
  - Largely the intention of policymakers
- **Convergence of IRR**
  - IRR converge towards growth rate (Samuelson, 1958)
  - Still positive real rate of return for young cohorts
  - But negative transfers compared to market rate of return

Redistribution within cohorts

- **Annual vs lifetime redistribution**
  - Annual : from workers to elderly
  - Lifetime : largely an empirical question

Redistribution within cohorts

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- **Redistribution mechanisms**
  1. Pension formula
  2. Differential life expectancy

Redistribution within cohorts

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  - Annual : from workers to elderly
  - Lifetime : largely an empirical question
- **Redistribution mechanisms**
  1. Pension formula
  2. Differential life expectancy
- **Nature of redistribution**
  1. Pension redistribute from those who die early to those die old
  2. Ex ante vs ex post redistribution

Redistribution within cohorts : United States

- **Liebman (2022)**
  - Measures of redistribution of U.S. Social Security
  - Direct redistribution through progressivity of benefit formula :
    - 90% up to $1,174 AIME, then 32%
  - But other effects (life expectancy differential, marital status)

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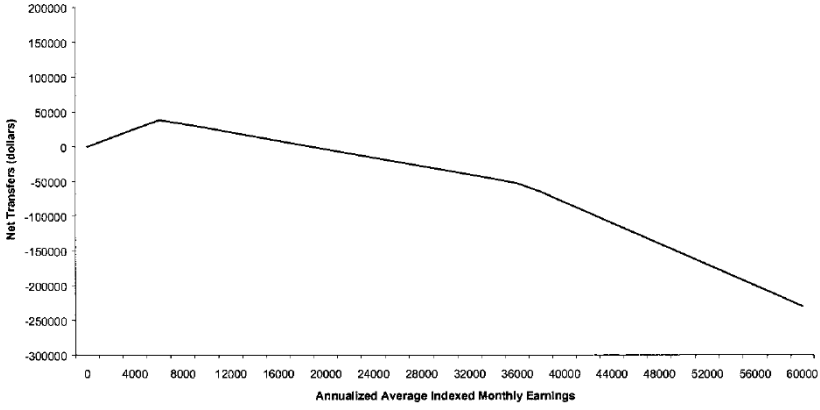
  - Direct redistribution through progressivity of benefit formula :
    - 90% up to $1,174 AIME, then 32%
  - But other effects (life expectancy differential, marital status)

- **Data and methodology**
  - Microsimulation model of US Social Security
  - Matched data from 1990/91 Surveys of Income and Program Participation (SIPP) to Social Security administrative earnings and benefit records
  - Separate mortality tables for each race-by-sex-by-education group from National Longitudinal Mortality Study

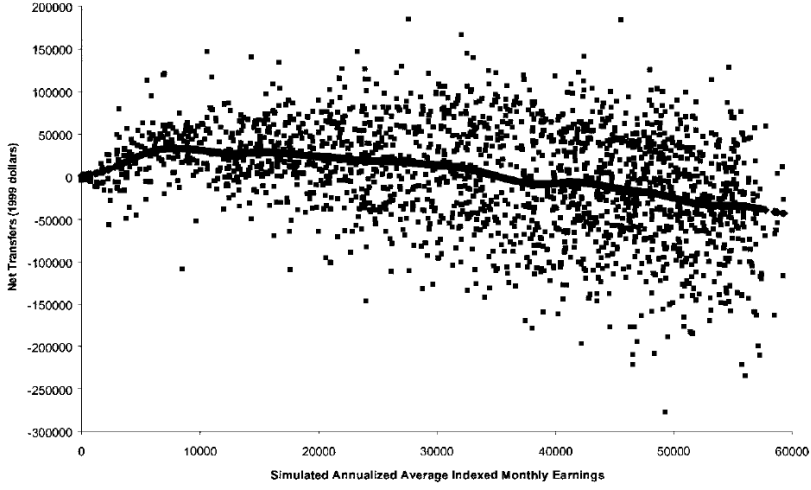
Redistribution within cohorts : the U.S.

Figure 40 – Net transfers from Social Security for hypothetical single adults (US)



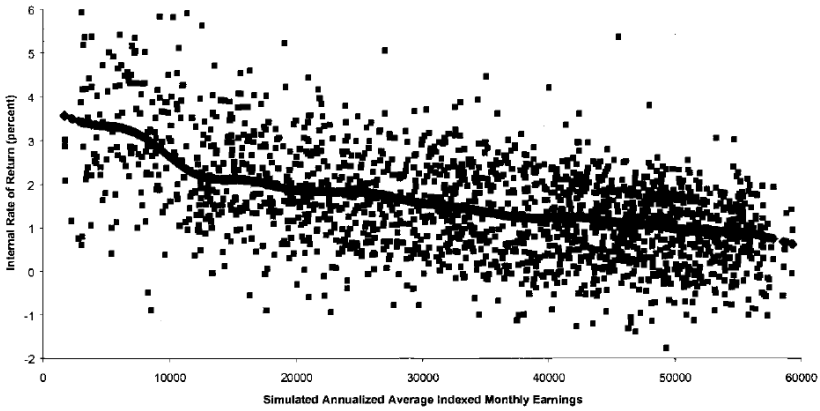
SOURCE : Liebman (2002), Fig. 1.1, p. 23.

Figure 41 – Net transfers from Social Security by AIME



SOURCE : Liebman (2002), Fig. 1.2, p. 24.

Figure 42 – Internal rates of return from Social Security by AIME



SOURCE : Liebman (2002), Fig. 1.4, p. 26.

Figure 43 – The Impact of Differential Mortality on the Redistribution from Social Security

	Using Mortality Tables that Vary by Age, Sex, Race, and Education		Using Mortality Tables that Vary by Only Age and Sex[a]	
	Internal Rate of Return (%)	Net Transfer at 1.29% Discount Rate	Internal Rate of Return (%)	Net Transfer at 1.29% Discount Rate
White	1.52	205	1.59	3,174
	(0.03)	(1,456)	(0.03)	(1,390)
Black	1.62	−2,514	2.19	18,259
	(0.12)	(4,241)	(0.11)	(3,453)
Hispanic[b]	2.46	14,249	2.70	22,664
	(0.19)	(4,860)	(0.18)	(4,461)
Less than high school	1.63	810	1.88	12,103
	(0.05)	(2,162)	(0.05)	(1,939)
High school	1.46	−693	1.52	1,905
	(0.04)	(2,119)	(0.04)	(2,008)
More than high school	1.46	−10	1.35	−8,355
	(0.06)	(3,371)	(0.07)	(3,483)

SOURCE : Liebman (2002), Tab. 1.3, p. 31.

Redistribution within cohorts : the U.S.

- **Liebman (2002)**
  - Roughly neutral impact of Social Security contribution (slight progressivity)
  - Two counteracting effects :
    1. Redistribution with progressive formula
    2. Regressivity because of differential life expectancy

Redistribution within cohorts : the U.S.

- **Liebman (2002)**
  - Roughly neutral impact of Social Security contribution (slight progressivity)
  - Two counteracting effects :
    1. Redistribution with progressive formula
    2. Regressivity because of differential life expectancy
- **Redistribution by types**
  - Redistribution from males to females
  - From single to married
  - From two-earner couples to one-earner

Redistribution within cohorts : Germany

- **Haan, Kemptnerb,and Lüthenc (JEoA, 2020)**
  - German pension data (1992-2015)
  - Measure mortality from age 65
  - Measure lifetime earnings decile
  - Focus on West German males

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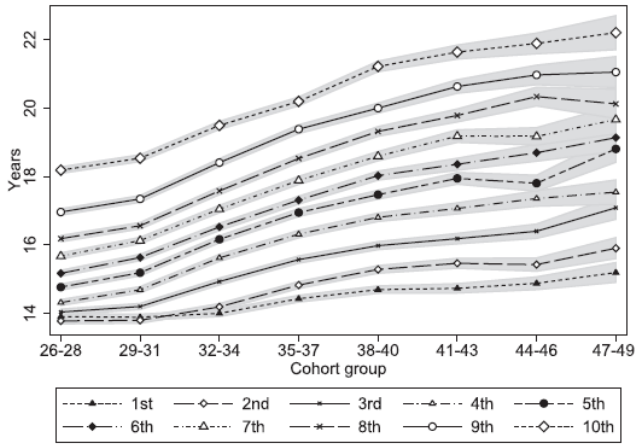
  - German pension data (1992-2015)
  - Measure mortality from age 65
  - Measure lifetime earnings decile
  - Focus on West German males
- **Indicator of redistribution**
  - Internal rate of return (IRR)
  - Progressive system with homogeneous life-expectancy
  - With unequal life-expectancy the results are turned around

Redistribution within cohorts : Germany

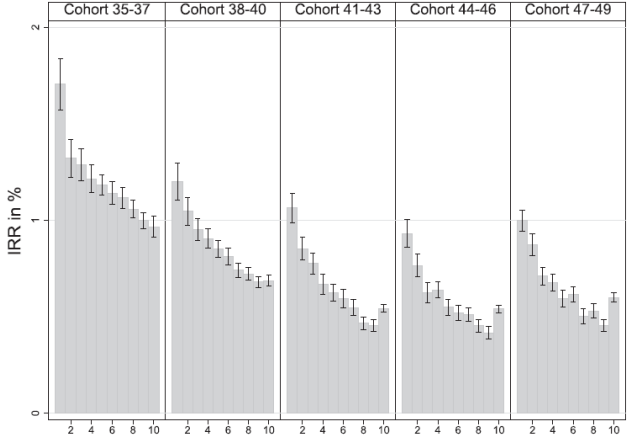
Figure 44 – Life expectancy by cohort and earnings decile (German males)



Source : Haan, Kemptnerb, and Lüthenc (2020), Fig. 2, p. 5.

Redistribution within cohorts : Germany

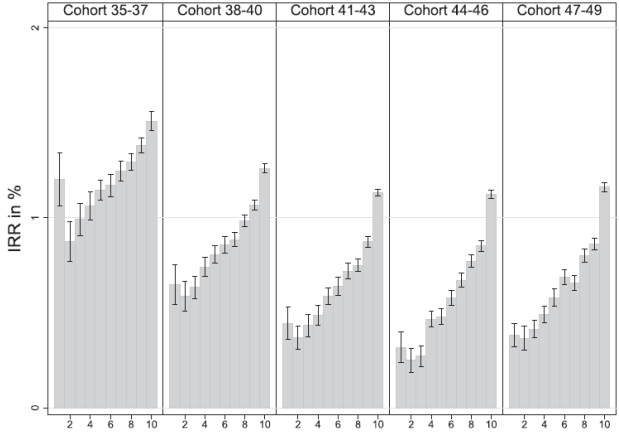
Figure 45 – Internal rate of return by earnings decile – homogeneous life-expectancy



SOURCE : Haan, Kemptnerb, and Lüthenc (2020), Fig. 4.A.

Redistribution within cohorts : Germany

Figure 46 – Internal rate of return by earnings decile – heterogeneous life-expectancy



Source : Haan, Kemptnerb, and Lüthenc (2020), Fig. 4.B.

Redistribution within cohorts : France

Figure 47 – Internal rate of return by decile (France)

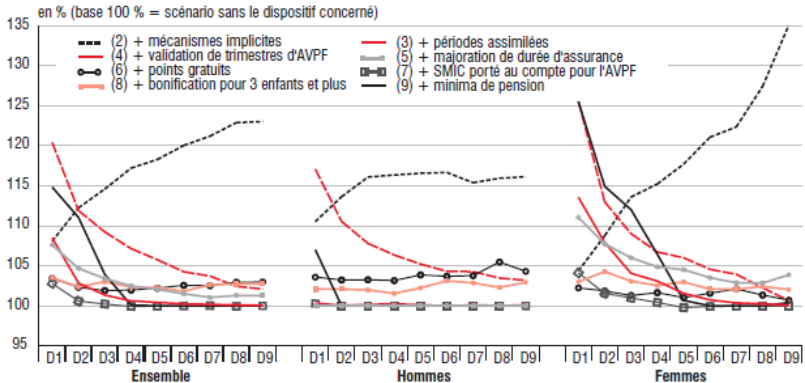
Table 3: Median internal rate of return by decile of average wages per working year

	1	2	3	4	5	6	7	8	9	10	all
All individuals	6.1 %	4.2 %	3.7 %	3.4 %	3.2 %	3.2 %	3.1 %	3.1 %	3.0 %	2.9 %	3.4 %
Men	3.1 %	2.9 %	2.9 %	3.0 %	2.9 %	2.9 %	3.1 %	2.8 %	2.9 %	2.8 %	2.9 %
Women	6.9 %	5.2 %	4.8 %	4.0 %	3.8 %	3.7 %	3.6 %	3.6 %	3.7 %	3.6 %	4.0 %

Source: Destinie simulation on a sample of married individuals born between 1948 and 1960 and working in the private sector

SOURCE : Walraet and Vincent (2002)

Figure 48 – Redistribution within French pension system



Source : Aubert P. and Bachelet M. (2012), ≪ Disparités de montant de pension et redistribution dans le système de retraite français ≫, INSEE, L'Économie française, édition 2012, et document de travail no G2012/06.

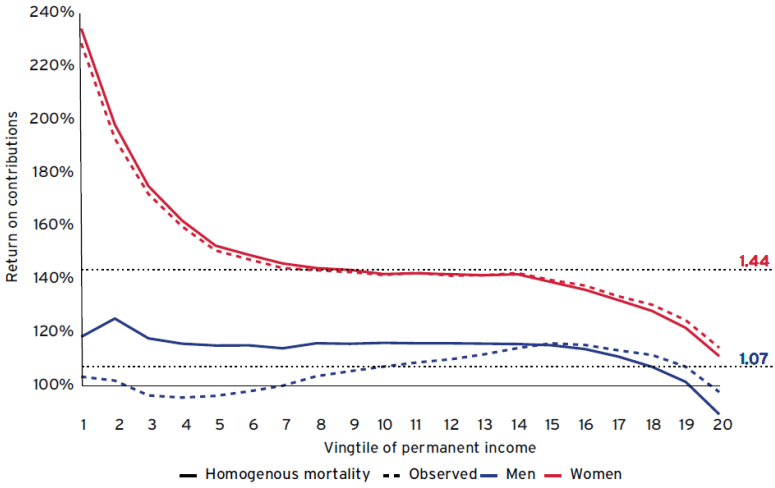
Redistribution within cohorts

- **France**
  - Less progressivity in the pension formula
  - But non-contributory elements counteract
    1. Additional rights for having raised children
    2. Minimum contributory pension

Redistribution within cohorts

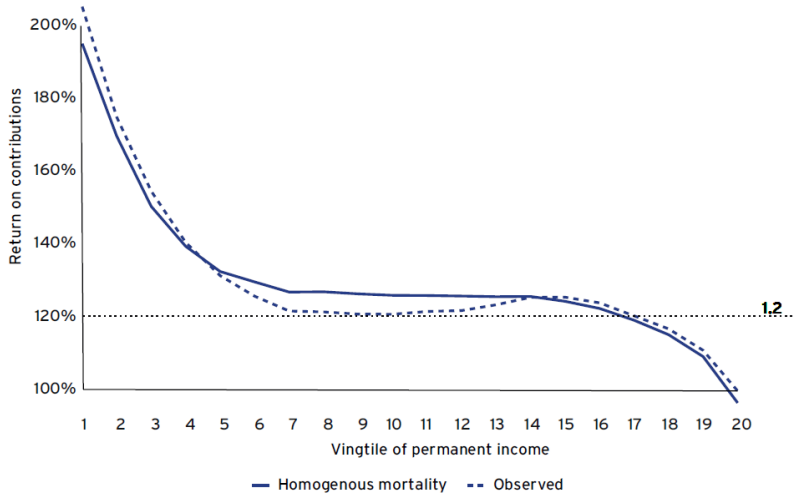
- **France**
  - Less progressivity in the pension formula
  - But non-contributory elements counteract
    1. Additional rights for having raised children
    2. Minimum contributory pension
- **Other countries**
  - Depends highly of the institutional setting
  - UK basic state pension, very redistributive (but small scale)
  - All countries have regressive effects of differential mortality

Figure 49 – Redistribution of the French pension system with and without heterogeneous mortality



Source : Bozio et al. (2024), Fig. 3.A, p. 61.

Figure 50 – Redistribution of the French pension system with and without heterogeneous mortality



Source : Bozio et al. (2024), Fig. 3.B, p. 61.

II. Health and well-being

1. Impact of health on retirement
2. Impact of retirement on health

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Impact of health on retirement

- **Recent concern in the literature**
  - Early studies with little information on health status
  - Advent of Health Retirement Survey (HRS) in the U.S.
    - Panel data with health, wealth and pension variables
    - Self-reported health and objective measures
  - Other countries : ELSA, SHARE, JSTAR, etc.

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    - Self-reported health and objective measures
  - Other countries : ELSA, SHARE, JSTAR, etc.
- **Main questions**
  - Do health status impact retirement choices ?

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- **Early studies**
  - Poor health encourage early retirement (Rust, 1989 ; Quinn et al., 1990)
  - Early retirees reported being in worse health than what suggested by more objective measures
  - Health effects were attenuated by economic variables

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  - Poor health encourage early retirement (Rust, 1989 ; Quinn et al., 1990)
  - Early retirees reported being in worse health than what suggested by more objective measures
  - Health effects were attenuated by economic variables
- **Objective measures of health**
  - Both self-reported health and mortality data measure health with error (Bound, 1991)
  - Objective measures : grip strength, walking speed, climbing stairs, etc.

II. Health and well-being

Impact of health on retirement

- **HRS studies**
  - Poor health (with objective measures) do play a key role in explaining early retirement
  - Dynamics of health more important than health itself (Bound et al., 1999 ; Disney, et al., 2006)
  - Financial incentives play a reduced role when health issues (Kerkhohfs et al., 1999)

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  - Financial incentives play a reduced role when health issues (Kerkhohfs et al., 1999)

- **Health interactions**
  - Interaction with health insurance (Rust and Phelan, 1997 ; French and Jones 2011)
  - Nature of the job
  - Workplace accommodation
  - Family status

Impact of retirement on mortality

- **Recent interest**
  - A number of recent studies
  - Key question is whether recent pension reforms have detrimental impact on health
  - No consensus yet

Impact of retirement on mortality

- **Recent interest**
  - A number of recent studies
  - Key question is whether recent pension reforms have detrimental impact on health
  - No consensus yet
- **Classical results**
  - Self-reported health or well-being increase post-retirement
  - Hard to conclude anything from this fact

Impact of retirement on mortality

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  - Use SS notch to assess impact on mortality
  - Apply DiD and RDD estimations

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  - Snyder and Evans (RESTAT, 2006)
  - Use SS notch to assess impact on mortality
  - Apply DiD and RDD estimations
- **Results**
  - They find negative impact of higher SS income
  - Those with lower income have worker longer
  - They speculate that could be linked with socialization of workers

Figure 51 – RDD estimates on mortality

TABLE 6.—REGRESSION DISCONTINUITY ESTIMATES OF LOG QUARTERLY MORTALITY REGRESSIONS, 1915:4–1918:1 BIRTH COHORTS, AGES 65 THROUGH 72 (32 QUARTERS)

Covariates	Males	Females
Age in quarters	0.0167	0.0193
	(0.0002)	(0.0002)
Cohort index	−0.0036	−0.0033
(15.4 = 1, 16.1 = 2, . . . , 18.1 = 10)	(0.0012)	(0.0015)
Year of birth = 1917 or 1918	−0.0191	−0.0006
	(0.0067)	(0.0086)
R^2	0.968	0.959
N	320	320
Mean log quarterly mortality	2.16	1.55

Models include the log quarterly mortality rate for each cohort as they age from 65 (260 quarters of age) to end of age 72 (291 quarters of age). All models include three quarters of death dummy variables.

SOURCE : Snyder and Evans (2006).

Impact of retirement on mortality

- **Coe and Lindeboom (2008)**
  - Exploit early retirement window for IV in the Netherlands
  - No impact on mortality

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  - Exploit early retirement window for IV in the Netherlands
  - No impact on mortality
- **Hernaes et al. (2013)**
  - Norwegian administrative data
  - No impact on mortality
- **Kuhn et al. (2010)**
  - Austrian administrative data
  - Early retirement through UI variation by region
  - Negative impact on mortality

Fitzpatrick and Moore (JPubE, 2018)

- **Method**
  - Exploit Early Retirement Age (ERA) in the U.S.
  - ERA at age 62 generates increase in the probability to retire : 31% of Americans claim SS pensions at 62
  - Regression discontinuity (RD) design : Test whether mortality is also discontinuous at age 62

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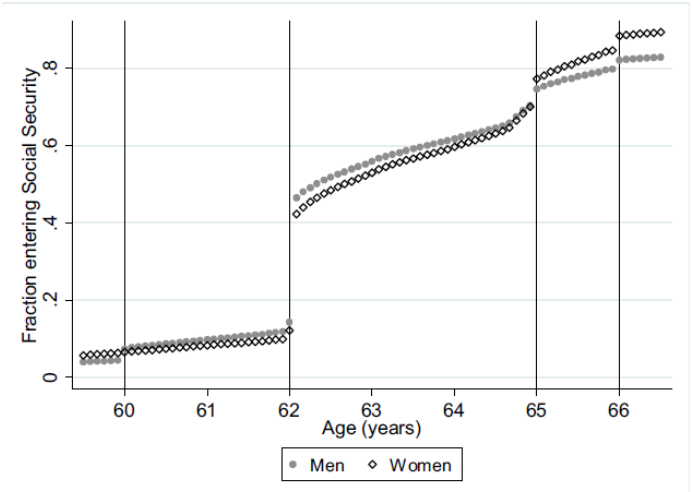
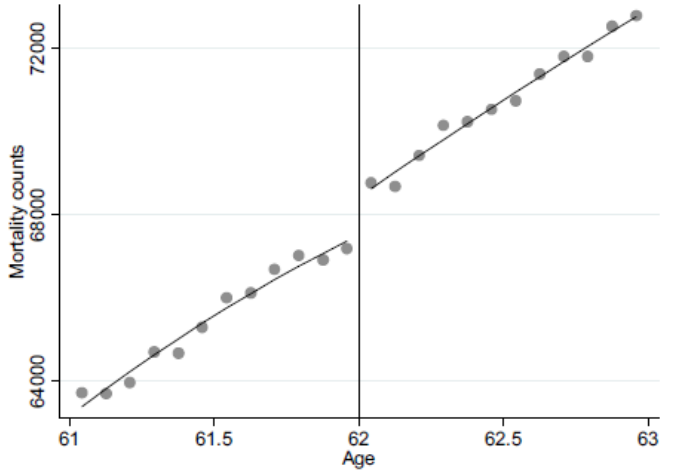
  - ERA at age 62 generates increase in the probability to retire : 31% of Americans claim SS pensions at 62
  - Regression discontinuity (RD) design : Test whether mortality is also discontinuous at age 62
- **Data**
  - National Center for Health Statistics' Multiple Cause of Death (MCOD) data : universe of US death certificates
  - Death records and cause of death
- **Results**
  - Increase of 1.5% in mortality at 62 (2% for males)
  - No impact detected for women

Figure 52 – Cumulative rate for ever having claimed Social Security, by sex.



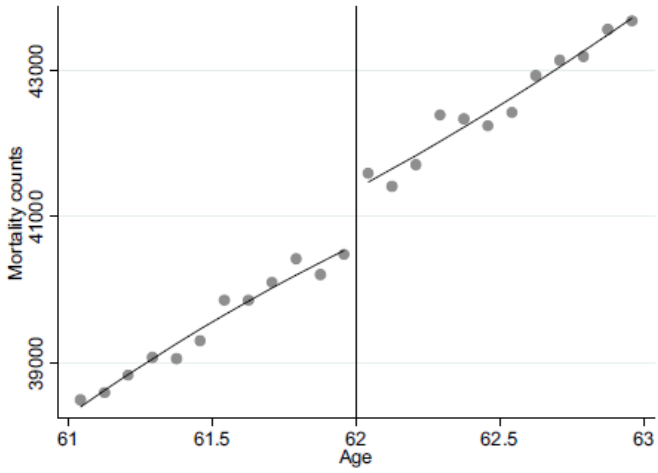
Source : Fitzpatrick and Moore (2018), Fig. 1.

Figure 53 – Monthly mortality counts in relation to turning age 62, cohorts born 1921–1948, male and female



Source : Fitzpatrick and Moore (2018), Fig. 2.A.

Figure 54 – Monthly mortality counts in relation to turning age 62, cohorts born 1921–1948, male



Source : Fitzpatrick and Moore (2018), Fig. 2.B.

Figure 55 – Regression estimates of increase in mortality at age 62

Table 2
Regression estimates of increase in mortality at age 62.

Regression type	All	Males	Females
	(1)	(2)	(3)
Global parametric regressions (bandwidth = 12 months)			
Quadratic regression	0.0135***	0.0185***	0.0058
	(0.0043)	(0.0049)	(0.0049)
Cubic regression	0.0197***	0.0236***	0.0138***
	(0.0049)	(0.0060)	(0.0047)
Quartic regression	0.0193***	0.0243***	0.0116***
	(0.0051)	(0.0082)	(0.0043)
Local nonparametric regressions			
Local linear using data-driven	0.0142***	0.0215***	0.0103***
bandwidth	(0.0036)	(0.0041)	(0.0030)
Data-driven bandwidth	10 months	7 months	6 months
Local quadratic using data-driven	0.0194***	0.0233***	0.0131***
bandwidth	(0.0039)	(0.0058)	(0.0026)
Data-driven bandwidth	7 months	7 months	8 months

Notes: ** denotes $p < 0.05$, *** denotes $p < 0.01$. Data are from restricted-use versions of the Multiple Cause of Death data and include the 1921 to 1948 birth cohorts. The global parametric regressions allow for the polynomial to vary either side of the discontinuity and we report robust standard errors. The nonparametric regressions are estimated using the "robust data-driven" procedures of Calonico et al. (2014a, 2014b). We use a triangular kernel, robust standard errors, and their bandwidth selection and bias correction procedures. See text for more details.

SOURCE : Fitzpatrick and Moore (2018), Tab. 2.

Fitzpatrick and Moore (JPubE, 2018)

- **Further results**
  - Larger increase for unmarried low education males
  - Cause of death increases : Chronic Obstructive Pulmonary Disease (COPD), lung cancer and traffic accidents
  - Risk factors of COPD and lung cancers are smoking and lack of physical activity

Fitzpatrick and Moore (JPubE, 2018)

- **Further results**
  - Larger increase for unmarried low education males
  - Cause of death increases : Chronic Obstructive Pulmonary Disease (COPD), lung cancer and traffic accidents
  - Risk factors of COPD and lung cancers are smoking and lack of physical activity
- **Discussion**
  - Identification of the immediate and contemporaneous effect of retiring on mortality
  - Suspicion of change in risk factors, when stop working
  - Hard to generalize, as age-62 claimants are less healthy than later claimants

Bozio, Garrouste and Perdrix (HE, 2021)

- **Method**
  - Exploit French pension reform in 1993
  - Dynamic DiD on labor force participation (Bozio, 2006)
  - 2SLS on mortality outcomes

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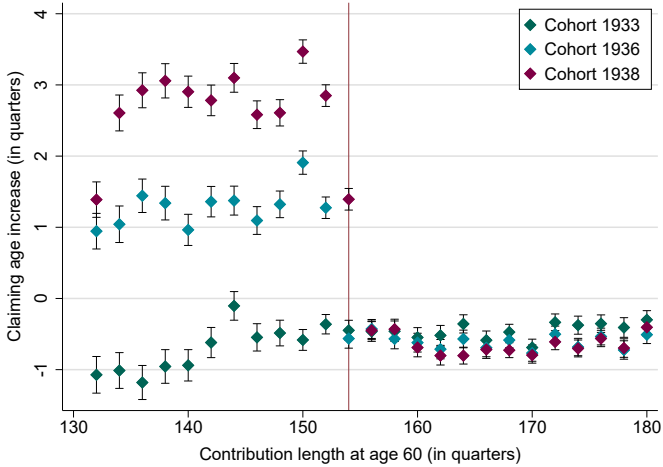
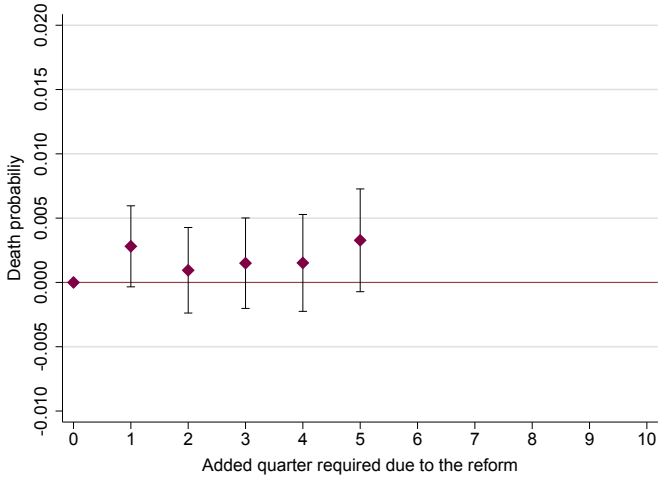
  - 2SLS on mortality outcomes
- **Data**
  - Exhaustive administrative data from CNAV pension scheme
- **Results**
  - No impact on mortality
  - Discussion of the external validity of the results (long careers not affected by the reform)
  - Meta-analysis of previous literature

Figure 56 – Impact of the 1993 Reform on Claiming Age



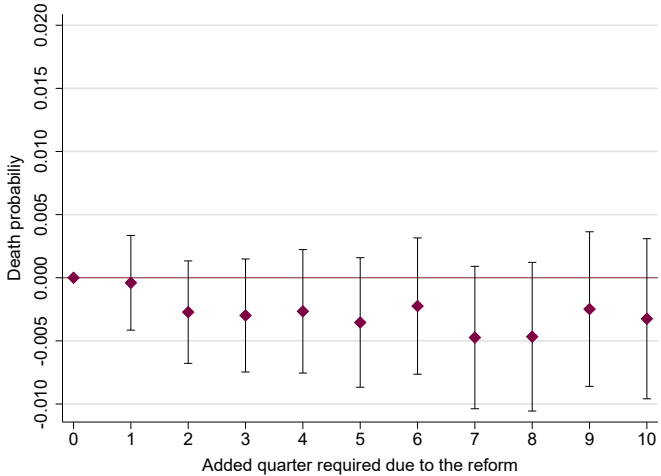
Source : Bozio, Garrouste and Perdrix (2021), Fig. 3.B.

Figure 57 – Impact of Increased Retirement Age on Mortality – Cohorts born between 1933 and 1938



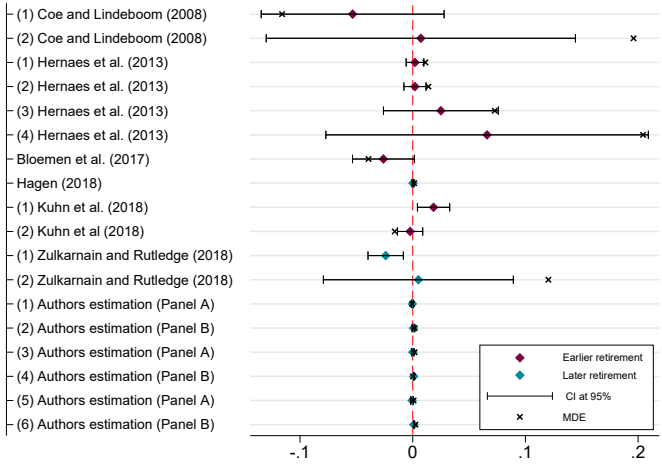
Source : Bozio, Garrouste and Perdrix (2021), Fig. 5.A.

Figure 58 – Impact of Increased Retirement Age on Mortality – Cohorts born between 1938 and 1943



Source : Bozio, Garrouste and Perdrix (2021), Fig. 5.B.

Figure 59 – Meta Analysis of Retirement Age Impact on Mortality



Source : Bozio, Garrouste and Perdrix (2021), Fig. 7.

Impact of retirement on health

- **Coe and Zamaro (2011)**
  - SHARE data
  - Retirement leads to better self-reported health

Impact of retirement on health

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  - Exploit pension reform in Australia
  - Find positive impact on subjective and objective health

Impact of retirement on health

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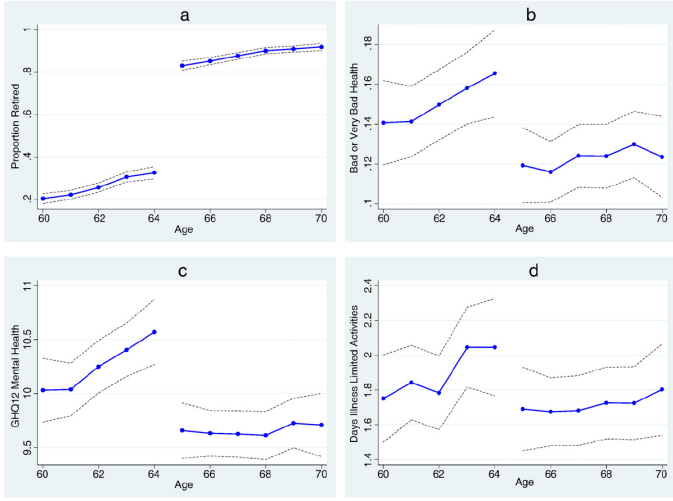
  - SHARE data
  - Retirement leads to better self-reported health
- **Atalay and Barrett (2014)**
  - Exploit pension reform in Australia
  - Find positive impact on subjective and objective health
- **Johnston and Lee (2009)**
  - Health survey for England
  - RDD design
  - Impact on well-being and mental health, no physical impact

Figure 60 – RDD estimates on health measures



SOURCE : Johnston and Lee, 2009.

Impact of retirement on cognitive functions

- **Mental retirement**
  - Retirement leads to a decrease in cognitive functions (Rohwedder and Willis, 2010 ; Mazzonna and Peracchi (2012) ; Bonsang et al. 2013)
  - Using SHARE data, cross-country evidence
  - IV estimates (instruments from eligibility to pension benefits) show large effects (Rohwedder and Willis, 2010)

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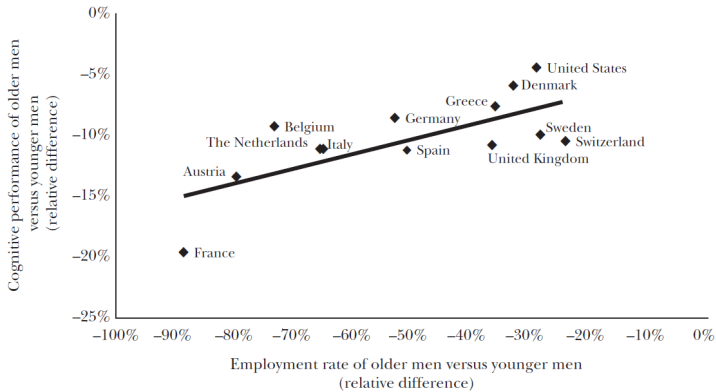
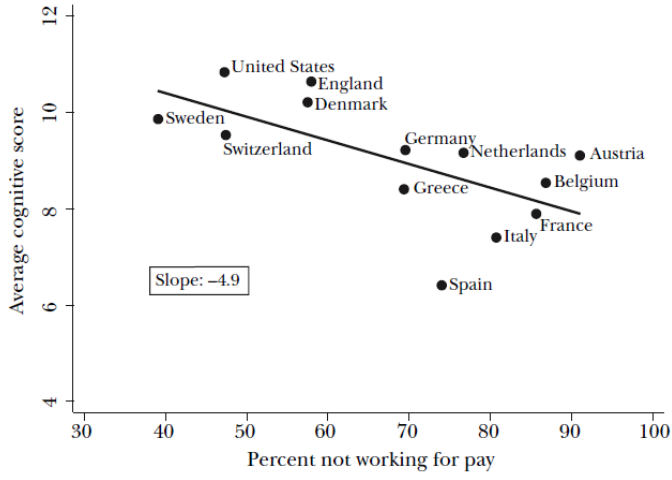
  - Using SHARE data, cross-country evidence
  - IV estimates (instruments from eligibility to pension benefits) show large effects (Rohwedder and Willis, 2010)
- **Some discussion**
  - Correlation with education reduces the link (Bingley and Martinello 2013)

Figure 61 – Drop in Cognitive Performance as a Function of Drop in Employment Rate between Men 50-54 and 60-64 Years Old



SOURCE : Adam, Bay, Bonsang, Germain, and Perelman (2007), reproduced in Rohwedder and Willis (2010).

Figure 62 – Cognition by Percent Not Working for Pay, 60-64 Year-Old



Source : Rohwedder and Willis (2010), Fig. 5, p. 131.

II. Health and well-being

The role of work quality

- **Work quality**
  - Health and well-being at retirement should depend from the difficulty experienced on the job
  - varying degree of job quality should matter

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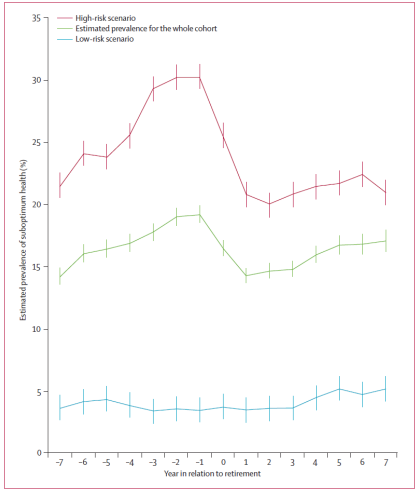
The role of work quality

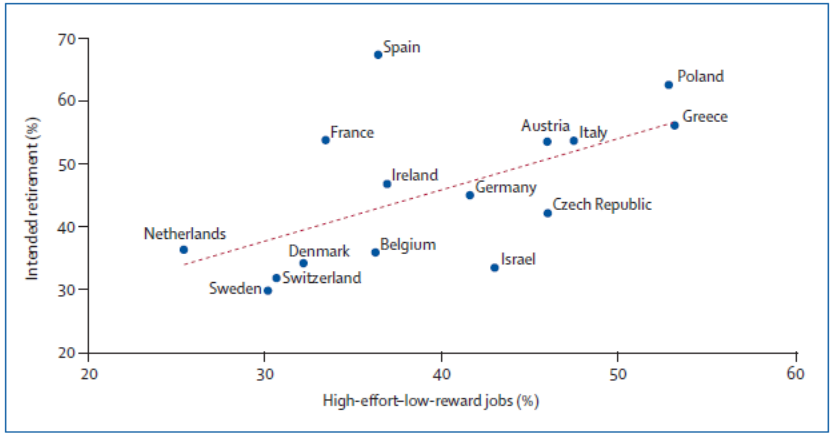
- **Work quality**
  - Health and well-being at retirement should depend from the difficulty experienced on the job
  - varying degree of job quality should matter
- **Some evidence**
  - Link between job quality and health experience before and after retirement (Westerlund et al. 2009)
  - Cross-country evidence from SHARE

Figure 63 – Health measure for different work quality



SOURCE : Westerlund, et al. (2009), Fig. 3, p. 1894.

Figure 64 – Quality of work (effort-reward imbalance) and intended retirement in 15 European countries



SOURCE : Siegrist and Wahrendorf (2009). Data from the Survey of Health, Ageing, and Retirement in Europe (SHARE).

III. Gender and family

1. Gender issues
2. Kids and pensions

III. Gender and family

Gender issues

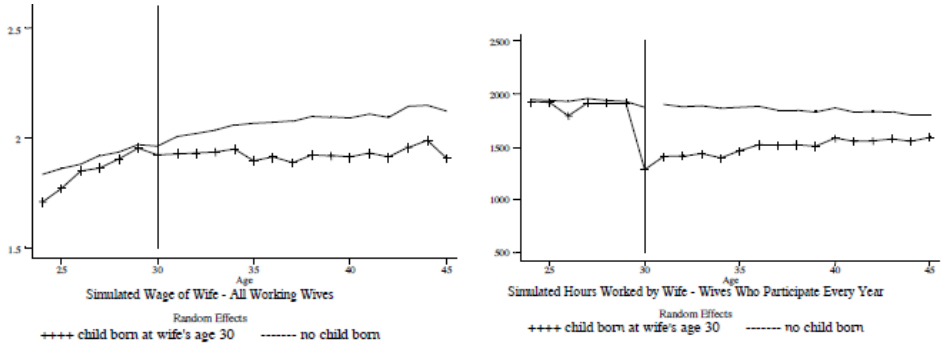
- **Lower pensions for women**
  - Women have lower earnings and lower participation
  - They end up with lower pension rights

III. Gender and family

Gender issues

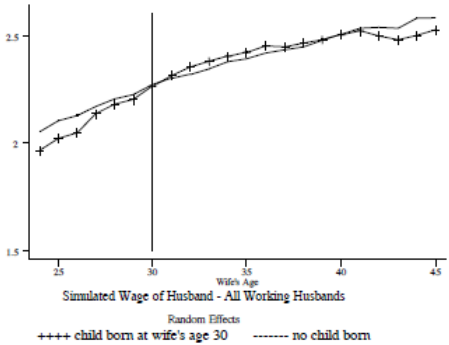
- **Lower pensions for women**
  - Women have lower earnings and lower participation
  - They end up with lower pension rights
- **Why lower pension contributions ?**
  - Women tend to predominantly care for children
  - Reduction in labour force participation or hours worked after birth of a child

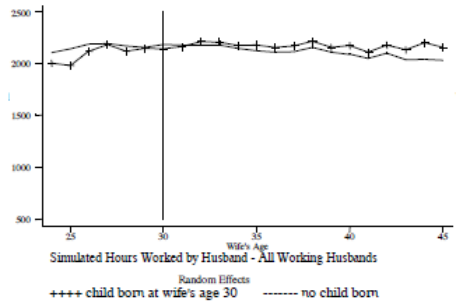
Figure 65 – Impact of children on wage and hours (US women)



SOURCE : Lundberg and Rose (2000).

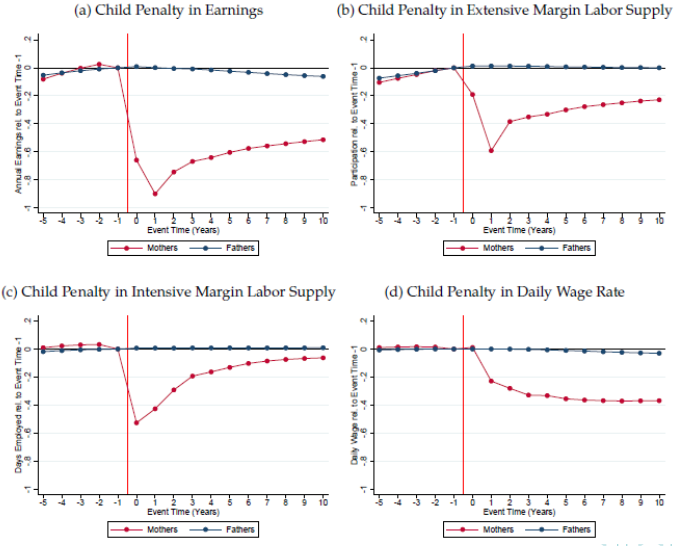
Figure 66 – Impact of children on wage and hours (US men)





SOURCE : Lundberg and Rose (2000).

Figure 67 – Child penalties in Austria



SOURCE : Kleven et al. (2023).

III. Gender and family

Gender issues

- **Which policy ?**
  - Higher pension benefits for women ?
  - Benefit dedicated for women : linked with caring of children

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Gender issues

- **Which policy ?**
  - Higher pension benefits for women ?
  - Benefit dedicated for women : linked with caring of children
- **French case**
  - Additional years of contribution for each kid (2 years)
  - 10% bonus for the pension (for men too)
  - Pension rights while stoping work for caring

III. Gender and family

Gender issues

- **Higher life expectancy of women**
  - Lower pension benefits for women ?
  - Most countries apply same annuity rate (US and Europe) but in Latin America often different annuity rate (lower pensions for women)

III. Gender and family

Gender issues

- **Higher life expectancy of women**
  - Lower pension benefits for women ?
  - Most countries apply same annuity rate (US and Europe) but in Latin America often different annuity rate (lower pensions for women)
- **Benefit for widows**
  - Important historically (women supported by their husband)
  - Today some countries have abolished these specific benefits
  - Long term incentives vs current realities

III. Gender and family

Children

- **Should pension benefit depend on number of children ?**
  - Some people think it should (H.W. Sinn)
  - French system designed that way

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- **Arguments put forward**
  - In PAYGO system, investing in children leads to pension returns
  - More children higher rate of return of PAYGO system
  - People who have children can't save as much

III. Gender and family

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  - French system designed that way
- **Arguments put forward**
  - In PAYGO system, investing in children leads to pension returns
  - More children higher rate of return of PAYGO system
  - People who have children can't save as much
- **Arguments against**
  - In PAYGO system, productivity matters more (one needs well educated children)
  - Incentives for children likely to be more effective closer to when one has children

References (1/2)

- Atalay, K., and Barrett, G. (2014) "The Causal Effect of Retirement on Health : New Evidence from Australian Pension Reform". *Economics Letters* 125 (3) : pp. 392–95.
- Bingley, P., and Martinello, A. (2013) "Mental Retirement and Schooling". *European Economic Review* 63, pp. 292–98.
- Blanpain, N. (2018), "L'espérance de vie par niveau de vie – méthode et principaux résultats", Documents de travail Insee, No. F1801.
- Bonsang, E., Adam, S. and Perelman, S. (2012) "Does Retirement Affect Cognitive Functioning ?" *Journal of Health Economics* 31 (3) : pp. 490–501.
- Bound, J. (1991) "Self-Reported Versus Objective Measures of Health in Retirement Models". *The Journal of Human Resources* 26 (1) : pp. 106–38.
- Bound, J., Schoenbaum, M., Stinebrickner, T. and Waidmann, T. (1999) "The Dynamic Effects of Health on the Labor Force Transitions of Older Workers". *Labour Economics* 6 (2) : pp. 179–202.
- Bozio, A., Garrouste, C., and Perdrix, E. (2021) "Impact of later retirement on mortality : Evidence from France", *Health Economics*, Vol. 30, No. 5, pp. 1178–1199. [web link]
- Bozio, A., Rabaté, S. and Tô, M. "Inequality in life expectancy and the design of pension systems" (2024) in *Rethinking Pension Reform*, Giupponi, G. and Seibold, A. (eds.), Paris, France : Centre for Economic Policy Research. [web link]
- Case, A. (2004) "Does Money Protect Health Status ? Evidence from South African Pensions". In *Perspectives on the Economics of Aging*, University of Chicago Press, pp. 287–312.
- Chetty R., Stepner M., Abraham S., et al. (2016) "The Association Between Income and Life Expectancy in the United States, 2001–2014", *The Journal of the American Medical Association*, Vol. 315, No. 14, pp. 1750–1766.
- Deaton, A. and Paxson, C. (1998) "Measuring Poverty among the Elderly". NBER, January, pp. 169–204.
- Engelhardt, G. and Gruber, J. (2004) "Social Security and the Evolution of Elderly Poverty". Working Paper 10466. National Bureau of Economic Research.
- Engelhardt, G., Gruber, J. and Perry, C. (2005) "Social Security and Elderly Living Arrangements : Evidence from the Social Security Notch". *The Journal of Human Resources* 40 (2) : 354–72.
- Feldstein, Martin, and Jeffrey B. Liebman, eds. (2002), *The Distributional Aspects of Social Security and Social Security Reform*. A National Bureau of Economic Research Conference Report. Chicago : University of Chicago Press.

References (2/2)

- Fitzpatrick, M. and Moore, T. (2018) "The mortality effects of retirement : Evidence from Social Security eligibility at age 62" *Journal of Public Economics*, Vol. 157, pp. 121-137.
- Gustman, Alan L., and Thomas L. Steinmeier. 2000. "Pensions and Retiree Health Benefits in Household Wealth : Changes from 1969 to 1992". *The Journal of Human Resources* 35 (1) : 30-50.
- Hernaes, Erik, Simen Markussen, John Piggott, and Ola L. Vestad (2013) "Does Retirement Age Impact Mortality ?" *Journal of Health Economics* 32 (3) : 586-98.
- Johnston, David W., and Wang-Sheng Lee. 2009. "Retiring to the Good Life ? The Short-Term Effects of Retirement on Health". *Economics Letters* 103 (1) : 8-11.
- Kerkhofs, Marcel, Maarten Lindeboom, and Jules Theeuwes (1999) "Retirement, Financial Incentives and Health". *Labour Economics* 6 (2) : 203-27.
- Leimer, Dean R. 1995. "A Guide to Social Security Money's Worth Issues". *Social Security Bulletin* 58 (2) : 3-20. Resources 40 (2) : 354-72.
- Leimer, Dean R. (1999) "Lifetime Redistribution Under the Social Security Program : A Literature Synopsis". *Social Security Bulletin* 62 (2) : 43-51.
- Leimer, Dean R. (2007) "Cohort-Specific Measures of Lifetime Social Security Taxes and Benefits". SSRN Scholarly Paper ID 1217123. Rochester, NY : Social Science Research Network.
- Mazzonna, Fabrizio, and Franco Peracchi (2012) "Ageing, Cognitive Abilities and Retirement". *European Economic Review* 56 (4) : 691-710.
- Rohwedder, Susann, and Robert J Willis (2010) "Mental Retirement". *Journal of Economic Perspectives* 24 (1) : 119-38.
- Siegrist, Johannes, and Morten Wahrendorf (2009) "Quality of Work, Health, and Retirement". *The Lancet* 374 (9705) : 1872-73.
- Snyder, Stephen E., and William N. Evans (2006) "The Effect of Income on Mortality : Evidence from the Social Security Notch". *The Review of Economics and Statistics* 88 (3) : 482-95.
- Westerlund, Hugo, Mika Kivimäki, Archana Singh-Manoux, Maria Melchior, Jane E Ferrie, Jaana Pentti, Markus Jokela, et al. 2009. "Self-Rated Health before and after Retirement in France (GAZEL) : A Cohort Study". *The Lancet* 374 (9705) : 1889-96.