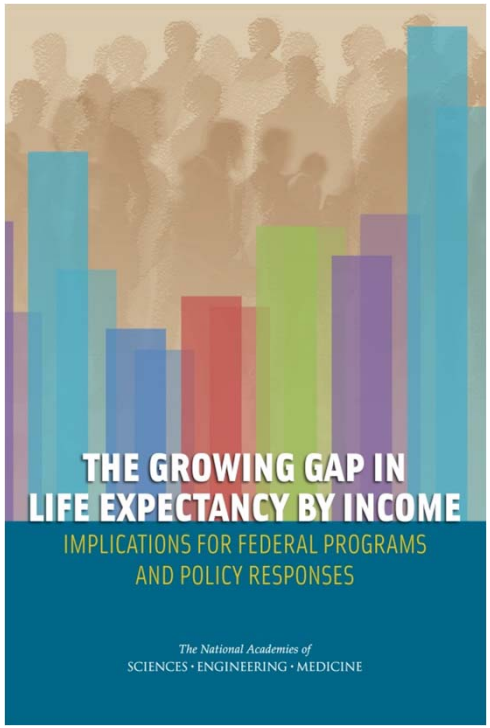
The National Academies of
SCIENCES • ENGINEERING • MEDICINE

Committee on the Long-Run Macroeconomic Effects of the Aging U.S. Population—Phase II



Committee Membership

Co-Chairs

- Ronald Lee
- Peter Orszag

Other members

- Alan Auerbach
- David Weil
- Courtney Coile
- Louise Sheiner
- William Gale
- Rebeca Wong
- Dana Goldman
- Kerwin Charles
- Justin Wolfers
- Charles Lucas

Staff Director

- Kevin Kinsella

Overview

I. Lifespan differences by education and by income are large and are widening.

II. Widening longevity differences disproportionately raise the lifetime public benefits of high earners relative to low earners

- Social Security (public pension)
- Medicare (health care for elderly, 65+)
- Medicaid (need-based long term care)

III. Fiscal consequences of population aging require policy adjustments that interact with widening lifespan differences, such as:

- Raising the normal retirement age or early retirement age
- Changing cost of living adjustment
- Raising the eligibility age for Medicare

Why care about effect of widening lifespan disparities on relative lifetime benefits of high and low earners?

- For many programs (e.g. national defense) it is not a problem; there is no age/time dimension.
- For transfers to elderly there is a strong age/time dimension, and lifespan is relevant.
- *Ex post*, some die young, some die old, and we share this risk through annuities. No problem.
- *Ex ante* differences in expected age of death for groups in the population may raise concerns.

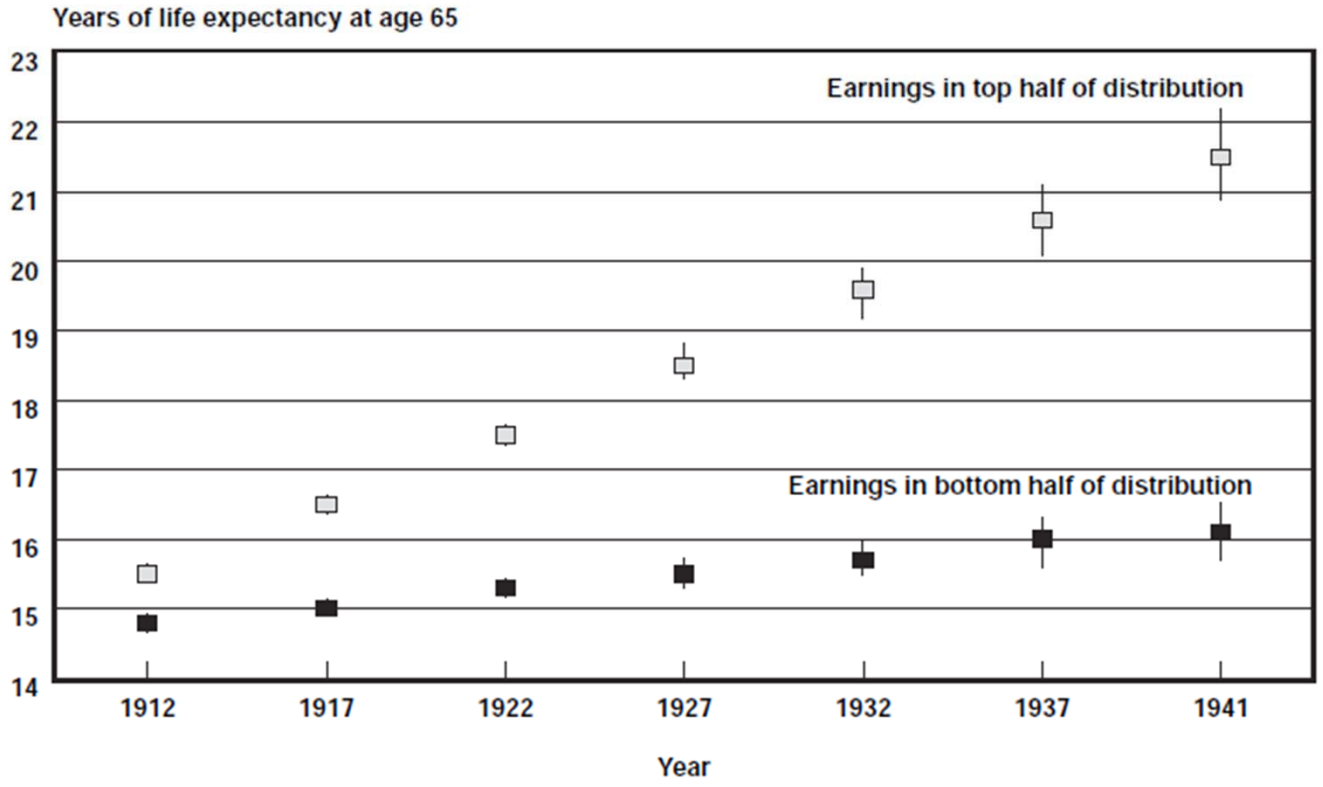
I. Disparities in lifespan

- Black-White lifespan differences have declined in past two decades.
  - Difference in remaining life expectancy at 50 is now only 2.8 years.
- However, a large literature finds differences by education and income are widening, even as racial differences are narrowing.
- Some studies now find life expectancy differences by educational level of 10 to 15 years.

Key paper by Waldron at Social Security

[Waldron (2007) Social Security Bulletin • Vol. 67 • No. 3 • 2007]

Chart 3.
Cohort life expectancy at age 65 (and 95 percent confidence intervals) for male Social Security–covered workers, by selected birth years and earnings group



Note:
More recent cohorts are observed for fewer years

The gap in e_{65} increases by 4.6 years.

Life expectancy at 65 rises by only one year for bottom half of income distribution.

Results for females are less reliable here and in subsequent research including ours.

Committee's analysis follows Waldron (2007), and particularly Bosworth and Burke (2014)

We use

- Health and Retirement Surveys 1992-2008 linked to Social Security earnings histories
- Midcareer earnings measure (average non-zero earnings age 41-50)
- For those in a couple, sum of earnings divided by square root of 2
- Use relative position: earning quintiles (bottom 20% etc.)
- Analyze mortality at ages 50+
- Include cohorts born 1912 to 1957

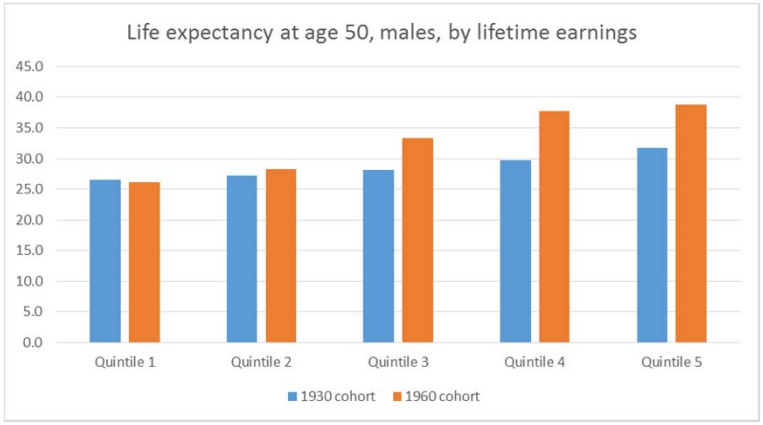
Model

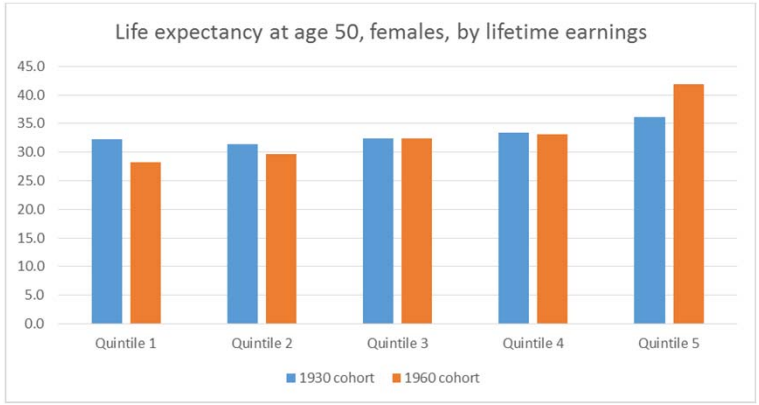
- Logit on age specific death rates with cohort dummies and continuous year of birth variable
- Alternative specifications gave similar results

We focus on birth cohorts of 1930 and 1960

- For 1930 cohort, we observe deaths at ages 62-78. For older ages, we extrapolate using model.
- For 1960 cohort, we observe no deaths after 50 at all.
  - This mortality scenario is entirely a projection from the fitted model
  - We might call it an hypothetical “high dispersion” scenario that would result from continuing trends.
- Why use this projected mortality dispersion rather than dispersion for an actual observed cohort?
  - The 1960 cohort will turn 60 in 2020.
  - It is the right cohort to consider for impact of policy changes.
  - Downside is uncertainty about whether trends in dispersion will continue.
  - We do a sensitivity test for this 1960 “cohort” assuming half the mortality dispersion, same mean mortality trend.

Life expectancy at age 50 by midcareer earnings quintile: Preliminary Committee estimates **and projections** for birth cohorts of 1930 and 1960.





The diff between top and bottom quintile for males grows from 5.1 to 12.7 years .

The diff for females grows from 3.9 to 13.6 years.

These are large, but not out of line with some other studies.

For sensitivity test, we constructed alternative scenario with growth in dispersion only half this great.

Probability of surviving from age 50 to age 85 and to 100 for males

- Didn't change for bottom earning group
- Big increase for top earning group.

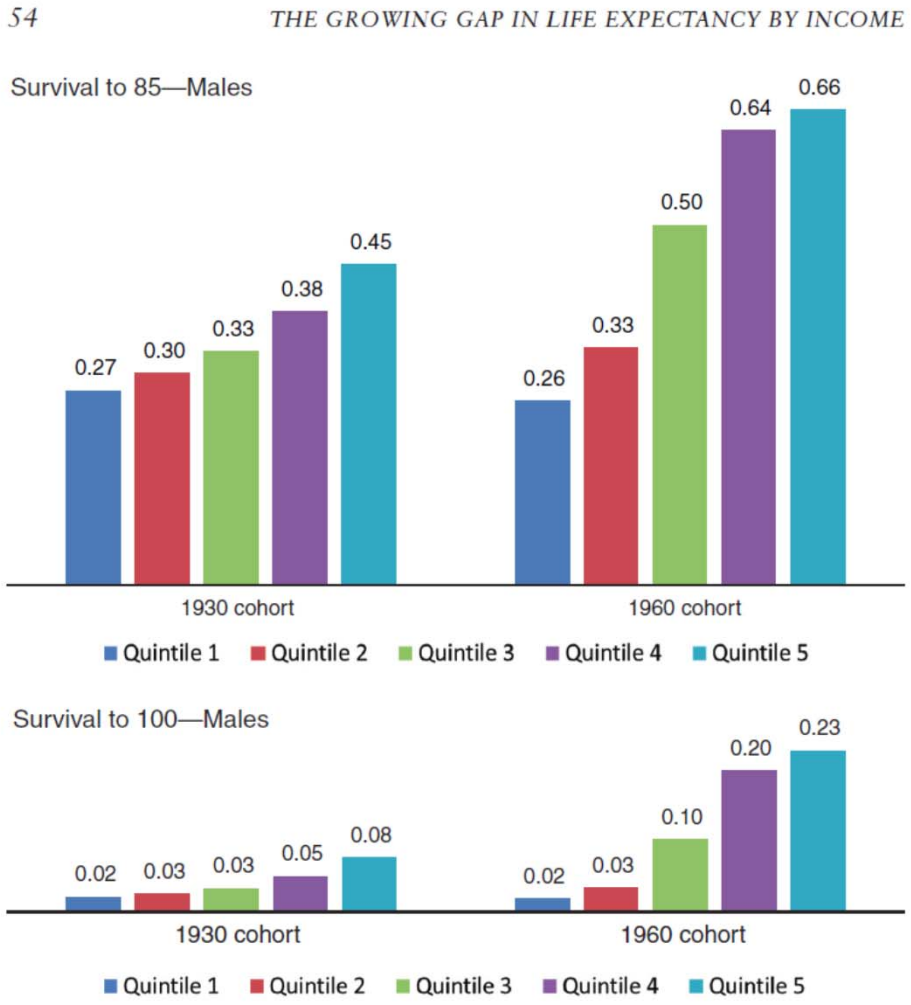


FIGURE 3-3 Proportions of males and females reaching age 50 who survive to ages 85 and 100, by birth cohort and income quintile.
SOURCE: Committee generated from Health and Retirement Study data.

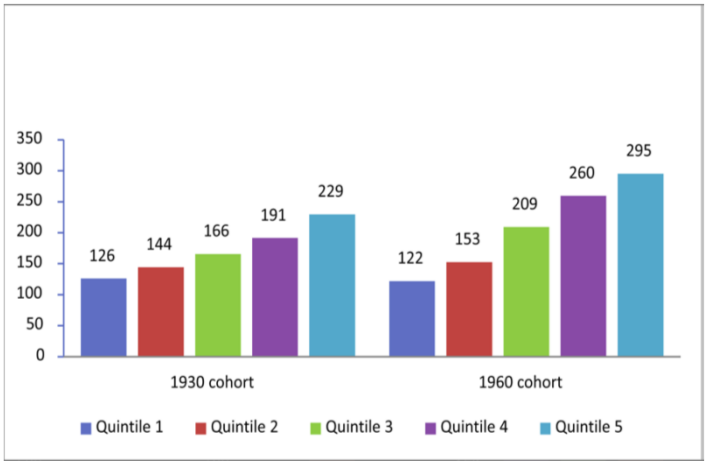
II. Widening longevity differences raise public benefits to elderly proportionately more for high earning groups than low

- We run a simulation experiment
  - Held constant
    - Policy rules for taxes and benefits fixed as in 2010.
    - Individual earnings histories are fixed, as are quintile positions.
  - Only mortality and health differ
    - In one simulation, individuals experience the mortality risks of the 1930 birth cohort
    - In other, they experience the mortality of the 1960 birth cohort (as we project it)
    - Individual health, disability vary accordingly.
- We calculate and compare --
  - Present Value of benefits received and taxes paid above age 50 until death
  - We compare these present values and their difference by income quintile under the two mortality regimes

The calculations

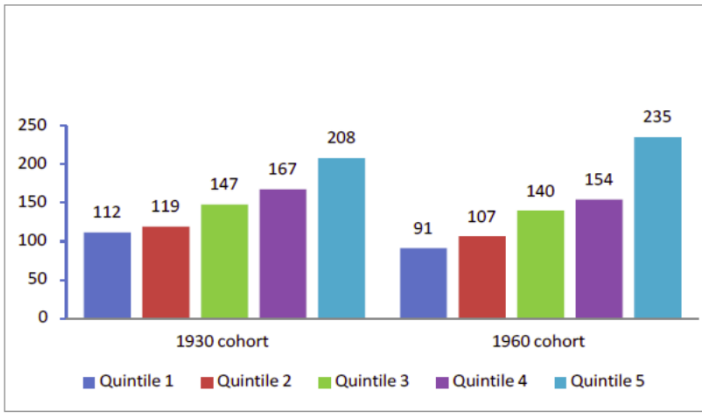
- Future Elderly Model (FEM) is a well-established microsimulation model based on the Health and Retirement Survey.
- FEM simulates health, disability and mortality outcomes and program costs and taxes.
  - Professor Dana Goldman leads FEM project at University of Southern Calif.
- From FEM simulations, we calculate PV of benefits and taxes for each mortality regime at age 50.
  - Because HRS does not provide tax or benefit payments before age 50, we cannot include these.
- Effects of lifespan arise almost entirely from benefits, not taxes, since variation in survival mostly occurs at very old ages when taxes are low.

Present Value (2.9% discount) Lifetime Social Security **Old Age Benefits** (in $000s) under two mortality regimes; **program rules of 2010**.



For Men:
For 1930 mortality, the Q5-Q1 diff is $103,000
For 1960 mortality, the Q5-Q1 diff is $173,000

- **The High-Low difference rises by $70,000**.



For Women:
For 1930 mortality, the Q5-Q1 diff is $96,000
For 1960 mortality, the Q5-Q1 diff is $144,000

- **The High-Low difference rises by $48,000.**

Medicare – PV of benefits: public health care for 65+

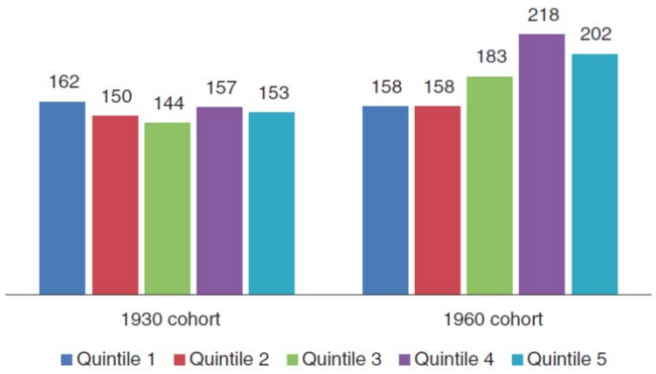


FIGURE 4-13 Average lifetime Medicare benefits for males (in thousands of dollars).
SOURCE: Committee generated using Health and Retirement Study data and cohort assumptions.

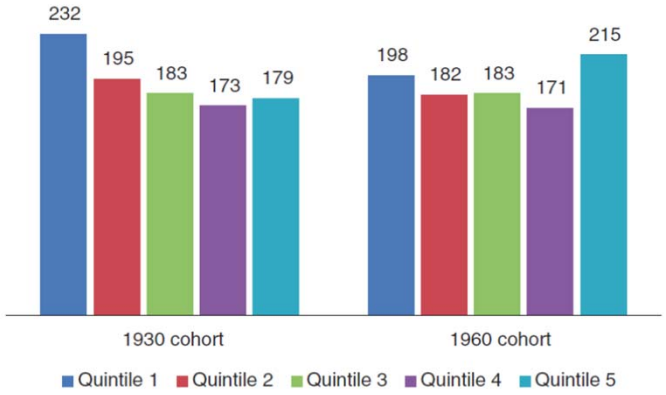


FIGURE 4-14 Average lifetime Medicare benefits for females (in thousands of dollars).
SOURCE: Committee generated using Health and Retirement Study data and cohort assumptions.

For Men:
For 1930 mortality, the Q5-Q1 diff is -$9,000
For 1960 mortality, the Q5-Q1 diff is +$44,000
The High-Low difference rises by $53,000

For Women:
For 1930 mortality, the Q5-Q1 diff is -$53,000
For 1960 mortality, the Q5-Q1 diff is +$17,000
The High-Low difference rises by $70,000

Medicaid – PV of benefits:

- Long Term Care for people with low assets.
- Many elderly receive long term care through this program
- Mostly beyond age 85
- Women receive twice the men's PV of Medicaid benefits
  - Women are more likely to need long term care than men at each age
  - Women are more likely to survive to old ages
- Note that low income (Q1) receives much more PV because
  - They meet asset test
  - They have higher disability rates

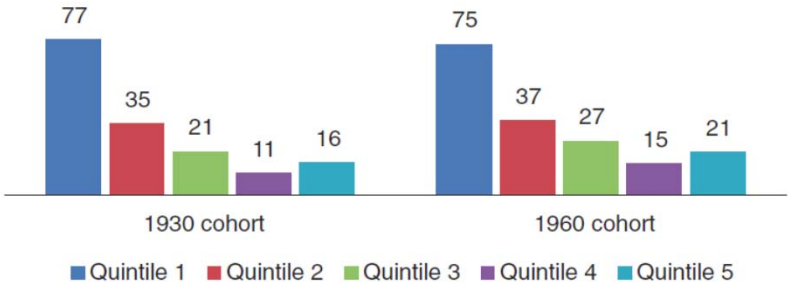


FIGURE 4-15 Average lifetime Medicaid benefits for males (in thousands of dollars).
SOURCE: Committee generated using Health and Retirement Study data and cohort assumptions.

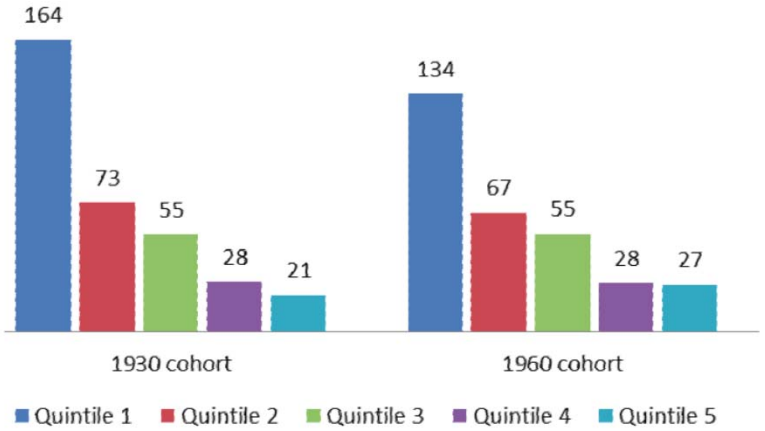
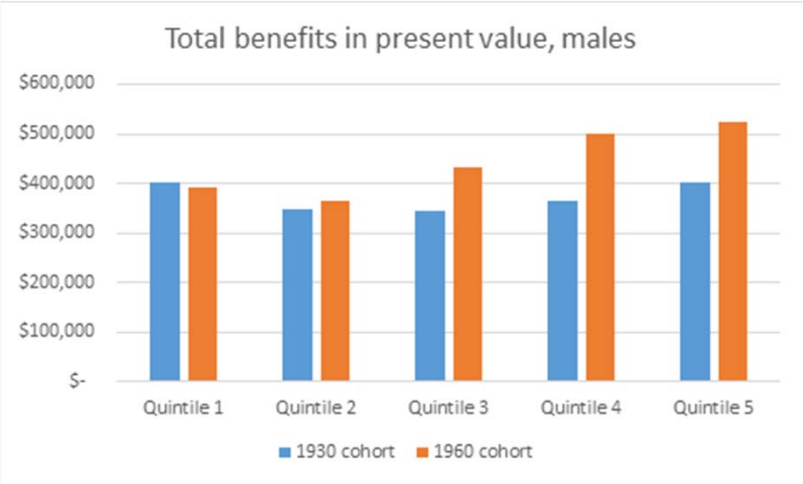
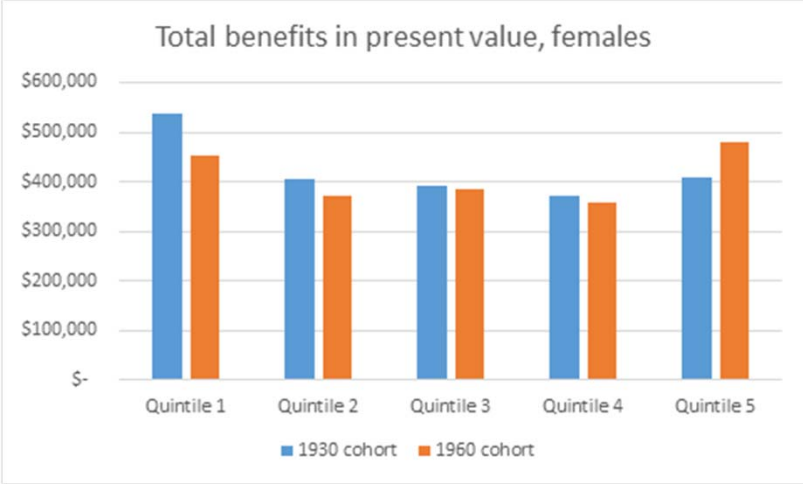


FIGURE 4-16 Average lifetime Medicaid benefits for females (in thousands of dollars).
SOURCE: Committee generated using Health and Retirement Study data and cohort assumptions.

Present value of total benefits under mortality regimes of 1930 and 1960 cohorts

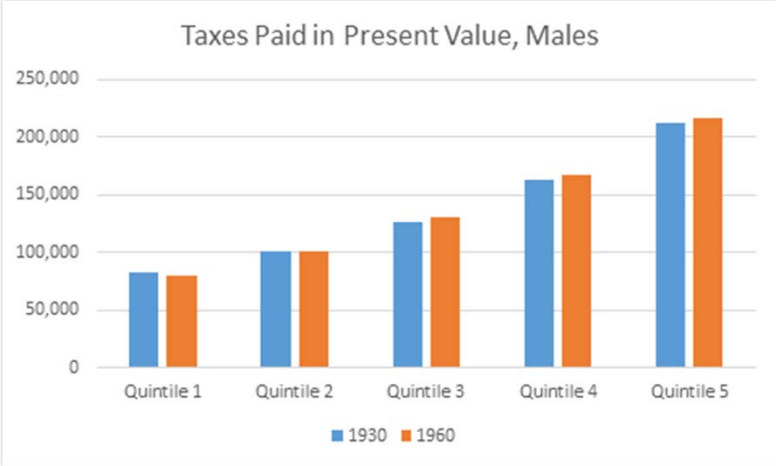


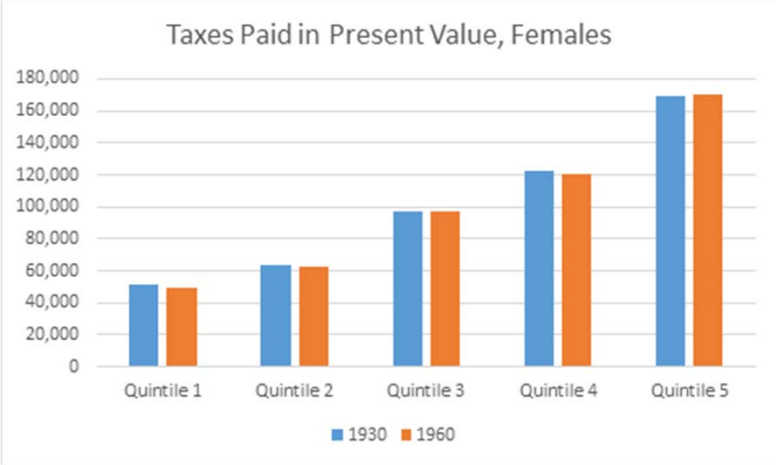


Benefits = Social Security, Disability, Survivors, Medicare, Medicaid, and SSI.

Q5-Q1 increases by about $130,000 for men, and $160,000 for women.

Present value of taxes above age 50 under mortality regimes of 1930 and 1960 cohorts





Taxes = personal income tax and both employer's and employee's payroll tax.

These taxes cover more than the costs of the benefit programs.

How large are the changes in net benefits as a fraction of resources?

- Because these survival differences have little effect on lifetime taxes, their effects on lifetime benefits and net benefits are very similar.
- To assess their importance, we compare them to wealth at age 50 for each earnings category.
- Wealth here at age 50 is:

  Assets including home equity

  + future earnings

  + future benefits

  - future taxes

PV of Total Net Benefits as a share of Wealth at age 50

- Total net benefits are a much larger share of wealth at age 50 for low earners than for high earners.
- But widening disparities in longevity narrow the difference by:
  - 7 percentage points for men
  - 9 percentage points for women

Earnings Quintile	Present value of net benefits at age 50, relative to inclusive wealth, based on the mortality profile for those: Born in 1930 (%)	Born in 1960 (%)	Percentage Point Change
Males			
Lowest	45.7	45.6	–0.1
2	34.9	36.8	1.9
3	26.9	33.3	6.4
4	20.0	28.9	8.8
Highest	14.4	21.4	6.9
Females			
Lowest	69.0	65.4	–3.6
2	56.6	54.8	–1.8
3	45.3	44.9	–0.4
4	34.7	33.5	–1.3
Highest	25.4	30.8	5.4

Sensitivity Test: Q1-Q5 Difference in PV of Total Net Benefits by Mortality Assumption

- Test leaves average mortality trend unchanged, but cuts the increase in dispersion by half.
- Straight lines show that the outcome is proportional to the dispersion.

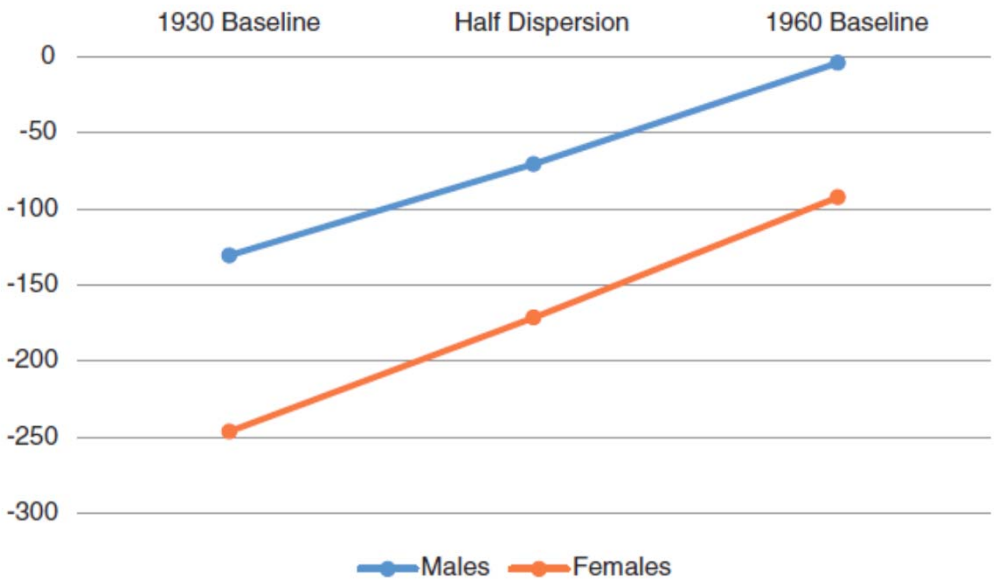


FIGURE 4-26 Difference in present value (in thousands of dollars) of total lifetime benefits net of taxes between top and bottom income quintiles, for three mortality regimes: 1930 cohort, half dispersion, and 1960 cohort.
SOURCE: Committee generated using Health and Retirement Study data and cohort assumptions.

III. Policy adjustments for population aging interact with widening differences in lifespan

- Consider 6 commonly discussed policy adjustments.
- Labor force participation, benefit claiming, and receipt of disability all respond to changes in policy.
- Report looks at:
  - Change in $ gap between quintiles
  - Ratio of benefits in top/bottom quintiles
  - Change in % cuts in benefits
  - Change in benefits as a % of wealth
- These measures can show different patterns.
- Presentation today focuses on 1960 mortality cohort.

1. Raise Early Retirement Age (ERA) from 62 to 64 under 1960 cohort mortality regime

- Raising ERA increases lifetime benefits a bit for all income quintiles.
  - Individuals tend to claim a little "too early" relative to what would maximize lifetime benefits.
- But effect larger for higher earners because of longer life expectancy.
- Policy change raises Social Security spending a small amount.

	Males Present value of net benefits at age 50, relative to wealth, based on the mortality profile for those born in 1960		
Earnings quintile	Baseline	Under policy experiment	Percentage point change
Lowest	45.6%	45.7%	0.1%
2	36.8%	37.0%	0.2%
3	33.3%	33.8%	0.5%
4	28.9%	29.3%	0.5%
Highest	21.4%	21.7%	0.4%
	Females Present value of net benefits at age 50, relative to wealth, based on the mortality profile for those born in 1960		
Earnings quintile	Baseline	Under policy experiment	Percentage point change
Lowest	65.4%	65.6%	0.2%
2	54.8%	55.1%	0.3%
3	44.9%	45.5%	0.6%
4	33.5%	34.1%	0.6%
Highest	30.8%	31.4%	0.6%

2. Raise Normal Retirement Age (NRA) to 70 in 1960 cohort mortality regime

- For males
  - PV of Social Security benefits falls by $30,000 (25%) for bottom quintile workers and by $59,000 (20%) for top quintile workers.
  - Ratio of Social Security benefits of top earners to bottom earners rises from 142 percent to 157 percent.
  - But, as a share of total wealth, policy mildly progressive: total net benefits fall 4.8% for lowest earners and 5.1% for top earners.
- For females
  - PV of Social Security benefits falls by $16,000 (18%) for bottom quintile workers and $36,000 (15%) for top quintile workers.
  - Ratio of Social Security benefits of top earners to bottom earners rises 158 percent to 164 percent.
  - Net benefits as as share of wealth fall 3% for lowest earners and 4.7% for highest earners.

3. Reducing the automatic COLA (Cost of Living Adjustment) for Social Security and other benefits (switch from CPI-W to Chained CPI; about .2% lower on average)

	Males Present value of net benefits at age 50, relative to wealth, based on the mortality profile for those born in 1960		
Earnings quintile	Baseline	Under policy experiment	Percentage point change
Lowest	45.6%	45.2%	-0.4%
2	36.8%	36.3%	-0.5%
3	33.3%	32.7%	-0.6%
4	28.9%	28.2%	-0.7%
Highest	21.4%	20.8%	-0.6%
	Females Present value of net benefits at age 50, relative to wealth, based on the mortality profile for those born in 1960		
Earnings quintile	Baseline	Under policy experiment	Percentage point change
Lowest	65.4%	65.1%	-0.2%
2	54.8%	54.4%	-0.3%
3	44.9%	44.5%	-0.4%
4	33.5%	33.1%	-0.4%
Highest	30.8%	30.3%	-0.5%

The longer a retiree lives, the greater the difference this makes.

Consequently, this change hits the top quintile harder than the bottom quintile.

Reduces lifetime benefits of high earners relatively more than low.

Relatively small change in PV of net benefits, however.

3. Reducing the automatic COLA (Cost of Living Adjustment) for Social Security and other benefits (switch from CPI-W to Chained CPI; about .2% lower on average)

	Males Present value of net benefits at age 50, relative to wealth, based on the mortality profile for those born in 1960		
Earnings quintile	Baseline	Under policy experiment	Percentage point change
Lowest	45.6%	45.2%	-0.4%
2	36.8%	36.3%	-0.5%
3	33.3%	32.7%	-0.6%
4	28.9%	28.2%	-0.7%
Highest	21.4%	20.8%	-0.6%
	Females Present value of net benefits at age 50, relative to wealth, based on the mortality profile for those born in 1960		
Earnings quintile	Baseline	Under policy experiment	Percentage point change
Lowest	65.4%	65.1%	-0.2%
2	54.8%	54.4%	-0.3%
3	44.9%	44.5%	-0.4%
4	33.5%	33.1%	-0.4%
Highest	30.8%	30.3%	-0.5%

The longer a retiree lives, the greater the difference this makes.

Consequently, this change hits the top quintile harder than the bottom quintile.

Reduces lifetime benefits of high earners relatively more than low.

Relatively small change in PV of net benefits, however.

4. Raise the usual eligibility age for Medicare from 65 to 67 (calculation does not reflect potential impact of the ACA)

- Expect first quintile to have a bigger reduction in PV of benefits since
  - Shorter life expectancy
  - Higher health costs at 65 and 66
- Actual difference in effect is fairly small because
  - Health costs are much higher at older ages
  - More low income people qualify for Medicare through Disability so are not affected by "usual eligibility age"
- Result under 1960 mortality regime:
  - Males: Lowest quintile workers' benefits reduced 5.1%
    Top quintile workers' benefits reduced 3.5%
  - Females: Lowest quintile workers' benefits reduced 5.6%
    Top quintile workers' benefits reduced 3.3%

5. Reduce marginal replacement rate by 1/3 for high income workers (marginal replacement rate above second bend-point is reduced from 15% to 10%)

- Very modest savings for pension system (about 1% of deficit)
- Very slight relative gain for low earners.

6. Move second bend point to median income, and reduce marginal replacement rate to 0 for high income workers.

- Greater savings for public pension system – 11% reduction in benefits for males, 5% for females.
- High-Low earner gap is reduced by $42,000 for men, $12,000 for women.
- Under 1960 cohort mortality, this policy helps to make **total** benefits more equal.

Q5-Q1=173K Q5-Q1=131K

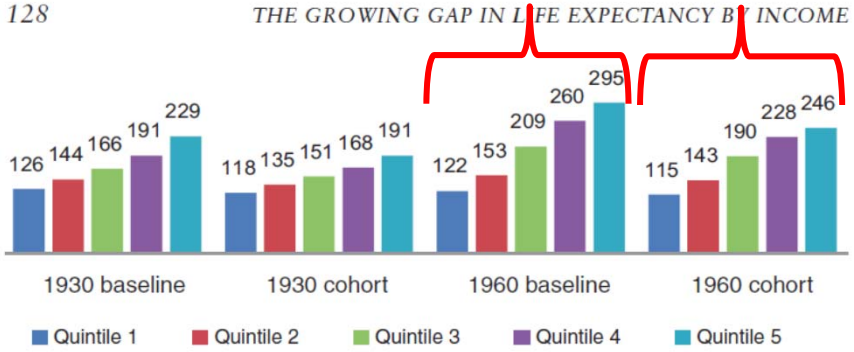


FIGURE 5-21 Average lifetime Social Security benefits for males (in thousands of dollars). Baseline compared with reducing benefits to workers in the top half of the average indexed monthly earnings distribution.
SOURCE: Committee generated using Health and Retirement Study data and cohort assumptions.

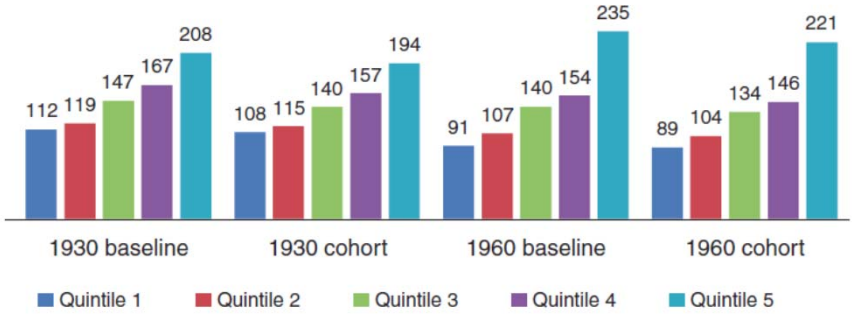


FIGURE 5-22 Average lifetime Social Security benefits for females (in thousands of dollars). Baseline compared with reducing benefits to workers in the top half of the average indexed monthly earnings distribution.
SOURCE: Committee generated using Health and Retirement Study data and cohort assumptions.

Summary: Progressivity of Policy Options: Change in Net Benefits Relative to Wealth for Top and Bottom Quintiles: Males

Policy Experiment	Impact on Progressivity	Impact on Present Value of Net Benefits Relative to Wealth for Bottom/ Top Quintiles for Males	Impact on Solvency
Raise EEA from age 62 to 64	Somewhat less progressive	+0.1 +0.4	Small
Raise NRA to age 70	Somewhat more progressive	–4.8 –5.2	Significant (23% reduction in present value benefits for males; 15% reduction for females)
Raise EEA and NRA as above	Somewhat more progressive	–4.8 –5.1	Significant (22% reduction in benefits for males; 14% for females)
COLA based on chained CPI	Somewhat more progressive	–0.4 –0.6	Small (reduces benefits by less than 2%)
Marginal benefit 10% at top	Somewhat more progressive	–0.1 –0.3	Small (reduces benefits by less than 1%)
Marginal benefit after median	Substantially more progressive	–1.1 –3.4	Medium (11% reduction in benefits for males, 5% for females)
Raise Medicare eligibility to age 67	Less progressive	–1.4 –0.5	Modest (in part because 65 and 66 year olds are much less expensive than older beneficiaries, and in part because some would qualify through disability insurance)

Conclusions

- Top half of income distribution has benefitted much more from rising life expectancy than bottom half.
- Widening survival differences mean that lifetime public benefits of high earners rise proportionally more than for low.
- Widening survival differences also interact with potential policy changes that are intended to improve the sustainability of programs.
- These points should be considered when designing policy responses to population aging.