Retirement Reform

OLG Framework

- OLG framework ideal, in fact necessary, for studying retirement reform
- Timely and policy-oriented research topic

Health, Longevity and Retirement Reform

Laun et al. (2019)

- Population aging places enormous pressure on traditional PAYG social security programs
- Solvency of social security in the future will require one or more of following
  - People work longer
  - Benefits are cut
  - Taxes are raised

Health, Longevity and Retirement Reform

Motivation

- Population aging largely driven by improvements in longevity
- However, there is substantial heterogeneity in the life expectancy and health of older people
  - More educated individuals enjoy better health, and can also expect to live longer, than their less educated counterparts
  - Improvements in both have also benefited more educated individuals more over last decades
- Yet, in most countries these heterogenous workers face homogenous social security rules

Health, Longevity and Retirement Reform

Goal

- Develop life cycle model of heterogeneous agents who face health and mortality risk
- Use model to study labor supply and welfare effects of alternative pension reforms
- In particular, contrast ways of making pension schemes robust to improvements in longevity
  1. Raising early eligibility age for old-age pension benefits
  2. Lowering old-age pension benefits
  3. Raising taxes on labor and pension income
  4. Lowering both old-age pension and disability benefits

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Goal

- Interested in differential effects of reforms for agents who differ in terms of productivity, health and life expectancy
- Important to include disability insurance in model
  - Restricting access to old-age retirement may have unintended consequence of increasing flow into disability

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Model Environment

- Life cycle model with heterogeneous agents who face
  - Health risk
  - Mortality risk
  - Income risk
- 3 education levels: compulsory, high school and college

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Model Environment

- Model period is one year
- Agents enter model at age 27 endowed with education type, initial health and initial assets
- Agents live for at most 69 periods (up to age 95)
- Agents face positive mortality risk at the end of each period (dependent on age, education and health)

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Preferences

- Agents have preferences over consumption (c), labor supply (l) and health (h):

$$U(c, l, h) = \ln(c) - b(e, h)l - \psi(a, h)$$

education age

- Disutility of labor depends on health and education
  - Working is more unpleasant when in bad health
- $\psi(\cdot)$ is the utility cost or stigma of applying for DI benefits, which depends on age and health

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Budget Constraint

a = age

- Per period budget constraint given by:

$$(1+\tau_c)c_a + k_{a+1} - (1+r)k_a = (1-\tau_l(y_a))w_a l_a + (1-\tau_b(y_a))(DI_a + R_a)$$

where

- k: capital
- y: labor income
- R: retirement benefits
- DI: disability benefits

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Wages

- Labor supply is a discrete choice: $l_{a,e} \in \{0, \bar{l}\}$
- Labor income is the product of the wage and labor supply: $y_{a,e} = w_{a,e} l_{a,e}$
- Wage process is uncertain and consists of deterministic, persistent and transitory components:

$$w_{a,e} = \omega_{a,e} + u_{a,e}$$

where

- $u_{a,e} = v_{a,e} + \mu_{a,e}$
- $v_{a,e} = \rho v_{a-1,e} + \varepsilon_{a,e}$
- $\varepsilon_{a,e} \sim N(0, \sigma_{\varepsilon}^2)$
- $\mu_{a,e} \sim N(0, \sigma_{\mu}^2)$

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Health and Longevity

- 2 health states: good and bad
- All agents start out in good health
- Agent faces age and education dependent probability of transitioning from good to bad health
  - Bad health assumed absorbing
- Mortality rates depend on age, education and past health

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Social Security

- Model stylized representation of Norwegian pension system
- Old-age retirement benefit depends on past earnings through so called average pension points
- Pension points (pp) accumulated through work, as follows:

$$pp = \min[\max(y-1,0),5] + \max[\min((y-6)/3,2),0]$$

- Benefits indexed to BA, where one accrues
  - Full pension points on earnings up to 6 BA
  - 1/3 points on income above 6 BA
  - 0 points on income above 12 BA
- Points based on earnings from 20 best years

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Social Security

- Average pension points then map into the retirement benefit as follows:

$$R = 1 + 0.435 * pp * [min(yow/40, 1)]$$

  - Full old-age retirement benefit awarded with 40 years of work (yow)

- Earliest claiming age for pension benefits age 62

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Disability Insurance

- Disability benefits equal 66% of last income before going on disability
- Accrue pension points while on disability, as if continued to work at last wage
- Utility cost associated with applying for disability insurance benefits
  - Cost greater if in good health as opposed to bad health
- Assume everyone who applies gets disability benefits

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Taxation

- Government levies proportional tax on consumption and progressive tax on labor/pension income
- Government uses proceeds to finance retirement and disability insurance benefits
- Assume remaining tax revenue thrown away

government consumption that doesn't impact MU of private consumption

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Calibration: Stage 1

- Estimate following parameters using Norwegian administrative panel data
  - Wage process
  - Taxes — OECD tax database
  - Health risk
  - Survival risk

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Calibration: Stage 2

- Calibrate preference parameters
  - Discount factor chosen to match asset to income ratio
  - Parameters governing disutility from working and utility cost of applying for disability benefits jointly pin down retirement entry (stop work) and disability benefit claiming
    - Target these moments by age and education, and also report fit over health

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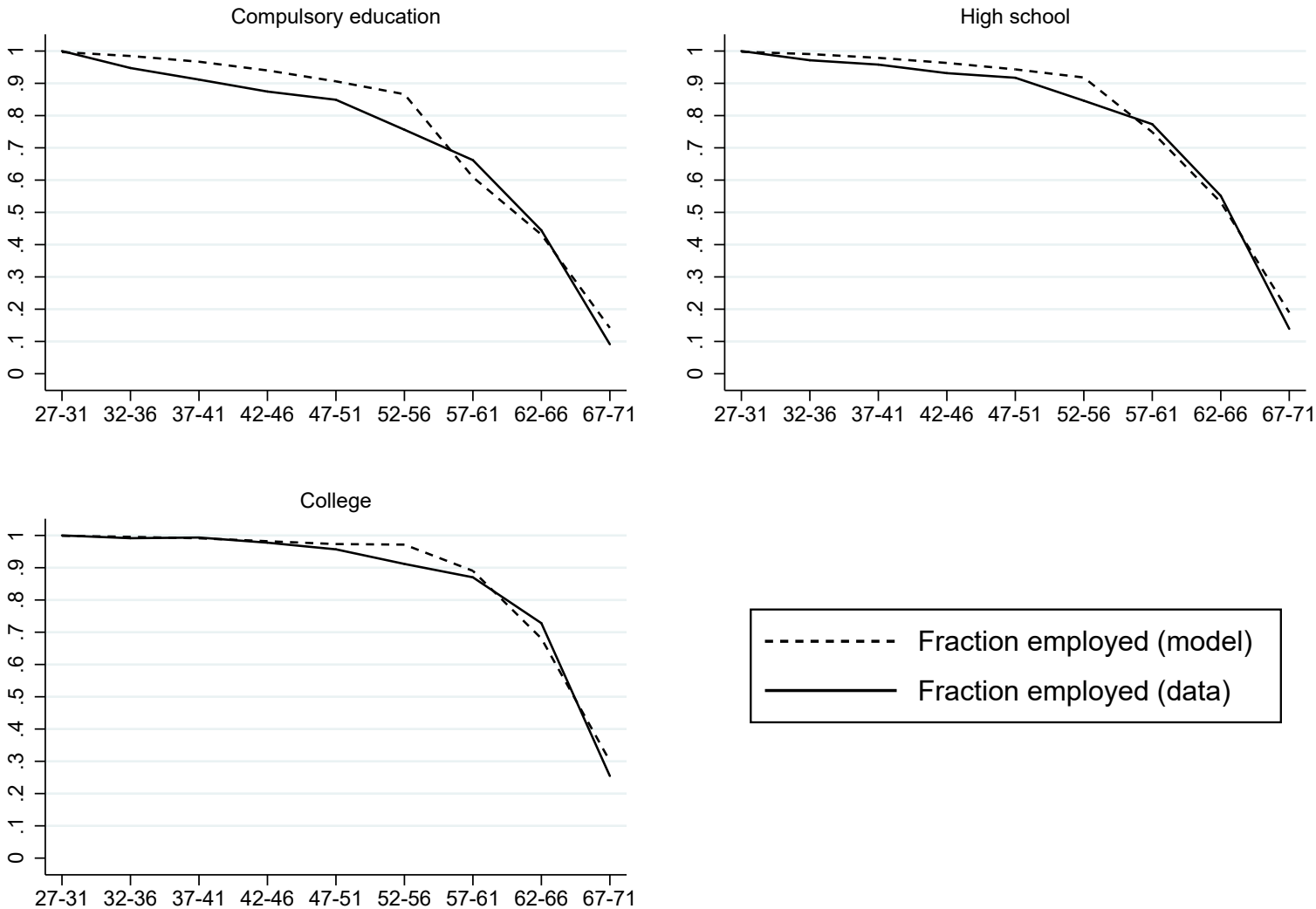
Model Fit



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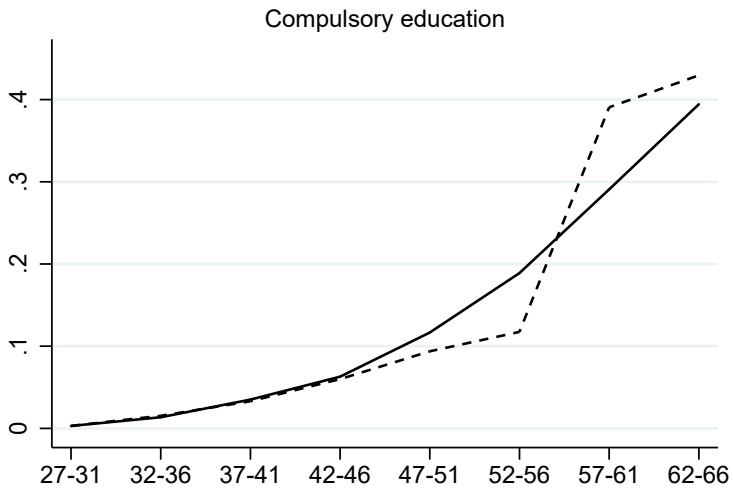
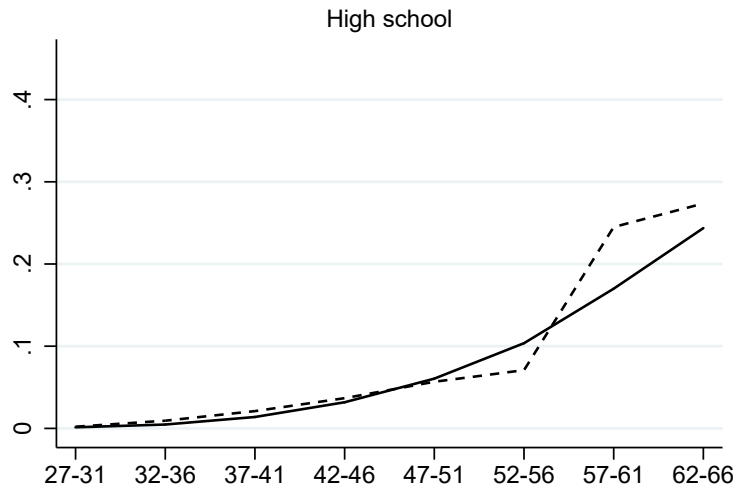
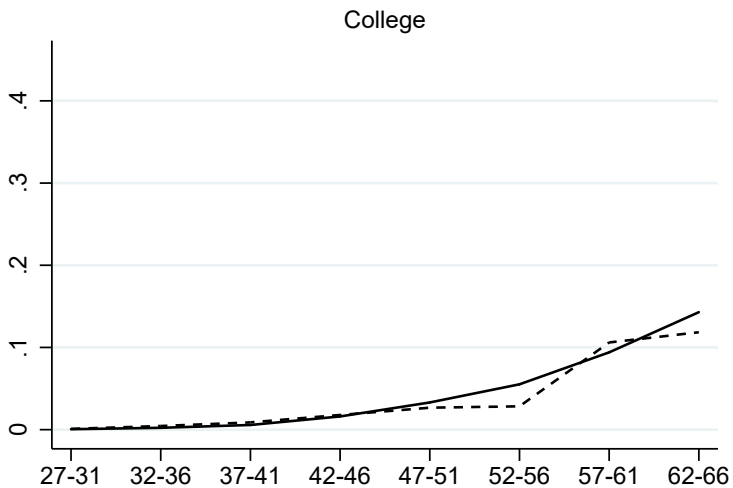
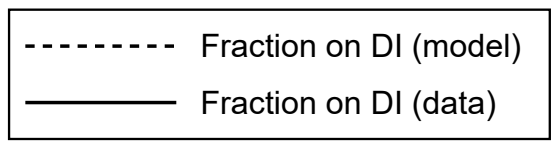
Model Fit

calibrate to cohorts born 1949-53









validation exercise using cohorts born 1939-43

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Policy Analysis

- Increasing longevity threatens solvency of social security
- Study alternative pension reform measures that are fiscally sustainable in face of demographic change
- Compare optimal life cycle behavior of two groups of individuals
  - First group: age- and education-specific health and survival risk associated with cohort born 1949-53 (calibration period)
  - Second group: age- and education-specific health and survival risk associated with cohort born 1969-73 (data and projection)

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No Reform Scenario

- Norwegian pension scheme features built-in longevity adjustment
- According to model, this built-in longevity adjustment not sufficient to achieve revenue neutrality
  - Government revenue declines by 7.9%
  - This despite 6 pp increase in employment of 50–66 year old men

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Revenue Neutral Reforms

- For comparability, each reform generates same government consumption as benchmark economy
- Policy alternatives
  - Raising early access age to old-age pension
  - Increasing longevity adjustment for pension benefits (i.e., lowering pension benefits)
  - Proportionately increasing taxes on labor and pension income
  - Lowering both pension and disability benefits

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Results: Employment and DI

- Increasing early access age to pension benefits not effective policy tool
  - Raising early access age from 62 to 67 not enough to achieve revenue neutrality
  - Largely due to increase in disability benefit claiming
- Combine increasing early access age to 67 with lowering pension benefits

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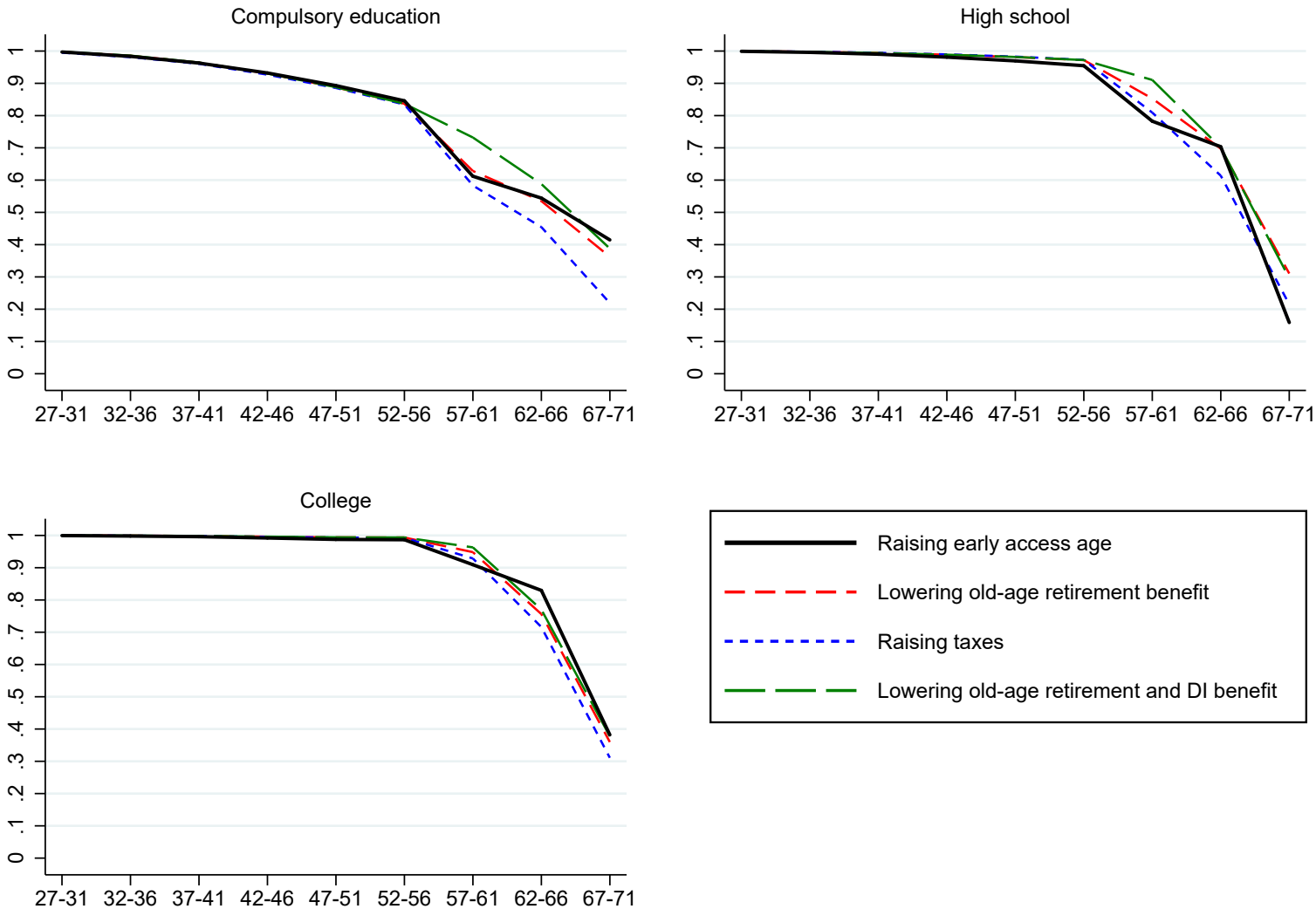
Results: Employment and DI



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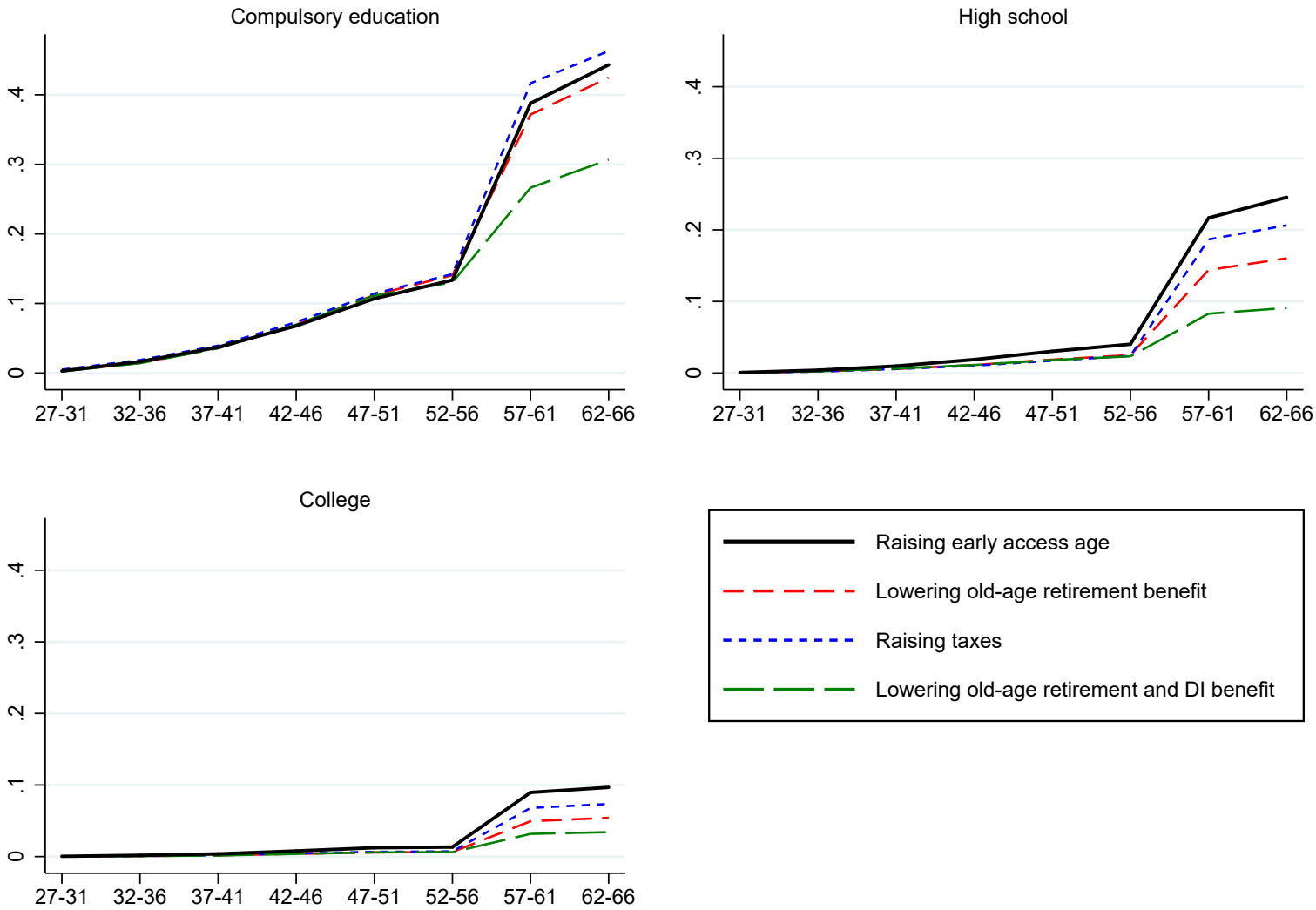
Results: Employment and DI



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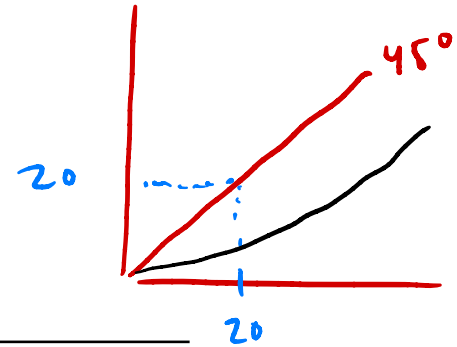
Results: Welfare and Inequality



	EAA	LPB	RTX	PDI
Average discounted lifetime labor income	1	1.003	0.992	1.008
Average discounted lifetime utility	1	1.010	0.975	1.022
Average employment (50-66)	1	1.000	0.960	1.037
Average DI (50-66)	1	0.899	1.010	0.664
Share of DI recipients in bad health	1	1.022	0.926	1.099
Gini discounted lifetime labor income	1	1.004	0.997	0.959
Gini discounted lifetime total income	1	1.002	0.992	1.011
Gini discounted lifetime utility	1	1.337	1.091	1.314

EAA: early access age for old-age retirement benefit claiming raised to 67 and benefit scaled down. LPB: all old-age retirement benefits scaled down proportionally. RTX: taxes on labor and social security income increased proportionally. PDI: all old-age retirement and disability benefits scaled down proportionally. Results reported relative to the EAA policy scenario. Gini computed based on net of tax income.

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Summary of Results

- Proportionally lowering old-age retirement and disability benefits best policy?
  - It maximizes average welfare of agents
  - It also results in highest average employment, and thereby highest average labor earnings
  - However, it results in greater inequality of welfare than some other policy scenarios

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Summary of Results

- In model, assume all workers able to work, regardless of health
  - Framework captures fact that disability utilized as pathway into early retirement
  - Share of disability benefit recipients in bad health 6-18 pp higher with cut in old-age retirement and disability benefits than with other reforms

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Sensitivity Analysis

- While improvements in health and longevity in Norway favor more educated, gradient steeper in many other countries
- Consider more pessimistic scenario
  - For individuals with compulsory education, scale transition probabilities from good to bad health up by 10%
  - For individuals with a college education scale transition probabilities from good to bad down by 10%
  - Leave high school types unchanged
- Results similar to baseline

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Sensitivity Analysis

- Data on disability insurance claiming and health imply that substantial share of disability claimants in Norway in relatively good health
- In Norway, temporary disability easy to obtain and acts as pathway into permanent disability
- In model, abstract from temporary disability and only model permanent disability
- What if everyone couldn't claim disability?
  - Consider scenario where people in bad health face 80% probability of being granted disability benefits and people in good health face 50% probability
  - Results similar to baseline

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Conclusions

- Faced with aging populations, many governments the world over grappling with social security reform
- OLG/life cycle model allows us to contrast alternative ways of achieving fiscally sustainable pension systems
- Find that
  - Increasing early access age to pensions not effective policy tool
  - Proportionally increasing income taxes yields lowest employment outcomes for all education types
    - Also results in lowest average welfare for all education types
  - Proportionally lowering old-age retirement and disability benefits most effective for boosting average employment
    - Also results in highest average welfare for all education types
    - But increases inequality

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Assessment

- Is this a good model for thinking about these questions?
- What might model be missing?