All or Nothing: Health and the U.S. Social Security Disability Insurance

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Public Disability Insurance Program In The US

- One of the most fundamental questions in health and public economics is how income from government programs influences beneficiaries' health
- The Social Security Disability Insurance (SSDI) program is the main disability insurance program for disabled individuals in the US
- 10 mln Americans receive SSDI benefits worth $12 bln/month
- The last modification of SSDI has been introduced in 1999

Public Disability Insurance Program In The US

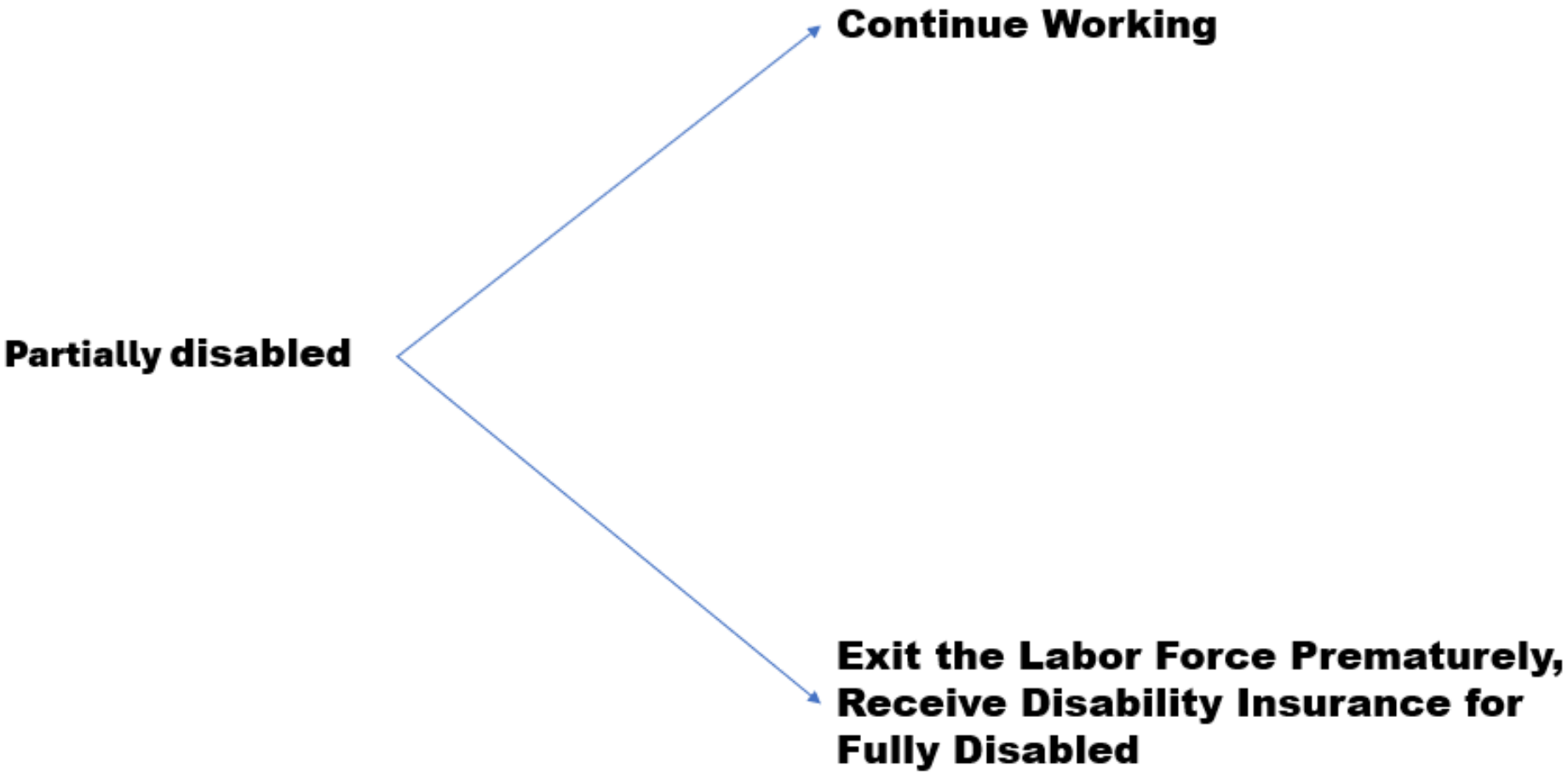
- SSDI program evaluates health as a binary outcome:
  a person is either considered to be fully disabled or not disabled

- The existing SSDI program incentivizes applicants to exaggerate or even exacerbate their health problems and leave the labor force prematurely

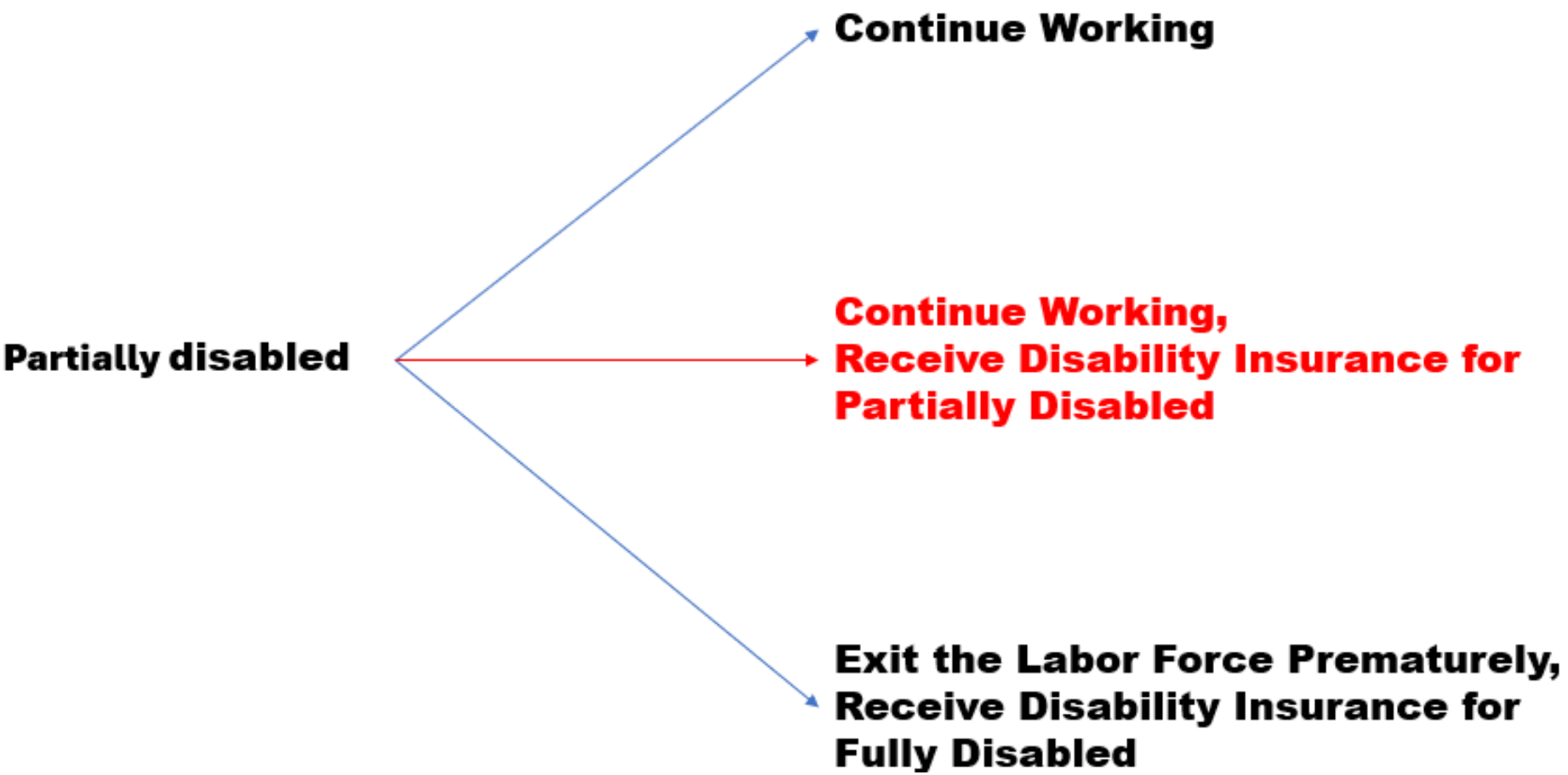
  - Around 20% of SSDI beneficiaries have some capability to return to work — they are not fully disabled

  - Less than 1% of SSDI recipients return to the labor force

Public Disability Insurance Program In The US



Public Disability Insurance Program In Other Countries



Americans with Disabilities

- The SSDI program does not cover all existing demand for disability insurance
- The majority of SSDI applications are not approved
- Out-of-pocket medical costs are 2 times higher for Americans with disabilities (Kennedy et al., 2017)
- 13% of 35–64-year-old Americans have some disability,
  6% of 35–64-year-old Americans receive SSDI

Americans with Disabilities

Table: Age Conditional Disability Transition Probabilities

	Not disabled	Partially disabled	Fully disabled	Deceased
Not disabled	0.861	0.087	0.048	**0.005**
Partially disabled	0.275	0.529	0.183	**0.012**
Fully disabled	0.177	0.313	0.492	0.018

Notes. Table is based on the Health and Retirement Study (HRS) Data. It shows the health transition probability of a person whose current period's health is described in the first column and whose next period's health is described in the first row. HRS is biennial, and the period for this table is two years.

Americans with Disabilities

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Existing Evidence

- Under the public disability insurance program for the partially disabled, partially disabled Americans will choose to retire at an older age (see Yin, 2015)
- Younger age at retirement leads to up to 11% increase in annual mortality (see Wu, et al., 2015)
- The negative effect of premature retirement is more significant for women (see Fitzpatrick and Moore,2018; Kuhn et al.,2020)
- Cognitive and mental health suffer due to premature retirement (see Bonsang et al., 2012; Mazzonna and Peracchi, 2012)

Research Questions

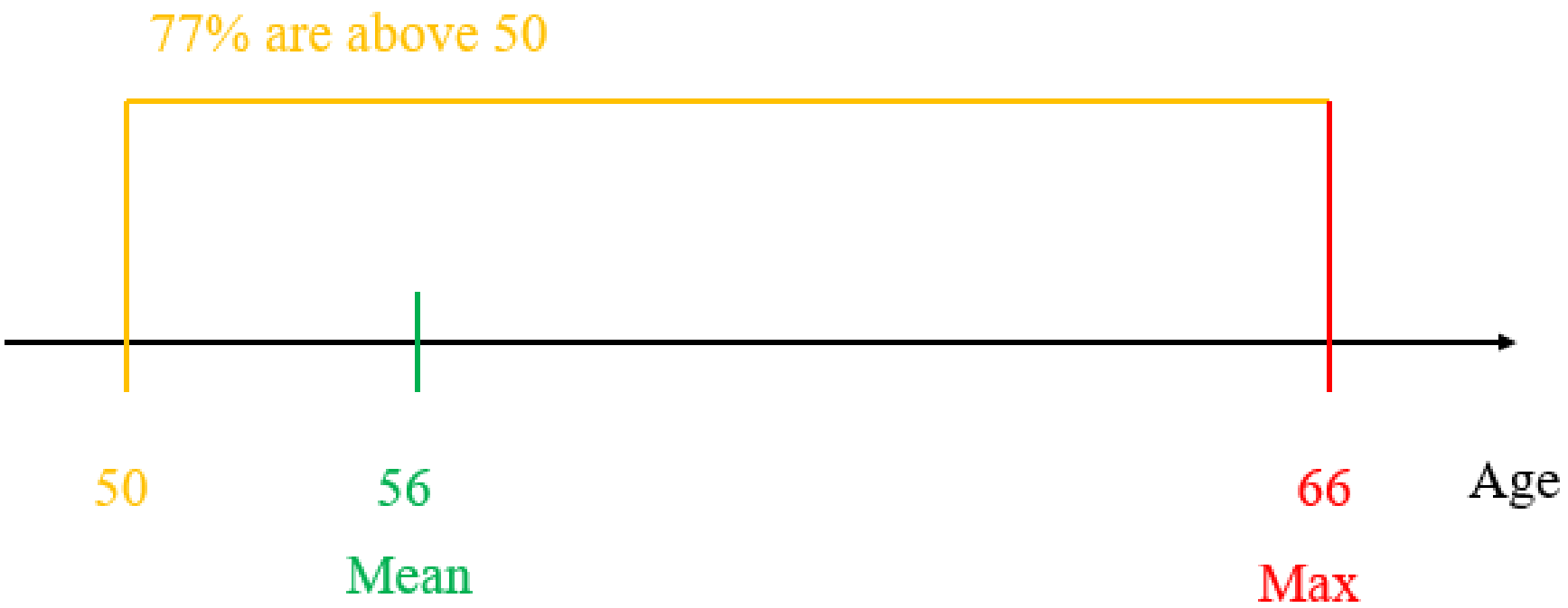
. **How would SSDI benefits for partial disability impact the health and longevity of the nearly elderly?**

. **Will their disability propensity decrease thanks to the introduction of partial SSDI benefits?**

Literature on Disability Insurance

	Effects on health	Effects on labor supply
Reduced form models	Borsch-Supan et al. (2017) Black et al. (2021) Gelber et al. (2023)	
Individual decision-making models that permit the prediction of the effects of the modifications of SSDI design	**This paper**	Yin (2015)

Age Distribution of SSDI Beneficiaries



Data and Sample Design

Two sources of the data:

1. Health and Retirement Study (HRS) Public Survey Data (1994–2016)
2. Social Security Administration (SSA) Administrative Data

Four estimation sample restrictions:

1. No households with members below 50
2. Observations with missing data on health-related variables and age
3. Observations with missing data during the initial observations
4. No individuals older than 90

HRS Questions on Disabilities Preventing Work

HRS has the following questions on disabilities preventing work:

- Do you have any impairment or health problem that limits the kind or amount of paid work you could do? (question $M002$ in HRS)
- Does this limitation keep you from working altogether? (question $M008$ in HRS)

I classify

- Those who have limitations that limit their work but do not prevent them from working altogether as **partially disabled**
- Those who have limitations keeping them from working altogether as **fully disabled**

Self-Reported Disability Status is Unreliable

Questions on disabilities preventing work are unreliable because:

- People report themselves in poor health as a rationalization for what might otherwise be seen as socially unacceptable early retirement (Bound, 1991)
- 20% of HRS respondents who reported receiving SSDI benefits also reported that their disability does not prevent them from working altogether (Benitez-Silva et al., 2004)
  - So, 20% SSDI beneficiaries admit they are cheating
  - How many respondents decided not to admit their fraud?

HRS Health-Related Variables

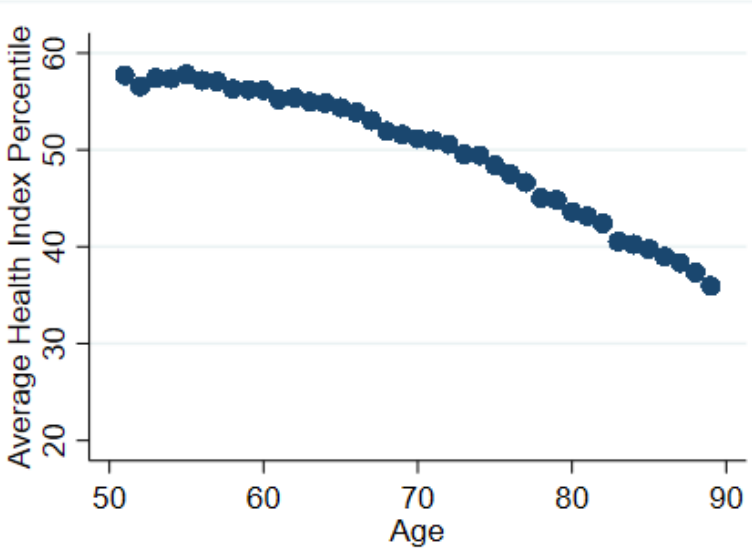
Using principal component analysis for the following HRS health-related variables:

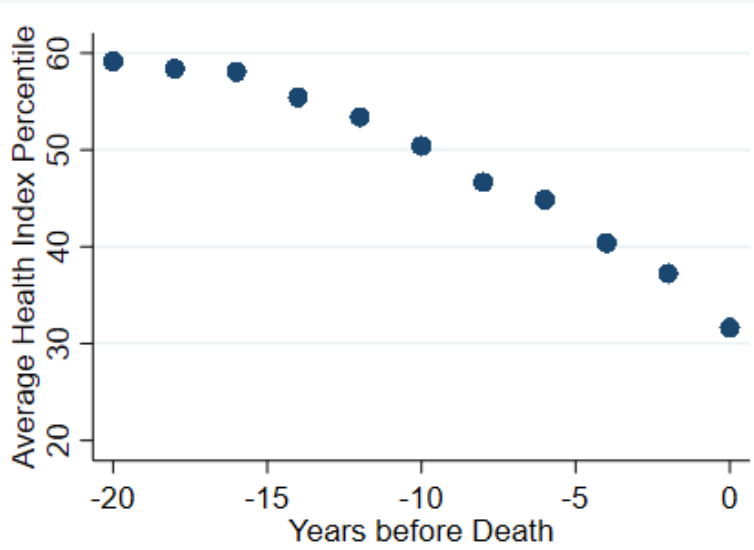
1. Self-reported health status (excellent/very good/good/fair/poor)
2. 2 variables related to healthcare utilization
3. 8 variables related to mental health issues
4. 8 variables related to doctor-diagnosed health problems
5. 10 variables related to difficulties with the activities of daily living and instrumental activities of daily living
6. Self-reported back pain

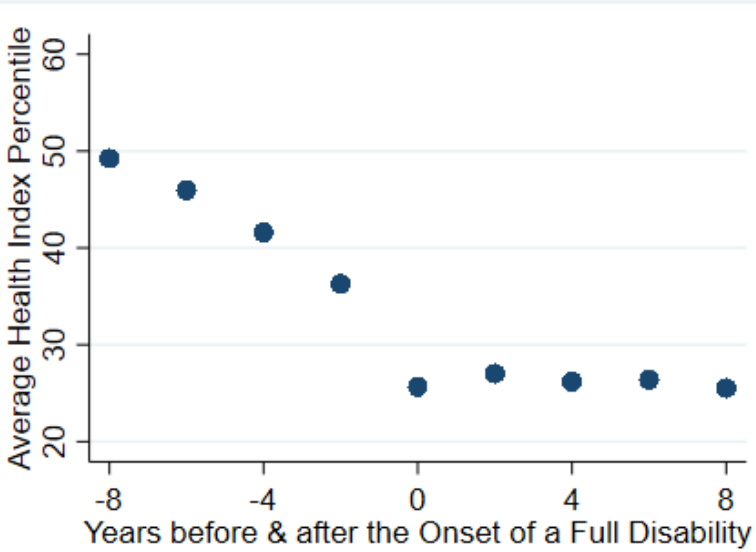
I construct a health index summarizing all available data on the individual health (the process is similar to Poterba et al., 2013)

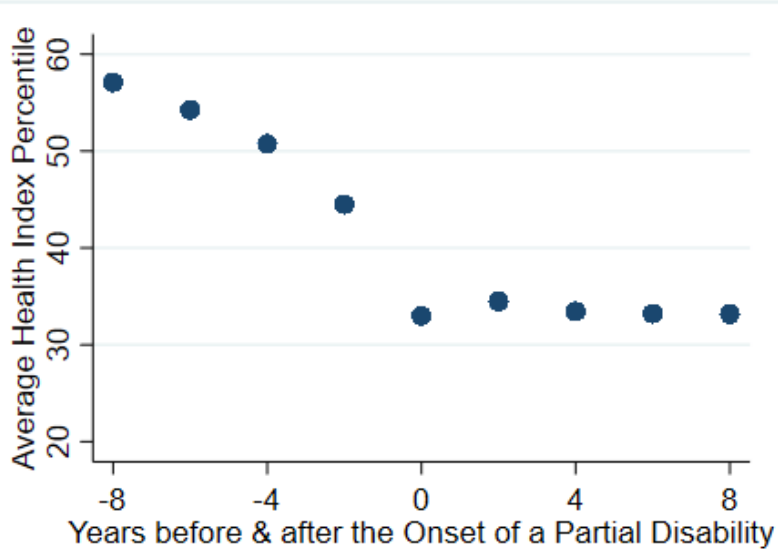
The Percentage of HRS Respondents Who Experienced Health Shocks by 2010 by Health Index Quintile in 1994

Health Index Dynamics



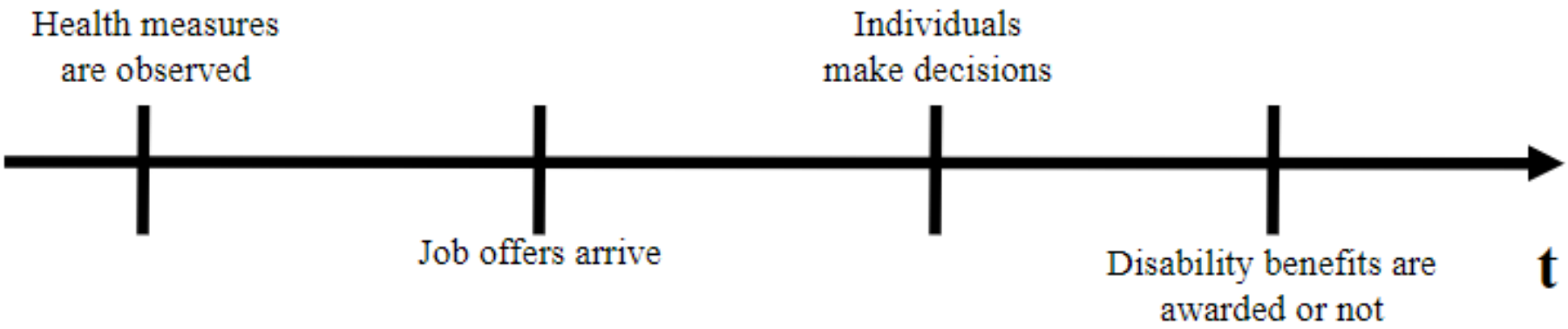






Model

Timing and Initial Conditions



Individuals make decisions when they are between 51 and 70 years old.

The set of initial conditions, $\Omega^j_{t_0}$, consists of initial year of observation, t_0, age, $A^j_{t_0}$, disability , $D^j_{t_0}$, and SSDI recipiency statuses, $SSDI^j_{t_0}$, and average indexed monthly earnings (AIME), $AIME^j_{t_0}$, at the initial period t_0 for an individual j.

After a successful application, SSDI benefits are received starting the next period.

Model

Decisions of Agents and Health Measures

- Agents make decisions about:
  - Labor supply: full-time, $w_t^j = 1$, part-time, $w_t^j = 2$, no work, $w_t^j = 0$
  - Disability insurance benefits application, a_t^j:
    - $a_t^j = 1$, if an individual is eligible for full SSDI benefits and claims them
    - $a_t^j = 2$, if an individual is eligible for partial SSDI benefits and claims them
    - $a_t^j = 0$, otherwise
  - Old-age (SSOA) benefits starting year, s_t^j
    - $s_t^j = 1$, if an individual is eligible for SSOA benefits and starts benefits this year
    - $s_t^j = 1$, otherwise
- Health measures
  - Disability status: fully disabled (FD), $D_t^j = 1$, partially disabled (PD), $D_t^j = 2$, not disabled, $D_t^j = 0$
  - Health index, H_t^j, a continuous measure of health based on all other 30 observable health-related variables

Model

Utility Function

$$u^i(S_t^j) = ln(C_t^j)\big(1+$$ *Utility of consumption*

$$+\alpha_{FL}1_{w_t^j=0}+\alpha_{FLH}1_{w_t^j=0}\tilde{H}_t^j+$$ *Utility of full-time (FT) leisure*

$$+\alpha_{PL}1_{w_t^j=2}+\alpha_{PLH}1_{w_t^j=2}\tilde{H}_t^j+$$ *Utility of part-time (PT) leisure*

$$+\alpha_{FW}1_{w_t^j=1,D_t^j=2}+\alpha_{FWH}1_{w_t^j=1,D_t^j=2}\hat{H}_t^j+$$ *Disutility of working FT for PD*

$$+\alpha_{PW}1_{w_t^j=2,D_t^j=2}+\alpha_{PWH}1_{w_t^j=2,D_t^j=2}\hat{H}_t^j\big)+$$ *Disutility of working PT for PD*

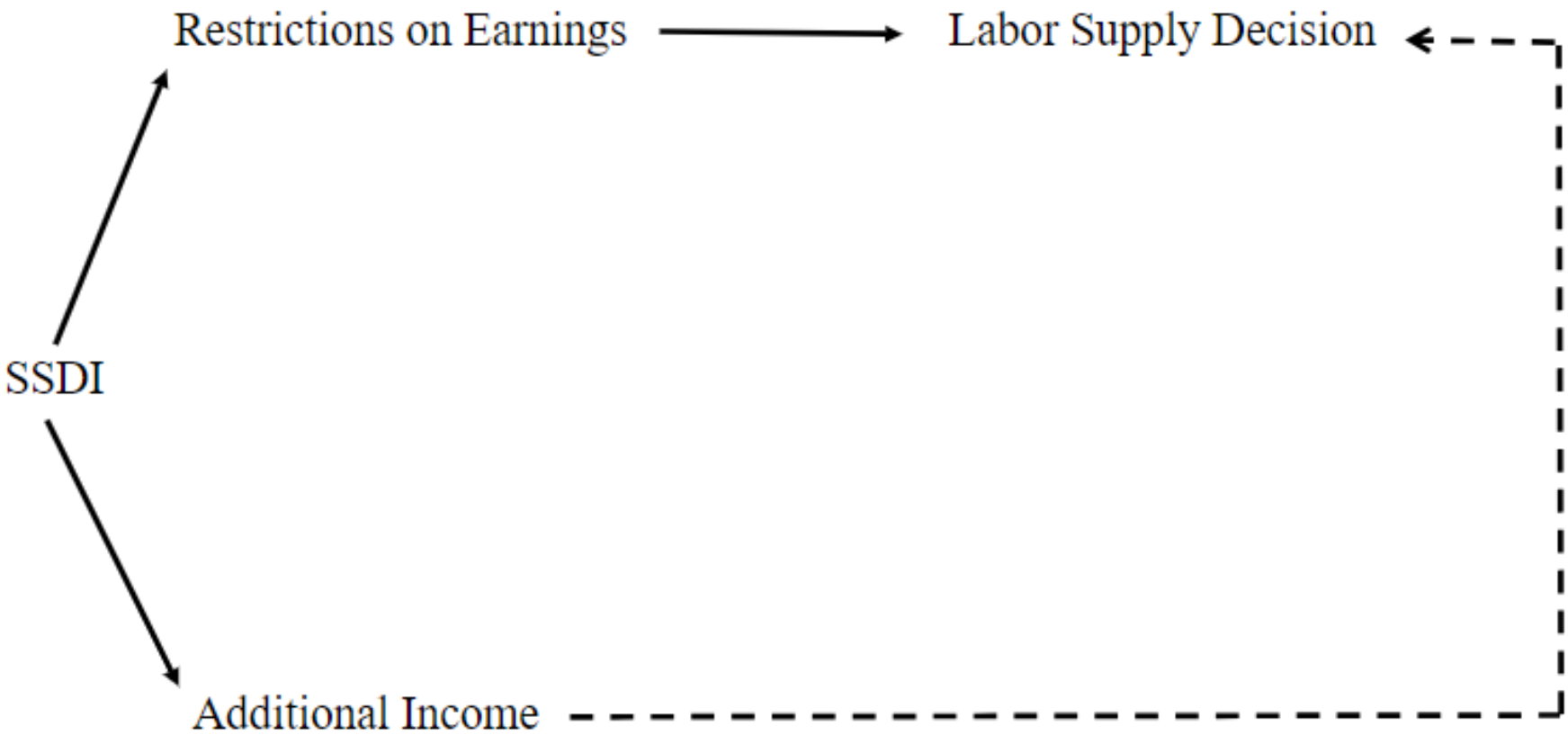
$$+\alpha_{FR}1_{w_t^j=1,w_{t-1}^j=0}+\alpha_{PR}1_{w_t^j=2,w_{t-1}^j=0}+$$ *Cost of returning to work*

$$+\alpha_{PA}1_{a_t^j=0,D_t^j=2}+\alpha_{PA}1_{a_t^j=0,D_t^j=2}\tilde{H}_t^j+$$ *Cost of SSDI application for PD*

$$+\alpha_{FA}1_{a_t^j=0,D_t^j=1}+\alpha_{FA}1_{a_t^j=0,D_t^j=1}\tilde{H}_t^j$$ *Cost of SSDI application for FD*

Model

SSDI and Labor Supply Decision



Model

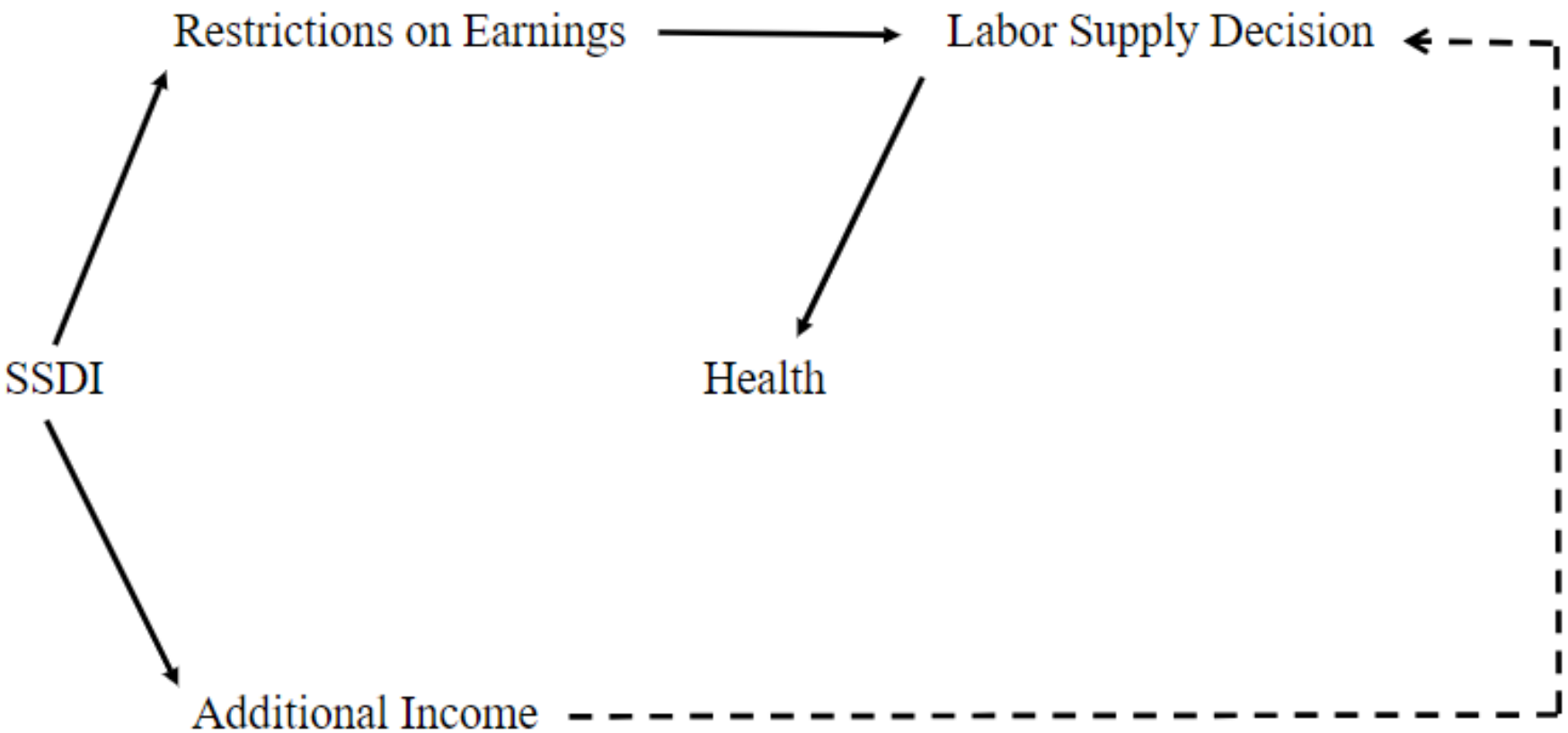
SSDI and Labor Supply Decision

SSDI affects labor supply decisions through

- restrictions on earnings: to be eligible for full SSDI, agents should not work $work_t^j = 0$
- additional income: Social Security benefits, SSB_t^i, depend on Social Security Administration decision on the application, $SSDI_t^i$, average indexed monthly earnings, $AIME_t^i$, and the current year t, $SSB_t^i = SSB(SSDI_t^i, AIME_t^i, t)$

Model

Labor Supply Decision and Health



Model

Health Measures

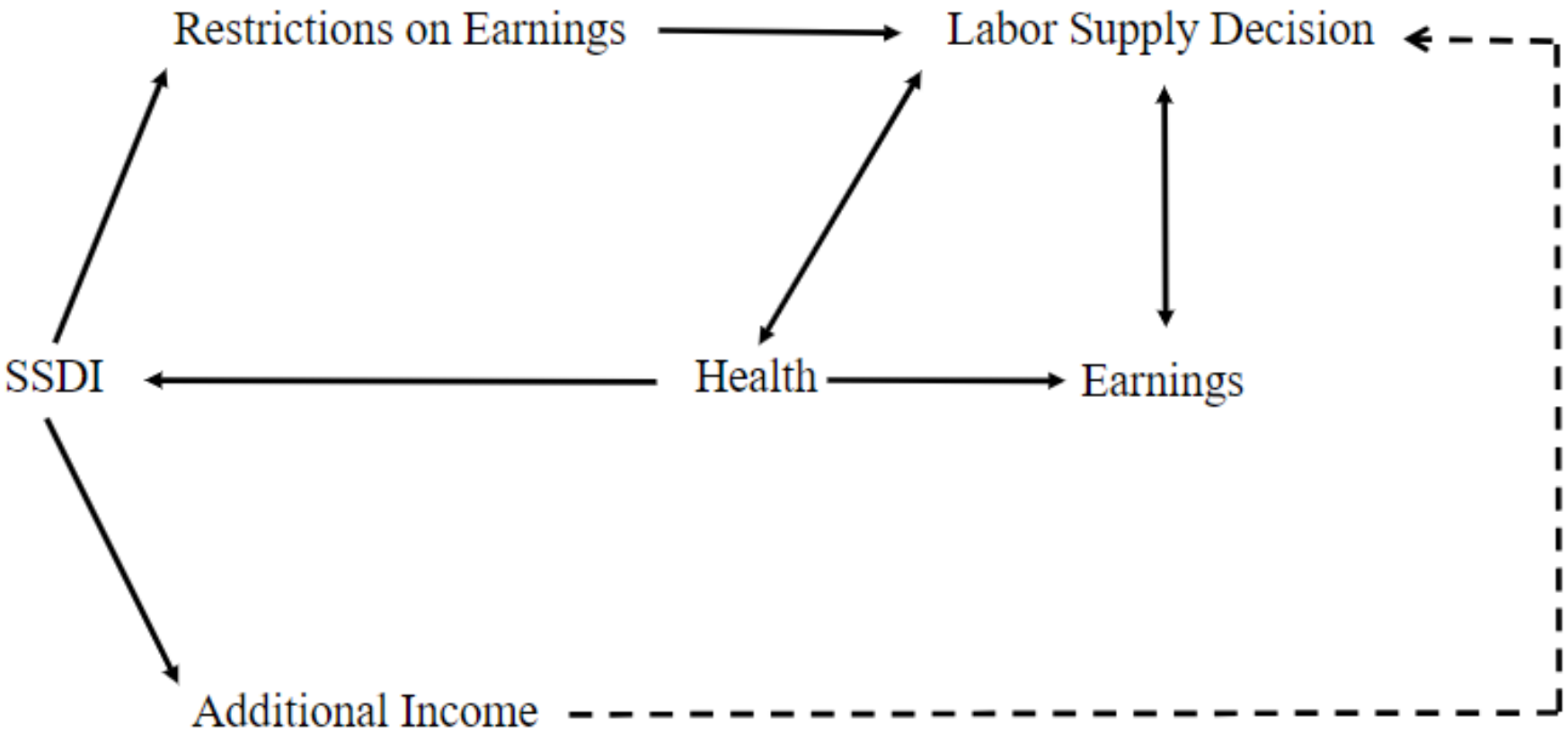
Disability status, $D^j_{t+1}(w^j_t, D^j_t, H^j_t, A^j_t, E^j_t)$, and mortality rate, $M^j_{t+1}(w^j_t, D^j_t, H^j_t, A^j_t, E^j_t)$, are both based on logistic functions of previous

- labor supply decision: w^j_t
- disability status: D^j_t
- health index: H^j_t
- age: A^j_t
- college education: E^j_t
- interactions of a labor supply decision, w^j_t, with
  - partial disability status, $1_{D^j_t=2}$
  - college education, $1_{E^j_t=1}$

Health index, $H^j_{t+1}(w^j_t, D^j_t, H^j_t, A^j_t, E^j_t)$, is simulated based on a linear combination of the same variables, and an i.i.d. normal shock, ϵ^{Hj}_t

Model

Health and Decision-Making Process



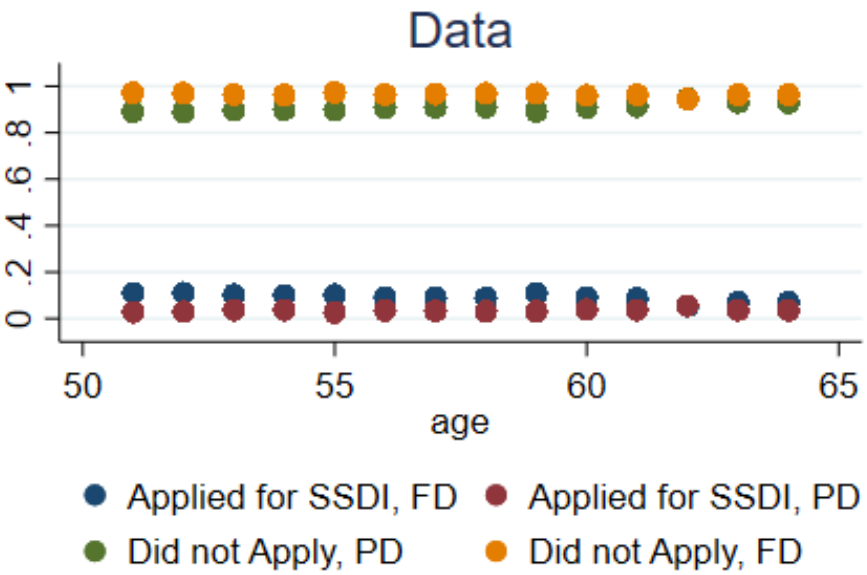
Model

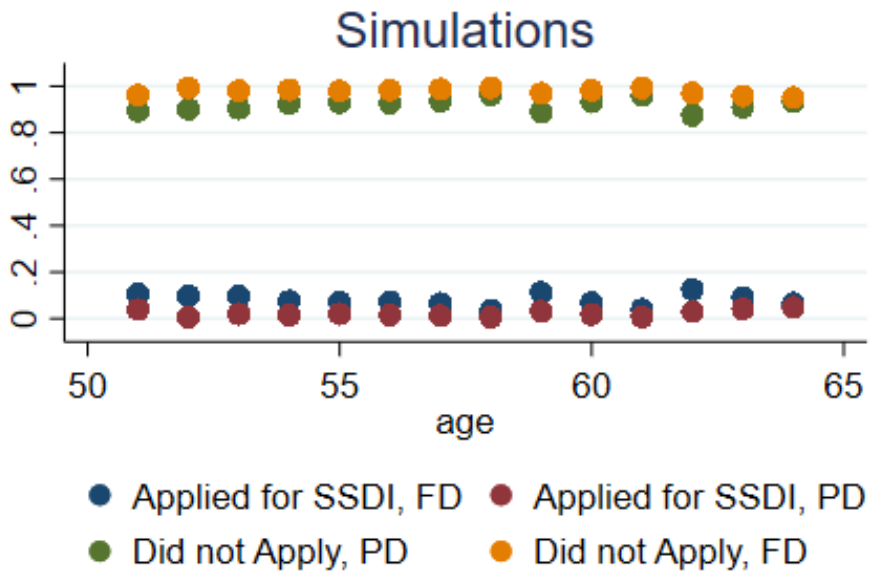
Health and Decision-Making Process

The probability of SSDI award, $\pi_t^{aj}(D_t^j, H_t^j, A_t^j, E_t^j)$, is determined based on a logistic function of

- disability status: D_t^j
- health index: H_t^j
- age: A_t^j
- college education: E_t^j

The earnings, $W_t^j(w_t^j, D_t^j, H_t^j, A_t^j, E_t^j, \epsilon_t^{Wj})$, are simulated as a linear combination of the same variables as health variables and an i.i.d. normal shock, ϵ_t^{Wj}


Data
0 .2 .4 .6 .8 1
50 55 60 65
age
Applied for SSDI, FD
Applied for SSDI, PD
Did not Apply, PD
Did not Apply, FD


Simulations
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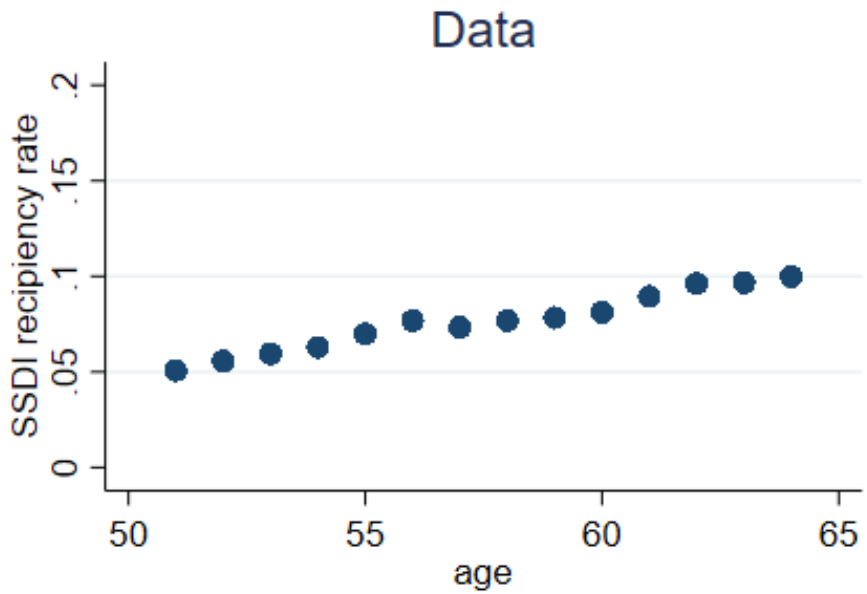
Data
SSDI recipiency rate
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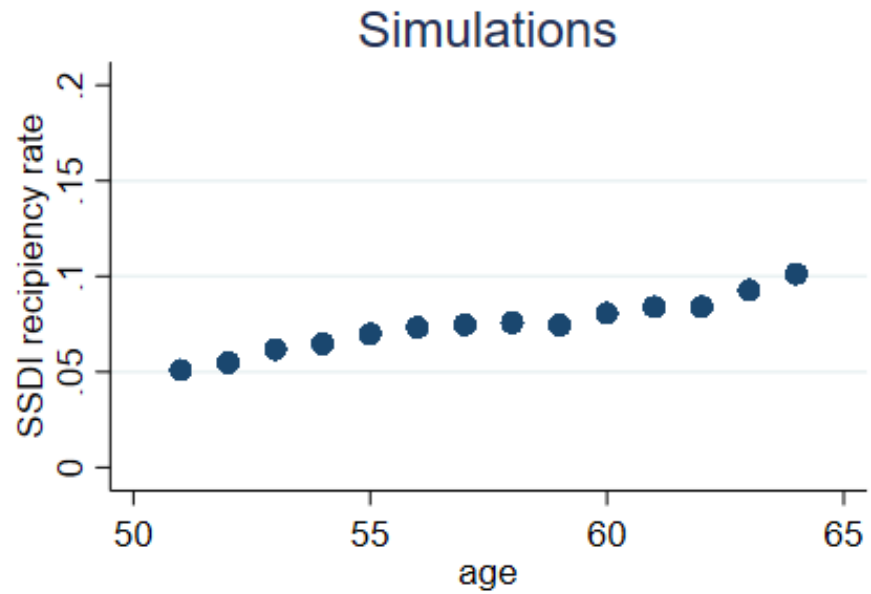
50 55 60 65
age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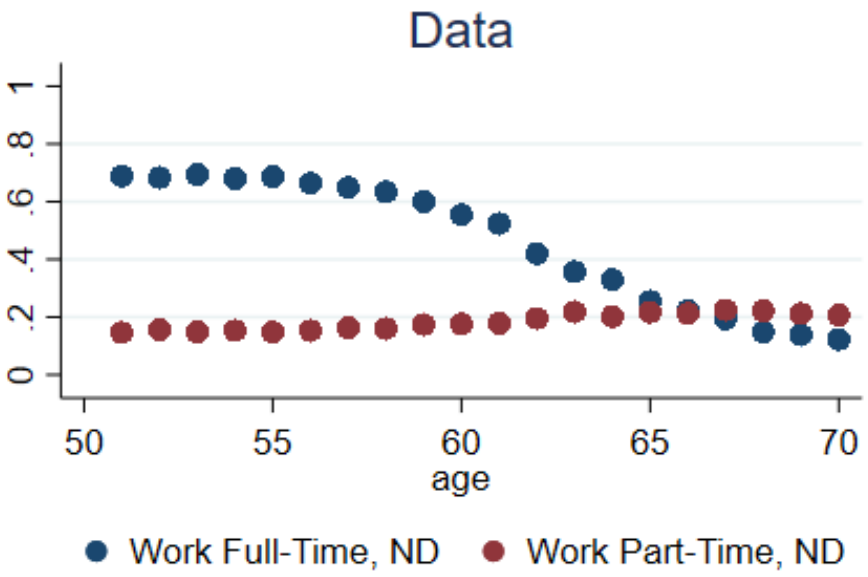
Data
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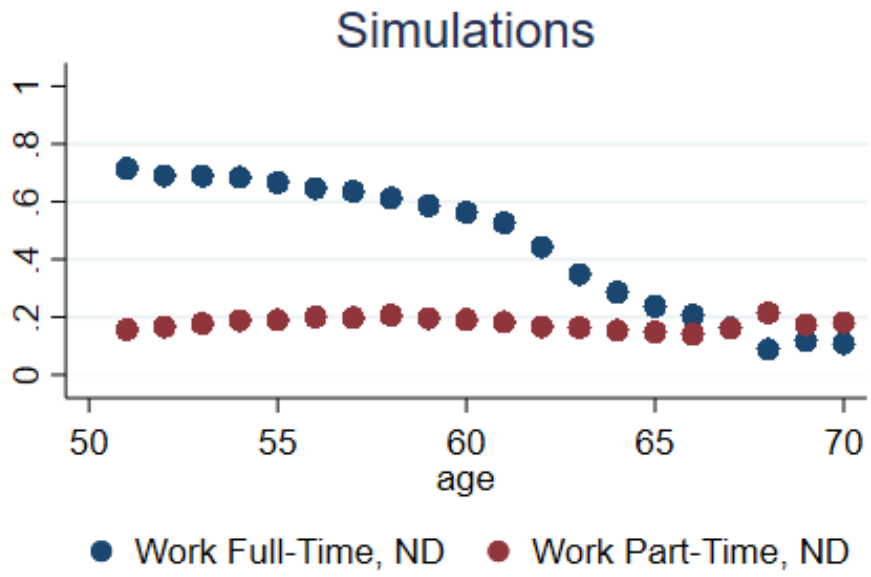
Work Full-Time, ND
Work Part-Time, ND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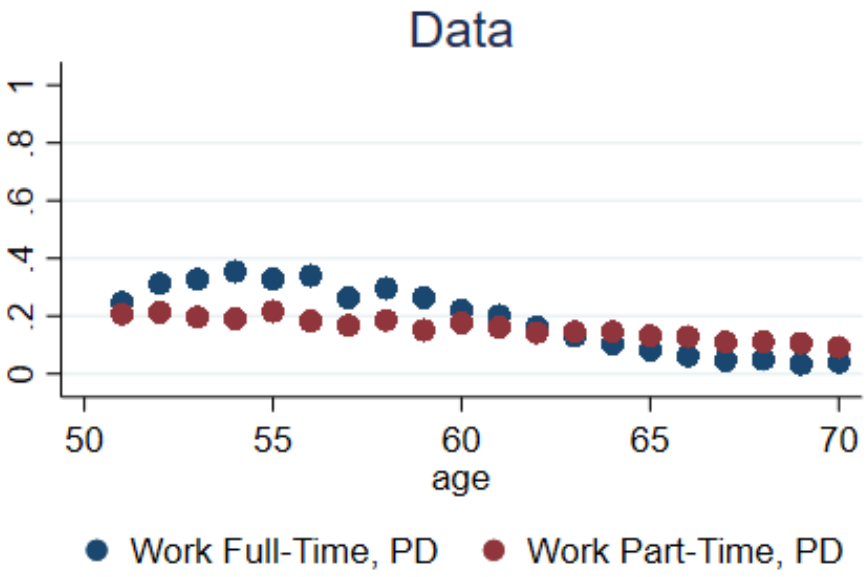
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age
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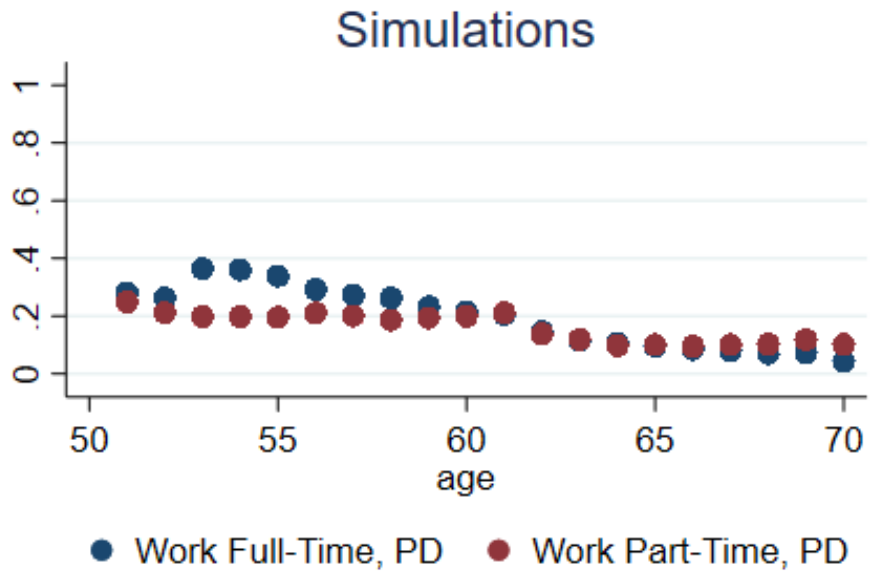
Work Part-Time, PD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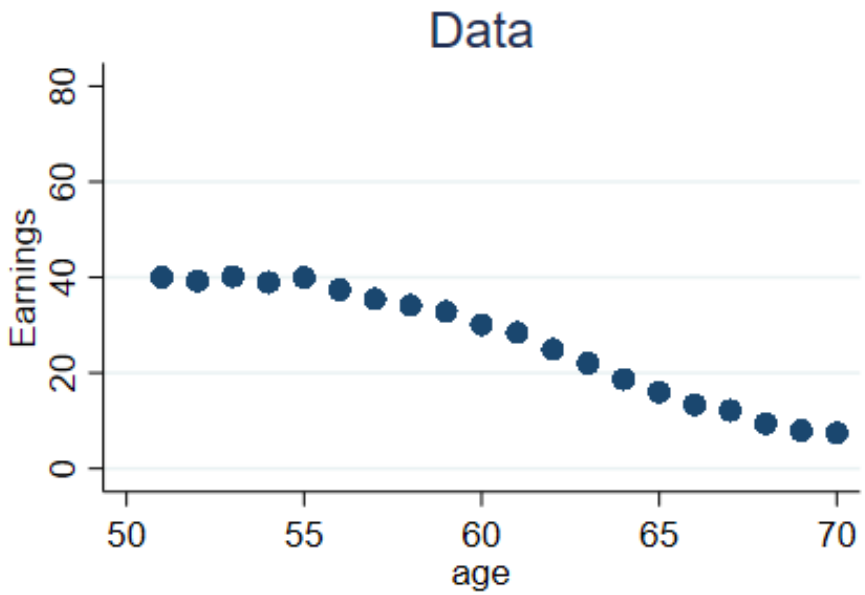
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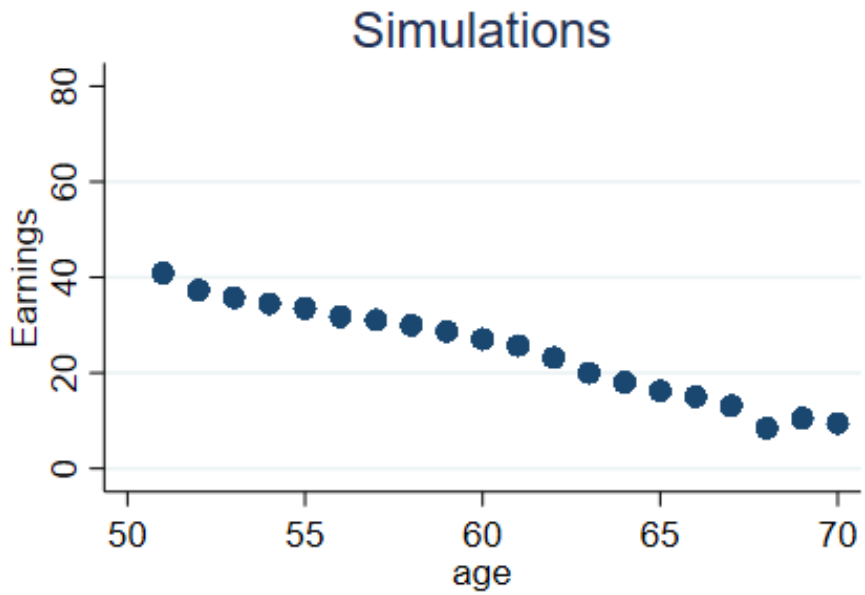
Simulations
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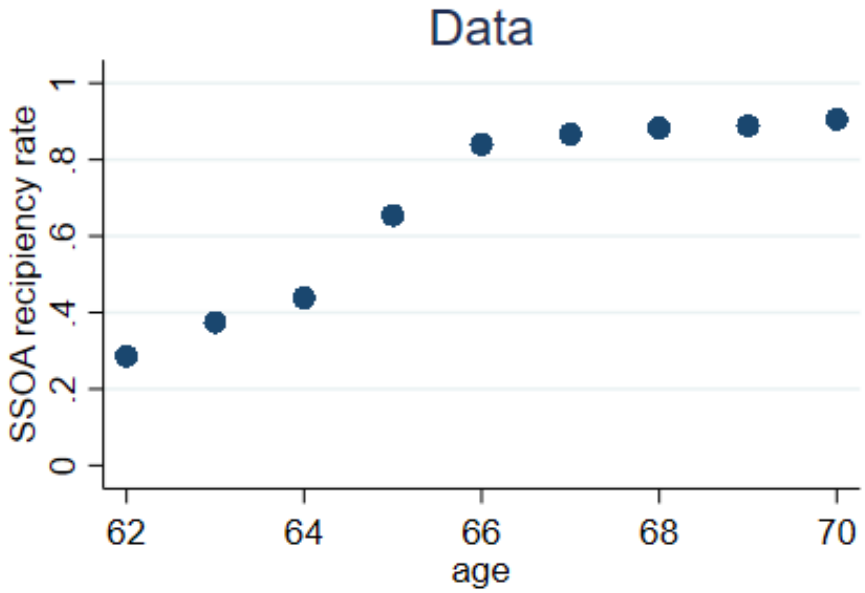
Data
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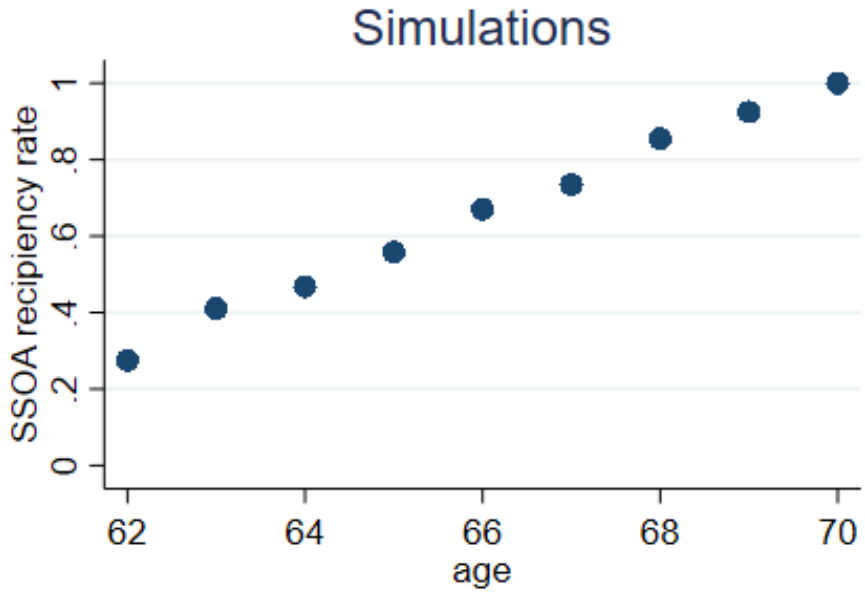
age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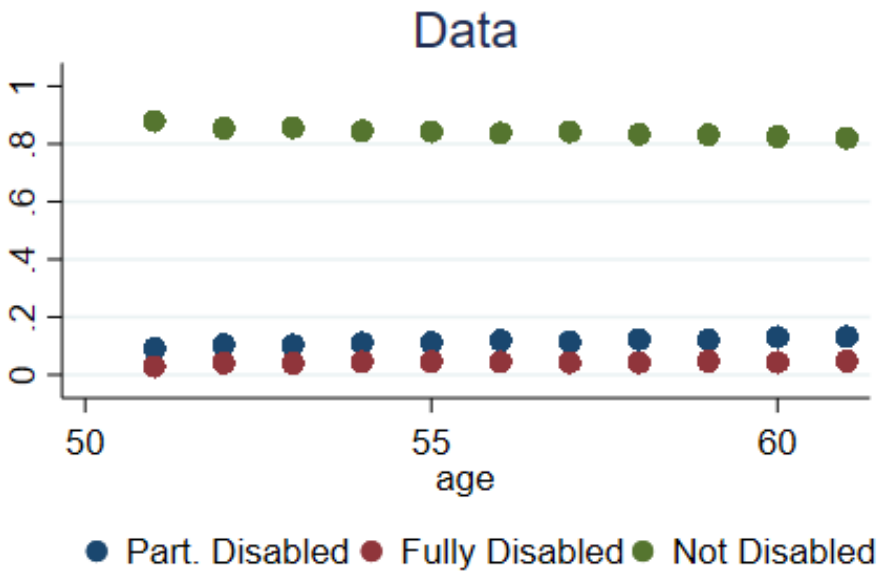
Data
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50 55 60
age
Part. Disabled
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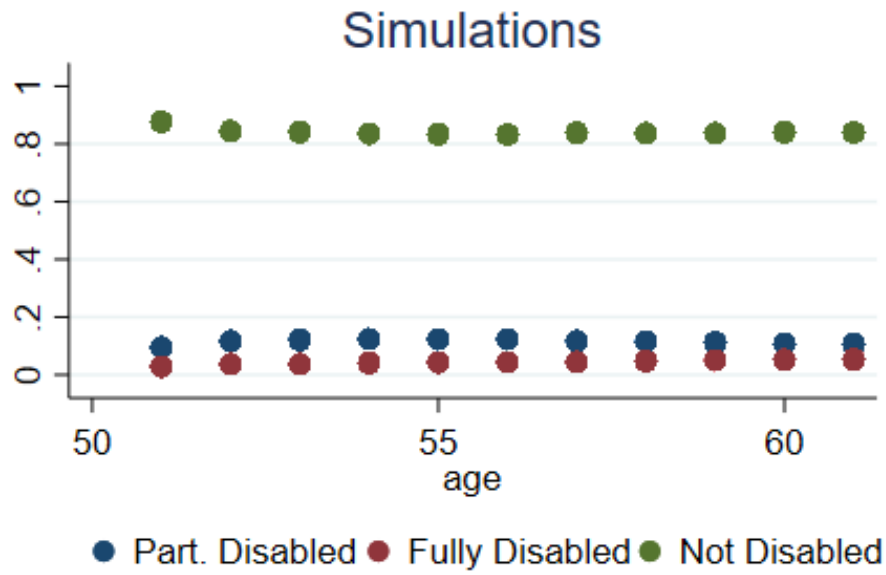
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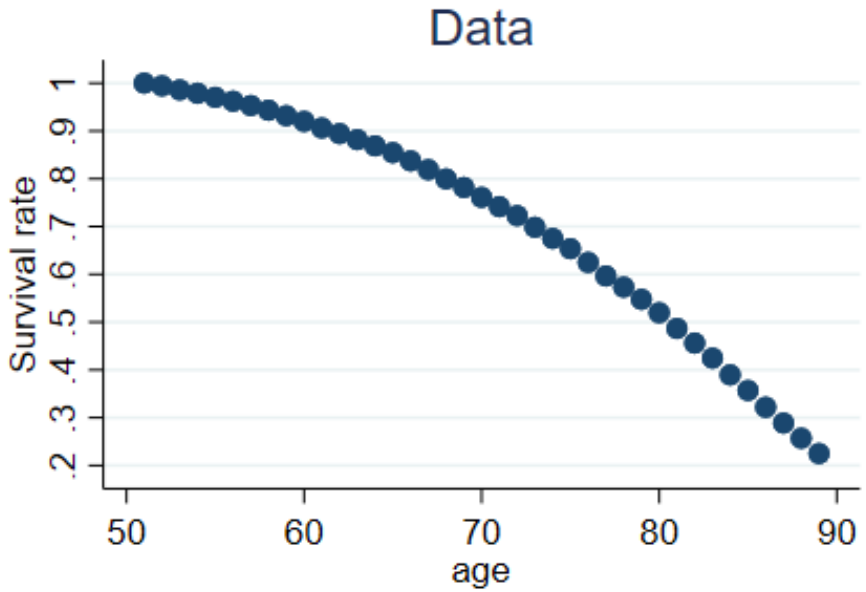
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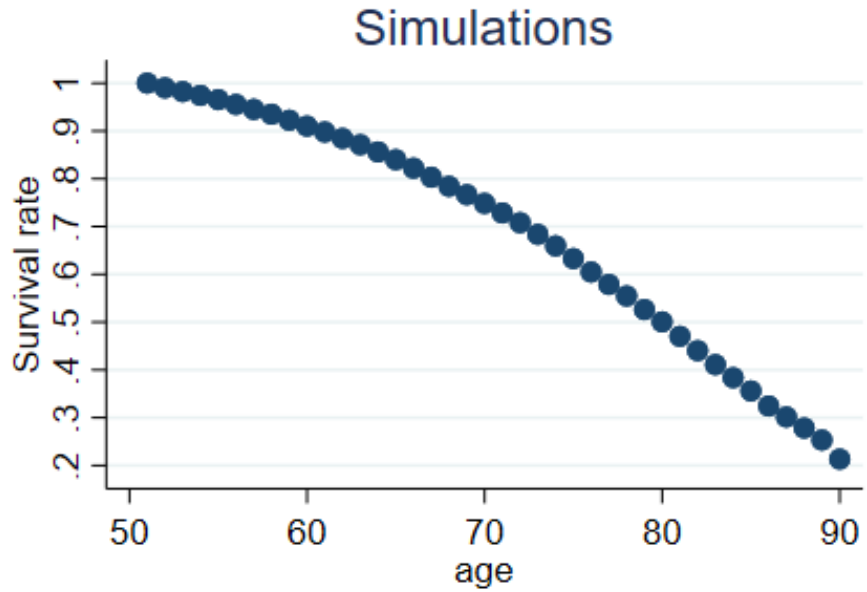
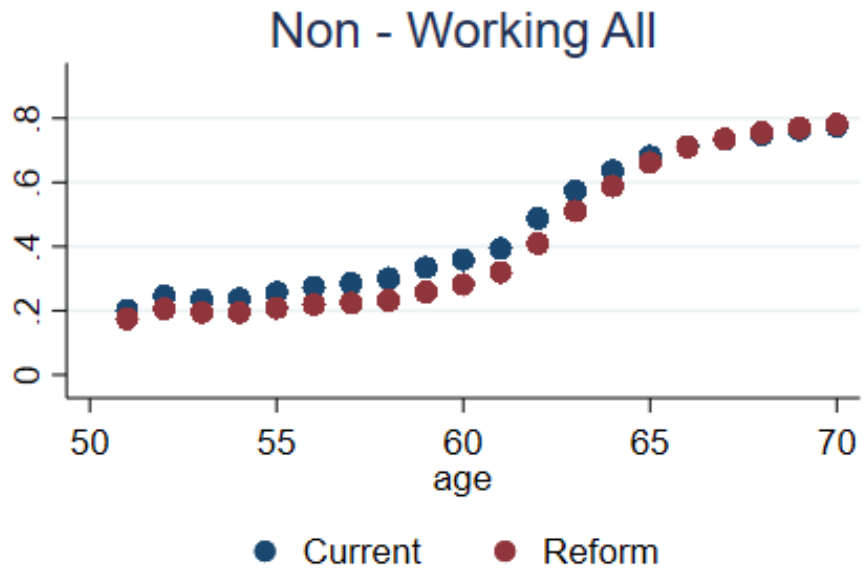

Simulations
Survival rate
.2 .3 .4 .5 .6 .7 .8 .9 1
50 60 70 80 90
age

Counterfactual Partial Disability Insurance Reform

- Those who apply for and those who receive partial DI must continue working (either part-time or full-time)
- If the sum of earnings and benefits of a partially disabled person is above SGA amount (Substantial Gainful Activity amount, \$1,130/month in 2018), then their benefits are decreased by \$1 for each extra \$1
- The age cap for partial disability insurance applicants and recipients is the full retirement age
- If partial disability insurance beneficiary becomes fully disabled, they receive full benefits for the period of application for full benefits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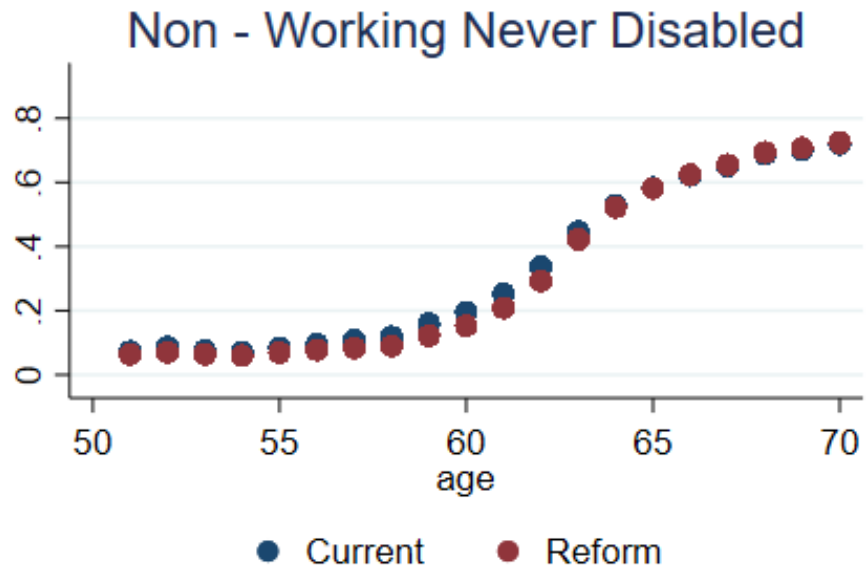
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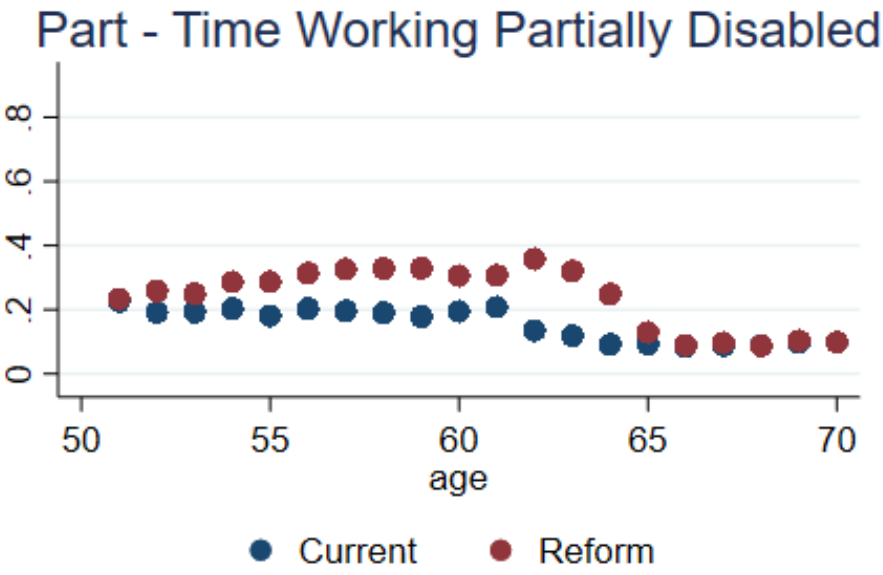
Part - Time Working Partially Disabled
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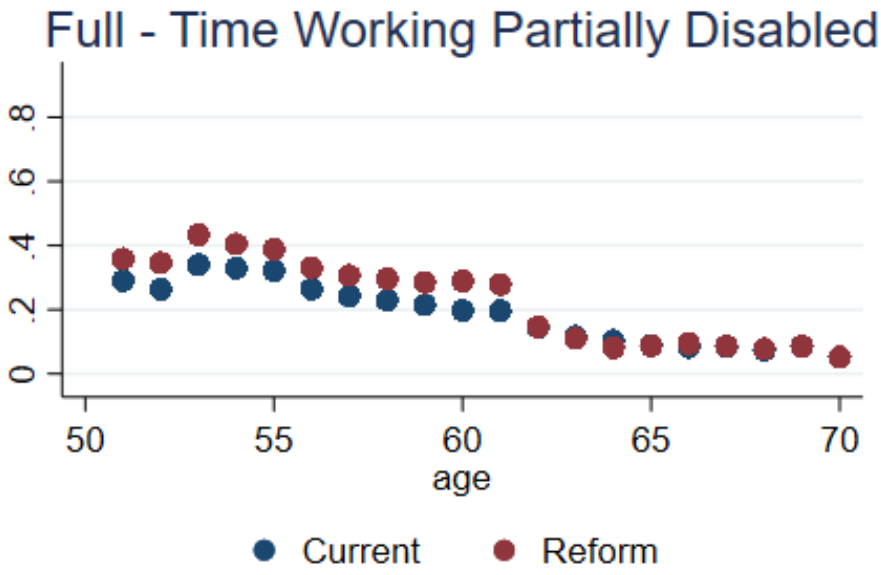
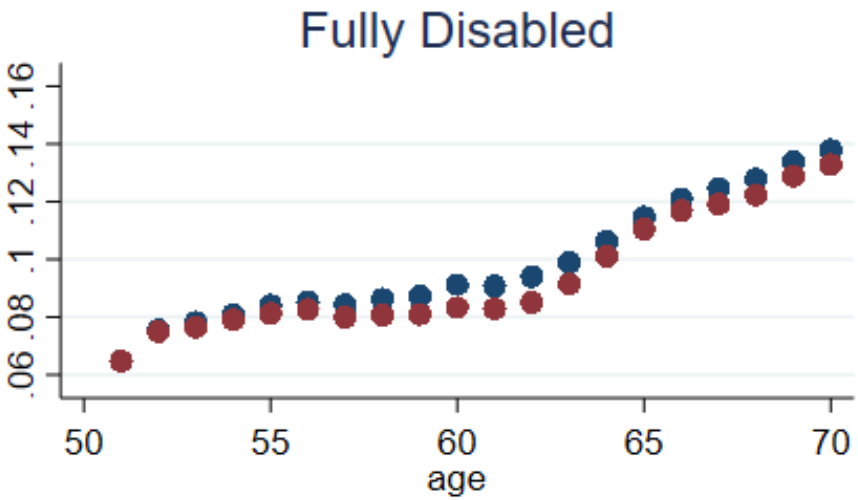
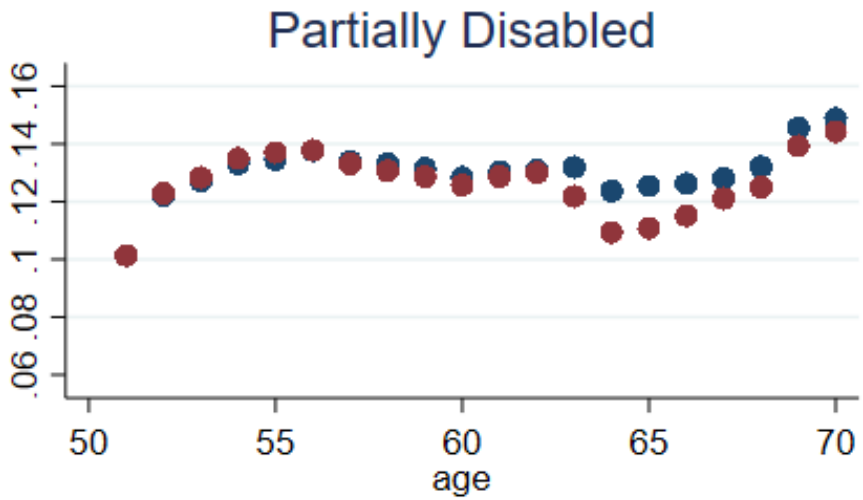
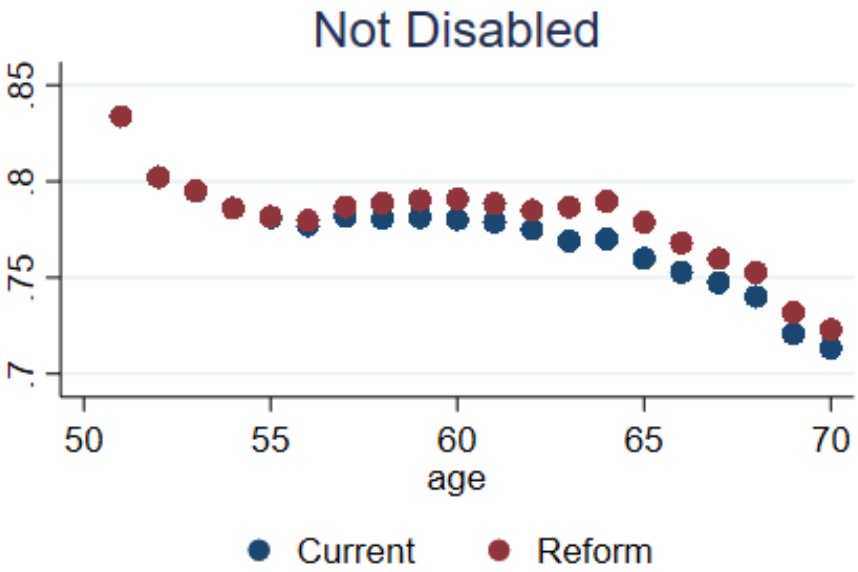
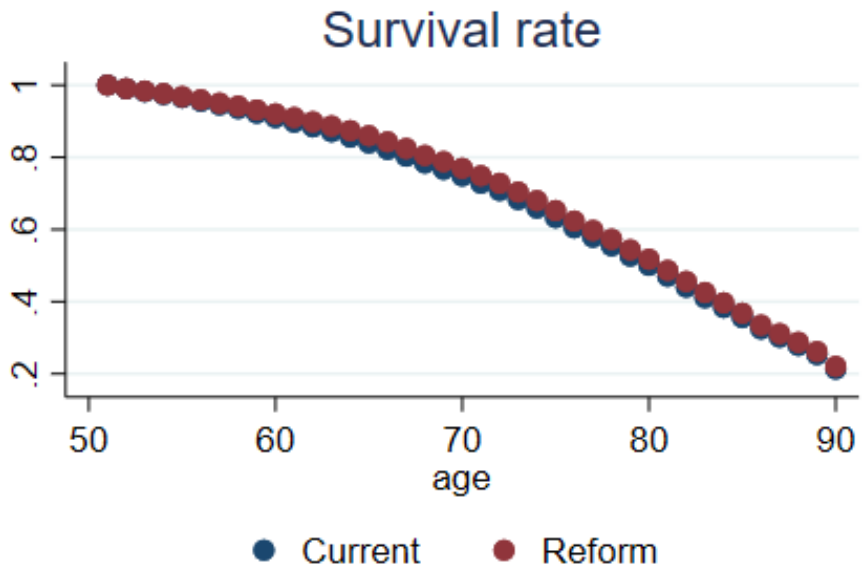
.4
.6
.8
50
55
60
65
70
age
Current
Reform

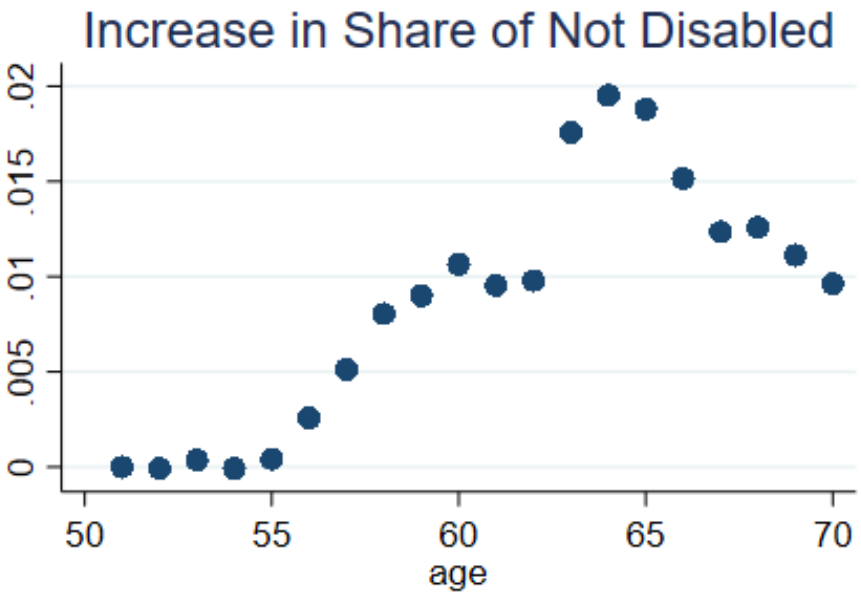

Full - Time Working Partially Disabled
0
.2
.4
.6
.8
50
55
60
65
70
age
Current
Reform

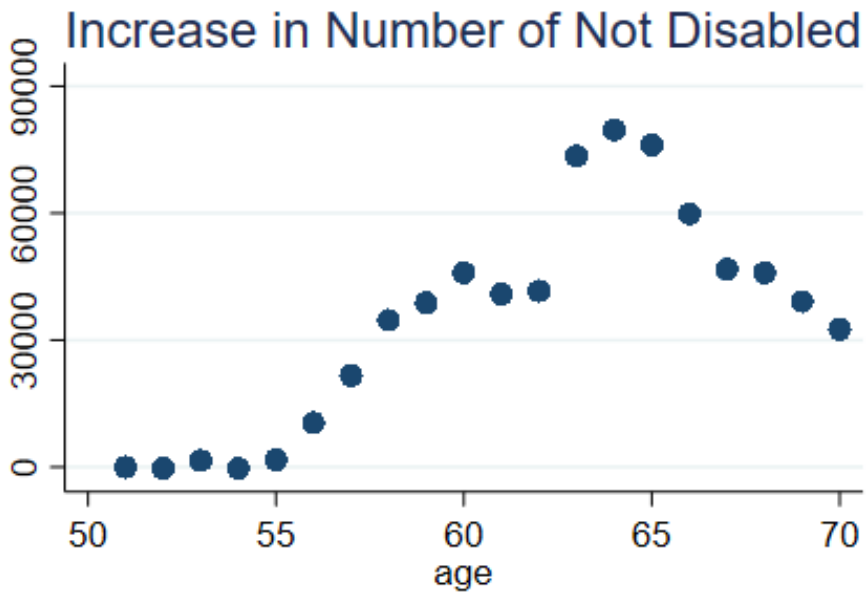

Fully Disabled
.06 .08 .1 .12 .14 .16
50 55 60 65 70
age
Current
Reform

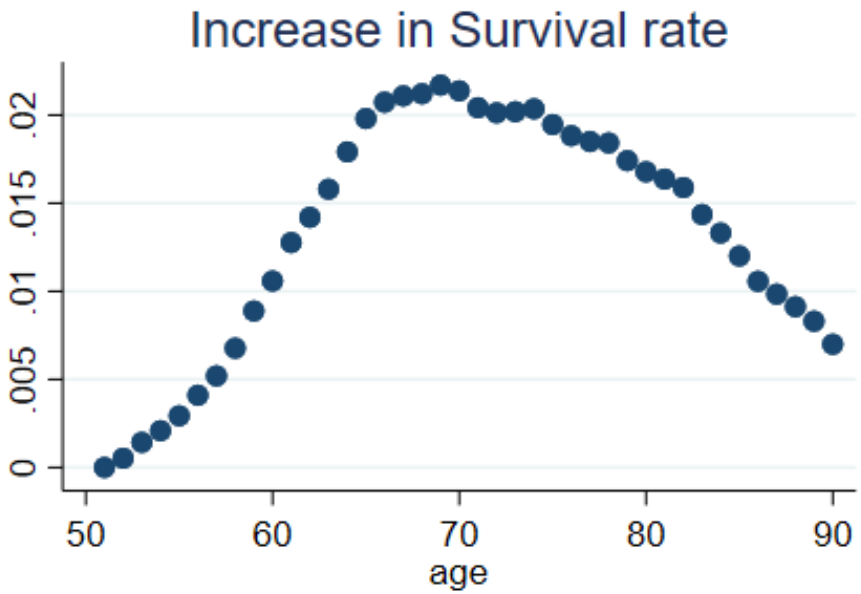

Partially Disabled
.06 .08 .1 .12 .14 .16
50 55 60 65 70
age
Current
Reform

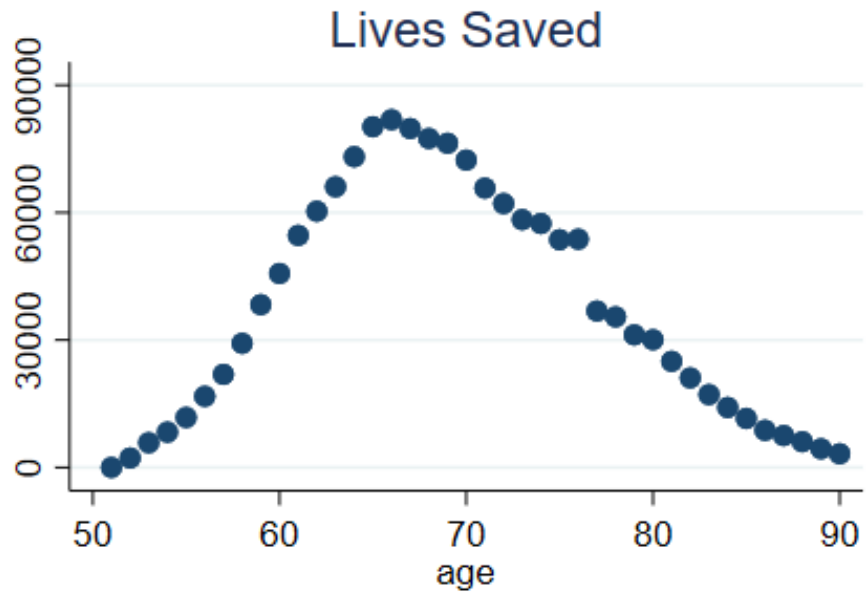

Not Disabled
.7 .75 .8 .85
50 55 60 65 70
age
Current
Reform

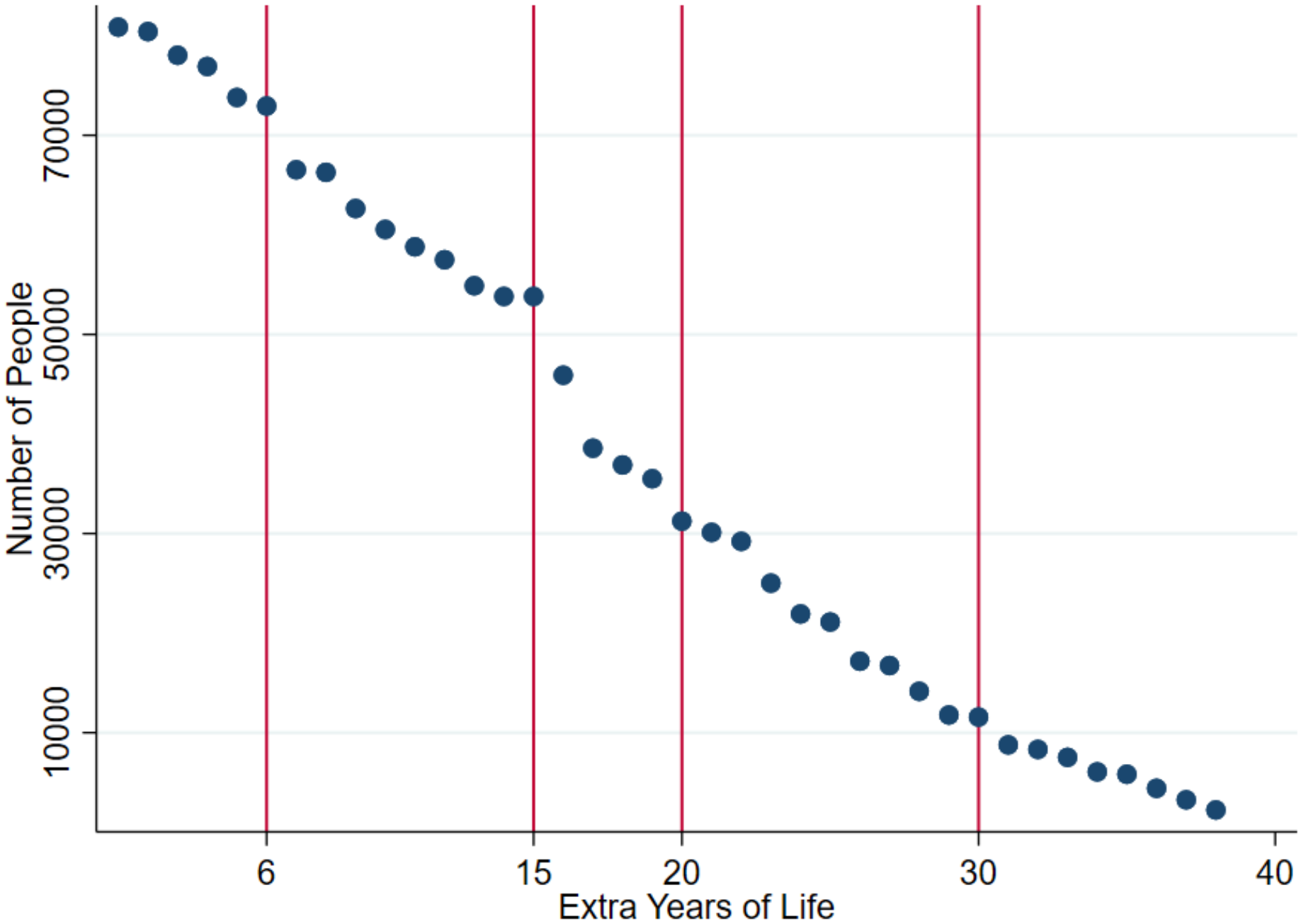

Survival rate
.2 .4 .6 .8 1
50 60 70 80 90
age
Current
Reform


Increase in Share of Not Disabled
0
.005
.01
.015
.02
50
55
60
65
70
age


Increase in Number of Not Disabled
0
30000
60000
90000
50
55
60
65
70
age


Increase in Survival rate
0
.005
.01
.015
.02
50
60
70
80
90
age


Lives Saved
0
30000
60000
90000
50
60
70
80
90
age


Number of People
10000
30000
50000
70000
6
15
20
30
40
Extra Years of Life

Partial Disability Insurance Reform Benefits

- Partially disabled increase their labor supply. The reform increases part-time employment more than full-time employment
- The quality of life is improved, which is epitomized by a decrease in the share of individuals who are not disabled
- Survival rate increases — for 65-year-olds, the increase in survival rate (conditional on their survival up to 51) is around 2 p.p.
- This increase in the total size of benefits is covered by the increase in income taxes

Partial Disability Insurance Reform Drawbacks

- The number of disability insurance applications more than doubles
- Social Security Administration will have to distinguish between fully disabled and partially disabled individuals
- Not disabled individuals are more likely to succeed in pretending to be partially disabled than fully disabled
- Partially disabled individuals are more likely to fully recover in comparison with fully disabled ones

Partial Disability Insurance Reform Conclusion

The introduction of partial disability insurance (DI) in the US can

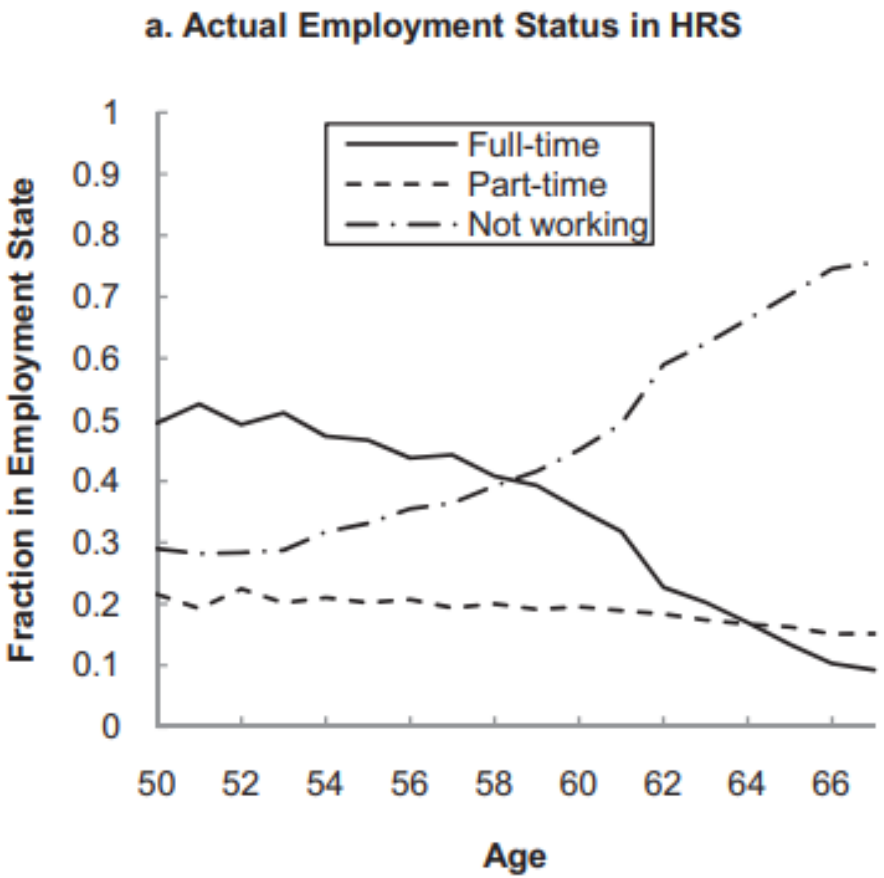
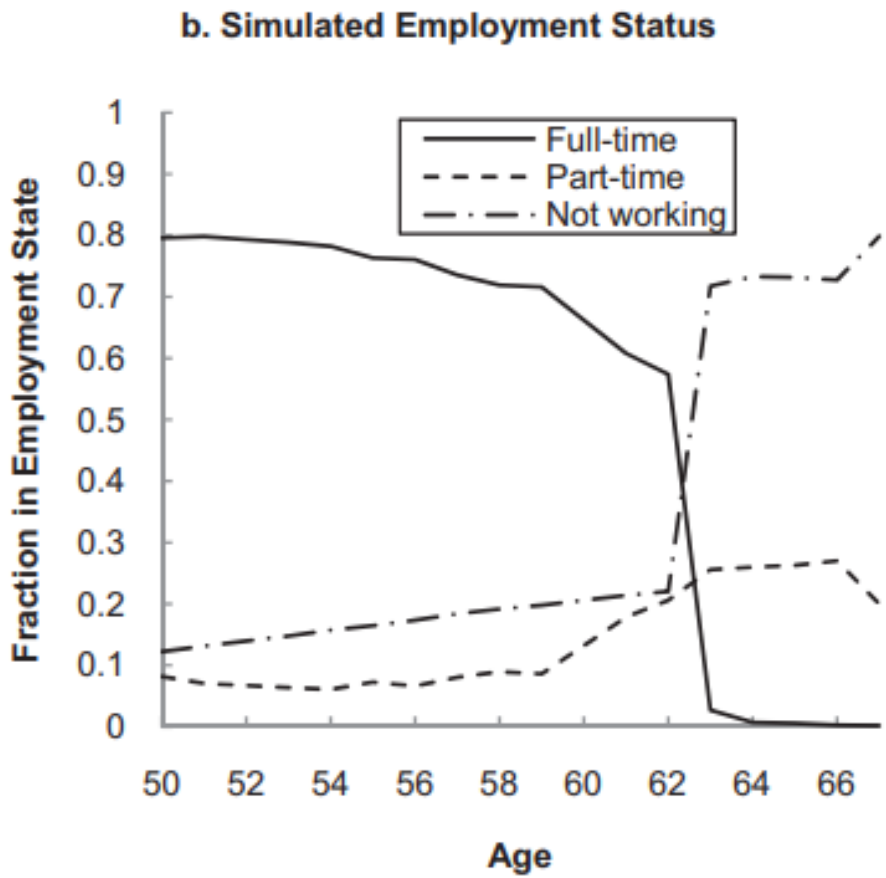
- Increase labor supply of partially disabled individuals
- 70,000 Americans will extend their lives by 6 years, 50,000 Americans — by 15 years, 30,000 Americans — by 20 years, and 10,000 Americans — by 30 years
- Decrease the number of disabled Americans by around 1%
- Come at no cost, as the increase in the total amount of DI benefits will be covered by the increase in income taxes

Health Index Transformations

- The health index is transformed in such a way that everyone receives utility benefits from leisure and utility costs from applications and working while disabled.

- Those who have a higher health index receive higher utility benefits from leisure, higher utility costs from the application, and lower utility costs from working while disabled.

- $\tilde{H}_t^i = max(|H_t^i|) + H_t^i$

- $\hat{H}_t^i = max(|H_t^i|) - H_t^i$

Model Fit in Yin (2015)