

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

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Abstract

The U.S. Social Security Disability Insurance currently classifies applicants as either fully disabled or not, incentivizing partially disabled applicants to exaggerate health problems and retire early. The literature shows that early retirement can increase mortality. I use Health and Retirement Study data to estimate a life-cycle model that allows the evaluation of the labor and health effects of changes in the SSDI design. Specifically, I focus on a modification that allows disability benefits for partially disabled Americans aged between 51 and Social Security's full retirement age. Simulations show this reform raises labor supply by up to ~ 6 p.p., cuts the annual mortality rate by 0.1 p.p. and disability prevalence by 1% for this age group, extending $\sim 40,000$ lives. The net cost of prolonging one person's life by one year by this reform is $\sim \$17,000$.

Keywords: Social Security, Disability, Retirement, Health, Mortality

1. Introduction

Many papers show early retirement increases mortality among older Americans (Waldron, 2001; Snyder and Evans, 2006; Fitzpatrick and Moore,

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2018; Xu, 2023). Yet the U.S. Social Security Disability Insurance (SSDI) program, which provides benefits to ~ 9 million individuals¹, incentivizes early retirement. SSDI insures Americans only from total disability². An SSDI applicant is either considered to be fully disabled or not. However, millions of Americans are between full disability and no disability. Around 15% of Americans aged from 50 to 70 are partially disabled (Yin, 2015). These Americans have some disability, but they also retain the ability to work. Partially disabled Americans face a dilemma: continue working without any support from SSDI, or exaggerate their health status to qualify for benefits. Since Americans with disabilities earn significantly less than those without³, the partially disabled have strong incentives to misreport their status. While 20% of SSDI recipients report they do not have a health problem that prevents them from working (Benitez-Silva et al., 2004), only 1% return to the labor force¹. Work-contingent disability benefits for partially disabled Americans can incentivize delayed retirement, which can decrease mortality.

This paper evaluates how the introduction of disability benefits for partially disabled Americans will affect their labor supply, disability prevalence, and mortality rates. All existing research on the health effects of disability insurance programs is based on reduced-form models that cannot assess major counterfactual reforms. This study is the first to analyze the health effects of the disability insurance program using a structural model that allows predictions of outcomes under such a significant policy change, as the expansion of disability benefits to partially disabled Americans.

¹[Annual Statistical Report on the Social Security Disability Insurance Program, 2023](#)

²[What We Mean by Disability, the Social Security Administration website](#)

³[The Census Bureau data on economics characteristics for the population by disability status](#)

Extending disability benefits to partially disabled Americans will alter their income, health insurance coverage, and retirement timing. The effect of SSDI income on beneficiaries’ mortality has been shown to be negative by Gelber et al. (2023), and multiple papers show health insurance coverage has modest negative effects on mortality (Yang et al., 2009; Goldin et al., 2021; Miller et al., 2021; Wyse and Meyer, 2025). While the evidence on the retirement effects on mortality in European countries is mixed (Hallberg et al., 2015, and Bloemen et al., 2017 show negative effects; Hernaes et al., 2013, Hagen, 2018, and Nielsen, 2019 show no effects; Kuhn et al., 2010 show positive effects), the existing literature repeatedly finds that early retirement in the U.S. increases mortality (Waldron, 2001; Snyder and Evans, 2006; Fitzpatrick and Moore, 2018; Xu, 2023). Fitzpatrick and Moore (2018) exploit a policy-induced discontinuity at age 62 — the minimum eligibility age for Social Security Old-Age benefits — to identify jumps in both retirement and mortality rates. This policy variation reveals that retiring early leads to higher mortality. Using Health and Retirement Study (HRS) data, I exploit the same policy variation and identify a jump in both retirement and mortality for partially disabled Americans at age 62 (see Figure 1 and Table 1), implying that this group of Americans particularly increases their mortality following retirement.

Building on this reduced-form evidence, this paper introduces and examines a novel idea of improving public health dynamics through work-conditional disability payments for partially disabled Americans. This article aims to answer the following question. What are the mortality and disability propensity effects of expanding disability insurance coverage to the partially disabled in the U.S., and what mechanisms — income, health insurance coverage, and labor supply — drive these effects?

Using the Method of Simulated Moments, I estimate an individual decision-making model of labor supply and disability insurance application decisions. By incorporating the utility cost of working while being partially disabled and allowing for heterogeneous health effects of work, I simulate how individuals self-select into employment and disability insurance reciprocity. HRS data are used to estimate the model. These data are representative of the U.S. population only above 51 years old. As a result, I focus on these older individuals. This is not a significant drawback, as $\sim 80\%$ of SSDI beneficiaries are above 50 years old.

As discussed in the next section, the literature on the health effects of disability benefits is limited and consists only of reduced-form studies. These studies provide valuable insights motivating structural model estimation. This paper is the first to develop and estimate a structural model for analyzing the health effects of disability benefits, focusing primarily on work-contingent disability benefits. I validate my model by examining how it fits the data and reduced-form evidence (internal validity) and how the estimation results align with those in the literature (external validity). The retrieved parameters allow for the analysis of counterfactual reforms.

I consider the disability insurance reform that grants work-contingent disability benefits to partially disabled Americans aged 51 to full retirement age. Benefits are calculated in the same way as existing SSDI payments, based on average indexed monthly earnings (AIME), and phased out if earnings are above the substantial gainful activity (SGA) threshold.

Following the introduction of work-conditional disability benefits for the partially disabled, Americans increase their labor supply (see Figure 2).

The increase in the survival rate⁴ peaks around 70 at ~ 1 p.p., implying that $\sim 40,000$ Americans live longer (see Figure 3). After accounting for increased taxes, the cost of extending one person’s life by one year by this reform is $\sim \$17,000$. The recent Medicaid expansion extends a similar number of lives per year, but at a ten-times higher cost (Wyse and Meyer, 2025).

In addition to the primary version of the reform, this paper examines alternative reform designs that vary by benefit generosity, Medicare access, work requirements, and award probabilities (see Table 2). Some versions of the reform even result in net savings to the disability insurance program while still prolonging thousands of lives.

The rest of the paper is organized as follows. Section 2 reviews the literature. Section 3 provides background information. Section 4 describes the data. Section 5 presents the reduced-form evidence. Section 6 outlines the model. Section 7 discusses the identification and estimation. Section 8 discusses the results of the counterfactual partial disability insurance reform. Section 9 examines alternative designs for this reform. Section 10 concludes.

2. Literature Review

One of the most fundamental health and public economics questions is how income from government programs can influence beneficiaries’ health. Many papers have focused on this research question. The conclusions depend on the context and details of the designs of these programs. Most of the research focuses on the effects of health insurance on health, while the impact of disability insurance on health is much less analyzed.

⁴The online Appendix A outlines the possible mechanism behind an increase in the survival rate.

The literature on the relationship between disability benefits and health is scarce. Ziebarth (2018) summarizes: “Despite the richness of the literature, there is a severe paucity of evidence on the short and long-term health effects of disability insurance.” Some papers have concluded that receiving disability benefits positively affects health outcomes (Meara and Skinner, 2011; Gelber et al., 2023). In particular, Gelber et al. (2023) exploit “bend points” in SSDI payment formulas and conclude that an increase of \$1,000 in annual SSDI payments decreases beneficiaries’ probability of mortality over the next four years by 0.47 percentage points per year. However, another study concluded that disability benefits do not impact physical health (Börsch-Supan and Schuth, 2014).

Meanwhile, other economists emphasize the heterogeneity of disability insurance effects on health. Black et al. (2024) conclude that the impact of SSDI on a recipient’s mortality can depend on the severity of this person’s disability. If the Social Security Administration rejects an SSDI application, an applicant can request a hearing. Black et al. (2024) analyzed the effects of the assignment of judges to these hearings. For marginal recipients who receive benefits only if seen by lenient judges, the receipt of disability benefits increases their mortality rate. However, the mortality rate was reduced for those recipients who would receive benefits even if seen by a relatively strict judge. This might imply that the fully disabled benefit from the current SSDI program, while partially disabled Americans are harmed by the existing SSDI policy.

All the papers to date analyze the effects of disability benefits on health using reduced-form empirical models. The researchers ran linear regressions with and without individual fixed effects, used instrumental variables, and regression discontinuity designs.

This paper is the first to estimate the health effects of the receipt of disability benefits using a structural model. Structural estimation permits the examination of counterfactual scenarios that cannot be analyzed using reduced-form methods. In particular, this article concentrates on the analysis of the health effects of the counterfactual introduction of disability benefits for partially disabled Americans.

In contrast to health effects, the labor supply effects of disability programs are not ambiguous. Nearly all studies find negative labor supply effects of disability benefits. Existing literature suggests that 20–30% of current SSDI recipients would work in the absence of the program (Maestas et al., 2013; French and Song, 2014). While the U.S. has not reformed the SSDI program since the last century, many other countries have had relatively recent disability insurance program reforms. The literature on these reforms provides valuable insights. For instance, the 2005 policy change in Norway (Kostøl and Mogstad, 2014) and the Netherlands’ 2006 reform (Koning and van Sonsbeek, 2017) show that many beneficiaries can be incentivized to work. The latter reform introduced work-conditional disability benefits, which increased labor supply, but the effects of work-contingent disability benefits on disability propensity and mortality rates remain unknown.

The closest paper to this study is Yin (2015), which employs a structural model to estimate the labor supply effects of the introduction of partial disability benefits for partially disabled Americans who continue working. Yin (2015) does not analyze health outcomes. Instead, it relies on the survival rates from the 1997 U.S. Life Tables and treats mortality rates as constants. This study expands the analysis by examining the health effects of such a reform, in particular, focusing on the effects on mortality rates and disability propensity.

Several studies have also analyzed disability insurance programs from the viewpoint of welfare (Bound et al., 2004; Conesa and Garriga, 2008; Low and Pistaferri, 2015; Autor et al., 2019; Harenberg and Ludwig, 2019; Meyer and Mok, 2019). A typical conclusion is that more generous disability policies increase welfare. Autor et al.’s (2019) conclusions imply that savings have little effect on the decisions of disability insurance applicants, as they tend to have very low savings. Motivated by this, I abstain from including savings decisions in my model. Another paper examines the welfare implications of bad health in general and concludes that the main channel of poor health effects on welfare is a shortened life span (De Nardi et al., 2024). This paper contributes to these threads of literature by examining a particular kind of more generous disability insurance policy that extends longevity.

While the literature on the health effects of disability insurance is limited, rich literature on the health effects of health insurance exists (e.g., Hall and Jones, 2007; Blau and Gilleskie, 2008; Finkelstein and McKnight, 2008; Yang et al., 2009; Finkelstein et al., 2012; Goldin et al., 2021; Miller et al., 2021; Chen et al., 2025). This literature generally concludes that health insurance coverage has either negligible or modest effects on reducing mortality rates. The way I simulate health-related outcomes and their dynamics is very close to that utilized in Khwaja (2001).

This study is also related to the literature on the influence of health on retirement. Poor health status might cause individuals to expect shorter lives. Such expectations will make these people less willing to accumulate more wealth, and these people will also be less productive (Hamermesh, 1985). Thus, the partially disabled might be more likely to leave the labor force. Work-conditional disability benefits can incentivize the partially disabled to postpone their retirement.

Some researchers looked at the reverse effect and analyzed the influence of retirement on health. The partially disabled might prefer to retire if they are given disability benefits that do not require them to continue working. Several papers have demonstrated that retirement can improve health (Coe and Zamarro, 2011; Eibich, 2015; Shai, 2018). However, many other studies indicate that an earlier exit from the labor force can worsen the lives of retirees in many different ways. While evidence on the impact of retirement on mortality in Europe is mixed — some researchers find negative effects (Hallberg et al., 2015, and Bloemen et al., 2017), others do not find any impact (Hernaes et al., 2013; Hagen, 2018; Nielsen, 2019), and some show positive effects (Kuhn et al., 2010) — the literature consistently finds that early retirement in the U.S. raises mortality (Waldron, 2001; Snyder and Evans, 2006; Fitzpatrick and Moore, 2018; Xu, 2023). Furthermore, the risks of cardiovascular disease and cancer might increase (Behncke, 2011). Finally, cognitive and mental health might suffer due to earlier retirement as well (Rohwedder and Willis, 2010; Bonsang et al., 2012; Celidoni et al., 2017; Heller-Sahlgren, 2017).

In summary, this paper’s idea builds on two results from the existing literature. Following the introduction of a disability insurance program for partially disabled Americans, they will increase their labor supply and retire at an older age (Yin, 2015). Because of this, the mortality rate for Americans is expected to decrease (Waldron, 2001; Snyder and Evans, 2006; Fitzpatrick and Moore, 2018; Xu, 2023). The questions are by how much the mortality rate will decrease, how many lives will be saved, how much money this will cost, and what version of the reform will lead to the best outcomes at the lowest costs.

3. Background

Social Security Disability Insurance is a key component of the U.S. social safety net, designed to support Americans whose ability to work is impaired due to health-related issues. In 2023, around 9 million people received SSDI benefits,⁵ totaling almost \$13 billion/month.⁶

To qualify for SSDI benefits, an individual must be insured, be younger than full retirement age, have applied for the benefits, and meet the definition of disability under the Social Security Act. As for the first requirement of being insured, a person must have worked enough and recently enough. As regards the last requirement on disability, the Social Security Act defines a qualified disability as “(A) inability to engage in any substantial gainful activity by reason of any medically determinable physical or mental impairment which can be expected to result in death or which has lasted or can be expected to last for a continuous period of not less than 12 months, or (B) in the case of an individual who has attained the age of 55 and is blind (within the meaning of blindness as defined in section 216(i)(1)), inability by reason of such blindness to engage in a substantial gainful activity requiring skills or abilities comparable to those of any gainful activity in which the individual has previously engaged with some regularity and over a substantial period of time.”⁷ A person is considered to be engaged in a substantial gainful activity (SGA) if their earnings are more than an SGA amount (\$1,620/month⁸ in 2025).

⁵Annual Statistical Report on the Social Security Disability Insurance Program, 2023

⁶Chart Book: Social Security Disability Insurance by the Center on Budget and Policy Priorities

⁷Social Security Act, Title II, Section 223

⁸Substantial Gainful Activity, the Social Security Administration website

Introduced by the Social Security Act of 1935, the Social Security program originally paid benefits only to retired workers aged 65 and older. The 1956 amendments introduced the SSDI program, creating benefits for disabled workers aged 50 and older, later expanded to include dependents of disabled workers (1958) and all disabled workers regardless of age (1960). In 1972, SSDI recipients became eligible for Medicare after two years of SSDI recipience, and the 1980 amendments introduced a periodic review process. The most recent reform, the Ticket to Work and Work Incentives Improvement Act of 1999, allowed SSDI recipients to retain benefits for up to nine months while engaging in substantial gainful activity.

In the last 20 years, the Social Security Administration ran 14 demonstration projects assessing potential SSDI program modifications.⁹ Two of these projects analyzed the option of offering partial disability insurance benefits for SSDI beneficiaries who are ready to return to the labor force. The analyses of these projects concluded that such modifications can not noticeably change the labor supply of SSDI recipients while substantially increasing the SSDI program's costs (Benitez-Silva et al., 2011). People who have already started to receive disability insurance benefits with no work requirements are very unlikely to join the labor force again. Two attempts by the Social Security Administration to implement partial disability insurance benefits underscore how compelling this idea is for the government. In contrast to modifications examined by the Social Security Administration, the counterfactual reform considered in this paper focuses on partial disability insurance benefits for partially disabled Americans who have not yet started to receive existing SSDI benefits.

⁹[Demonstration projects conducted by the Social Security Administration](#)

In 2023, ~80% of SSDI recipients were older than 50; 34% of SSDI awards were granted based on the impairments of the musculoskeletal system and connective tissue, 13.6% — due to neoplasms, 12.7% — because of mental health disorders, 10.9% — because of circulatory system diseases, 28.8% — based on other reasons.¹⁰

The SSDI eligibility criteria depend on the applicant’s medical condition, age, education, and work history.¹¹ Applicants with “listed impairments” qualify automatically.¹² Throughout the last decade, only ~21% of individuals were approved during initial claims, and the final award rate was 30%. Thus, the demand for disability insurance in the U.S. exceeds the supply.

SSDI benefits are calculated based on Average Indexed Monthly Earnings (AIME), calculated from up to 35 years of highest earnings. For those first eligible in 2025, SSDI benefits will be the sum of 90% of the first \$1,226 of their AIME, 32% of their AIME over \$1,226 and through \$7,391, and 15% of their AIME over \$7,391.¹³

SSDI recipients can stop receiving benefits due to the following reasons: they turn the full retirement age (then SSDI benefits become Old-Age benefits), they did not meet medical standards (1.1% of SSDI beneficiaries had their benefits terminated because of this in 2023), they died (2.6% of SSDI benefits receivers died in 2023), or due to some other reasons (0.03% of SSDI benefits were terminated because of other reasons in 2023). Thus, once individuals receive SSDI benefits, they are unlikely to stop receiving benefits.

¹⁰ [Annual Statistical Report on the Social Security Disability Insurance Program, 2023](#)

¹¹ [How you qualify for Social Security disability benefits](#)

¹² [Listings of impairments](#)

¹³ [A PIA formula](#)

4. Data and Summary Statistics

4.1. Data and Sample Design

The data used in this study are the cross-sectional Health and Retirement Study (HRS) Public Survey and the RAND HRS Longitudinal File. HRS is a national longitudinal biennial household survey of individuals over 51 and their spouses. The HRS is sponsored by the National Institute on Aging (grant number NIA U01AG009740) and is conducted by the University of Michigan. More than 15,000 individuals who comprise more than 10,000 households are surveyed every two years. The RAND HRS Longitudinal File is a cleaned dataset containing information from HRS, produced by the RAND Center for the Study of Aging, with funding from the National Institute on Aging and the Social Security Administration.

The estimation sample consists of observations between 1994 and 2016, except for 2004. In the 2004 wave, disability questions were not asked of those who had disabilities in the previous wave. Due to this, for the 2004 wave, the transitions between different disability statuses cannot be analyzed. The HRS sample is not representative of the United States population below 51. Therefore, I exclude observations on individuals below 51 years old. I focus on individuals below 90 years old, as the effects of the proposed reform on mortality disappear by the point a person turns 90. Thus, I also delete all observations on people older than 90 years. Finally, I delete observations with missing data in the initial period of observation and a few observations with missing information on age.

4.2. Measures of Health Outcomes

I construct and use two health measures. My first health measure is based on the following questions:

1. Do you have any impairment or health problem that limits the kind or amount of paid work you could do?
2. Does this limitation keep you from working altogether?

I classify individuals who state that they do not have any impairment or health problem that limits the kind or amount of paid work they could do as healthy individuals, those who argue that they have impairments that limit their work but do not prevent them from working altogether as partially disabled, and those who claim that they have limitations keeping them from working altogether as fully disabled.

Table 3 presents the health transition probabilities for the estimation sample below 62, the minimum age for Social Security Old-Age benefits. People are more likely to have the same level of disability as in the previous period. Those with a partial disability are more likely to become fully disabled than those without a disability, and those with a full disability are less likely to recover than those with a partial disability. Also, when a person's level of disability is higher, she is more likely to die. Specifically, the biennial age-conditional mortality rate for not disabled people is $\sim 1\%$, while it is $\sim 2\%$ for the partially disabled and $\sim 4\%$ for the fully disabled.

Standard economic theory models health as a stock variable that is both subject to sudden shocks and dependent on investments and depreciation (Grossman, 1972). Following existing literature, I construct my second health measure, a health index. Similarly to Poterba et al. (2013), I choose 30 HRS variables to derive a health measure using Principal Component Analysis (PCA). The selected variables are related to self-reported health status, mental health, doctor-diagnosed diseases, functional limitations, and medical utilization (see Appendix B for a detailed list). Like Poterba et al.

(2013), I choose the standardized and inversed prime principal component that explains the biggest share of the variance as one of my health measures. I call this health measure a health index. Unlike Poterba et al. (2013), following Kolenikov and Angeles (2005), I use polychoric PCA, which takes into account the discreteness of the variables. My health index has several valuable properties:

- The health index is persistent and is predictive of the onset of disabilities and death (see Figure B1 in the online Appendix B).
- A health index predicts bad health events well (see Figure B2 in the online Appendix B).

4.3. Summary Statistics

The decision-making process in my model stops when people turn 70 years old. Therefore, in Table 4, I compare the summary statistics for respondents aged 51 to 70 years of age from my estimation sample with the summary statistics for those in the sample of all HRS respondents within this age range. In total, there are 147,612 observations from HRS respondents between 51 and 70 years of age. The estimation sample consists of 121,348 observations. The averages for the estimation sample and the full sample are reasonably close. Around 39% of the sample work full-time, and approximately 15.5% work part-time. About 6.5% are receiving SSDI benefits, and around 1.3% have pending SSDI applications. Among fully disabled people, this percentage is higher than among partially disabled people, around 8.5% and approximately 3.6%, respectively. Approximately 16% of the respondents are partially disabled, and around 10% are fully disabled.

5. Reduced Form Evidence

The literature consistently finds that early retirement increases mortality for Americans regardless of their disability status (Waldron, 2001; Snyder and Evans, 2006; Fitzpatrick and Moore, 2018; Xu, 2023). An intriguing question is whether this holds for partially disabled Americans.

HRS data do not have as many observations on deaths as the dataset used in Snyder and Evans (2006) and Fitzpatrick and Moore (2018). However, in contrast to that dataset, the HRS data have information on self-reported disability statuses. Using HRS data, I perform a regression discontinuity analysis similar to that conducted in Fitzpatrick and Moore (2018), exploiting the policy-induced discontinuity at age 62, the minimum eligibility age for Social Security Old-Age (SSOA) benefits.

Figure 1 shows the retirement and 10-year mortality rate for all individuals and for those particular individuals who have been partially disabled in both the current and previous periods and who do not receive SSDI. When individuals turn 62, the minimum age for SSOA benefits, the share of retired individuals jumps for both the general sample and the latter particular group. However, a noticeable increase in the 10-year mortality rate at age 62 is observed only among individuals who were partially disabled in both the current and previous periods and did not receive SSDI. The size of the HRS sample does not allow for the identification of the mortality effect of retirement for the general sample. Nonetheless, the available sample is sufficient to identify a statistically significant 5 p.p. positive effect of retirement on 10-year mortality for Americans who had partial disability for two consecutive periods and who do not receive SSDI (see Table 1). The online Appendix A discusses potential mechanisms for these mortality effects.

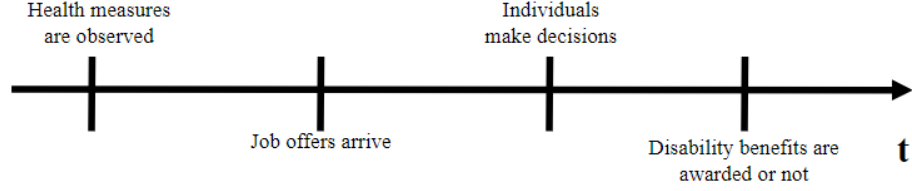
The outlined evidence implies that work-incentivizing partial disability insurance benefits will decrease the mortality rate for Americans. This conclusion is further verified with the estimation of the structural model and counterfactual simulations discussed in the next sections.

6. The Model

The dynamic behavioral model describes how individuals make decisions about work and the applications of Social Security benefits. I follow the general methodological approach of Rust and Phelan (1997). The closest paper to mine is Yin (2015), who introduced the first structural model to examine the labor supply effects of partial disability insurance reform in the U.S. I adjusted Yin’s model of individuals’ labor supply decisions to analyze the health effects of partial disability insurance reform. Disability insurance affects health through three channels: employment, amount of consumption, and health insurance. The effects of employment are heterogeneous for the partially disabled. The partially disabled consider the health effects of their decisions when self-selecting into employment and disability insurance. The model solution is provided in the online Appendix C.

6.1. *Timing and initial conditions*

In the model, the individuals are between 51, t_{min} , and 90, t_{max} . By age 70, t_R , people retire and stop making decisions. In each period, disability status and health index are observed first. Next, job offers arrive. Consequently, individuals make their decisions as described in the following subsection. Following this, the Social Security Administration awards SSDI.



The set of initial conditions,

$$\Omega_{t_0} = \{t_0, SSDI_{t_0}^i, D_{t_0}^i, H_{t_0}^i, AIME_{t_0}^i, a_{t_0}^i, e^i\},$$

consists of the initial year of observation, t_0 , SSDI reciprocity, $SSDI_{t_0}^i$, statuses, their disability, $D_{t_0}^i$, health index, $H_{t_0}^i$, average income monthly earnings, $AIME_{t_0}^i$, the age of an individual, $a_{t_0}^i$, and education, e^i , during the initial period of observation.

6.2. Decisions and an Information Set

Forward-looking agents between 51, t_{min} , and 70, t_R , make decisions, Z_t^i , about:

- Employment: full-time $work_t^i = FT$, part-time $work_t^i = PT$, no work $work_t^i = N$
- Application for Social Security Disability Insurance benefits: $apply_t^i = FD$ if an individual is eligible for full SSDI benefits and claims them, $apply_t^i = PD$ if an individual is eligible for partial SSDI benefits and claims them, $apply_t^i = NO$, o/w
- Start receiving Social Security Old-Age benefits: $start_t^i = 1$ if an individual is eligible for Social Security Old-Age benefits and starts receiving them, $start_t^i = 0$, o/w.

Individuals make these choices, Z_t^i , based on information, Ω_t :

■ Endogenous outcome variables:

- SSDI outcomes: $SSDI_{t-1}^i = FD$ if an individual is awarded and receives full SSDI, $SSDI_{t-1}^i = PD$ if an individual is awarded and receives partial SSDI
- First period of Social Security Old-Age (SSOA) reciprocity:
 $SSOA_{t-1}^i = t_1$, if an individual has started receiving SSOA benefits in some period t_1 , and $SSOA_{t-1}^i = NA$, if an individual has not started receiving SSOA yet
- Disability status: $D_t^i = F$ if fully disabled, $D_t^i = P$ if partially disabled, $D_t^i = N$ if not disabled
- Health index: H_t^i
- Health insurance: I_t^i
- Average indexed monthly earnings: $AIME_t^i$

■ Exogenous variables:

- Education: $e^i = 1$ for college graduates and $e^i = 0$, o/w
- Age: a_t^i
- Year: t .

6.3. The Utility of the Agents

The utility, $u_t^i(C_t^i, work_t^i, apply_t^i, start_t^i, D_t^i, H_t^i, SSOA_t^i)$, depends on consumption, C_t^i , employment, SSDI and SSOA statuses, disability, and the health index. Decisions are made between ages 51, t_{min} , and 70, t_R . Utility in the first period is adjusted by $\tilde{u}_{t_{min}}^i(\cdot)$, which depends on whether individuals have been working or applying for SSDI benefits and their health during

the initial period of observation. At 70, t_R , individuals receive the utility $\tilde{u}_R^i(\cdot)$, which depends on their employment, Social Security, and disability statuses during the last period of decision making. The equations for $u_t^i(\cdot)$, $\tilde{u}_{t_{min}}^i(\cdot)$, and $\tilde{u}_R^i(\cdot)$ are presented in the online Appendix D. If individuals die before 70, they receive a terminal value of $\alpha_{terminal}$.

6.4. Social Security Benefits

To be eligible for full SSDI benefits, a person should not be working, should be partially or fully disabled, and should be below full retirement age. The likelihood of the award of these benefits, $\pi_t^{ai} = \pi^a(D_t^i, H_t^i, a_t^i, e^i)$, is assumed to depend on the disability status, D_t^i , health index, H_t^i , age dummy variables, education, e^i , where π^a is a logistic function. The size of Social Security benefits, SSB_t^i , depends on the Social Security Administration decision, SSD_t^i , Average Indexed Monthly Earnings, $AIME_t^i$, and the current year, $SSB_t^i = SSB(SSD_t^i, AIME_t^i, t)$.

Under the counterfactual partial disability insurance reform, working partially disabled individuals below full retirement age will be eligible for partial SSDI benefits calculated in the same way as full SSDI. If a recipient's earnings exceed the substantial gainful activity threshold (\$1,620/month in 2025), their partial SSDI benefits are reduced accordingly. Partially disabled individuals applying for partial SSDI benefits are assumed to experience the same utility cost of application as the fully disabled individuals applying for full SSDI. The award probability of partial SSDI benefits for partially disabled individuals is, on average, the same as that of full SSDI benefits for fully disabled individuals of the same age and education status. If a partial SSDI recipient claims to develop full disability, they receive full SSDI benefits for the period of application for the full SSDI program.

6.5. Health Measures

Future health index, $H_{t+1}^i = H(D_t^i, work_t^i, I_t^i, C_t^i, H_t^i, a_{t+1}^i, e^i, \epsilon_{t+1}^{Hi})$, depends on disability status, D_t^i , employment status, $work_t^i$, health insurance coverage, I_t^i , consumption, C_t^i , health index H_t^i , age, a_{t+1}^i , college education, e^i , and health shock, $\epsilon_{t+1}^{Hi} \stackrel{iid}{\sim} N(0, \sigma_H^2)$, and $H(\cdot)$ — linear function. Thus,

$$\begin{aligned} H_{t+1}^i = & \beta^{HC} + \beta_t^{HPFTi} 1_{D_t^i=P} \cdot 1_{work_t^i=FT} + \beta_t^{HPPTi} 1_{D_t^i=P} \cdot 1_{work_t^i=PT} + \\ & + \beta_t^{HI} I_t^i + \beta_t^{HC} C_t^i + \beta^{HP} 1_{D_t^i=P} + \beta^{HF} 1_{D_t^i=F} + \beta^{HH} H_t^i + \\ & + \beta^{HNFT} 1_{D_t^i=N} \cdot 1_{work_t^i=FT} + \beta^{HNPT} 1_{D_t^i=N} \cdot 1_{work_t^i=PT} + \beta^{HA} a_{t+1}^i + \\ & + \beta^{HE} e^i + \beta^{HFE} 1_{work_t^i=FT} \cdot e^i + \beta^{HPE} 1_{work_t^i=PT} \cdot e^i + \epsilon_{t+1}^{Hi}, \end{aligned}$$

where β_t^{HPJi} , $J \in \{FT, PT\}$ are heterogeneous:

$$\beta_t^{HPJi} = \gamma^{HJ} + \epsilon_t^{HJi}, \quad \epsilon_t^{HJi} \stackrel{iid}{\sim} N(0, \sigma_{HJ}^2).$$

The future disability status and mortality rate, D_{t+1}^i and π_{t+1}^{mi} , depend on the same variables as H_{t+1}^i , $D_{t+1}^i = D(work_t^i, D_t^i, H_t^i, a_{t+1}^i, e^i, \epsilon_t^{DJi})$, and $\pi_{t+1}^{mi} = \pi^m(work_t^i, D_t^i, H_t^i, a_{t+1}^i, e^i, \epsilon_t^{MJi})$, but $D(\cdot)$ and $\pi^m(\cdot)$ are logistic functions. If an individual is predicted to be both fully disabled and partially disabled, full disability dominates partial disability. After individuals turn 70, t_R , they stop making decisions and are assumed not to be working. After that point, only health equations are modeled, and the mortality rate starts to depend on age quadratically.

6.6. Health Insurance

Health insurance is a dummy variable, I_t^i , representing enrollment in any health insurance before age 65 when everyone becomes eligible for Medicare. Individuals can be enrolled in private health insurance, early Medicare

(through SSDI), or Medicaid. The probability of enrollment into private health insurance depends on the same variables as health measures. When individuals receive full SSDI in the previous period, they automatically receive Medicare in the current period. Finally, the probability of enrollment into Medicaid depends on health measures, age, and consumption. If an individual has health insurance before 65, $I_t^i = 1$, and $I_t^i = 0$ otherwise.

6.7. Earnings and Income

Annual earnings, W_t^i , are:

$$W_t^i = \beta_W^C + \sum_{j \in \{FT, PT\}} (\beta_W^{jP} 1_{work_t^i=j} \cdot 1_{D_t^i=P} + \beta_W^{jE} 1_{work_t^i=j} \cdot e^i) + \beta_W^F 1_{work_t^i=FT} + \beta_W^H H_t^i + \beta_W^A a_t^i + \epsilon_{t+1}^{Wi}.$$

The earnings depend on whether they work full-time or not, $work_t^i$, their disability status, D_t^i , health index, H_t^i , age, a_t^i , education, e^i , and earnings shock, $\epsilon_{t+1}^{Wi} \stackrel{iid}{\sim} N(0, \sigma_W^2)$. The income of an individual is the sum of earnings and Social Security benefits:

$$Y_t^i = W_t^i + SSB_t^i.$$

If income is lower than the annual cost of food stamps in 2018, then the income is equal to this cost.

6.8. The Maximization Problem of the Agents

The maximization problem of an individual:

$$V_t^i(\Omega_t^i; Z_t^i; \tilde{\epsilon}_t^i) = \max_{Z_t^i} (u^i(S_t^i) + \beta E(V_{t+1}^i(\Omega_{t+1}^i; Z_{t+1}^i; \tilde{\epsilon}_{t+1}^i)))$$

s.t.

$$C_t^i = Y_t^i,$$

where $\tilde{\epsilon}_{t+1}^i$ — a vector of shocks to the effects of work on the health of the partially disabled and shocks to the health index and earnings.

7. Estimation

The model parameters are estimated using the Method of Simulated Moments. This section discusses the identification of the main variables, the average marginal effect, and the model fit. 160 estimated parameters and 287 moments are reported in the online Appendix E.

7.1. Identification of the main parameters

The key parameters of the model are those driving the main results on labor supply and mortality. Work-contingent SSDI benefits reduce the reservation wage of the partially disabled, increasing their labor supply. The size of the SSDI benefits relative to the wages and the utility of leisure will drive the scale of this increase. The effect of partial disabilities on wages is captured by the moments related to wages by disability and employment status. The utility of leisure for the partially disabled is identified based on employment rates at different ages, including 62–70, when Social Security Old-Age (SSOA) benefits become available, and when these benefits gradually grow, conditional on postponed retirement.

As for the main results on mortality, they are driven by the effects of employment, consumption, and health insurance on mortality and by the utility of leisure for the partially disabled. Partially disabled individuals in my model self-select into employment and disability benefits reciprocity based on their utility of leisure and the heterogeneous effects of employment on their health. These effects are captured by the moments related to the current period mortality and disability rates and health index conditional on

the previous period full-time or part-time employment, consumption, health insurance, disability and college education statuses, health index, and age, including moments capturing increases in mortality for people retiring at 62–70, when SSOA benefits become available and when they grow contingent on delayed retirement.

The credibility of the estimated parameters is checked by testing how the implied results fit the existing literature (see section 7.2) and how the model fits the data (see section 7.3).

7.2. Average Marginal Effects

Table 5 shows the average marginal effect of the main variables on health transition probabilities for the partially disabled. Full-time work, increases in consumption, and health insurance coverage all have negative average marginal effects on mortality and full and partial disability probabilities. Part-time work effects are more ambiguous.

The effects (β_t^{KJi}) of full-time (FT) and part-time (PT) employment on mortality (M), partial (P) and full (F) disability probability for the partially disabled are heterogeneous in the following way: $\beta_t^{KJi} = \gamma^{KJ} + \epsilon_t^{KJi}$, $\epsilon_t^{KJi} \stackrel{\text{iid}}{\sim} N(0, \sigma_{KJ}^2)$, $K \in \{M, P, F\}$, $J \in \{FT, PT\}$. Table 5 presents not only the AME of the constant component, γ^{KJ} , but also the average *absolute* marginal effect of ϵ_t^{KJi} . The estimates of average *absolute* marginal effects of ϵ_t^{KJi} show the heterogeneity of the health effects of labor supply decisions. Employment decreases the mortality of the partially disabled. Since early retirement benefits expedite retirement by 1.4 years (Engelhardt et al., 2022), the AMEs of employment on mortality are consistent with reduced-form evidence (Figure 1 and Table 1). In line with existing literature (Newhouse, 1993; Weathers II and Stegman, 2012; Black et al., 2017;

Black et al., 2024; Miller et al., 2024), consumption and health insurance coverage have small effects on mortality. Estimated AMEs have consequences for the optimal SSDI reform. Given these estimates, the optimal reform should motivate the partially disabled to continue working. By postponing retirement, the partially disabled will decrease their mortality.

7.3. *Model fit*

A model has a very good fit. Figures 4–7 show the shares of individuals satisfying the criteria outlined in each graph. Shares are calculated for individuals of each possible age. The graphs on the left correspond to shares calculated based on the HRS data, while the graphs on the right correspond to shares estimated based on the simulated data. Figure 4 shows the average shares of the partially disabled and the fully disabled applying for SSDI benefits, and the average shares of those who receive SSDI benefits. The fully disabled individuals are more likely to apply for SSDI benefits than the partially disabled ones in the simulated data to around the same extent as in the HRS data. Figure 5 reports the shares of people working full-time or part-time among the not disabled and the partially disabled. While not disabled people are more likely to work full-time than part-time, partially disabled people are as likely to work part-time as to work full-time. Figure 6 shows the average earnings and the shares of Social Security Old-Age benefits recipients. The average earnings of the partially disabled are consistently ~\$20,000 lower than those of the not disabled. Only when Americans start receiving old-age benefits at 62 and the massive retirement process begins will the average earnings for the not disabled become close to the earnings of the partially disabled. Finally, Figure 7 displays the shares of individuals who are partially or fully disabled and the survival rate.

8. Partial Disability Insurance Reform

I consider the following partial disability insurance reform. Under the considered reform, individuals with partial disabilities can apply for partial SSDI benefits, provided they continue working. If the earnings of a partially disabled individual are higher than a substantial gainful activity amount (\$1,620/month in 2025), then the partial SSDI benefits are reduced by \$1 for each extra \$1. Unlike full SSDI beneficiaries, partial SSDI recipients do not gain early access to Medicare. However, they are covered by insurance from the onset of full disability. If a partial SSDI beneficiary claims they have become fully disabled, they may choose to stop working and apply for full SSDI benefits. During the application period, they will receive full SSDI benefits. If the application is approved, they continue receiving full SSDI benefits until the Full Retirement Age (FRA), when full SSDI benefits automatically become Social Security Old-Age Benefits (SSOA); otherwise, benefits cease. Similar to full SSDI benefits, partial SSDI benefits are subject to an age limit — the FRA. Partial SSDI benefits are only available to those below the FRA. However, unlike full SSDI beneficiaries, partial SSDI recipients are not automatically transitioned to SSOA upon reaching FRA. Instead, they have the flexibility to claim SSOA at a later age. The partially disabled applying for partial SSDI benefits have higher chances of being awarded benefits in comparison with their peers applying for the existing SSDI benefits. The probability of a partial SSDI benefits award for the partially disabled is as high as the probability of the current SSDI benefits award for the fully disabled. Moreover, partially disabled individuals applying for partial SSDI benefits experience the same disutility as the fully disabled experience when they are applying for the existing SSDI benefits.

Figure 2 illustrates that under the reform, the partially disabled increase their labor supply. Around a 6 p.p. increase in the labor supply of the general population of Americans ages 51 to 70, both those who are not disabled and partially disabled, is in line with Yin (2015).

Figure 3 shows the increase in the share of not disabled and the survival rate. At age 60, the reduction in the share of disabled individuals is around 1 p.p, and the decrease in the annual mortality rate is approximately 0.1 p.p. The increase in the survival rate is the highest for 70-year-old Americans. Back-of-the-envelope calculations based on these percentages and based on the numbers of Americans of a given age in 2022¹⁴ show that following the introduction of partial disability insurance benefits for the partially disabled 40,000 of 70-year-olds will extend their lives, and the number of 60-year-old disabled Americans will decrease by around 45,000.

These health improvements will come with the cost of an increase in the total sum of benefits awarded. The number of disability insurance applications increases by approximately 60%. A drastic increase in the number of applications will not come with a drastic increase in the program cost, as ~70% of the partially disabled who received full SSDI benefits will now choose partial SSDI benefits. Then, benefit spending will increase only by about 30%. Most of this increase in the program's cost is canceled by the additional taxes collected from people who increase their labor supply. After accounting for the increase in taxes (payroll taxes and income taxes), the investment necessary to prolong one person's life by one year is around \$17,000. This is significantly lower than common estimates of the value of one year of life, which typically (Murphy and Topel, 2006) exceed \$100,000.

¹⁴I use U.S. Census estimates of [the population](#) and of its [age distribution](#)

It is instructive to put the results on mortality and the corresponding costs in the context of recent healthcare evolution in the U.S. According to Wyse and Meyer (2025), the recent Medicaid expansion prolongs the lives of around the same number of people. However, the cost of extending one person’s life by one year is ~\$179,000. The partial disability insurance reform considered in this paper can extend the lives of around the same number of people as the recent Medicaid expansion, but at a considerably lower cost. This cost will be below that of the plethora of existing life-saving interventions (see Figure 8).

9. Alternative Designs of Partial Disability Insurance Reform

I analyze the health effects of five alternative designs of partial disability insurance reform (see Table 2). Under the primary version of the partial disability insurance reform, partial SSDI benefits are calculated in the same way as the existing SSDI benefits and are based on earnings history, specifically on AIME. Alternatively, partial SSDI benefits can constitute the taxes that working partially disabled individuals are paying. As under the primary version of the reform, the benefits are still reduced by \$1 for each \$1 earned above the substantial gainful activity amount (\$1,620/month in 2025). The partial disability insurance reform provides labor supply incentives to those partially disabled who otherwise would stay out of the labor force due to low wages. Those partially disabled who increase their labor supply because of the reform earn little and pay little taxes. As a result, the labor supply and health effects of this version of the reform are smaller than under the primary version. However, the increase in disability insurance benefits in this case will be fully covered by the increase in income and payroll taxes.

This version of the reform will not only extend the lives of thousands of Americans, but also will save around \$2B.

Under the second alternative, the recipients are provided early access to Medicare. The partially disabled can have health insurance not only from the SSDI program, but they can also have private health insurance and Medicaid. With the low health effects of health insurance on mortality (see Table 4), the health improvements due to early access to Medicare relative to a primary version of the reform are small. With early access to Medicare, the cost of extending one life by one year increases to around \$59,000.

Under the third alternative, the reform does not have work requirements. The health effects of this alternative are smaller, while the number of partially disabled individuals applying for disability insurance benefits and the cost of the reform both considerably increase. The expenses necessary to prolong one person's life by one year rise to around \$61,000.

Finally, I also consider the version with the low probability of award of partial disability insurance for the partially disabled and the version of the reform that eliminates any disutility from applying for disability insurance benefits. Under the former version, the award probability of partial disability insurance for the partially disabled is as low as the probability of the existing SSDI benefits award for the partially disabled. In this case, the increase in the number of the partially disabled applying for disability insurance benefits will be low, but the increase in taxes will fully cover the increase in benefits awarded. This increase in collected taxes will be $\sim$ \$25B. Whereas, if partial disability insurance applicants do not experience any disutility from applying, the number of new applications for disability insurance skyrockets by 666%, and the cost of extending one person's life by one year rises to up to about \$72,000.

10. Conclusion

This paper examines a novel idea of improving public health dynamics through work-conditional disability insurance benefits for partially disabled Americans. This paper demonstrates that expanding disability insurance through work-conditional benefits for the partially disabled can significantly improve public health, primarily by increasing labor supply among older Americans. The current SSDI program motivates the partially disabled to exaggerate their impairments and retire earlier. Offering work-contingent benefits to the partially disabled boosts employment among Americans aged 51 to 70 by ~ 6 p.p. As a result, $\sim 40,000$ Americans will live longer lives. The reform will also improve the quality of life by reducing disability prevalence by $\sim 1\%$. Disability insurance applications will increase by $\sim 60\%$, but the total amount of benefits awarded to recipients will increase only by about 30%, as around 70% of the partially disabled people who applied for full benefits will choose to apply for partial ones. After taking an increase in taxes into account, the expenses necessary to prolong one person's life by one year are $\sim \$17,000$. The paper considers 6 different variations of partial disability insurance reform. All these alternatives result in the prolonged lives of a considerable number of people, with the cost of extending the life of one person by one year significantly below common valuations of one year of life and the costs of many existing life-saving interventions. Some of these alternatives result in even financial savings for the program.

Future work is necessary to explore firm responses, as well as the distributional impacts of the reform across gender and race. Social Security Administration demonstration projects could validate the model-based implications for optimal reform design features.

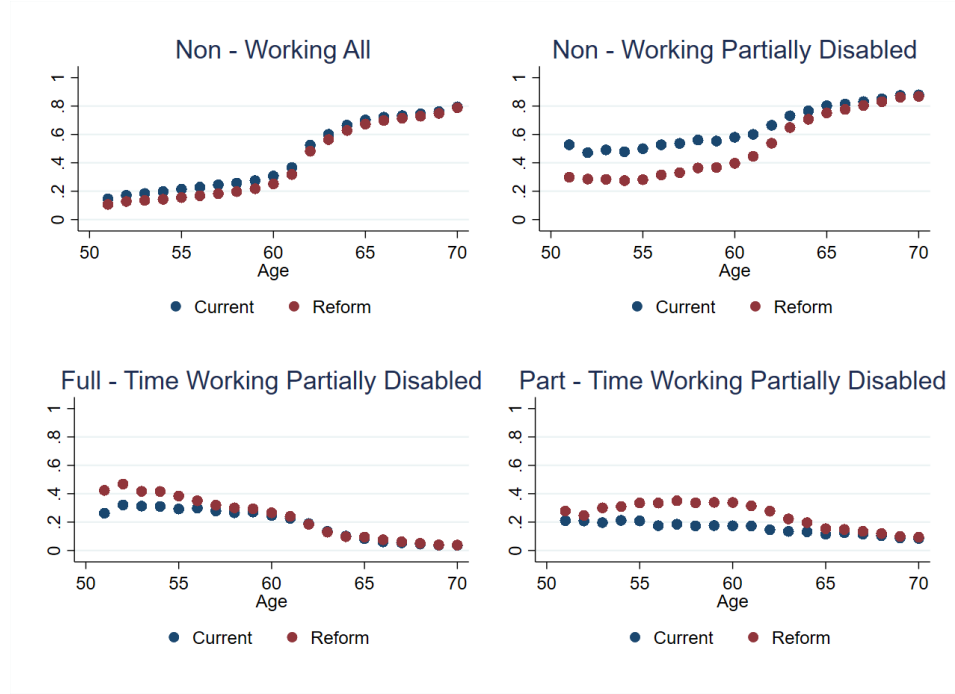
Figures

Figure 1 Retirement and 10-Year Mortality



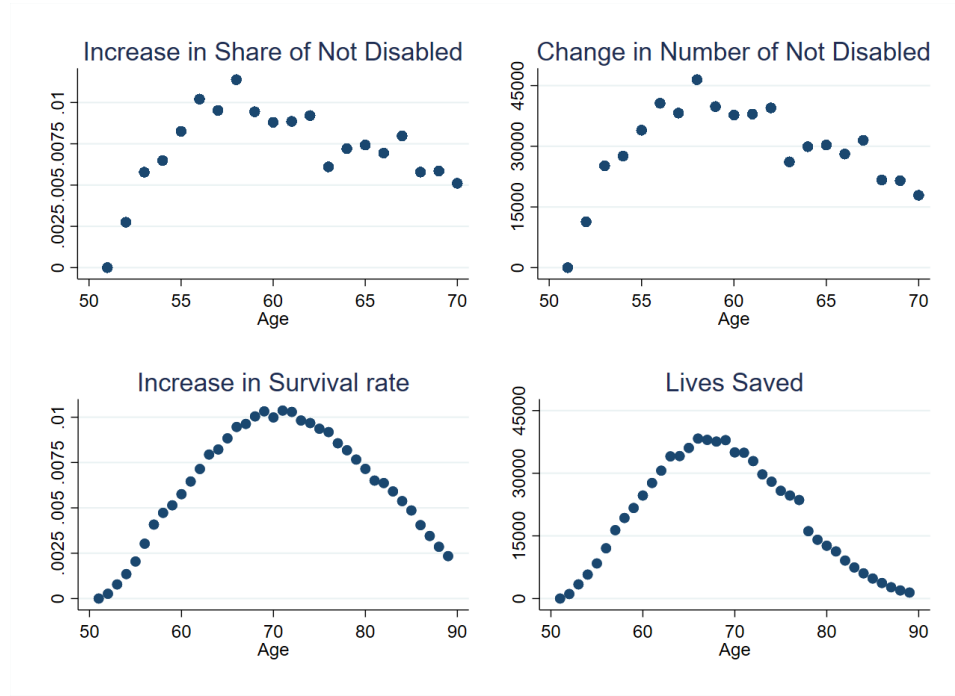
Notes: Figure 1 shows the retirement and 10-year mortality rate by age for Health and Retirement Study (HRS) respondents between 52 and 72 years old. Two groups of HRS respondents are considered: all individuals from the estimation sample and those who have been partially disabled in the current and previous periods and did not receive SSDI. At age 62, Americans become eligible for Social Security Old-Age benefits. As a result, the share of retirees jumps, and the 10-year mortality rate for individuals who have been partially disabled for two consecutive periods and did not receive SSDI rises sharply, too.

Figure 2 Simulated Labor Supply under Current SSDI Policy and After Partial Disability Insurance Reform



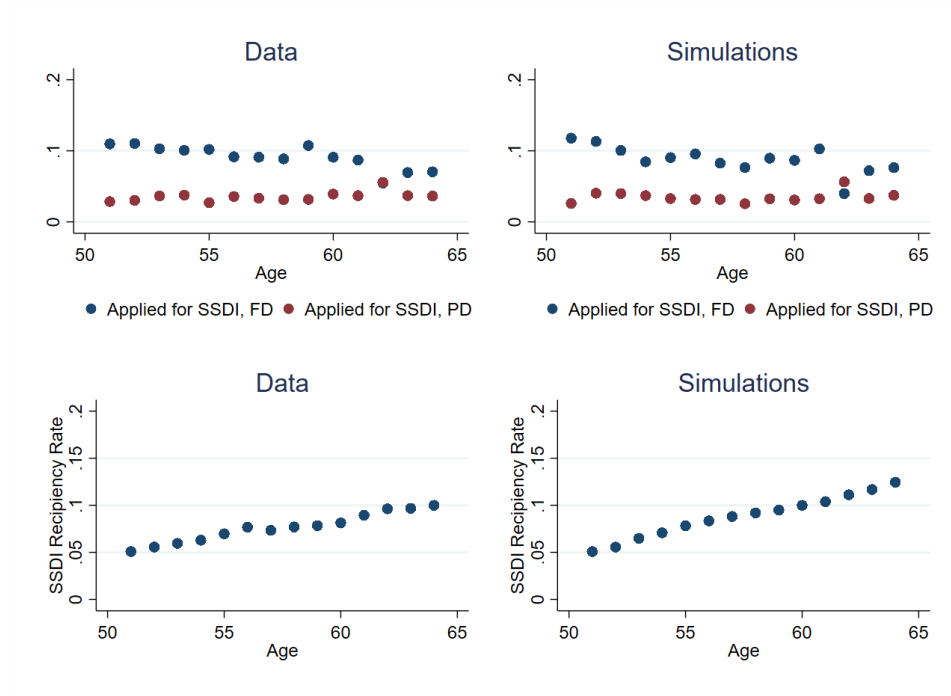
Notes: Figure 2 shows the effects of the introduction of disability insurance for the partially disabled on labor supply decisions. The dots show the shares of individuals who are not working (top left graph), the shares of partially disabled individuals who are not working (top right graph), the shares of partially disabled working part-time (bottom left graph), and the shares of partially disabled working full-time (bottom right graph). Individuals in the model are 51 and above and make labor supply decisions until 70.

Figure 3 Impact of the Partial Disability Insurance Reform on Disability Propensity and Survival



Notes: Figure 3 shows how the share and the number of disabled Americans and the survival rate will change after the introduction of partial disability insurance in the U.S. The dots in the graphs in the top row show increases in the shares and numbers of not disabled Americans, while the dots in the graphs in the bottom row show an increase in the survival rate and the number of lives saved. Increases in the number of not disabled Americans and the number of lives saved are estimated based on the changes in shares and the U.S. Census estimates of [the population](#) and of its [age distribution](#).

Figure 4 Model Fit: SSDI Applications and Reciprocity



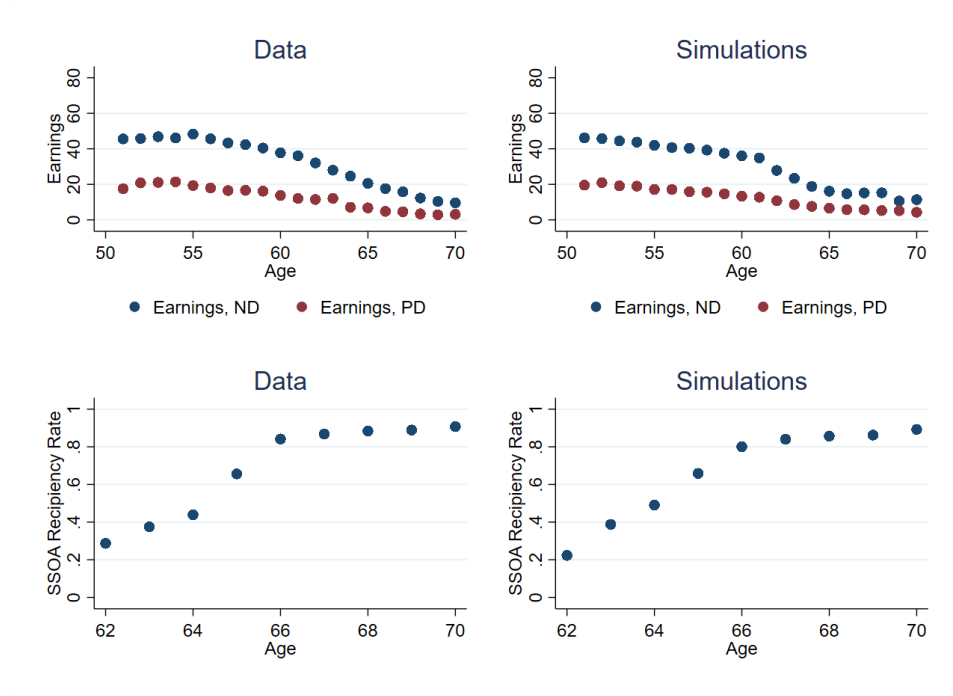
Notes: Figure 4 shows the average shares of individuals applying for SSDI or receiving SSDI at a given age in the HRS data and simulated data. “Applied for SSDI, PD” stands for the shares of individuals who applied while partially disabled, and “Applied for SSDI, FD” stands for the shares of individuals who applied while being fully disabled. For respondents in my data, Americans can apply and receive SSDI until they turn full retirement age (FRA), 65 or 66 years. After FRA, disability benefits are automatically transformed into old-age benefits.

Figure 5 Model Fit: Labor Supply Decisions



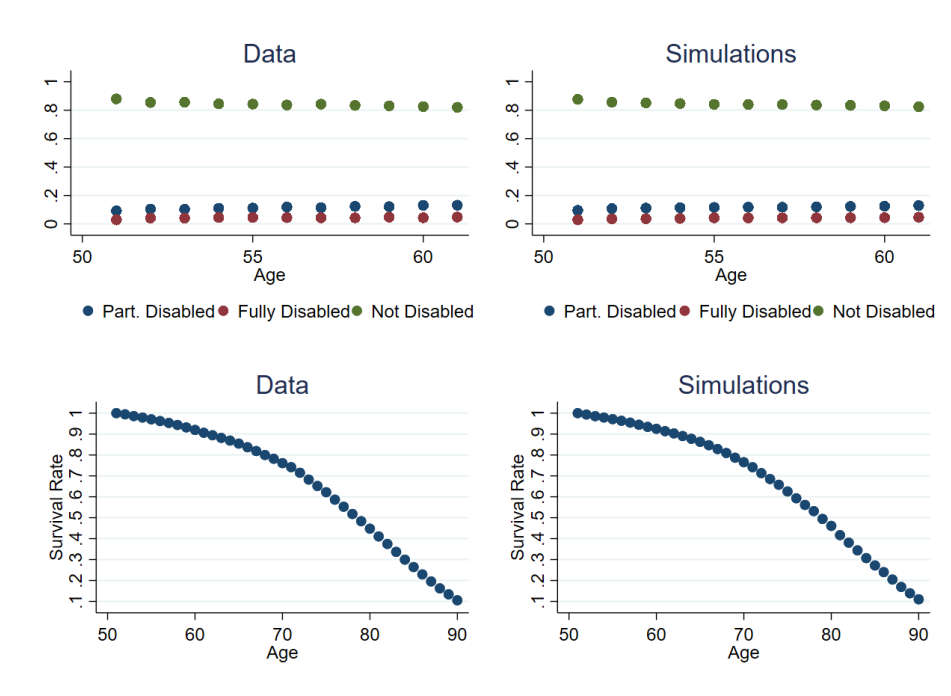
Notes: Figure 5 shows the model fit of labor supply decisions. The dots on the graphs in the first row show the average shares of not disabled (ND) individuals working full-time or part-time, while the dots on the graphs in the second row show average shares of partially disabled (PD) individuals working full-time or part-time. Individuals in the model are 51 and above and make labor supply decisions until they are 70. The graphs on the left are based on HRS Data, and the graphs on the right are based on simulated data.

Figure 6 Model Fit: Earnings and Social Security Old-Age Recipency



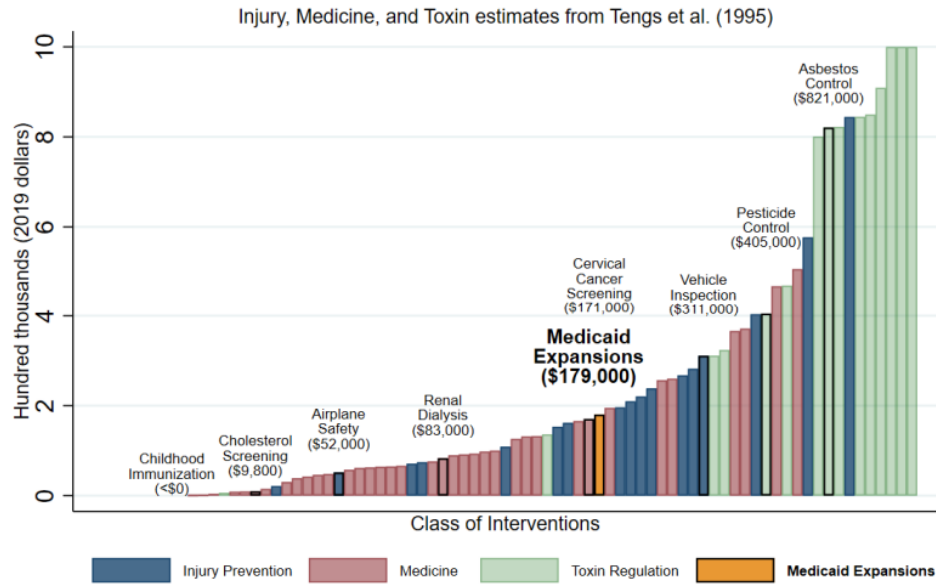
Notes: Figure 6 shows the model fit for earnings for not disabled (ND) and partially disabled (PD) people, and the Social Security Old-Age recipency rate. The dots on the graphs in the first row show the average earnings in thousands of 2018 U.S. dollars, while the dots on the graphs in the second row show the average shares of the individuals who have already claimed Social Security Old-Age benefits. Individuals in the model are 51 and above and make labor supply decisions until they are 70. The graphs on the left are based on HRS Data, and the graphs on the right are based on simulated data.

Figure 7 Model Fit: Disability Status and Survival Rate



Notes: Figure 7 shows the model fit for disability and survival rates. The dots on the graphs in the first row show the average shares of individuals by disability status, while the dots on the graphs in the second row show the survival rate at each age. The massive retirement process that starts when individuals turn 62 affects their answers to questions about disability. As a result, for the analysis of how my model fits the data on disability rates, I focus on the shares of disabled people below 62. The graphs on the left are based on HRS Data, and the graphs on the right are based on simulated data.

Figure 8 Cost-Effectiveness of Medicaid Expansions and Other Life-Saving Interventions: Average Cost Per Life-Year Saved



Notes: Figure 8 is from Wyse and Meyer (2025) and based on Tengs et al. (1995).

Tables

Table 1: Regression Estimates of Increase in Mortality and Retirement at Age 62

	10-Year Mortality		Retirement	
	Age^2	Age^3	Age^2	Age^3
$1_{62} * 1_{PD}$	.046** (.023)	.046** (.023)	-.0017 (.030)	-.0033 (.030)
1_{PD}	.005 (.003)	.005 (.004)	.136*** (.006)	.138*** (.006)
1_{62}	.005 (.004)	.007 (.004)	.048*** (.006)	.030*** (.007)
Age	-.054*** (.001)	-.080*** (.011)	-.090*** (.005)	-1.97*** (.094)
Age^2	.001*** (.00001)	.001*** (.0001)	.001*** (.00004)	.032*** (.002)
Age^3		-.000002** (.000001)		-.0002*** (.00001)
Obs.	204,614	204,614	121,348	121,348

Notes: Table 1 shows the regression results of a regression discontinuity analysis in 10-year mortality and retirement at age 62, the minimum age for Social Security Old-Age benefits. 1_{PD} stands for individuals who have been partially disabled during the current and previous periods and do not receive SSDI benefits, and 1_{62} stands for a dummy variable indicating whether a person is 62 years old or not. The sample for a regression for retirement is the estimation sample described in section 4.1, while the sample for a regression for 10-year mortality consists of observations on respondents between 51 and 90.

Whereas individuals in the model make decisions between 51 and 70, mortality is followed up to 90. Robust standard errors are in parentheses. ** denotes $p < 0.05$, *** denotes $p < 0.01$. The table is based on the HRS Public Survey Data for the years 1994–2016.

Table 2: Cost and Benefits of Five Versions of SSDI Reform

Reform	People	Years	Cost	Switchers	New
Primary Version	38,296	753,594	\$17K	72%	115%
Tax Credits	10,341	186,197	-	13%	37%
Early Medicare	40,147	791,644	\$59K	72%	115%
Work is not Required	29,107	562,647	\$61K	87%	196%
Low Award Probability	33,228	626,671	-	69%	38%
No Application Disutility	39,081	781,756	\$72K	75%	666%

Notes: Table 2 shows the costs and benefits of five versions of partial disability insurance reform in the U.S. The primary version of the reform and the alternative versions are outlined in sections 8 and 9. The numbers in the column People show the number of people who will live longer lives thanks to the reform. The column Years presents the total number of life-years saved by the reform, the column Cost shows the cost of extending one person’s life by one year, the column Switchers displays the decrease in the percentage of the partially disabled who apply for the existing SSDI benefits, and the column New shows the induced entry effect, the increase in the number of partially disabled applying for disability insurance (counterfactual partial disability insurance or existing SSDI).

Table 3: Age Conditional Disability Transition Probabilities

	ND	PD	FD	Deceased
Not Disabled (ND)	0.88	0.09	0.02	0.01
Partially Disabled (PD)	0.32	0.44	0.22	0.02
Fully Disabled (FD)	0.07	0.13	0.76	0.04

Notes: Table 3 shows the health transition probability of a respondent in the estimation sample below 62, the minimum eligibility age for Social Security Old-Age benefits, 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. The table is based on the HRS Public Survey Data for the years 1994 – 2016.

Table 4: Summary Statistics

	Full Sample	Estimation Sample
	Mean	Mean
Labor Force Status, %		
Working Full-Time	38.75	39.83
<i>by Disability Status</i>		
Partially Disabled	17.3	17.43
Not Disabled	49.9	49.97
Working Part-Time	15.28	15.71
<i>by Disability Status</i>		
Partially Disabled	14.58	15.09
Not Disabled	17.56	17.92

Table 4: Summary Statistics (Continued)

	Full Sample	Estimation Sample
	Mean	Mean
Pending SSDI Applications,%	1.29	1.42
<i>by Disability Status</i>		
Partially Disabled	3.66	3.63
Fully Disabled	8.47	8.54
Receive SSDI,%	6.82	6.15
Receive SSOA,%	21.16	25.24
Disability,%		
Partially Disabled	16.35	16.21
Fully Disabled	10.27	9.74
Annual Wage	52.43	52.16
Age	60.3	60.03
College	21.26	21.96
Number of Observations	147,612	121,348

Notes: Table 4 shows the summary statistics for key variables for the estimation and full samples. The full sample consists of all observations available for respondents between 51 and 70 — the age range within which individuals make decisions in my model, and the estimation sample described in section 4.1 is also restricted to respondents within this age range. The annual wage is in thousands of 2018 U.S. dollars, and it is the average among non-zero wages. The wages are censored if they are above \$400,000. SSOA stands for Social Security Old-Age benefits, while SSDI — for Social Security Disability Insurance benefits. The table is based on the HRS Public Survey Data for 1994 – 2016.

Table 5: The Effects of Employment, Consumption, and Health Insurance on Health Statuses of the Partially Disabled

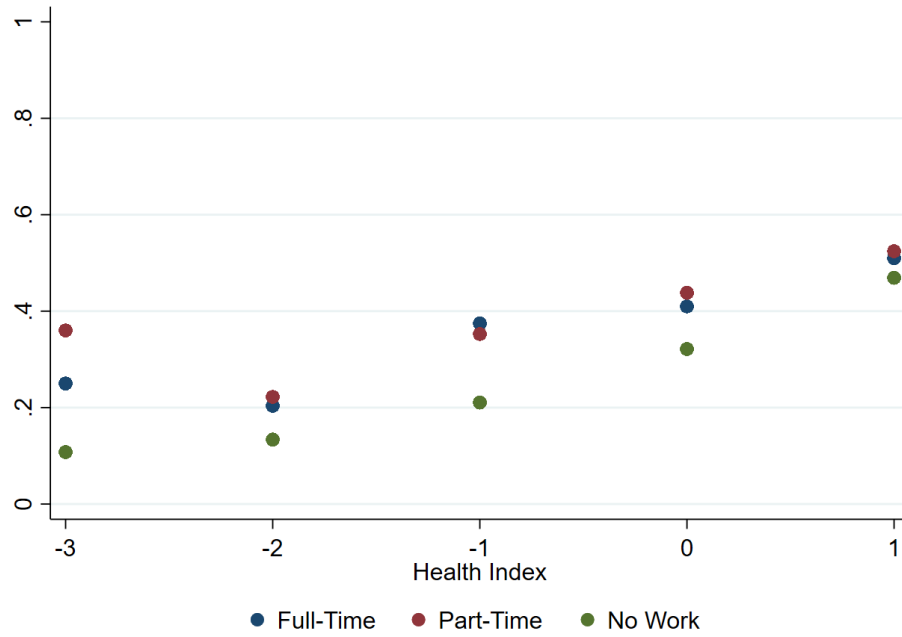
Mortality probability		
	Average Marginal Effect, %	Absolute AME, %
Full time work	-2.409282	.2707464
Part time work	-1.471762	.2931913
Consumption	-.0050716	
Health insurance	-.0000634	
Partial disability probability		
	Average Marginal Effect, %	Absolute AME, %
Full time work	-7.127741	.5382868
Part time work	.5819776	4.622073
Consumption	-.0096583	
Health insurance	-4.510421	
Full disability probability		
	Average Marginal Effect, %	Absolute AME, %
Full time work	-12.41317	.3865917
Part time work	.258383	4.878659
Consumption	-.0000672	
Health insurance	-2.871482	

Notes: Table 5 shows the average marginal effects of full-time (*FT*) and part-time (*PT*) employment, consumption (*C*) in tens of thousands of 2018 U.S. dollars, and health insurance (*I*) on mortality (*M*) and partial (*P*) and full (*F*) disability rates of the partially disabled. The health effects of employment are heterogeneous: $\beta_t^{KJi} = \gamma^{KJ} + \epsilon_t^{KJi}$, where $\epsilon_t^{KJi} \stackrel{\text{iid}}{\sim} N(0, \sigma_{KJ}^2)$, $K \in \{M, P, F\}$, $J \in \{FT, PT\}$. The second column shows the average marginal effects (AME), and the third column reports the absolute AME of ϵ_t^{KJi} .

Online Appendix A. Mechanisms behind Mortality Effects of Retirement

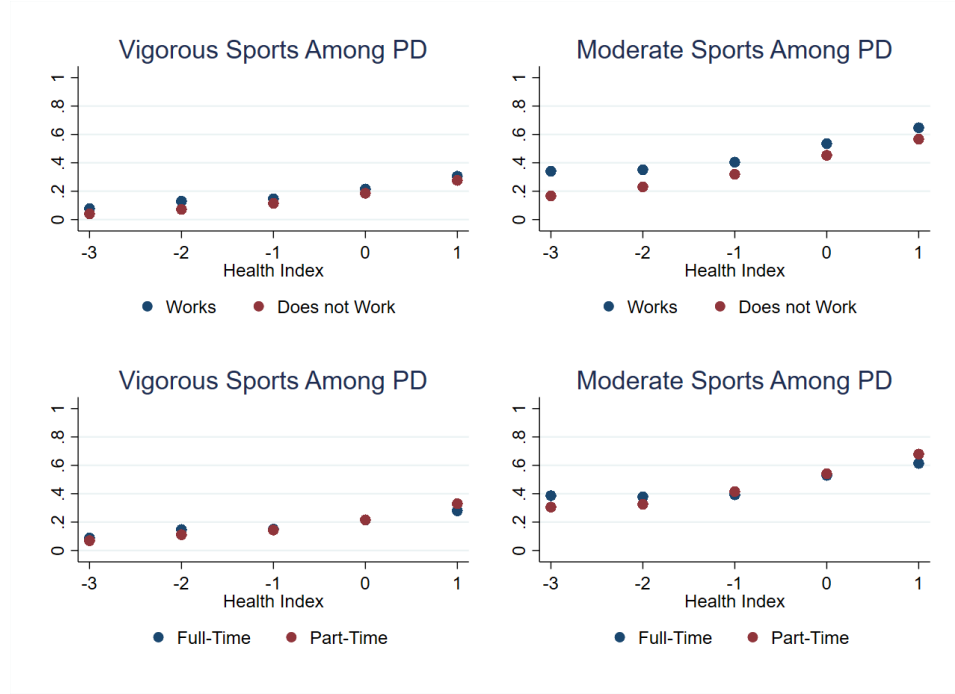
One of the reasons that existing studies (e.g., Fitzpatrick and Moore, 2018; Kuhn et al., 2020) cite as the cause of an increase in mortality following early retirement is the decrease in physical activity. This appendix examines how physical activity levels and health outcomes vary with different employment statuses, conditional on the health index (defined in section 4.2). For this analysis, I discretize the health index into 5 values: “-3” — around three standard deviations (s.d.) below the mean, “-2” — around two s.d. below the mean, “-1” — around one s.d. below the mean, “0” — around the mean, “1” — around one s.d. above the mean. The way questions on physical activities have been asked in the HRS data varied from wave to wave. In the waves before 2004, the questions on physical activity explicitly included work-related physical activity, while in the waves after 2004 (Figure A1), these questions instead focused on sports (Figure A2). If the questions on physical activity explicitly include work-related physical activity, then the health-conditional difference in physical activity between working and not working partially disabled is evident (Figure A1), while if the questions do not explicitly ask about work-related physical activity, the health-conditional difference in physical activity between working and not working is less pronounced but still present (Figure A2). With this more intense physical activity, working partially disabled Americans are less likely to develop high blood pressure, heart problems, stroke, and cancer (Figure A3). As a result, working partially disabled Americans are less likely to die in comparison with their non-working peers, while the mortality effects of health insurance coverage and income are noticeably lower (Figure A4).

Figure A1 Vigorous Physical Activity Including Work Among Partially Disabled by Employment Statuses and Health Index



Notes: Figure A1 shows the shares of the partially disabled engaged in vigorous physical activity, including work-related vigorous physical activity, by health index. Health Index is standardized and discretized into 4 values: “-3” — around three standard deviations below the mean, “-2” — around two standard deviations below the mean, “-1” — around one standard deviation below the mean, “0” — around the mean, “1” — around one standard deviation above the mean.

Figure A2 Vigorous and Moderate Sport Activity Among Partially Disabled by Employment Statuses and Health Index



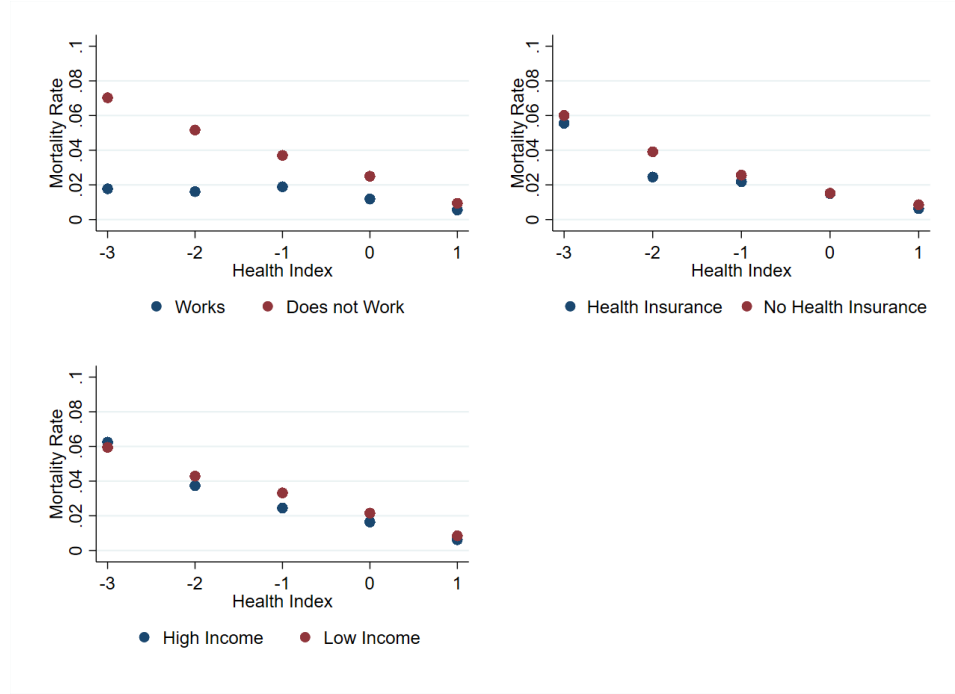
Notes: Figure A2 shows the shares of the partially disabled engaged in vigorous and moderate physical activity, by employment statuses and health index. Health Index is standardized and discretized into 4 values: “-3” — around three standard deviations below the mean, “-2” — around two standard deviations below the mean, “-1” — around one standard deviation below the mean, “0” — around the mean, “1” — around one standard deviation above the mean.

Figure A3 Health Problems of the Partially Disabled, by Employment Statuses and Health Index



Notes: Figure A3 shows the shares of the partially disabled experiencing health problems, by employment statuses and health index. Health Index is standardized and discretized into 4 values: “-3” — around three standard deviations below the mean, “-2” — around two standard deviations below the mean, “-1” — around one standard deviation below the mean, “0” — around the mean, “1” — around one standard deviation above the mean.

Figure A4 Mortality Rates of the Partially Disabled, by Employment, Health Insurance, and Income Statuses and Health Index



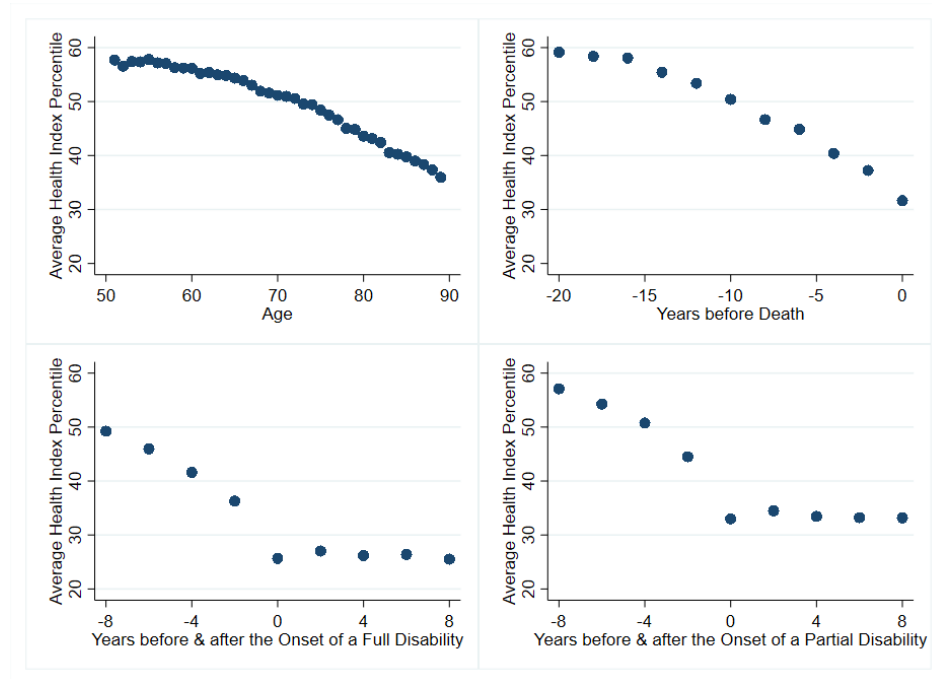
Notes: Figure A4 shows the mortality rate (the probability of dying in the next period) for the partially disabled, by employment, health insurance, and income (“High Income” stands for income above the median, and “Low Income” stands for income below the median) statuses, and by health index. Health Index is standardized and discretized into 4 values: “-3” — around three standard deviations (s.d.) below the mean, “-2” — around two s.d. below the mean, “-1” — around one s.d. below the mean, “0” — around the mean, “1” — around one s.d. above the mean.

Online Appendix B. Health Index

The following health-related variables are used in the construction of the health index: self-reported health, hospital stay during the last 2 years, nursing home stay during the last 2 years, depression, restless sleep, happiness, loneliness, joy of life, sadness, difficulty getting going, ever had heart problems, ever had a stroke, ever had psychological problems, ever had arthritis, any difficulty walking across the room, any difficulty dressing, any difficulty bathing, any difficulty eating, any difficulty getting in or out of bed, any difficulty walking one block, any difficulty sitting for 2 hours, any difficulty getting up from a chair, any difficulty picking up a dime, any difficulty extending arms up, had back problems.

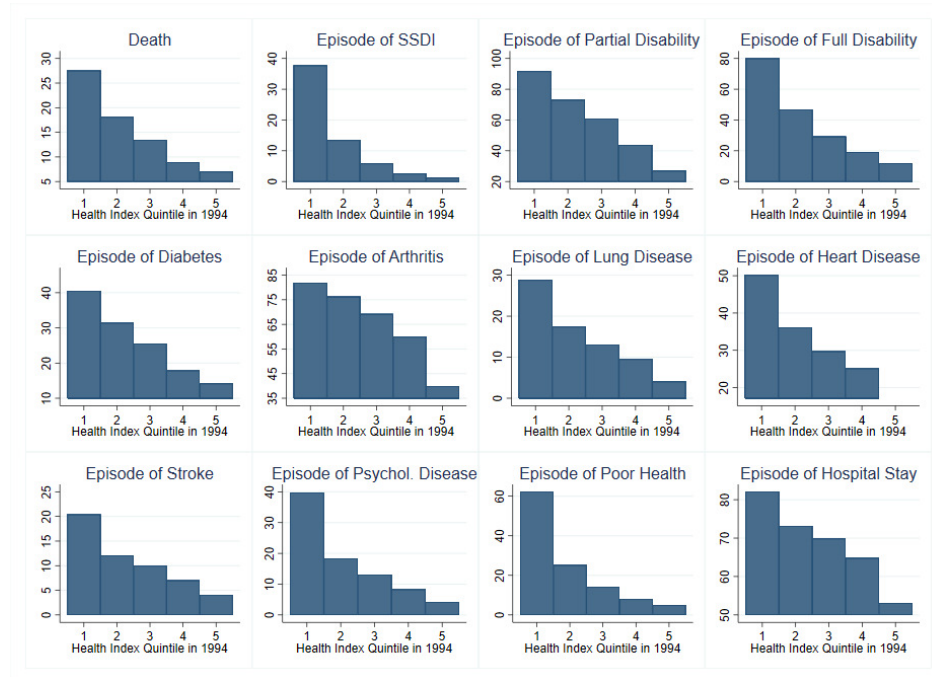
The constructed health index gradually declines with age and before death, and it falls sharply during the onset of partial or full disabilities (Figure B1). The health index is also predictive of bad health outcomes in the future (Figure B2). The lower the health index, the more likely it is for bad health outcomes to occur in the years to come. A low health index level is particularly predictive of poor health, psychological diseases, and the receipt of SSDI in the future.

Figure B1 Health Index Dynamics



Notes: Figure B1 shows the dynamics of the health index over a lifetime and during the onset of partial and full disabilities. The dots show the average percentile of a health index by age or year. The graphs are based on the HRS Public Survey Data for the years between 1994 and 2016.

Figure B2 The Percentage of HRS Respondents Who Experienced Health Events by 2010 by Health Index Quintile in 1994



Notes: Figure B2 demonstrates the predictive power of a health index. Respondents with a lower health index in 1994 were more likely to experience negative health outcomes by 2010. The graphs are based on the HRS Public Survey Data for the years 1994–2016.

Online Appendix C. Model Solution

The model solution is similar to that of Joubert and Todd (2024). Specifically, the model is solved by backward recursion. At age t_{D-1} , an individual makes optimal work and SSDI application decisions to maximize the weighted sum of current and future period utilities, $V_{t_{D-1}}$. The expected value of $V_{t_{D-1}}$, $EV_{t_{D-1}}$, is calculated using Monte Carlo integration. 10 Monte Carlo draws for health and earnings shocks are used. These calculations are performed at a set of all possible deterministic state points. Given that it is impossible to solve the problem at all continuous values of the health index and Average Indexed Monthly Earnings (AIME), I discretize the health index into 4 grid points and AIME into 4 grid points. For all other state points, $EV_{t_{D-1}}$ is approximated using a polynomial regression following the approximation method proposed by Keane and Wolpin (1994, 1997). The result of this approximation is denoted as $EmaxV_{t_{D-1}}$.

This procedure is then applied at age t_{D-2} . Substituting the $EmaxV_{t_{D-1}}$ for $EV_{t_{D-1}}$, the optimal decision is determined. Monte Carlo integration over the shock vector at t_{D-2} yields $EV_{t_{D-2}}$ for each specified deterministic state point. A polynomial regression over a subset of these state points again produces an approximation to $EV_{t_{D-2}}$ — $EmaxV_{t_{D-1}}$. Iterating the procedure back to the initial age produces the approximation at each age. The set of $EmaxV_t$ is the solution to the optimization problem.

Online Appendix D. Utility Function

The per-period utility function of an agent, $u_t^i(\cdot)$, has the following form:

$$\begin{aligned}
u_t^i(S_t^i) = & \ln(C_t^i) \left(1 + \sum_{j \in \{P, N\}} (\alpha_L^j 1_{work_t^i=j} + \alpha_L^{jH} 1_{work_t^i=j} \tilde{H}_t^i) + \right. \\
& + \sum_{j \in \{F, P\}} (\alpha_W^j 1_{work_t^i=j} 1_{D_t^i=P} + \alpha_W^{jH} 1_{work_t^i=j} 1_{D_t^i=P} \hat{H}_t^i) + \\
& + \sum_{j \in \{F, P, N\}} (\alpha_O^j start_t^i 1_{D_t^i=j} + \alpha_O^{jH} start_t^i 1_{D_t^i=j} \tilde{H}_t^i) \Big) + \\
& + \sum_{j \in \{F, P\}} (\alpha_R^j 1_{work_t^i=j} 1_{work_{t-1}^i=N} + \alpha_R^{jH} 1_{work_t^i=j} 1_{work_{t-1}^i=N} \hat{H}_t^i) + \\
& + \sum_{j \in \{P, N\}} (\alpha_{PF}^j 1_{work_t^i=F} 1_{work_{t-1}^i=P} + \alpha_{FP}^j 1_{work_t^i=P} 1_{work_{t-1}^i=F}) 1_{D_t^i=j} + \\
& + \sum_{k \in \{NA, t, t-1, t-2\}, j \in \{P, F\}} (\alpha_k^j + \alpha_k^{jH} 1_{D_t^i=j} \tilde{H}_t^i) 1_{apply_t^i=FD} 1_{SSOA_t^i=k}.
\end{aligned}$$

The utility derived from consumption varies with employment, disability, and Social Security Old-Age benefits statuses, $work_t^i$, D_t^i , $start_t^i$, and the health index, H_t^i . The health index is transformed in such a way that everyone receives utility benefits from leisure and disutility from Social Security benefits applications and from working while disabled. Those with a higher health index receive higher utility benefits from leisure, higher utility costs from the Social Security applications, and lower utility costs from working while partially disabled: $\tilde{H}_t^i = |max(H_t^i)| + H_t^i$, $\hat{H}_t^i = |min(H_t^i)| - H_t^i$. Agents also bear utility costs from returning to part-time or full-time work after not working, switching employment statuses, and applying for Social Security benefits. Individuals make decisions while they are between 51, t_{min} , and 70, t_R . To account for all unobserved factors preceding the initial period, the utility of individuals in this initial period is adjusted by:

$$\begin{aligned}\tilde{u}_{t_{min}}^i(S_{t_{min}}^i) &= \alpha_{t_{min}}^{FP} 1_{work_t^i=F} 1_{D_t^i=P} + \alpha_{t_{min}}^{PP} 1_{work_t^i=P} 1_{D_t^i=P} \\ &+ \alpha_{t_{min}}^{AP} 1_{apply_t^i=F} 1_{D_t^i=P} \tilde{H}_t^i + \alpha_{t_{min}}^{AF} 1_{apply_t^i=F} 1_{D_t^i=F} \tilde{H}_t^i.\end{aligned}$$

When individuals turn 70, t_R , they additionally receive the utility:

$$\begin{aligned}\tilde{u}_R^i(S_R^i) &= \alpha_R^R 1_{SSD_t^i=OA} + \alpha_R^{RP} 1_{SSD_t^i=OA} 1_{D_t^i=P} + \alpha_R^{RF} 1_{SSD_t^i=OA} 1_{D_t^i=F} + \\ &+ \alpha_R^A 1_{apply_t^i=OA} + \alpha_R^{AP} 1_{apply_t^i=OA} 1_{D_t^i=P} + \alpha_R^{AF} 1_{apply_t^i=OA} 1_{D_t^i=F}.\end{aligned}$$

If individuals die before 70, they receive terminal value, $\alpha_{terminal}$.

Online Appendix E. Parameter Estimates and Moments

Table E1: Parameter Estimates

Name	Symbol	Estimate
Discount Factor	β	0.98
Utility of		
PT leisure, constant	α_L^P	0.19
PT leisure, health index coefficient	α_L^{PH}	0.23
FT leisure, constant	α_L^F	0.21
FT leisure, health index coefficient	α_L^{FH}	0.35
FT work while PD, constant	α_W^F	-0.00008
FT work while PD, health index coefficient	α_W^{FH}	-0.00010
PT work while PD, constant	α_W^P	-0.00280
PT work while PD, health index coefficient	α_W^{PH}	-0.01007
Utility of applying for SSOA		
For ND, constant	α_O^N	-.635
For ND, health index coefficient	α_O^{NH}	-.403
For PD, constant	α_O^P	-.003
For PD, health index coefficient	α_O^{PH}	-.429
For FD, constant	α_O^F	-.620
For FD, health index coefficient	α_O^{FH}	-.256
Utility of Returning		
To FT work, constant	α_R^F	-11.50
To FT work, health index coefficient	α_R^{FH}	-43.00
To PT work, constant	α_R^P	-15.90
To PT work, health index coefficient	α_R^{PH}	-27.93

Table E1: Parameter Estimates (Continued)

Name	Symbol	Estimate
Utility of Switching		
To FT work for ND	α_N^{PF}	0.34
To PT work for ND	α_N^{FP}	-1.50
To FT work for PD	α_P^{PF}	-0.00199
To PT work for PD	α_P^{FP}	-0.00078
Utility of applying for SSDI before SSOA reciprocity for		
For PD, constant	α_{NA}^P	-1.83
For PD, health index coefficient	α_{NA}^{PH}	-0.20
For FD, constant	α_{NA}^F	-0.70
For FD, health index coefficient	α_{NA}^{FH}	-0.32
Utility of applying for SSDI during the 1st period of SSOA		
For PD, constant	α_t^P	-0.29
For PD, health index coefficient	α_t^{PH}	-0.12
For FD, constant	α_t^F	-0.07
For FD, health index coefficient	α_t^{FH}	-1.15
Utility of applying for SSDI during the 2st period of SSOA		
For PD, constant	α_{t-1}^P	-0.82
For PD, health index coefficient	α_{t-1}^{PH}	-0.89
For FD, constant	α_{t-1}^F	-0.56
For FD, health index coefficient	α_{t-1}^{FH}	-0.35

Table E1: Parameter Estimates (Continued)

Name	Symbol	Estimate
Utility of applying for SSDI during the 3rd period of SSOA		
For PD, constant	α_{t-2}^P	-1.15
For PD, health index coefficient	α_{t-2}^{PH}	-0.11
For FD, constant	α_{t-2}^F	-0.50
For FD, health index coefficient	α_{t-2}^{FH}	-6.15
Mortality rate logit regression		
Constant	β^{MC}	-7.700000
Full-time	β^{MFT}	-0.000200
Part-time	β^{MPT}	-0.005090
Fully disabled	β^{MF}	1.482000
Partially disabled	β^{MP}	1.824254
Health Index	β^{MH}	-0.017620
Age	β^{MA}	0.044584
Education	β^{ME}	-0.019000
Full-time work for PD	γ^{MFT}	-1.710000
Part-time work for PD	γ^{MPT}	-1.039622
Full-time work for college educated	β^{MFTE}	-0.000005
Part-time work for college educated	β^{MPTE}	-0.000003
Consumption in thousands of dollars	β^{MC}	-0.000360
Health insurance	β^{MI}	-0.000045
S.D. of full-time work effects for PD	σ_{MFT}	0.240625
S.D. of part-time work effects for PD	σ_{MPT}	0.260313
Quadratic age coefficient when age ≥ 70	$\beta^{MA_{squared}}$	0.00290

Table E1: Parameter Estimates (Continued)

Name	Symbol	Estimate
Partial disability rate logit regression		
Constant	β^{PC}	-2.5840220
Full-time	β^{PFT}	-0.7385721
Part-time	β^{PPT}	-2.0265713
Fully disabled	β^{PF}	0.0003600
Partially disabled	β^{PP}	2.6938740
Health Index	β^{PH}	-0.9987486
Age	β^{PA}	0.0194382
Education	β^{PE}	0.0440154
Full-time work for PD	γ^{PFT}	0.0005800
Part-time work for PD	γ^{PPT}	2.0868281
Full-time work for college educated	β^{PFTE}	0.0485781
Part-time work for college educated	β^{PPTe}	0.0000003
Consumption in thousands of dollars	β^{PC}	-0.0001000
Health insurance	β^{PI}	-0.4670000
S.D. of full-time work effects for PD	σ_{PFT}	0.1150000
S.D. of part-time work effects for PD	σ_{PPT}	1.4431250

Table E1: Parameter Estimates (Continued)

Name	Symbol	Estimate
Full disability rate logit regression		
Constant	β^{FC}	-3.101202
Full-time	β^{FFT}	-2.955109
Part-time	β^{FPT}	0.066250
Fully disabled	β^{FF}	3.885498
Partially disabled	β^{FP}	0.001610
Health Index	β^{FH}	-0.488417
Age	β^{FA}	0.009990
Education	β^{FE}	-1.700000
Full-time work for PD	γ^{FFT}	-0.000901
Part-time work for PD	γ^{FPT}	-0.004720
Full-time work for college educated	β^{FFTE}	0.246613
Part-time work for college educated	β^{FPTE}	0.000120
Consumption in thousands of dollars	β^{FC}	-0.000002
Health insurance	β^{FI}	-0.683800
S.D. of full-time work effects for PD	σ_{FFT}	0.070000
S.D. of part-time work effects for PD	σ_{FPT}	0.600625

Table E1: Parameter Estimates (Continued)

Name	Symbol	Estimate
Health index regression		
Constant	β^{HC}	0.2045000
Full-time	β^{HFT}	-.0555000
Part-time	β^{HPT}	0.0020000
Fully disabled	β^{HF}	-.6350000
Partially disabled	β^{HP}	-.4000000
Health Index	β^{HH}	0.7700000
Age	β^{HA}	-.0010700
Education	β^{HE}	0.1761300
Full-time work for PD	β^{HFTP}	-.1564000
Part-time work for PD	β^{HPTP}	-.0904900
Full-time work for college educated	β^{HFTE}	0.0000840
Part-time work for college educated	β^{HPTTE}	-.4008460
Consumption in thousands of dollar	β^{HC}	0.0000009
Health insurance	β^{HI}	0.0538000
S.D. of full-time work effects for PD	σ_{HFT}	0.000500
S.D. of part-time work effects for PD	σ_{HPT}	0.046000
Health index shock	σ_H^2	0.00010

Table E1: Parameter Estimates (Continued)

Name	Symbol	Estimate
SSDI award probability logit regression		
Constant	β_R^C	-10.62500
Fully disabled	β_R^F	0.23
Health Index	β_R^H	-11.08
Age	β_R^A	0.00
Education	β_R^E	-0.00
Age ≥ 59	β_R^{Age59}	1.34
Age ≥ 60	β_R^{Age60}	1.14
Age ≥ 61	β_R^{Age61}	3.40
Age ≥ 62	β_R^{Age62}	0.20
Age ≥ 63	β_R^{Age63}	0.12
Age ≥ 64	β_R^{Age64}	0.02
Earnings regression, Thousands of 2018 U.S. Dollars		
Constant	β_W^C	10.54443
Full-time work	β_W^F	61.75616
Health Index	β_W^H	0.03600
Age	β_W^A	-0.57952
Part-time work for PD	β_W^{PP}	-15.57655
Full-time work for PD	β_W^{FP}	-0.21405
Part-time work for college-educated	β_W^{PC}	63.10165
Full-time work for college-educated	β_W^{FC}	29.82717
Earnings shock	σ_W^2	28.01800

Table E1: Parameter Estimates (Continued)

Name	Symbol	Estimate
Private health insurance logit regression		
Constant	β_{PH}	-2.621
Full-time	β_{PH}^{FT}	2.393
Part-time	β_{PH}^{PT}	1.267
Fully disabled	β_{PH}^F	-0.310
Partially disabled	β_{PH}^P	0.782
Health Index	β_{PH}^H	0.067
Age	β_{PH}^A	0.035
Education	β_{PH}^E	0.394
Full-time work for PD	β_{PH}^{FP}	-1.480
Part-time work fo PD	β_{PH}^{PP}	-1.260
Full-time work for college educated	β_{PH}^{FE}	0.120
Part-time work for college educated	β_{PH}^{PE}	0.011
Consumption	β_{PH}^C	0.003
Medicaid logit regression		
Constant	β_{MC}	-4.40000
Health Index	β_{MC}^H	-0.00034
Age	β_{MC}^A	0.03422
Education	β_{MC}^E	-1.55500
Consumption	β_{MC}^C	-0.00002

Table E1: Parameter Estimates (Continued)

Name	Symbol	Estimate
First decision-making period utility of		
Working full-time	α_{FF}	-0.52
First period utility of working part-time	α_{FF}	-1.23
Working full-time for PD	α_{FF}	-2.01
Working part-time for PD	α_{FF}	-0.60
Applying for SSDI fo PD	α_{FF}	-1.10
Applying for SSDI for FD	α_{FF}	-0.18
Retirement period utility of		
Working full-time	α_{BF}	2.20000
Working part-time	α_{BP}	2.10625
Working full-time for PD	α_{BFP}	4.00000
Working part-time for PD	α_{BPP}	1.01500
Not receiving SSOA	α_{BF}	0.18000
Not receiving SSOA for PD	α_{BF}	-1.70250
Not receiving SSOA for FD	α_{BF}	-0.22360
Not starting SSOA	α_{BF}	-0.00278
Not starting SSOA for PD	α_{BF}	-56.53750
Not starting SSOA for FD	α_{BF}	37.79002
Terminal value	α_T	-0.23

Notes: Table E1 shows the model parameter estimates. In total, the model has 160 parameters described in section 6. PT stands for part-time, FT — for full-time, PD — for the partially disabled, ND — for the not disabled, and FD — for the fully disabled.

Consumption is in thousands of 2018 U.S. dollars. Age dummies in the SSDI award logit regression represent [special rules for applicants close to retirement age](#).

Table E2: List of Moments

Out.	Conditions							Mean		Var.
	Age	LS	PD	FD	Ed.	C	HI	Data	Sim.	
FT	51		-	-				0.689	0.745	0.214
FT	52		-	-				0.683	0.757	0.217
FT	53		-	-				0.694	0.749	0.212
FT	54		-	-				0.680	0.739	0.217
FT	55		-	-				0.687	0.715	0.215
FT	56		-	-				0.664	0.692	0.223
FT	57		-	-				0.649	0.687	0.228
FT	58		-	-				0.634	0.689	0.232
FT	59		-	-				0.601	0.660	0.240
FT	60		-	-				0.554	0.636	0.247
FT	61		-	-				0.524	0.593	0.249
FT	62		-	-				0.420	0.416	0.244
FT	63		-	-				0.357	0.332	0.230
FT	64		-	-				0.330	0.239	0.221
FT	65		-	-				0.255	0.189	0.190
FT	66		-	-				0.223	0.159	0.173
FT	67		-	-				0.194	0.159	0.156
FT	68		-	-				0.149	0.149	0.127
FT	69		-	-				0.138	0.098	0.119
FT	70		-	-				0.123	0.117	0.108

Table E2: List of Moments (Continued)

Out.	Conditions							Mean		Var.
	Age	LS	PD	FD	Ed.	C	HI	Data	Sim.	
FT	51		+	-				0.247	0.262	0.186
FT	52		+	-				0.312	0.321	0.215
FT	53		+	-				0.327	0.313	0.220
FT	54		+	-				0.354	0.310	0.229
FT	55		+	-				0.328	0.292	0.221
FT	56		+	-				0.340	0.298	0.225
FT	57		+	-				0.263	0.278	0.194
FT	58		+	-				0.297	0.266	0.209
FT	59		+	-				0.264	0.271	0.195
FT	60		+	-				0.222	0.246	0.173
FT	61		+	-				0.201	0.227	0.161
FT	62		+	-				0.163	0.190	0.137
FT	63		+	-				0.130	0.134	0.113
FT	64		+	-				0.104	0.101	0.093
FT	65		+	-				0.082	0.083	0.076
FT	66		+	-				0.062	0.060	0.058
FT	67–68		+	-				0.048	0.049	0.046
FT	69		+	-				0.034	0.037	0.032
FT	70		+	-				0.040	0.036	0.038
PT	51–52		-	-				0.152	0.200	0.129
PT	53		-	-				0.148	0.190	0.126
PT	54		-	-				0.153	0.186	0.130
PT	55		-	-				0.148	0.200	0.126

Table E2: List of Moments (Continued)

Out.	Conditions							Mean		Var.
	Age	LS	PD	FD	Ed.	C	HI	Data	Sim.	
PT	56		-	-				0.153	0.209	0.130
PT	57		-	-				0.163	0.196	0.136
PT	58		-	-				0.160	0.186	0.135
PT	59		-	-				0.174	0.193	0.144
PT	60		-	-				0.176	0.182	0.145
PT	61		-	-				0.179	0.156	0.147
PT	62		-	-				0.196	0.146	0.158
PT	63		-	-				0.218	0.151	0.171
PT	64		-	-				0.202	0.172	0.161
PT	65		-	-				0.217	0.189	0.170
PT	66		-	-				0.213	0.218	0.167
PT	67		-	-				0.225	0.226	0.174
PT	68		-	-				0.222	0.240	0.173
PT	69		-	-				0.212	0.292	0.167
PT	70		-	-				0.207	0.226	0.164
PT	51		+	-				0.208	0.210	0.165
PT	52		+	-				0.214	0.208	0.168
PT	53		+	-				0.196	0.196	0.158
PT	54		+	-				0.191	0.212	0.155
PT	55		+	-				0.216	0.208	0.170

Table E2: List of Moments (Continued)

Out.	Conditions							Mean		Var.
	Age	LS	PD	FD	Ed.	C	HI	Data	Sim.	
PT	56		+	-				0.182	0.175	0.149
PT	57		+	-				0.167	0.185	0.139
PT	58		+	-				0.186	0.174	0.152
PT	59		+	-				0.151	0.175	0.128
PT	60		+	-				0.177	0.174	0.146
PT	61		+	-				0.161	0.173	0.135
PT	62		+	-				0.143	0.146	0.122
PT	63		+	-				0.145	0.134	0.124
PT	64		+	-				0.146	0.132	0.124
PT	65		+	-				0.131	0.114	0.114
PT	66		+	-				0.129	0.125	0.112
PT	67–68		+	-				0.110	0.109	0.098
PT	69		+	-				0.106	0.089	0.095
PT	70		+	-				0.092	0.085	0.084
App.	51		+	-				0.029	0.026	0.028
App.	52		+	-				0.030	0.040	0.029
App.	53		+	-				0.036	0.040	0.035
App.	54		+	-				0.038	0.037	0.036
App.	55		+	-				0.027	0.033	0.026

Table E2: List of Moments (Continued)

Out.	Conditions							Mean		Var.
	Age	LS	PD	FD	Ed.	C	HI	Data	Sim.	
App.	56		+	-				0.036	0.032	0.035
App.	57		+	-				0.033	0.032	0.032
App.	58		+	-				0.031	0.026	0.030
App.	59		+	-				0.032	0.033	0.031
App.	60		+	-				0.039	0.031	0.038
App.	61		+	-				0.037	0.033	0.036
App.	62		+	-				0.056	0.056	0.053
App.	63		+	-				0.037	0.033	0.036
App.	64		+	-				0.036	0.037	0.035
App.	51		-	+				0.110	0.118	0.098
App.	52		-	+				0.110	0.113	0.098
App.	53		-	+				0.103	0.101	0.093
App.	54		-	+				0.101	0.085	0.091
App.	55		-	+				0.102	0.090	0.092
App.	56		-	+				0.092	0.096	0.083
App.	57		-	+				0.091	0.083	0.083
App.	58		-	+				0.089	0.076	0.081
App.	59		-	+				0.108	0.090	0.096
App.	60		-	+				0.091	0.087	0.083
App.	61		-	+				0.087	0.103	0.079
App.	62		-	+				0.055	0.040	0.052
App.	63		-	+				0.069	0.072	0.065
App.	64		-	+				0.070	0.076	0.066

Table E2: List of Moments (Continued)

Out.	Conditions							Mean		Var.
	Age	LS	PD	FD	Ed.	C	HI	Data	Sim.	
SSOA	62							0.287	0.223	0.205
SSOA	63							0.375	0.388	0.234
SSOA	64							0.439	0.490	0.246
SSOA	65							0.656	0.658	0.226
SSOA	66							0.841	0.801	0.133
SSOA	67							0.868	0.840	0.115
SSOA	68							0.884	0.857	0.103
SSOA	69							0.889	0.862	0.099
SSOA	70							0.907	0.893	0.084
SSDI	51							0.051	0.051	0.051
SSDI	52							0.056	0.056	0.051
SSDI	53							0.060	0.065	0.058
SSDI	54							0.063	0.071	0.058
SSDI	55							0.070	0.078	0.065
SSDI	56							0.077	0.083	0.071
SSDI	57							0.073	0.088	0.068
SSDI	58							0.077	0.092	0.071
SSDI	59							0.078	0.095	0.072
SSDI	60							0.081	0.100	0.075
SSDI	61							0.089	0.104	0.081
SSDI	62							0.096	0.111	0.087
SSDI	63							0.097	0.117	0.087

Table E2: List of Moments (Continued)

Out.	Conditions								Mean		Var.
	Age	LS	PD	FD	Ed.	C	HI	Data	Sim.		
SSDI	64							0.100	0.124	0.090	
SSDI	<65		-	+				0.544	0.625	0.248	
SSDI	<65				-			0.091	0.111	0.083	
SSDI	<65				-			0.028	0.030	0.027	
PD	51							0.092	0.095	0.083	
PD	52							0.104	0.108	0.093	
PD	53							0.103	0.111	0.092	
PD	54							0.110	0.114	0.098	
PD	55							0.112	0.116	0.099	
PD	56							0.119	0.117	0.105	
PD	57							0.114	0.118	0.101	
PD	58							0.123	0.120	0.108	
PD	59							0.121	0.123	0.107	
PD	60							0.131	0.125	0.114	
PD	61							0.132	0.129	0.114	
PD	62							0.142	0.116	0.122	
PD	63							0.131	0.100	0.114	
PD	64							0.138	0.114	0.119	

Table E2: List of Moments (Continued)

Out.	Conditions							Mean		Var.
	Age	LS	PD	FD	Ed.	C	HI	Data	Sim.	
PD	<65	-	-	-				0.149	0.176	0.127
PD	<65	PT	-	-				0.091	0.039	0.083
PD	<65	FT	-	-				0.067	0.066	0.063
PD	<65	-	+	-				0.521	0.579	0.250
PD	<65	PT	+	-				0.530	0.505	0.249
PD	<65	FT	+	-				0.422	0.470	0.244
PD	<65	-			-			0.234	0.265	0.179
PD	<65	PT			-			0.158	0.134	0.133
PD	<65	FT			-			0.100	0.098	0.090
PD	<65	-			+			0.180	0.186	0.148
PD	<65	PT			+			0.115	0.063	0.102
PD	<65	FT			+			0.062	0.073	0.058
PD	<65					<20		0.221	0.238	0.172
PD	<65					>20		0.115	0.095	0.101
PD	<65						-	0.178	0.176	0.146
PD	<65						+	0.121	0.102	0.106
FD	51							0.029	0.028	0.028
FD	52							0.041	0.036	0.039
FD	53							0.040	0.037	0.039
FD	54							0.045	0.039	0.043
FD	55							0.046	0.043	0.043

Table E2: List of Moments (Continued)

Out.	Conditions							Mean		Var.
	Age	LS	PD	FD	Ed.	C	HI	Data	Sim.	
FD	56							0.044	0.043	0.042
FD	57							0.043	0.043	0.041
FD	58							0.043	0.043	0.041
FD	59							0.047	0.043	0.045
FD	60							0.044	0.044	0.042
FD	61							0.048	0.047	0.046
FD	62							0.044	0.043	0.042
FD	<65	-	-	-				0.143	0.074	0.123
FD	<65	PT	-	-				0.014	0.020	0.014
FD	<65	FT	-	-				0.011	0.009	0.011
FD	<65	-	+	-				0.185	0.126	0.151
FD	<65	PT	+	-				0.094	0.086	0.085
FD	<65	FT	+	-				0.059	0.030	0.055
FD	<65	-			-			0.172	0.189	0.143
FD	<65	PT			-			0.029	0.049	0.028
FD	<65	FT			-			0.018	0.013	0.018
FD	<65	-			+			0.053	0.065	0.050
FD	<65	PT			+			0.010	0.005	0.010
FD	<65	FT			+			0.004	0.002	0.004
FD	<65					<20		0.162	0.179	0.136
FD	<65					>20		0.033	0.016	0.032
FD	<65						-	0.081	0.103	0.074
FD	<65						+	0.041	0.021	0.040

Table E2: List of Moments (Continued)

Out.	Conditions							Mean		Var.
	Age	LS	PD	FD	Ed.	C	HI	Data	Sim.	
M.	51–52							0.007	0.007	0.007
M.	53–54							0.008	0.007	0.008
M.	55							0.009	0.008	0.008
M.	56							0.009	0.009	0.009
M.	57							0.010	0.011	0.010
M.	58							0.012	0.011	0.012
M.	59							0.013	0.010	0.013
M.	60							0.015	0.012	0.015
M.	61							0.013	0.012	0.013
M.	62							0.014	0.014	0.014
M.	63							0.015	0.015	0.015
M.	64							0.016	0.017	0.016
M.	65							0.020	0.019	0.020
M.	66							0.022	0.022	0.021
M.	67–68							0.023	0.025	0.022
M.	69–70							0.026	0.029	0.025
M.	71							0.036	0.038	0.035
M.	72							0.046	0.040	0.043
M.	73							0.045	0.040	0.043
M.	74							0.046	0.049	0.044
M.	75							0.057	0.052	0.054

Table E2: List of Moments (Continued)

Out.	Conditions							Mean		Var.
	Age	LS	PD	FD	Ed.	C	HI	Data	Sim.	
M.	76							0.058	0.054	0.054
M.	77							0.063	0.053	0.059
M.	78							0.067	0.070	0.062
M.	79							0.074	0.068	0.068
M.	80							0.083	0.096	0.076
M.	81							0.088	0.086	0.080
M.	82							0.101	0.097	0.091
M.	83							0.110	0.107	0.098
M.	84							0.118	0.115	0.104
M.	85							0.133	0.117	0.115
M.	86							0.147	0.148	0.126
M.	87							0.170	0.173	0.141
M.	88							0.175	0.180	0.145
M.	89							0.213	0.207	0.168
M.	90							0.192	0.182	0.155
M.	≤70		-	-				0.007	0.007	0.007
M.	≤70		-	+				0.043	0.033	0.041
M.	≤70	-			-			0.026	0.025	0.025
M.	≤70	-			+			0.018	0.023	0.017
M.	≤70	FT			-			0.006	0.006	0.006
M.	≤70	PT			-			0.007	0.008	0.007
M.	≤70	-	-	-				0.012	0.008	0.012
M.	≤70	-	+	-				0.035	0.049	0.034

Table E2: List of Moments (Continued)

Out.	Conditions							Mean		Var.
	Age	LS	PD	FD	Ed.	C	HI	Data	Sim.	
M.	≤ 70	FT	+	-				0.015	0.008	0.015
M.	≤ 70	PT	+	-				0.011	0.014	0.011
M.	≤ 70					<20		0.019	0.021	0.018
M.	≤ 70					>20		0.008	0.008	0.008
M.	<65						-	0.012	0.015	0.012
M.	<65						+	0.008	0.009	0.007
HI	51–55							0.140	0.123	1.011
HI	56–61							0.080	0.142	1.049
HI	62–66							0.066	0.131	0.965
HI	67–70							0.036	-0.114	0.892
HI	≤ 70	-	-	-				0.316	0.274	0.586
HI	≤ 70	FT	-	-				0.453	0.525	0.467
HI	≤ 70	PT	-	-				0.412	0.418	0.486
HI	≤ 70	-	+	-				-0.639	-0.490	1.081
HI	≤ 70	FT	+	-				-0.403	-0.264	0.936
HI	≤ 70	PT	+	-				-0.464	-0.524	0.949
HI	≤ 70		-	+				-1.321	-1.086	1.292
HI	≤ 70	FT			+			0.612	0.656	0.347
HI	≤ 70	PT			+			0.530	0.340	0.422
HI	≤ 70					<20		-0.121	-0.174	1.204
HI	≤ 70					>20		0.371	0.397	0.583

Table E2: List of Moments (Continued)

Out.	Conditions							Mean		Var.
	Age	LS	PD	FD	Ed.	C	HI	Data	Sim.	
HI	<65						-	0.013	-0.206	0.971
HI	<65						+	0.341	0.335	0.690
E.	≤70	PT	-	-				55.27	52.50	2875
E.	≤70	FT	-	-				22.44	21.94	1416
E.	≤70	PT	+	-				39.99	43.671	1467
E.	≤70	FT	+	-				13.74	12.57	692
E.	≤70	PT			+			81.60	85.60	4917
E.	≤70	FT			+			32.71	26.01	2840
E.	51–55	FT			+			50.32	46.03	2702
E.	56–61	FT			+			47.07	43.37	2596
E.	62–66	FT			+			38.08	40.93	2432
E.	67–70	FT			+			26.43	30.01	1950
PHI	≤70	FT	-	-				0.866	0.885	0.116
PHI	≤70	PT	-	-				0.708	0.749	0.207
PHI	≤70	FT	+	-				0.787	0.786	0.168
PHI	≤70	PT	+	-				0.587	0.599	0.243
PHI	≤70	FT			-			0.835	0.861	0.138
PHI	≤70	PT			-			0.646	0.653	0.229
PHI	≤70	FT			+			0.924	0.923	0.070
PHI	≤70	PT			+			0.818	0.001	0.149
PHI	51–55							0.728	0.724	0.198
PHI	56–60							0.728	0.717	0.198
PHI	61–64							0.722	0.625	0.201

Table E2: List of Moments (Continued)

Out.	Conditions							Mean		Var.
	Age	LS	PD	FD	Ed.	C	HI	Data	Sim.	
PHI	≤ 70		-	-				0.768	0.713	0.178
PHI	≤ 70		+	-				0.582	0.624	0.243
PHI	≤ 70		-	+				0.274	0.315	0.199
PHI	≤ 70				-			0.644	0.606	0.229
PHI	≤ 70				+			0.851	0.836	0.127
MA	51–55							0.074	0.059	0.070
MA	56–60							0.076	0.069	0.070
MA	61–64							0.075	0.081	0.069
MA	≤ 70				-			0.093	0.092	0.084
MA	≤ 70				+			0.017	0.020	0.016

Notes: Table E2 shows the list of moments. All moments are conditional means calculated for the HRS data (1994–2016) and simulated data. The table’s columns are as follows: 1.) The Out. column describes the outcome variables for which the means are computed. FT stands for working full-time, PT — working part-time, App. — applying for SSDI benefits, SSOA — receiving Social Security Old-Age (SSOA) benefits, SSDI — receiving SSDI benefits, PD — probability of being partially disabled, FD — probability of being fully disabled, M. — the mortality rate (the probability of dying in the next period), HI — health index, E. — earnings, PHI — the probability of being covered by private health insurance, and MA — the probability of being covered by Medicaid. In the model, individuals make labor supply decisions when they are between 51 and 70, they can apply for SSDI benefits when they are younger than 65, and they can apply for SSOA benefits when they are between 62 and 70. The massive retirement process that starts when

individuals turn 62 years old affects their answers to questions about disability. As a result, I focus on the shares of disabled people below 62. 2.) Conditions columns list the variables on which the means are conditional. All non-age conditions are calculated based on lagged variables. “-” in the Conditions columns LS, PD, FD, Ed., and HI stand for conditional on not working, not being partially disabled, not being fully disabled, not having a college education, and not having health insurance. “+” in the columns PD, FD, Ed., and HI stand for conditional on being partially disabled, being fully disabled, being college educated, and being covered by health insurance before 65. “C” is the consumption in thousands of 2018 U.S. dollars. Consumption is the sum of earnings, SSDI, and Social Security Old-Age benefits. 3.) Mean columns show the means for the HRS data (Data column) and the simulated data (Sim. column). 4.) The Var. column shows the variance of the means computed using HRS data. The inverse variance is used for the weights.

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Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work, I used ChatGPT in order to improve the readability and language of the manuscript. After using this service, I reviewed and edited the content as needed and take full responsibility for the content of the publication.

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