The Economics of Catastrophic Income Insurance: Head and Neck Cancer as a Model

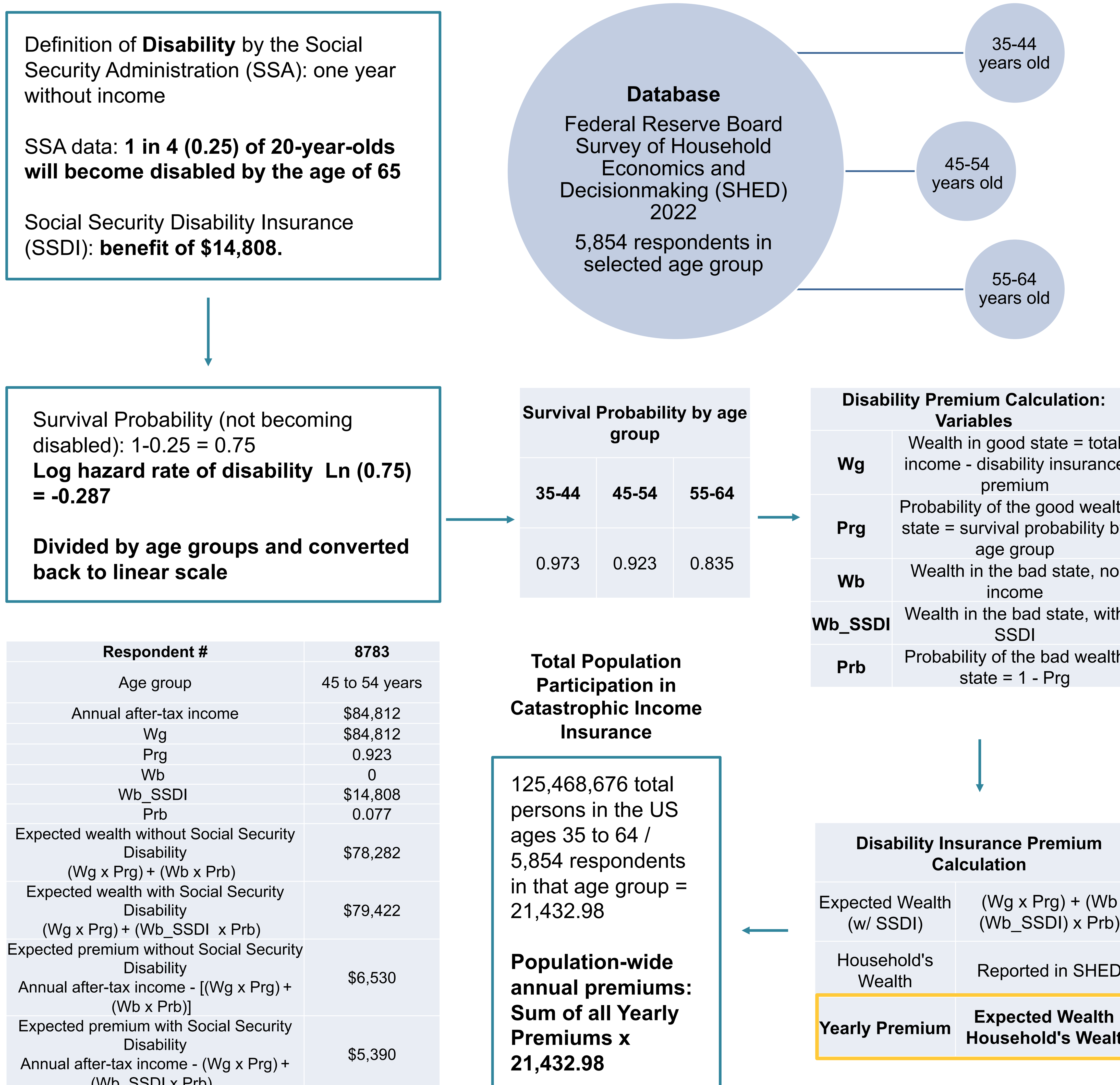
Ana V. Araujo[1], BS; Ryan J. Li[2], MD, MBA

School of Medicine[1]; Department of Otolaryngology-Head and Neck Surgery[2], Oregon Health & Science University, Portland, OR

Introduction

- Head and neck cancer (HNC), as well as its treatment can be functionally devastating
- A typical treatment duration is three-months, resulting in substantial work time lost
- Unpublished, population-level data modeled the ability of households to service short-term household debt with defined periods of lost income, if each household was to receive a diagnosis of HNC
- With 6 months of lost income → rates of insolvency neared 50%
- Disability insurance protecting half of the lost income reduced rates of insolvency to 21.1%
- Liquidation of long-term assets (savings) → rates of insolvency decreased to 6%
- Idea: an income protection insurance program with full population participation
- Model: estimate of the total U.S. expenditure on annual premiums for catastrophic disability insurance that would protect the entire income of policy holders for one year

Methods



Survival Probability by age group		
35-44	45-54	55-64
0.973	0.923	0.835

Disability Premium Calculation: Variables	
Wg	Wealth in good state = total income - disability insurance premium
Prg	Probability of the good wealth state = survival probability by age group
Wb	Wealth in the bad state, no income
Wb_SSDI	Wealth in the bad state, with SSDI
Prb	Probability of the bad wealth state = 1 - Prg

Disability Insurance Premium Calculation	
Expected Wealth (w/ SSDI)	(Wg x Prg) + (Wb (Wb_SSDI) x Prb)
Household's Wealth	Reported in SHED
Yearly Premium	**Expected Wealth - Household's Wealth**

Respondent #	8783
Age group	45 to 54 years
Annual after-tax income	$84,812
Wg	$84,812
Prg	0.923
Wb	0
Wb_SSDI	$14,808
Prb	0.077
Expected wealth without Social Security Disability (Wg x Prg) + (Wb x Prb)	$78,282
Expected wealth with Social Security Disability (Wg x Prg) + (Wb_SSDI x Prb)	$79,422
Expected premium without Social Security Disability Annual after-tax income - [(Wg x Prg) + (Wb x Prb)]	$6,530
Expected premium with Social Security Disability Annual after-tax income - (Wg x Prg) + (Wb_SSDI x Prb)	$5,390

Results

- The final estimate of total, population-wide annual premiums for catastrophic income protection insurance was: $ 995,378,000,000 without SSDI benefits, and $ 817,557,000,000 with average $14,808 SSDI annual benefit

Discussion

- SSDI paid out $1.05 trillion in benefits in 2020, while receiving $1.06 trillion in revenue, with $2.9 trillion in reserves—while paying out an average disability benefit of $14,808, substantially less than the average annual take home income
- Real-time financial stressors can overshadow the longer-term security of a guaranteed income financed by actuarially fair premiums
- Many other factors can result in reduced or lost income unrelated to disability. Mandating any sort of insurance program participation would require passing many political, ideological, and economic hurdles
- Assumptions: all customers were risk-averse, whereas in reality, consumers will exhibit different risk tolerance regarding their wealth. The 25% risk of becoming disabled that was divided into three age groups includes people who are 20-34 years of age, which were excluded from the study, given their small fractional share of this risk

*Upon re-analysis with 2022 data. The overall findings remain unchanged

References

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