
Mortality and Disability Risk Sharing under the OASDI Program in a Stochastic Overlapping Generations Framework

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Outline

- Disability and Mortality Risks over the life cycle
- The value of the OASDI program to individuals: --Annuity role of the OASI program and income smoothing role of the DI program.
 - Effect of the program on the mean and variance of asset holdings, earnings, and consumption over the life-cycle. (Program is not purely redistributive)
 - Effect of the program on the size of the representative individual's life-time welfare
 - Individual willingness to pay for the protection.
 - Macroeconomic effects on capital accumulation and labor supply.
- How individuals of different gender, race, education level and occupation encounter those two types of risks and which group benefits relatively more.

Mortality Risks over the life cycle for various groups

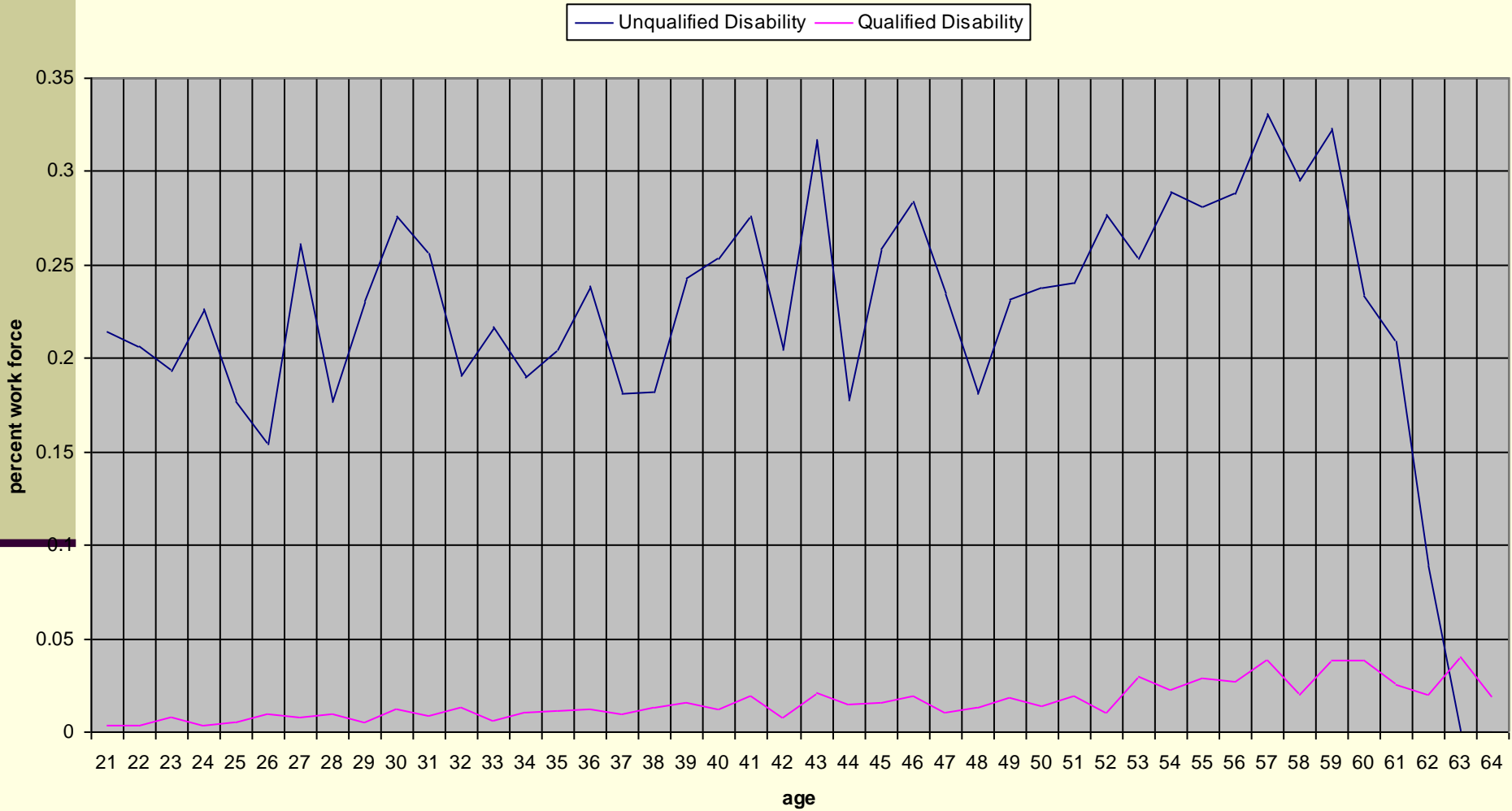
Transition Probability of disability Health Status

Table Transition probability for health Status

current year	Health Status Next year			Total
	Normal	Medium	Disabled	
Normal	90.9	7.36	1.74	100.00
Medium	21.14	71.77	7.09	100.00
Disable	18.35	55.06	26.58	99.99
Total	221.29	141.55	37.15	399.99
	55.32	35.39	9.29	100.00

Incidence of Disability

Incidence of medium and severe disability



Disability and Productivity

Structure of the Model Economy

$$u(c, \ell) = \frac{[c^\phi (1 - \ell)^{1-\phi}]^{1-\gamma}}{1 - \gamma} \quad (2)$$

The Bellman equation of the choice problem in Equation (1)

$$V_j^g(a, s) = \max_{c_j, \ell_j} u(c, 1 - \ell) + \tilde{\beta} \psi_{j+1}^g \sum_{s'} V_{j+1}^g(a', s') \Gamma_{j+1}^g(s'|s) \quad (3)$$

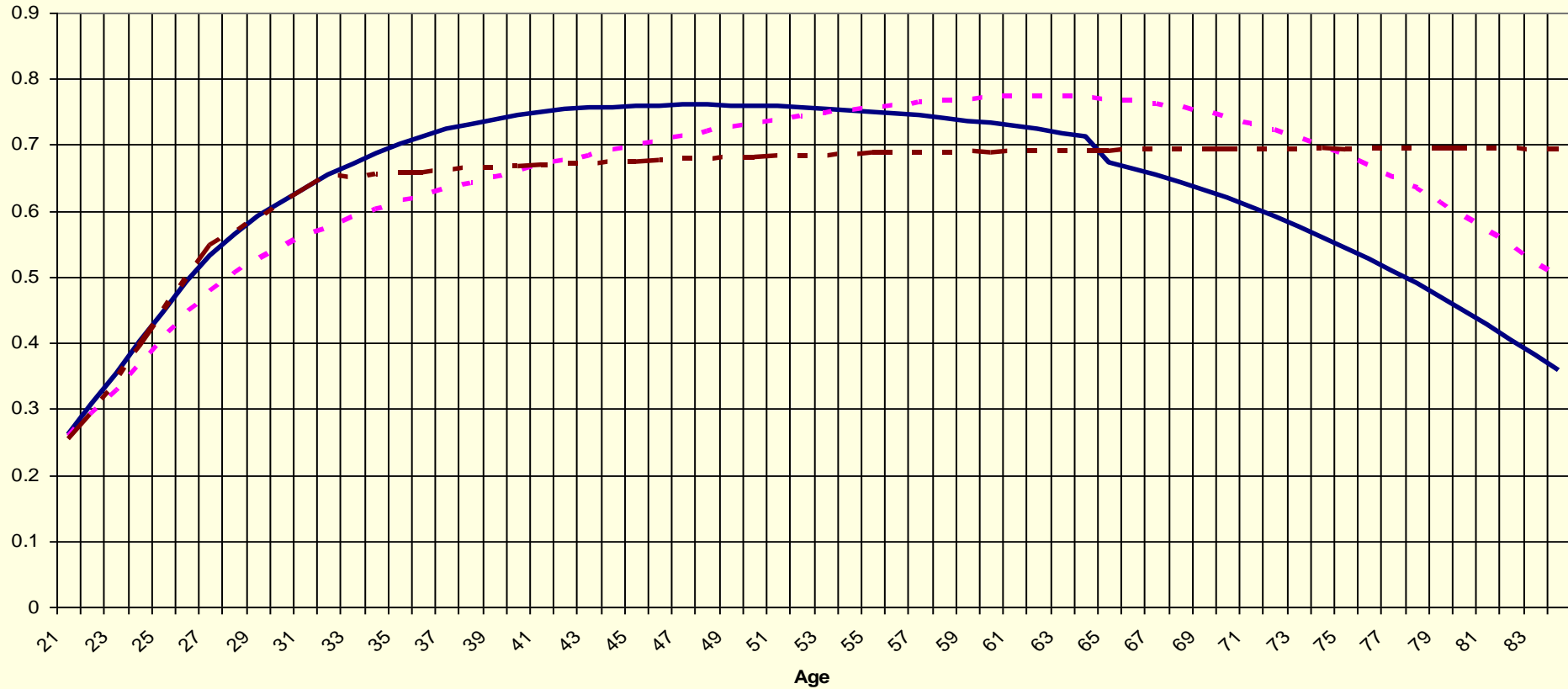
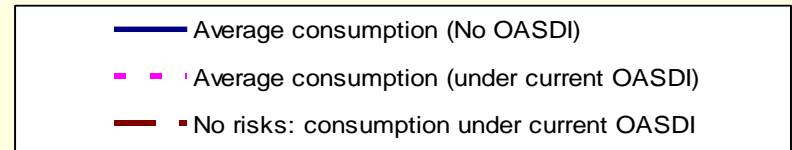
$$c + (1 + g_b) a' = (1 + r)a + (1 - \tau_o - \tau_d)w(g, j, s)\ell + A_j + D_j(s) + q \quad (4)$$

Findings

- Consider three scenarios: Compare the outcome of existing PAYGO system with OASI replacement rate .4 and DI Replacement Rate .3 with (a) with No OASDI and with the current system if there were no disability and mortality risks.
- Effect on mean and variance of consumption, asset holdings (i.e., savings) and earnings. Are the two insurance programs purely redistributive?
- Effect on life time welfare
- Value to individuals in terms of willingness to pay (under the veil of ignorance, or in private market willingness to pay at age 1, before knowing the health status

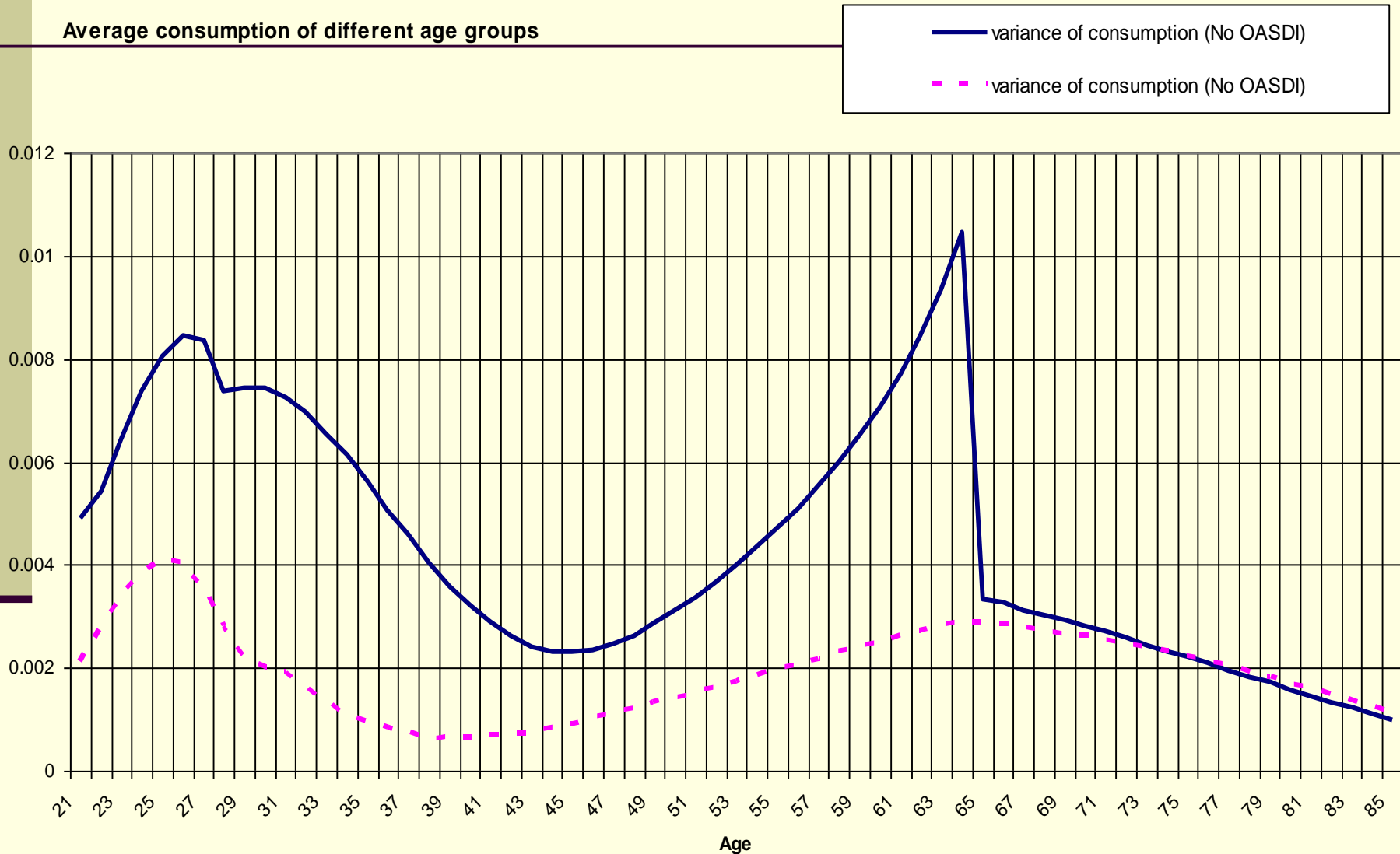
Effect on Consumption (mean)

Average consumption of different age groups

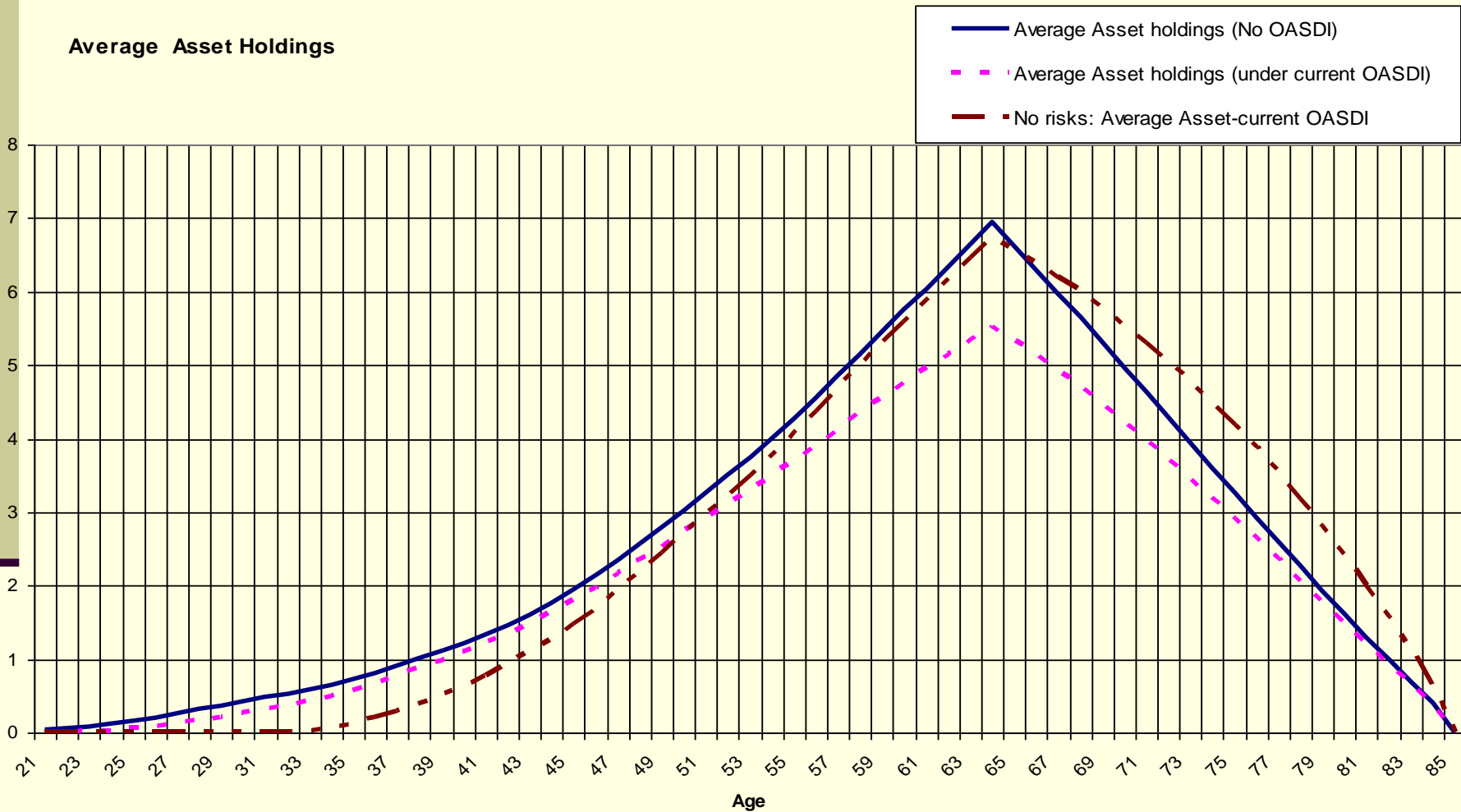


Effect on Consumption variance

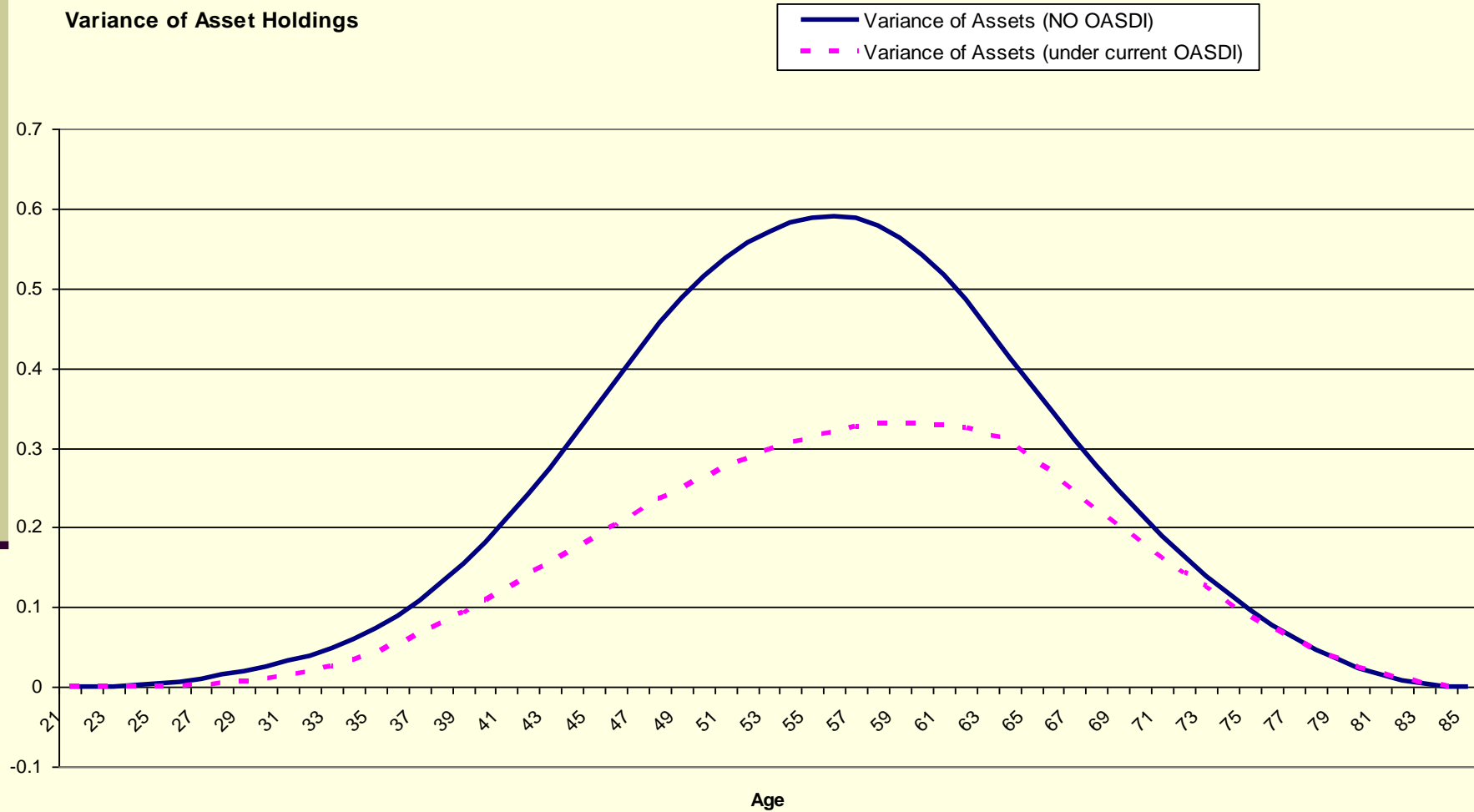
Average consumption of different age groups



Effect on mean asset holdings



Effect on asset holdings variations



Effect on Life Time Welfare, average savings, consumption and earnings

Table y: value of insurance provided by the OASI and DI programs

	In the presence of mortality and disability Risks			No risks
	Without publicly provided OASDI, i.e., replacement rates for SI=0, and DI = 0	publicly provided OASDI with replacement rates for SI =.4 and DI =.3	publicly provided OASDI with replacement rates for SI =.4 and DI =.9	publicly provided OASDI with replacement rates for SI =.4 and DI =.3
Welfare	102.49	101.72		103.33
Per capita income	47680.01	44916.45		42582.64
Asset holdings	2.18	1.85		2.18
Earnings	188755.36	177815.00		208630.68
Consumption	41189.71	40251.25		40858.75

Determination of optimal OASI Rate and willingness to pay for the OASDI Program

Table x: Equilibrium results for various SI replacement rates given a fixed DI replacement Rate .3

SI Replace ment Rate	Wage rate	Interest rate	Capital-Labor Ratio	Capital stock in efficien cy unit	Per capita income	Average yearly Earnings (in 2005 dollars)	Average consump tion (in 2005 dollars)	Welfare $\beta = .967$	Welfare $\beta = 1.011$
0.00	1.63	0.07	6.24	2.08	47,074.69	186,359.00	41,106.36	102.67	119.29
0.05	1.62	0.07	6.15	2.05	46,835.27	185,411.18	41,029.53	102.56	119.63
0.10	1.61	0.07	6.05	2.02	46,567.81	184,352.39	40,942.09	102.45	119.93
0.15	1.61	0.07	5.96	1.99	46,301.66	183,298.72	40,850.33	102.33	120.19
0.20	1.60	0.07	5.86	1.96	46,037.35	182,252.40	40,758.37	102.21	120.41
0.25	1.59	0.07	5.77	1.93	45,780.99	181,237.50	40,666.72	102.09	120.59
0.30	1.58	0.08	5.69	1.90	45,537.56	180,273.81	40,577.95	101.96	120.75
0.35	1.57	0.08	5.61	1.87	45,307.68	179,363.76	40,492.91	101.84	120.87
0.40	1.56	0.08	5.53	1.85	45,085.64	178,484.77	40,402.87	101.72	120.97
0.45	1.56	0.08	5.46	1.82	44,873.73	177,645.87	40,327.13	101.60	121.04
0.50	1.55	0.08	5.39	1.80	44,663.44	176,813.38	40,238.27	101.47	121.08
0.55	1.54	0.08	5.33	1.78	44,471.95	176,055.31	40,161.79	101.35	121.10
0.60	1.54	0.08	5.26	1.76	44,276.44	175,281.33	40,087.41	101.23	121.09
0.65	1.53	0.09	5.20	1.74	44,093.88	174,558.60	40,015.56	101.11	121.06
0.70	1.52	0.09	5.15	1.72	43,924.36	173,887.51	39,941.61	100.98	121.01
0.75	1.52	0.09	5.09	1.70	43,753.29	173,210.28	39,869.67	100.86	120.96
0.80	1.51	0.09	5.04	1.68	43,584.22	172,540.96	39,797.55	100.73	120.90
0.85	1.51	0.09	4.99	1.67	43,425.30	171,911.80	39,731.37	100.61	120.82
0.90	1.50	0.09	4.94	1.65	43,272.04	171,305.09	39,661.91	100.48	120.75
0.95	1.50	0.09	4.89	1.63	43,129.79	170,741.97	39,599.01	100.36	120.66
1.00	1.49	0.09	4.85	1.62	42,979.79	170,148.13	39,532.29	100.23	120.57

Yet to-do



Thank you ...

