
Retirement, Pension Reform, and Pension Transfer Wealth:
An International Comparison

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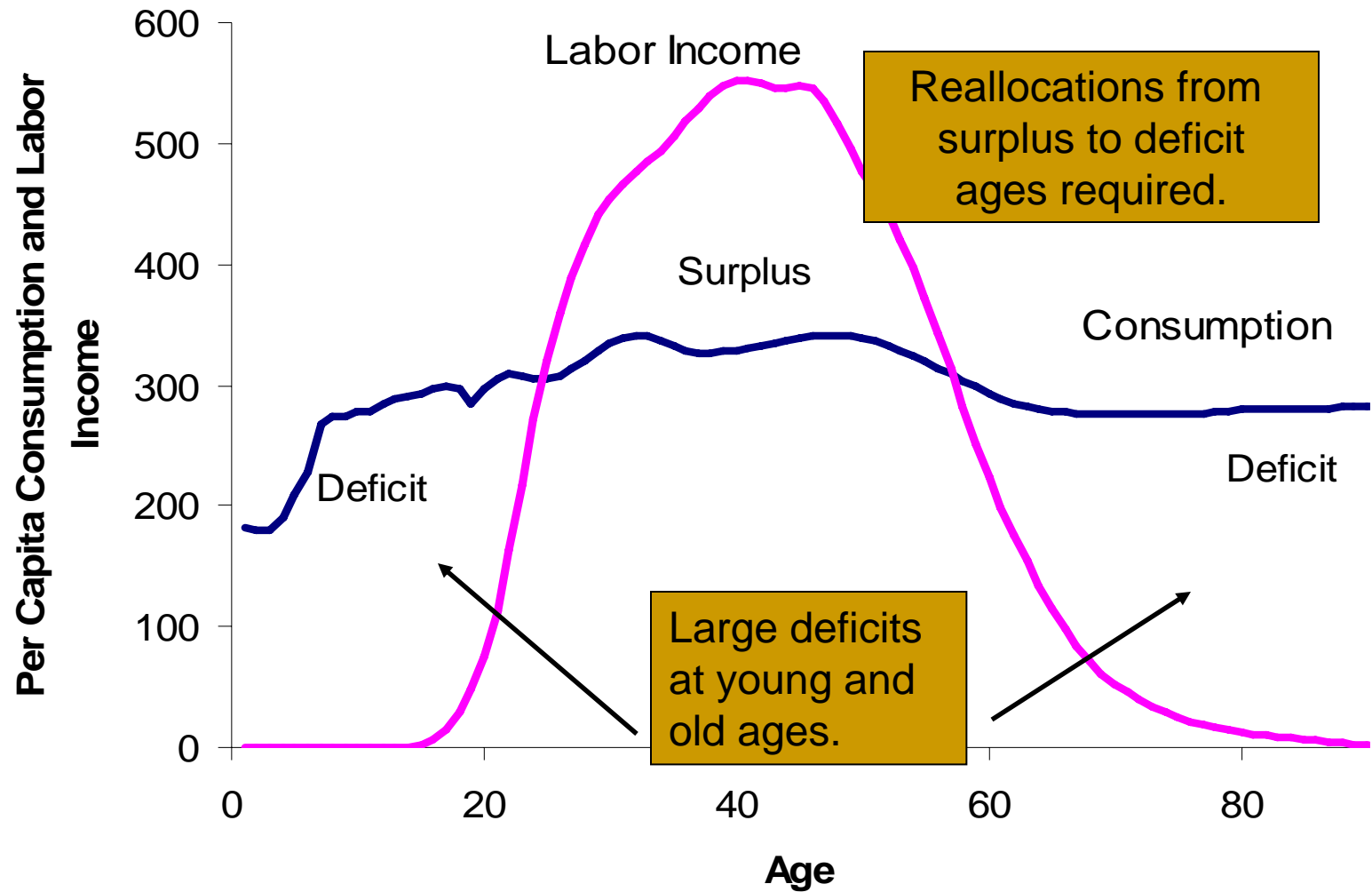
Research Questions

- What would be the effect of delaying retirement on economy (saving)?
- What if the delayed retirement is caused by a reduction in public transfers (e.g. an increase in normal retirement age)?

Motivation

- The age at retirement is usually fixed in saving literature (which focuses on demography).
- The effect of change in social security benefits on retirement has not been incorporated into a model.
- Bloom and Canning (2007) find that response to a longer life span can take the form of a longer working life or increased savings, but depends on social security arrangements of a country.

An Economic Lifecycle



Reallocations

- Transfers
 - Public Transfers (Social Security System)
 - Familial Transfers
- Asset-based Reallocations
 - Interest, dividends, rent from personal assets
 - Home
 - Dis-saving

Background (Mason and Lee 2007)

- Population aging can lead to an accumulation of wealth to meet pension needs for retirement (pension wealth)
 - Pension wealth (W_p) is either Asset (A) or Transfer Wealth (T_p).
 - If workers save more (A) in anticipation of aging, higher income is possible even after the first demographic dividend period has come to an end.
 - Alternatively, workers can rely on transfer wealth (T_p), which has little implication on growth.
 - $\tau = T_p/(T_p+A)$ plays an important role; countries with low τ leads to high aggregate savings.
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Innovation

- What would be the effect of delaying retirement on old-age support?
 - Reduce lifecycle deficit and pension wealth, unless retirees change the level of consumption.
 - If transfer wealth is unchanged
 - Should decrease savings and **increases** τ (new parameter)
$$\tau = T_p / (T_p + A)$$
- What if the delayed retirement is caused by a reduction in public transfers?
 - It **decreases** τ .
 - Delayed retirement **increases** τ .
 - Depends on the degree of delayed retirement in response to the change in public transfers (σ).

Normal Retirement Age (NRA)

- For example in the US, beginning with people born in 1938 or after, NRA gradually increases until it reaches 67 for people born after 1959.
 - Can be an attractive option
 - people live longer and healthier
 - people retire early
 - fiscal burden
 - An alternative tool is reducing benefit.
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Formulization: Basic Setup

(Mason and Lee, 2007)

$$W(a, t) = PV[C(a, t)] - PV[Y(a, t)]$$

$$W(t) = \sum_{a=a_0}^{\omega} W(a, t)$$

$$W(t) = A(t) + T_k(t) + T_p(t)$$

$$W_p(t) = W(t) - T_k(t) = A(t) + T_p(t)$$

$$\tau(t) = T_p(t) / W_p(t)$$

$$\tau_k(t) = T_k(t) / W(t)$$

$$A(t) = (1 - \tau(t))(1 - \tau_k(t))W(t)$$

Lifecycle Wealth

$$Y(a, t) = \bar{y}(a, t)L(a, t)$$

$$y(a, t) = \bar{y}(a, t)l(a, t)$$

$$\bar{y}(a, t + x) = \bar{y}(a, t)G_y(t, x)$$

$$PV[Y(t)] = \sum_{x=0}^{\omega-a_0} \sum_{a=a_0+x}^{\omega} \bar{y}(a, t)D_y(x)G_y(x)L(a, t+x)$$

$$PV[C(t)] = \sum_{x=0}^{\omega-a_0} \sum_{a=a_0+x}^{\omega} \bar{c}(a, t)D_c(x)G_c(x)N(a, t+x)$$

where $D(x) = (1+r)^{-x}$ and $G_y(x) = (1+g_y)^x$

$$G_y(t, x) = \prod_{z=0}^{x-1} (1+g_y(t+z))$$

Lifecycle Wealth (cont'd)

$$NTOT(t, x) = \sum_{a=a_0+x}^{\omega} N(a, t+x)$$

$$KNTOT(t, x)$$

for children.

$$LTOT(t, x) = \sum_{a=a_0+x}^{\omega} L(a, t+x)$$

$$KLTOT(t, x)$$

$$\frac{\bar{c}(t)}{\bar{y}(t)} = \frac{L(t) - (r - g_Y)(1 - \tau) \sum_{x=0}^{\omega-a_0} D(x) G_y(t, x) (LTOT(t, x) + KLTOT(t, x))}{N(t) - (r - g_Y)(1 - \tau) \sum_{x=0}^{\omega-a_0} D(x) G_c(t, x) (NTOT(t, x) + KNTOT(t, x))}.$$

Steady State & Backward Recursion

$$(1+r)A(t) + (1+r)[Y(t) - C(t)] = A(t+1) = (1+g_y)A(t)$$

$$A(t^*) = \frac{1+r}{r-g_y} [\bar{c}(t^*)N(t^*) - \bar{y}(t^*)L(t^*)]$$

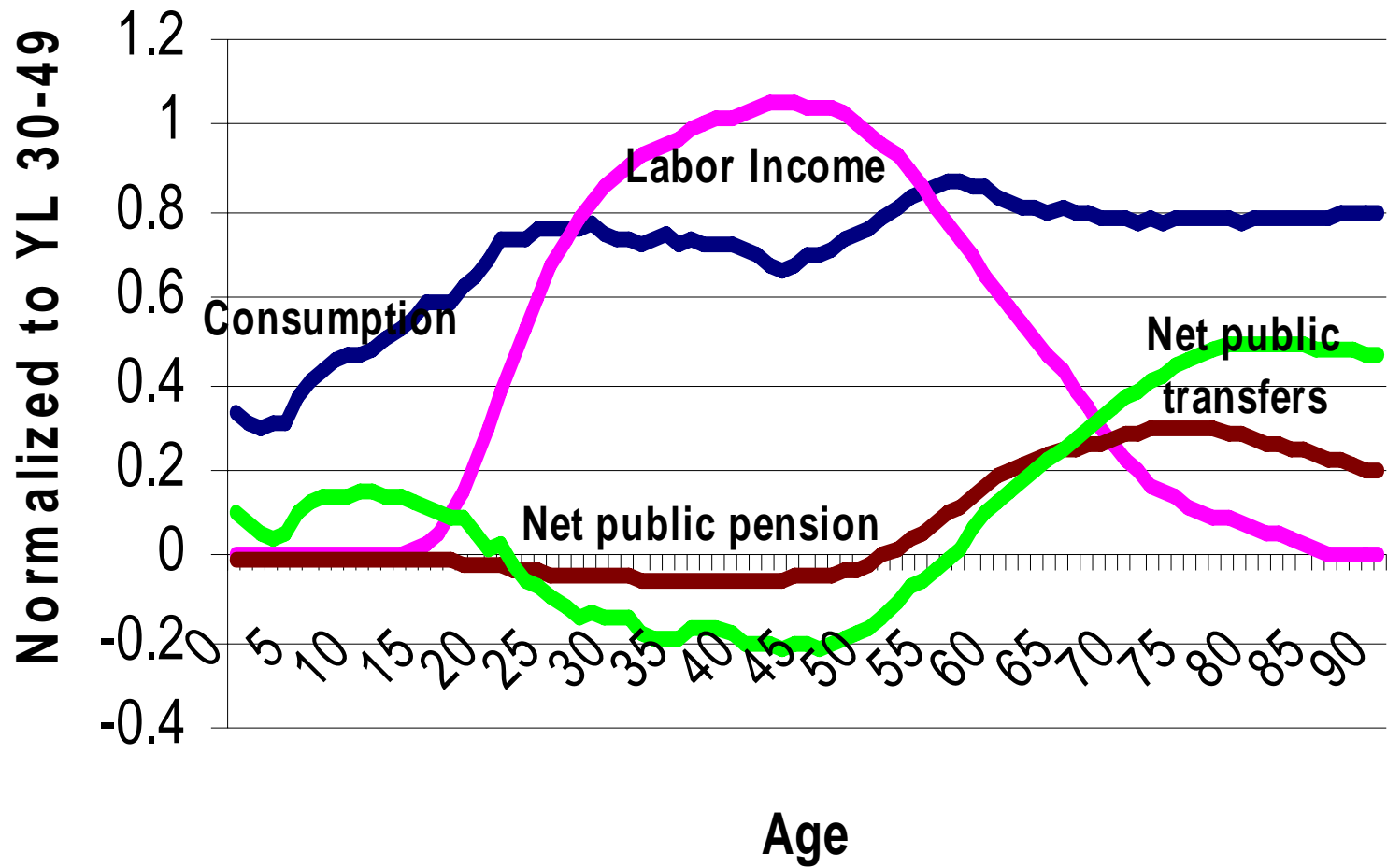
$$\frac{\bar{c}(t^*)}{\bar{y}(t^*)} = \frac{L(t^*)}{N(t^*)} \left[1 + (r-g_y)(1-\tau(t^*))w_p(t^*) \right]$$

$$\bar{c}(t-1) = \frac{\left\{ \begin{aligned} & A(t) - (1+r)(1-\tau) \sum_{x=1}^{\omega-q_0} D(x) \bar{c}(t-1+x) (NIOI(t-1,x) + KNIOI(t-1,x)) \\ & + \bar{y}(t-1) \left\{ (1+r)(1-\tau) \sum_{x=0}^{\omega-q_0} D(x) G_y(x) (LIOI(t-1,x) + KLIOI(t-1,x) - L(t-1)) \right\} \end{aligned} \right\}}{N(t-1) \left((1-\tau)(1+r)D(0) - 1 \right)}.$$

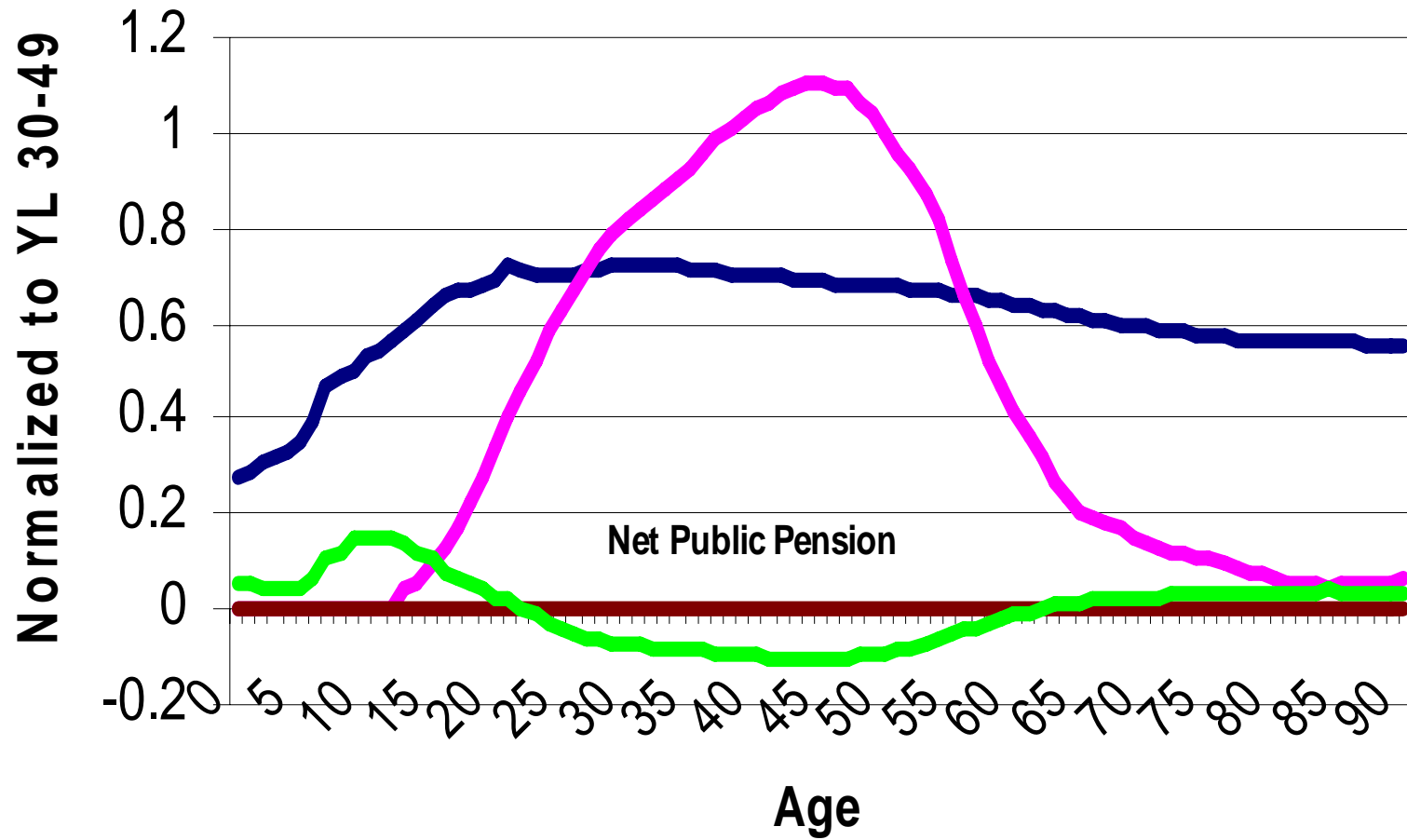
Data for simulation (1950-2300) and Assumptions

- Baseline assumptions
 - Small open economy. Interest: 6% until 2000 and decrease linearly to 4.75% until 2300
 - No bequest, no crowding out
 - Productivity growth: 1.5%
 - Familial share to kids: 0.67
- Population
 - UN World Population Prospects 2008 for most countries.
 - Medium scenario (instead of high or low)
- Age profiles
 - Activity rates: various sources
 - National Transfer Accounts database (www.ntaccounts.org)
 - Labor income
 - Consumption
 - Public transfers
 - Public pension benefit, contribution
 - Share of transfer wealth (τ)

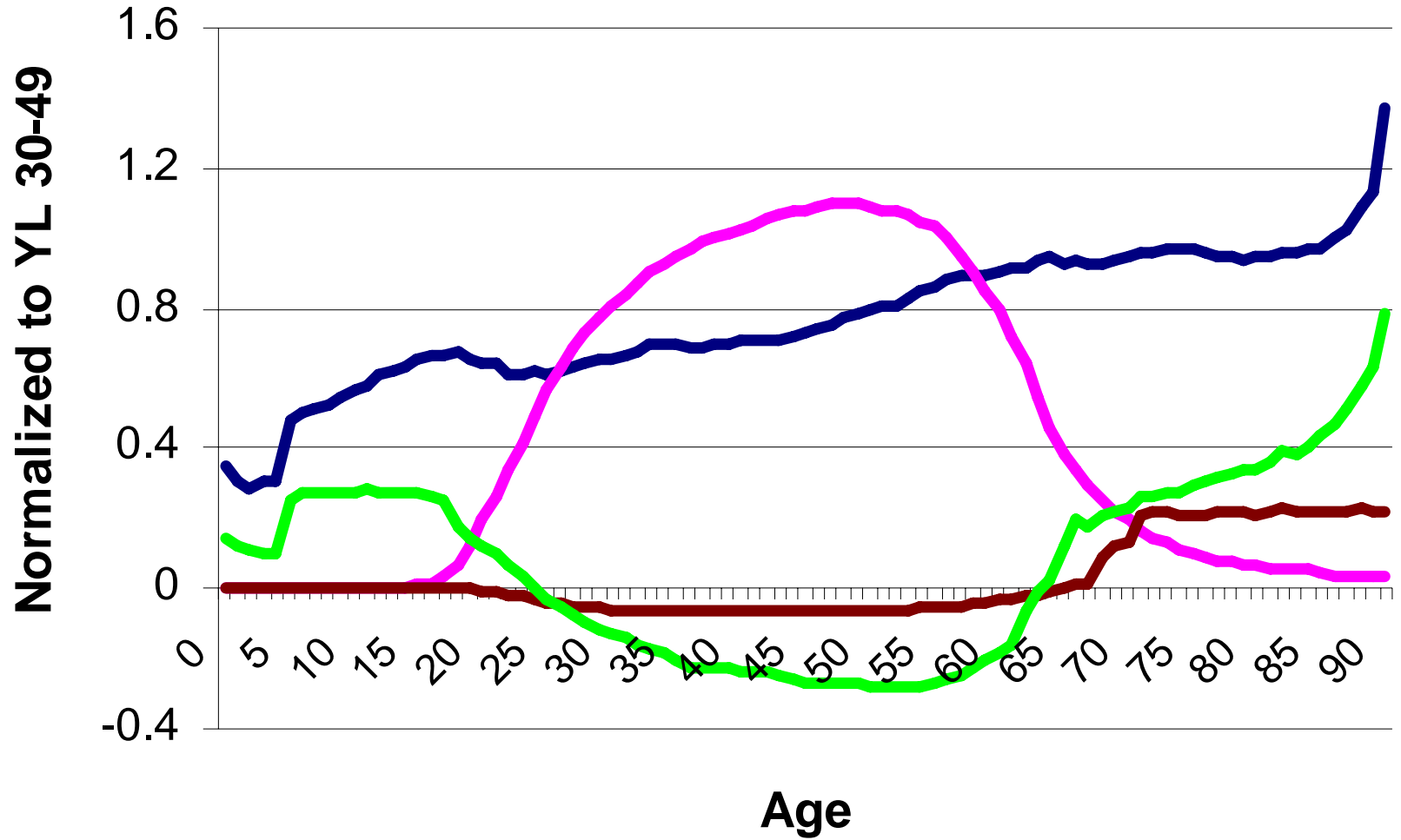
Costa Rica



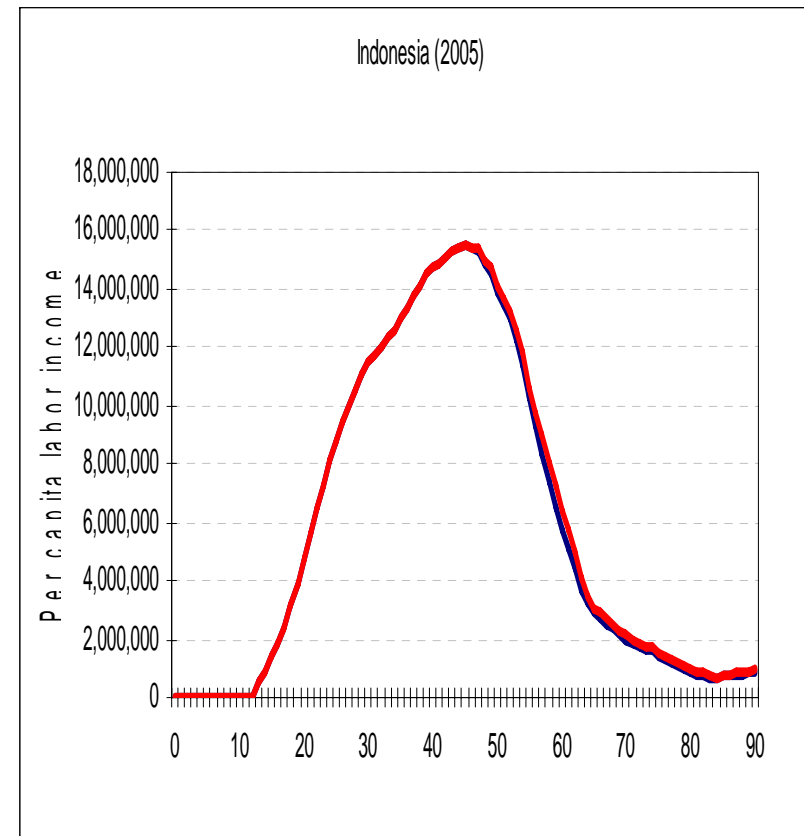
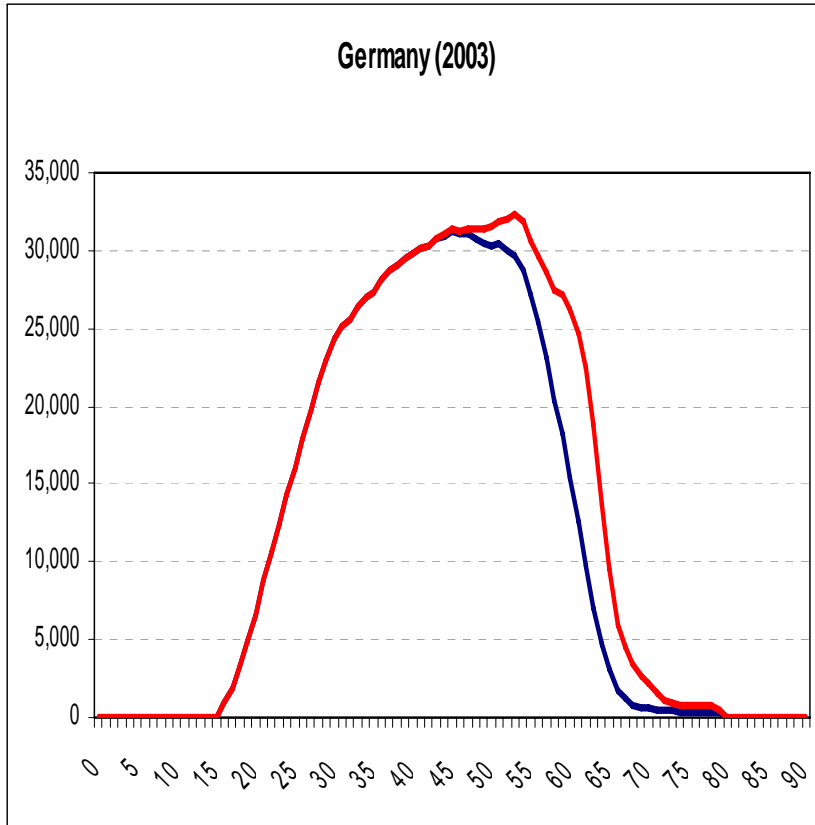
Indonesia



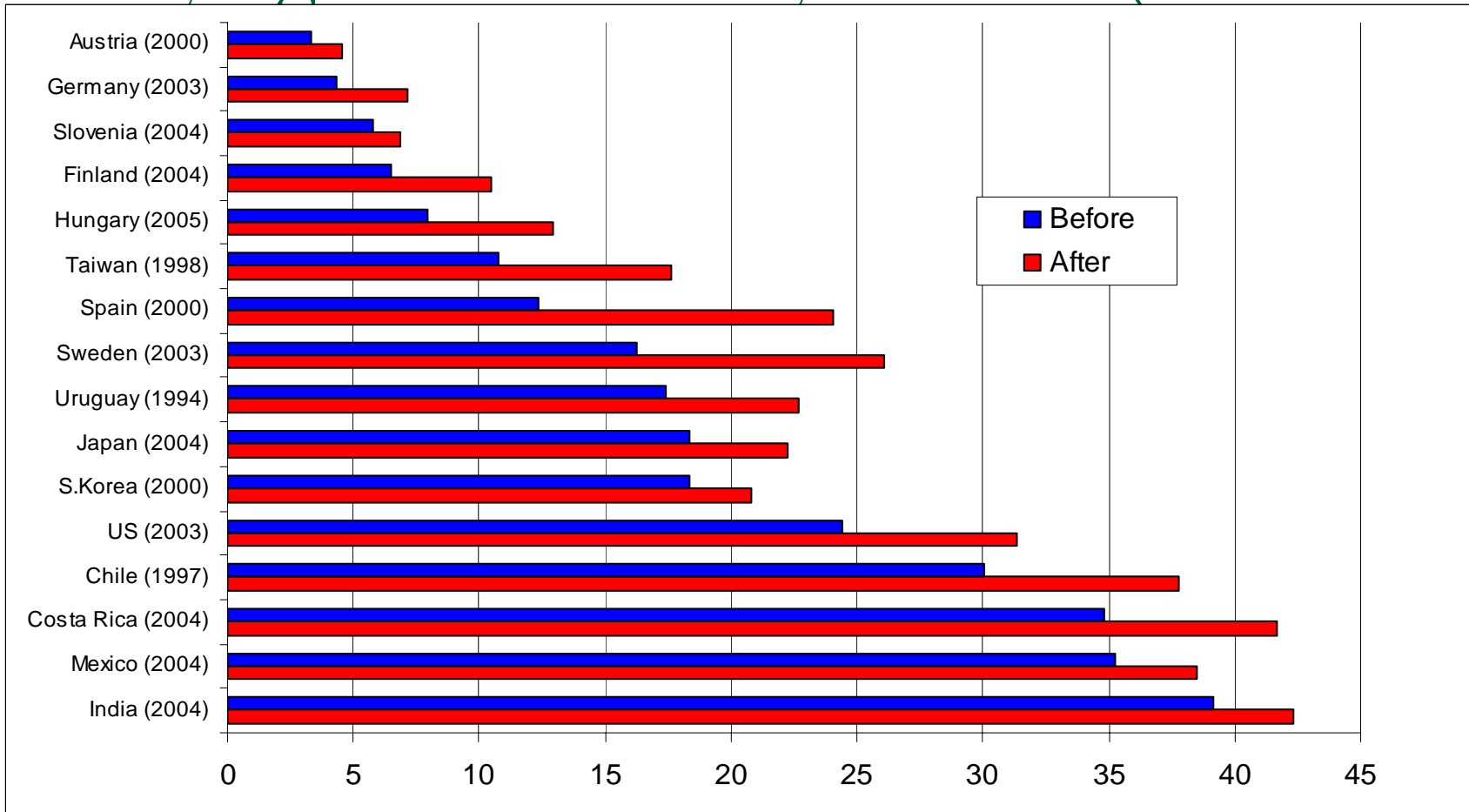
U.S.



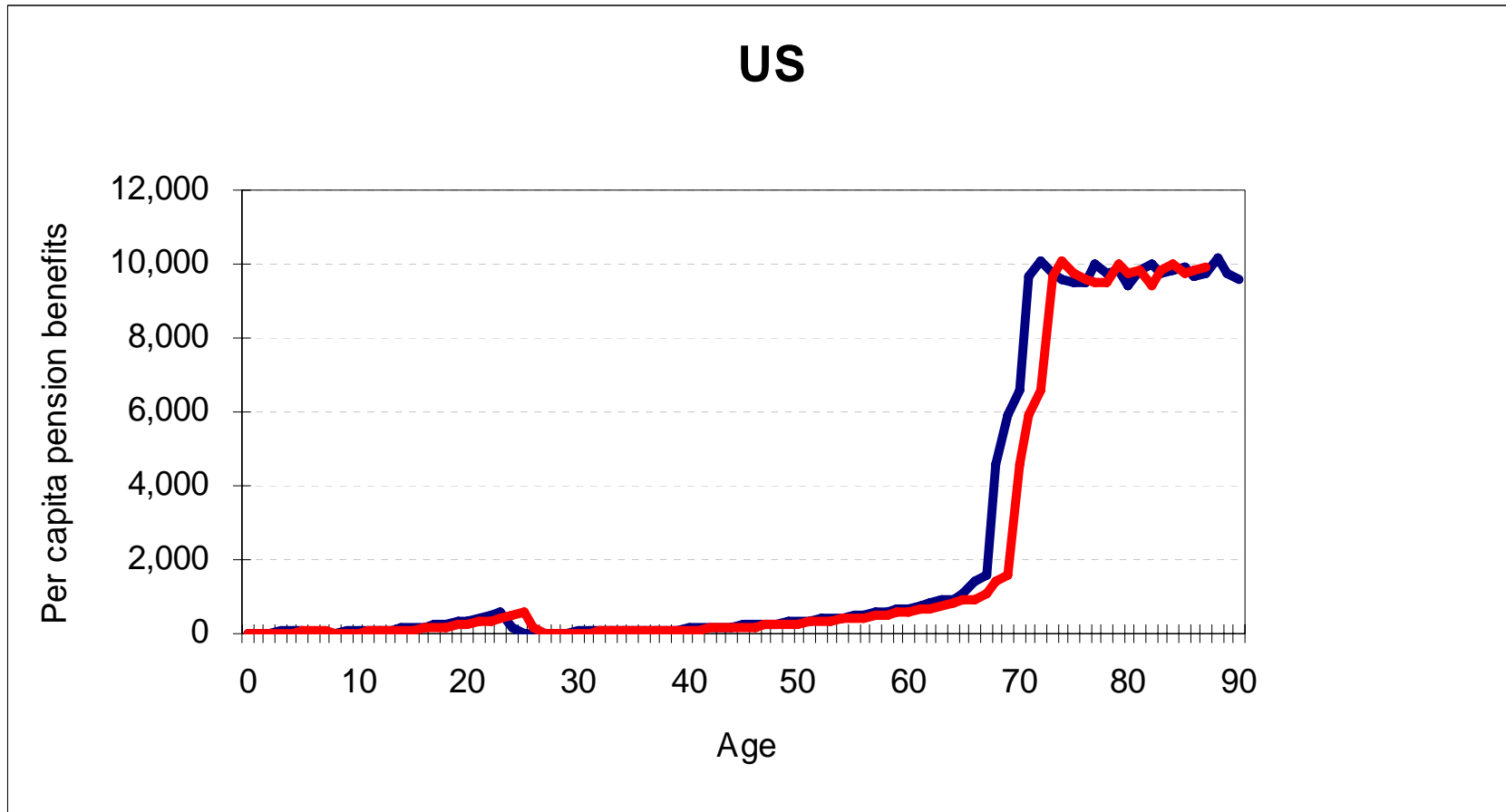
Delayed Retirement by 2 Years



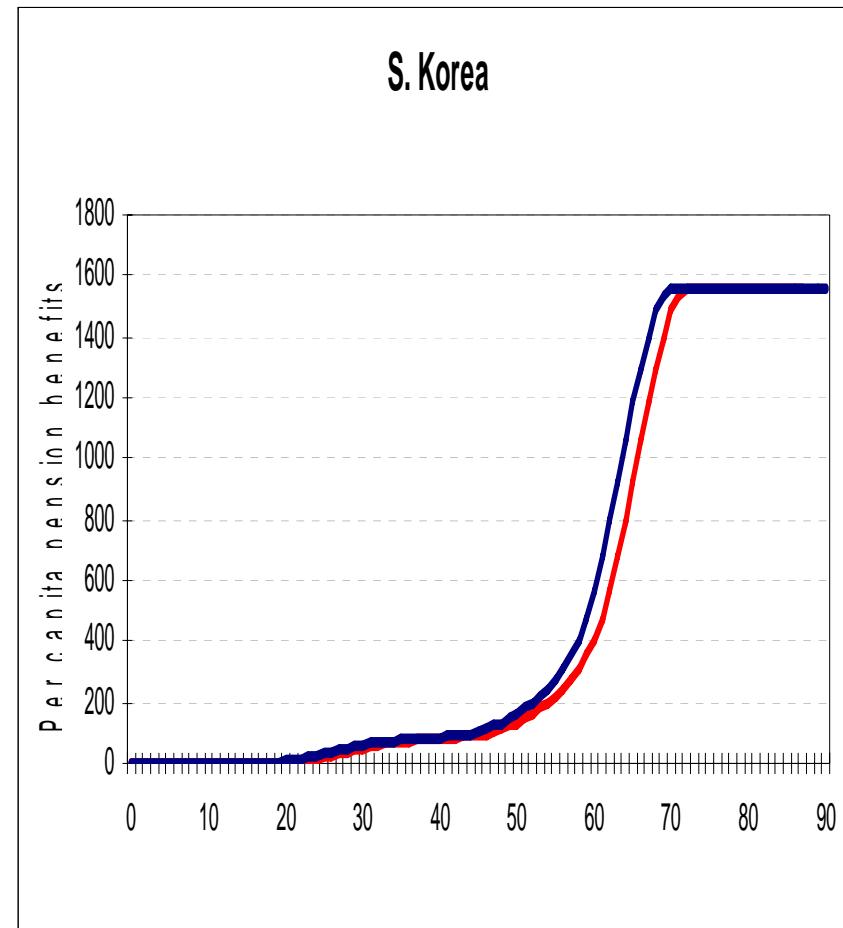
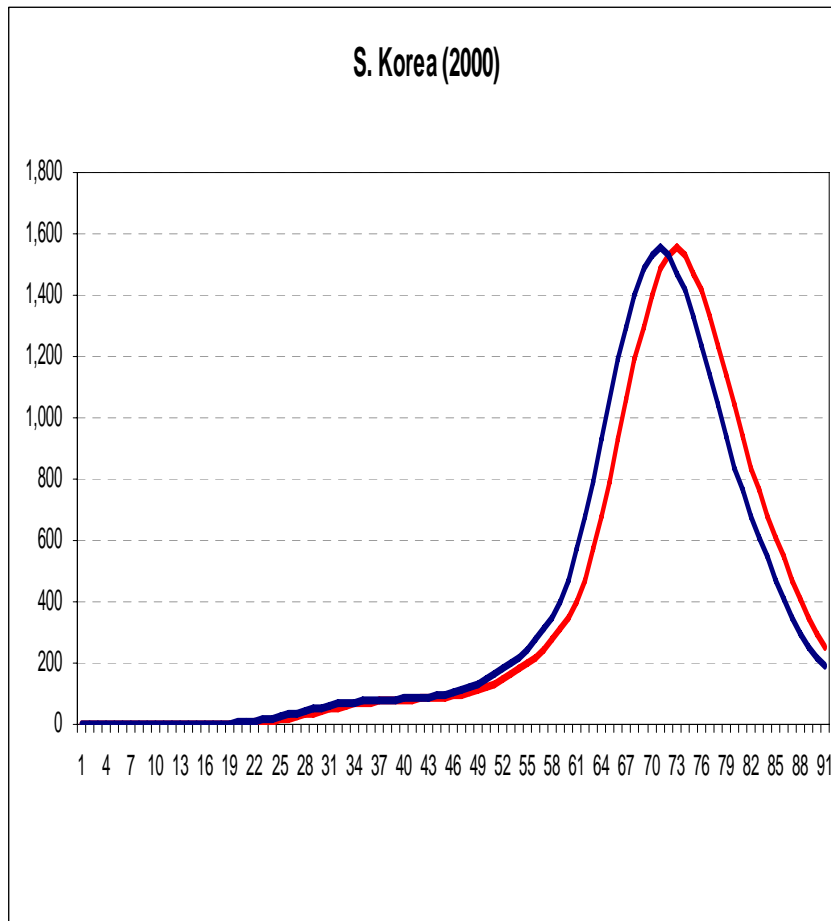
Labor Income to Consumption after Delaying Retirement by 2 Years (for 65-74)



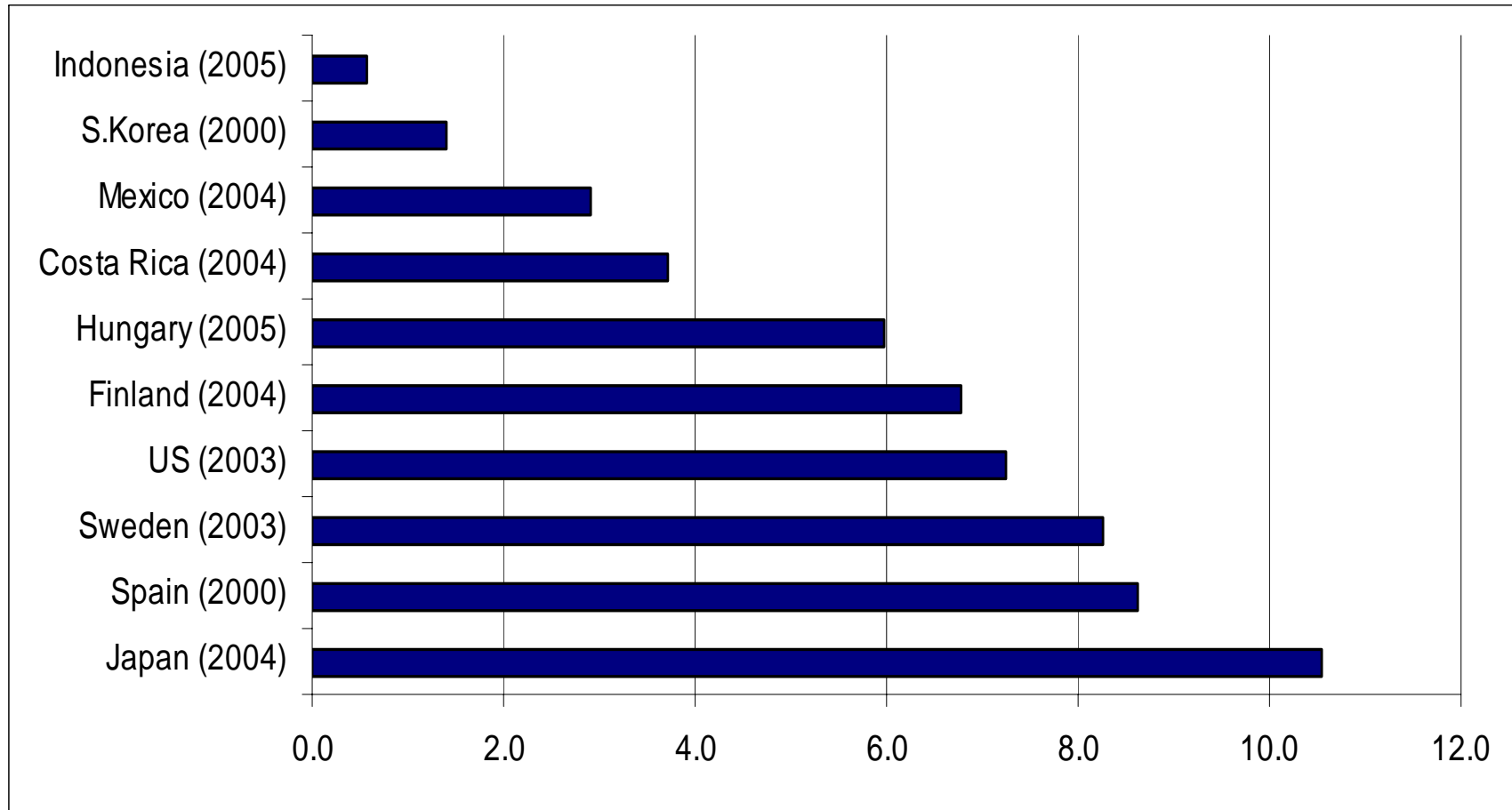
An Increase in NRA By 2 Years



Countries without Full Pension Benefit



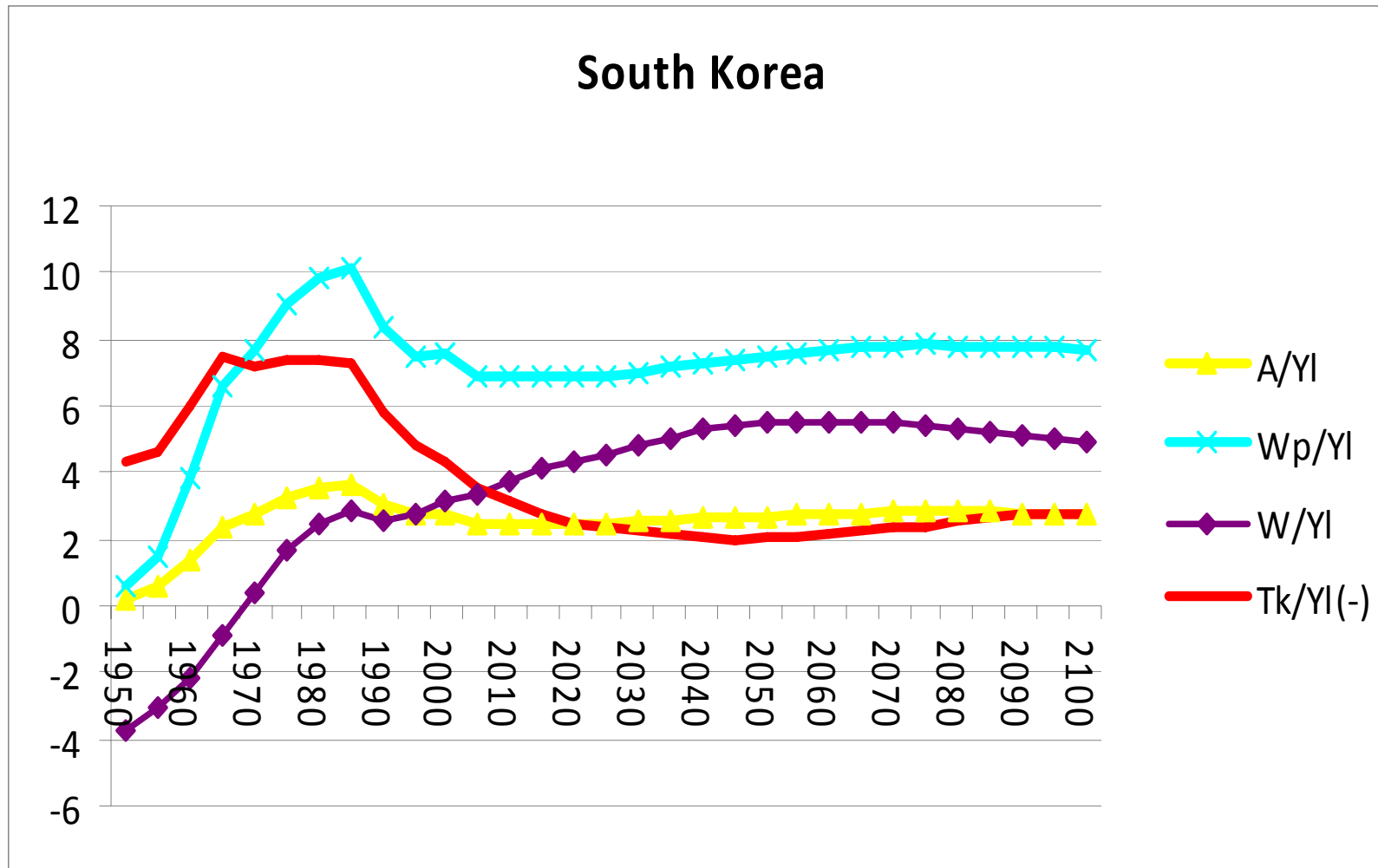
% Change in Net Public Transfers after an Increase in NRA by 2 Years (for 60+)



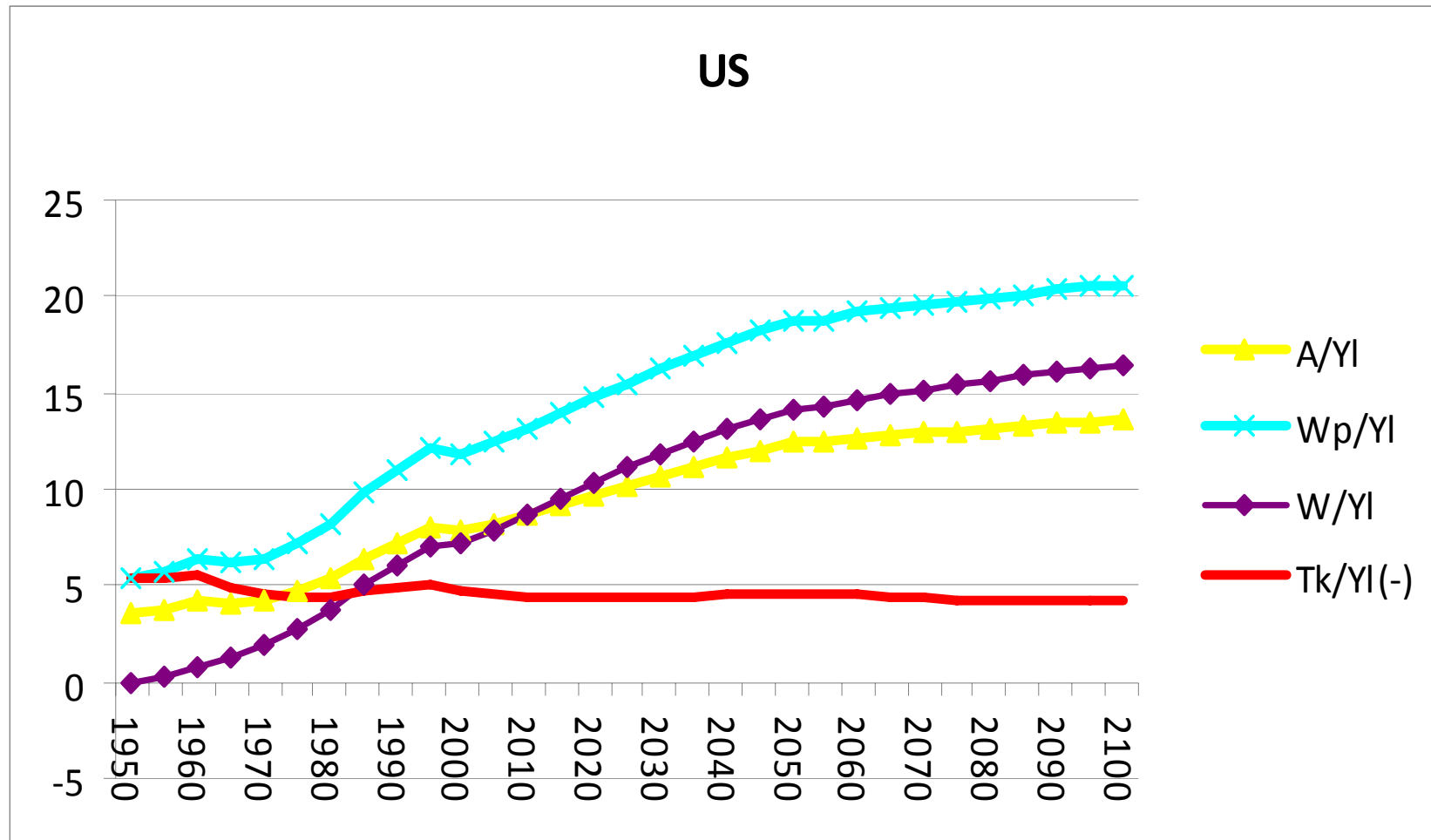
Steady-State Results (Asset to Labor Income Ratio)

	Baseline	Delayed Retirement	Increased NRA ($\sigma = 0$)	Increased NRA ($\sigma = 1$)	Increased NRA ($\sigma = 0.5$)
Costa Rica	0.0	-16.9	43.1	-7.4	6.1
<i>(τ)</i>	<i>(0.625)</i>	<i>(0.695)</i>	<i>(0.601)</i>	<i>(0.669)</i>	<i>(0.633)</i>
Finland	0.0	-44.5	32.2	-18.9	10.8
	<i>(0.740)</i>	<i>(0.814)</i>	<i>(0.684)</i>	<i>(0.752)</i>	<i>(0.717)</i>
Japan	0.0	-23.2	28.2	1.6	9.1
	<i>(0.660)</i>	<i>(0.699)</i>	<i>(0.597)</i>	<i>(0.632)</i>	<i>(0.614)</i>
S. Korea	0.0	-14.8	11.6	-4.0	0.1
	<i>(0.670)</i>	<i>(0.692)</i>	<i>(0.642)</i>	<i>(0.663)</i>	<i>(0.652)</i>
Spain	0.0	-23.4	61.4	-3.4	10.5
	<i>(0.560)</i>	<i>(0.641)</i>	<i>(0.505)</i>	<i>(0.578)</i>	<i>(0.539)</i>
U.S.	0.0	-8.1	26.3	4.9	10.6
	<i>(0.350)</i>	<i>(0.382)</i>	<i>(0.315)</i>	<i>(0.344)</i>	<i>(0.329)</i>

Simulation Results (Backward Recursion)



Simulation Results (cont'd)



Summary

- An increase in NRA raises the asset to labor income ratio, but delaying retirement lowers it.
 - A lot of variation across countries.
 - Age structure of population
 - Labor productivity of older people
 - Public transfers, public pension (Bloom and Canning 2007)
- Under realistic assumptions, the combined effect will raise it.
 - Value of σ : varies but usually range from 0.1-0.2 (e.g. Burtless and Moffitt 1985; Krueger and Pischke 1992)
- Qualification: need more country data, relax assumptions on crowding-out, bequest, etc.



Thank you.