From Transfers to Capital: Using Public Policies to Face Population Aging

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February 25th 2010
Max Planck Institute for Demographic Research (MPIDR)

† This work received institutional support from the Spanish Science and Technology System (Projects # ECO2009-10003 and ECO2008-04997/ECON), the Catalan Government Science network (Projects # SGR2009-600 and SGR2009-359 as well as from XREPP- Xarxa de referència en Economia i Política Públiques) and the Fulbright Commission (Ref. # 2007-0445).

Motivation

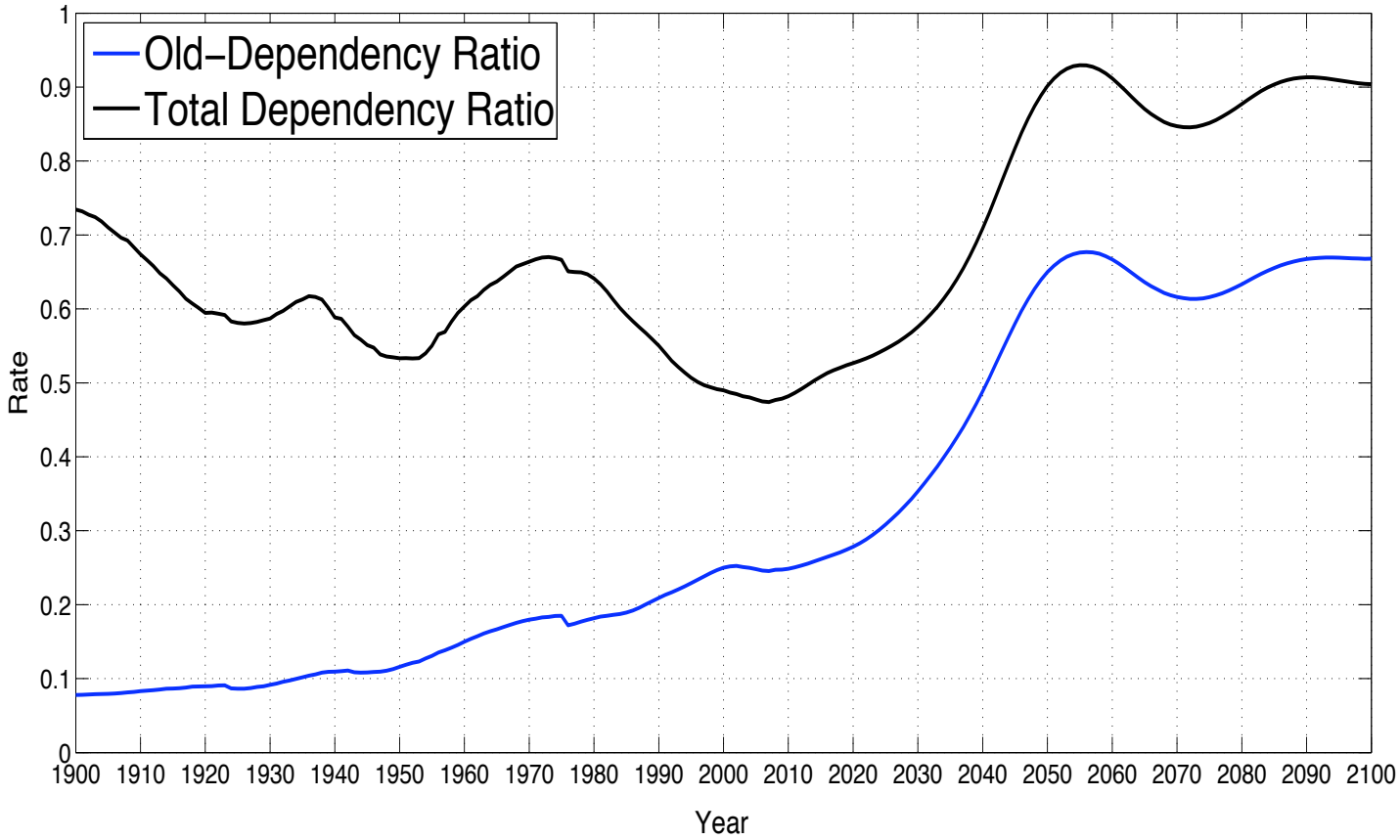

Figure: Estimated Dependency Rates, Spain 1900-2100

Motivation

Population aging is a burden depending on how the consumption of the elderly is financed.

asset-based reallocation (No intergenerational burden)

transfers (Intergenerational burden)

1. Market failures or myopic behavior.
   - \+ Diamond (1977)
2. No market failures
   - \- Selfish, Feldstein (1974)
   - = Altruism, Barro (1974)

Objective

Measure the economic burden of population aging

- 'Demographic' Support Ratio
- 'Economic' Support Ratio, Cutler et al. (1990)
- Second demographic dividend, Lee and Mason (2006)

- Demand for total, real, and transfer wealth, Willis (1988) & Lee (1994).

Demand for total Wealth

The wealth demanded by population to support their consumption needs

$$W = \sum_{x=0}^{\Omega-1} w_x N_x, \text{ where } w_x = \sum_{s=x}^{\Omega-1} lcd_s \prod_{z=x}^{s} \frac{p_z}{1+r} \tag{1}$$

$$W = K + T \tag{2}$$

- $W > K \Leftrightarrow$ Individuals are net receivers of transfers along their lifespan
- $W < K \Leftrightarrow$ Individuals are net givers of transfers along their lifespan

Demand for total Wealth

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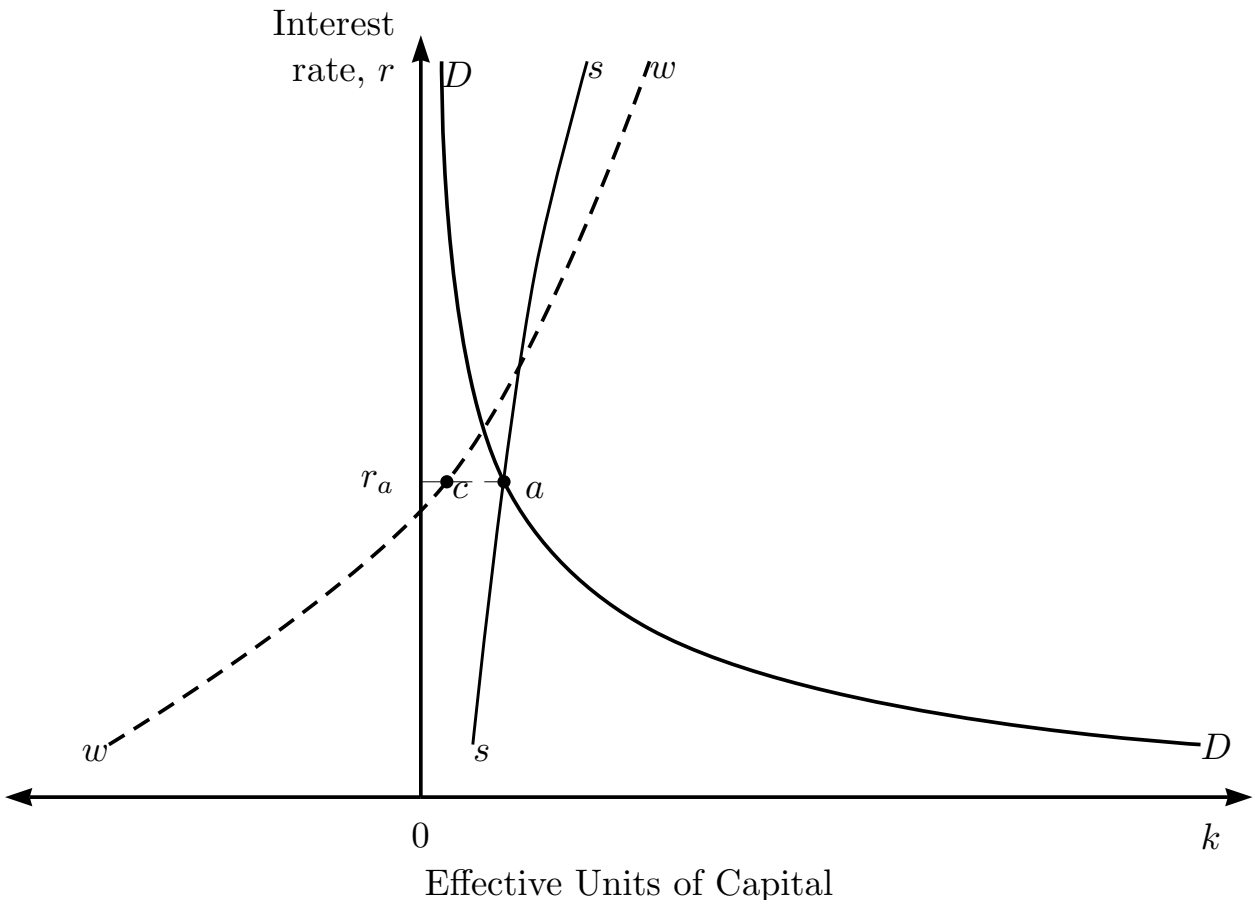

Figure: Aggregate Demand for Real and Total Wealth with Borrowing Constraint and $n < r_b < r_a$.

Demand for total Wealth

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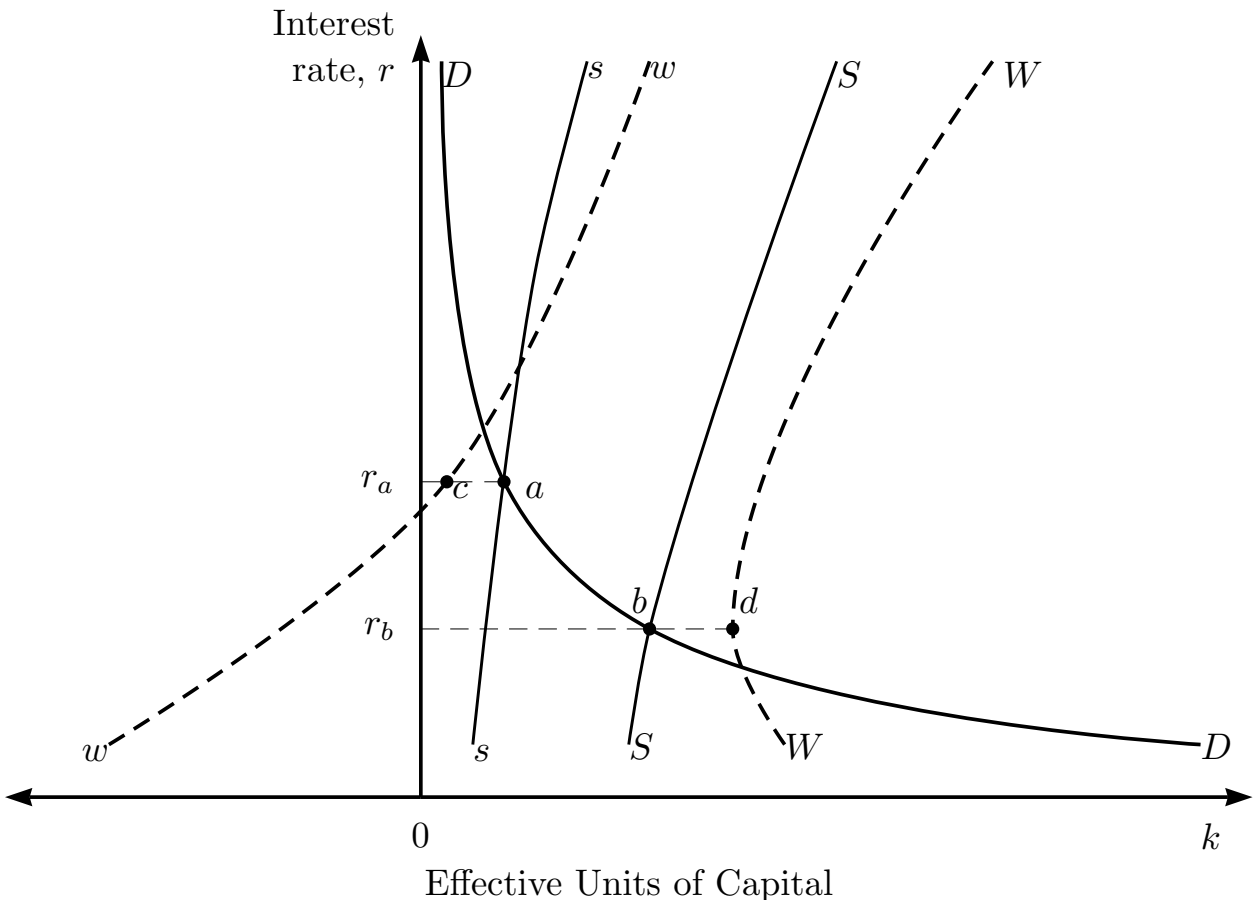

Figure: Aggregate Demand for Real and Total Wealth with Borrowing Constraint and $n < r_b < r_a$.

Economy

Individuals

- Rational
- Homogenous preferences (CRRA) but face different mortality risk
- Altruistic only when their offspring are children, LMM (2000, 2001, 2003)
- Enter into the labor market at age 21 and retire at age 63

Neoclassical Firm

- Maximize Profits
- Cobb-Douglas production function $F(K, AL)$

Government

- Collect taxes to provide public benefits and public goods and services
- Balanced budget $(D = 0, \tau^i)$

Economy

Table: Modeled National Transfer Accounts by Flow and Economic Agent

	Individual	**Government**	**Firm**
Inflows	Gross Salary Asset Income Familial Transfers Public Consumption Public Benefits Bequests	Progressive Income Tax Indirect Tax Corporate Tax Payroll Tax	Revenues
Outflows	Consumption Childrearing Familial Transfers Taxes Saving Bequests	Pensions Benefits Widowhood Benefits Maternity Benefits Public Health Public Education Public Others	Salaries Corporate Profits Corporate Tax Net Investment

Economy

- OLG budget constraint at prime working ages:

$$a_{x+1} = (1 + (1 - \tau^i)r)(a_x + h_x) + (1 - \tau^i)(1 - \tau^{ss})\omega_x + \phi_x - (1 + \tau^p)\lambda_x c_x, \tag{3}$$

- NTA flow budget constraint at prime working ages:

$$\underbrace{c_x + g_x - \omega_x}_{\text{LCD}_x} = \underbrace{ra_x - (a_{x+1} - a_x) + (1 + r)\frac{q_x}{p_x}a_x}_{\text{ABR}_x}$$
$$+ \underbrace{g_x - \tau^i\left(r(a_x + h_x) + (1 - \tau^{ss})\omega_x\right) - \tau^{ss}\omega_x - \tau^p\lambda_x c_x - \tau^c\frac{r + \delta}{1 - \tau^c}(a_x + h_x)}_{\text{TG}_x}$$
$$+ \underbrace{(1 + r)h_x - (1 + r)\frac{q_x}{p_x}a_x + \phi_x - (\lambda_x - 1)c_x}_{\text{TF}_x}. \tag{4}$$

Calibration

Table: UN SNA Classified Tax Revenues and Public Expenditures by Function in 2000

Expenditures	%GDP	
Property income, payable	3.27	
Social benefits other that in kind	12.08	
Pensions	10.18	
Contributory	9.91	
-Retirement	6.20	(6.22)
-Disability	1.73	
-Survivors	1.87	(1.34)
-Maternity	0.11	(0.11)
Non contributory	0.28	
Unemployment	1.38	
Other social protection	0.52	
Other current transfers	1.27	
Government final consumption	17.35	
Education	4.39	(4.37)
Health	5.23	(5.09)
Long-term care	0.33	
Other (in-kind)	7.40	(7.20)
Saving, net	1.46	
Total	35.43	(24.33)

Revenues	%GDP	
Taxes on production and imports	10.31	
Taxes on production and imports	11.46	(6.94)
Subsidies	-1.14	
Property income, receivable	1.12	
Current taxes on income and wealth	10.25	
Taxes on income	9.84	(9.87)
Individual income tax	6.70	(6.57)
Corporate income tax	3.14	(3.15)
Other current taxes	0.41	
Social contributions	12.99	(7.67)
Other current transfers	0.76	
Total	35.43	(24.33)

Calibration

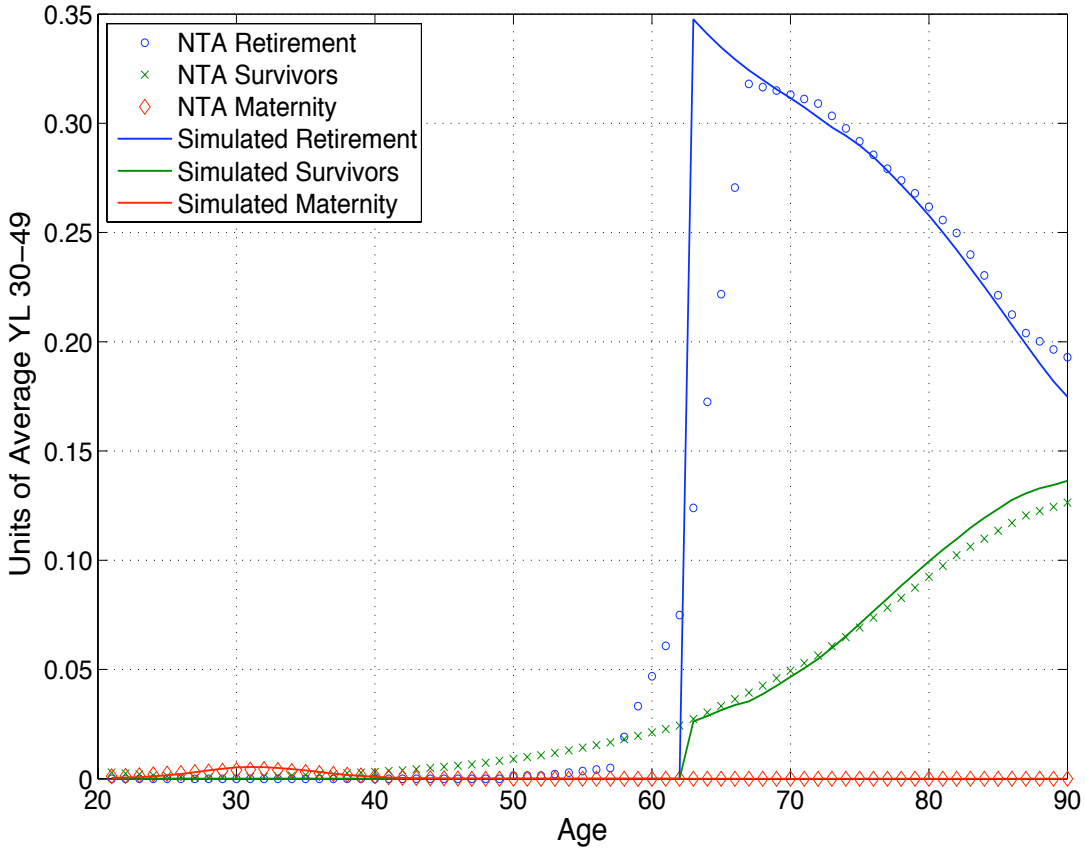

Figure: Spain, NTA and Simulated Public Benefits in 2000

Note:

Source: NTA Spain (2000), HMD and Eurostat.

Life Cycle Deficit

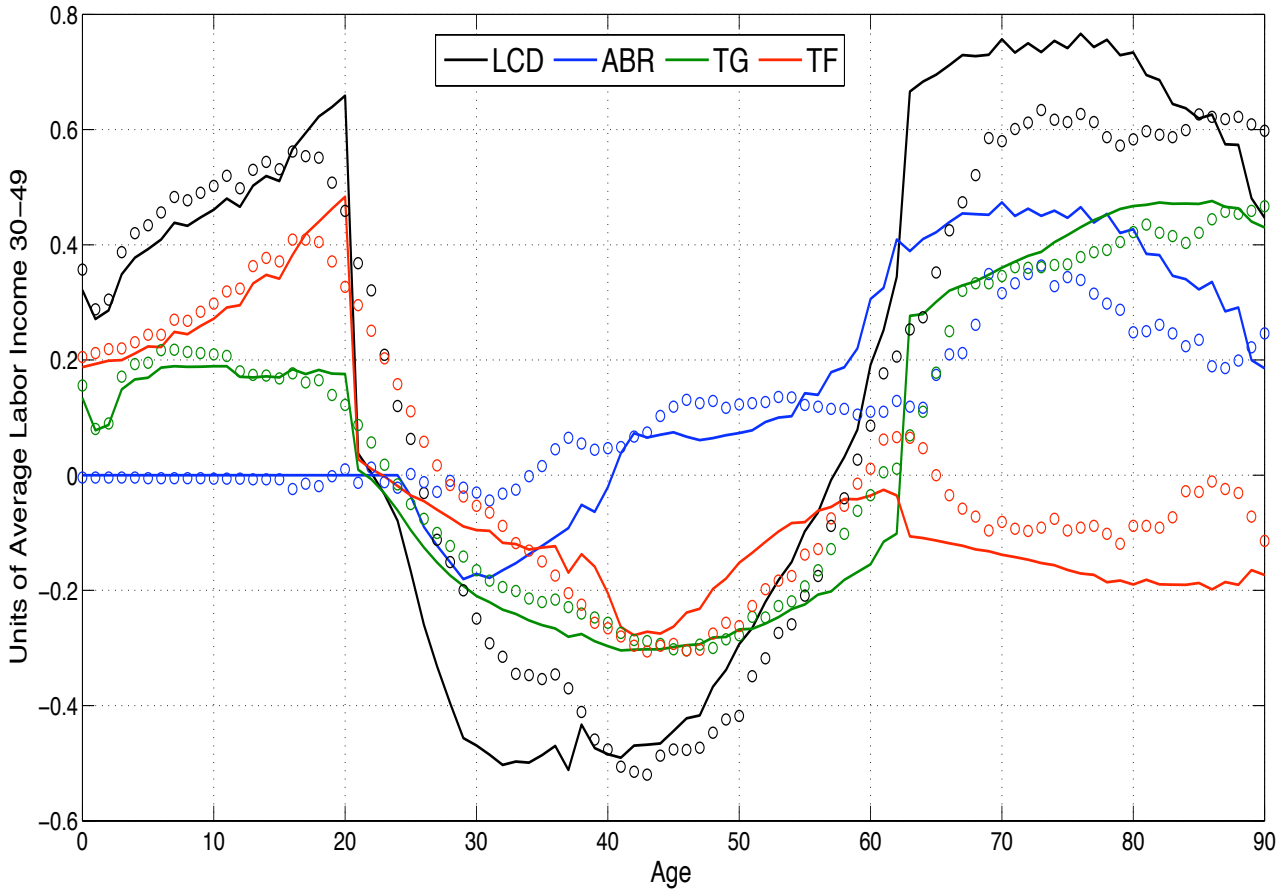

Figure: Actual (o) and Simulated (-) Life Cycle Deficit: Spain, year 2000.

Note: Actual NTA data does not contain bequests whereas our simulated NTA profiles does.

Life Cycle Deficit

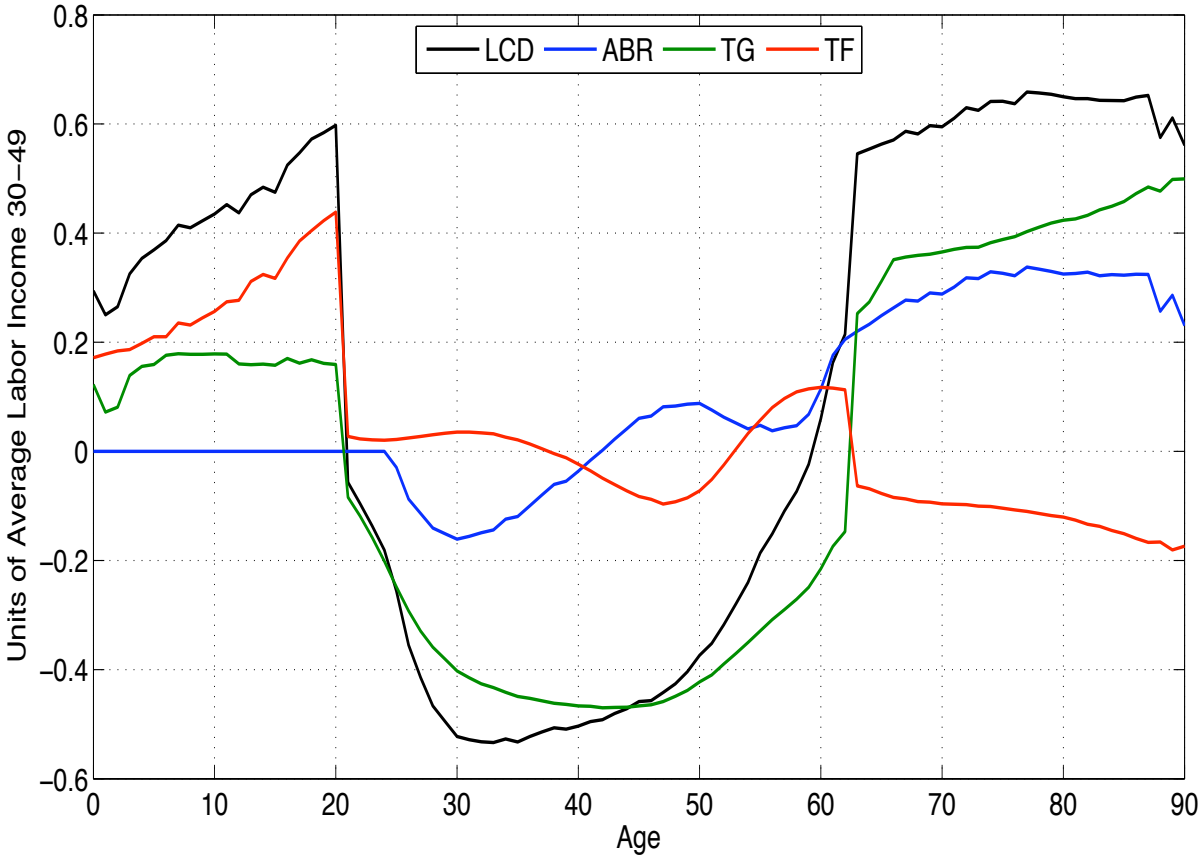

Figure: Simulated Life Cycle Deficit: Spain, year 2050.

Note: Actual NTA data does not contain bequests whereas our simulated NTA profiles does.

Familial Transfer Wealth

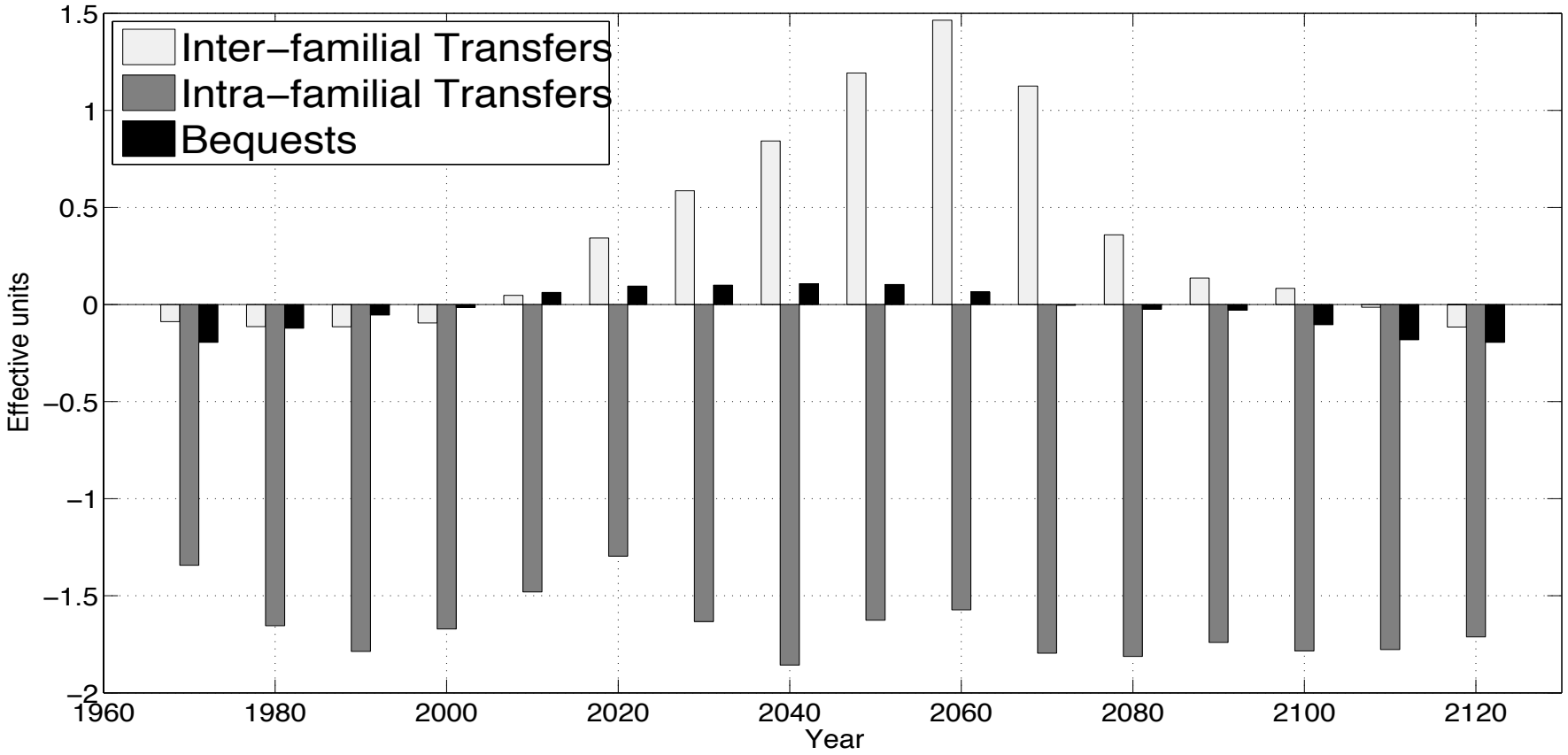

Figure: Simulated Aggregate Familial Transfer Wealth: Spain, 1970-2120.

Fertility and Mortality

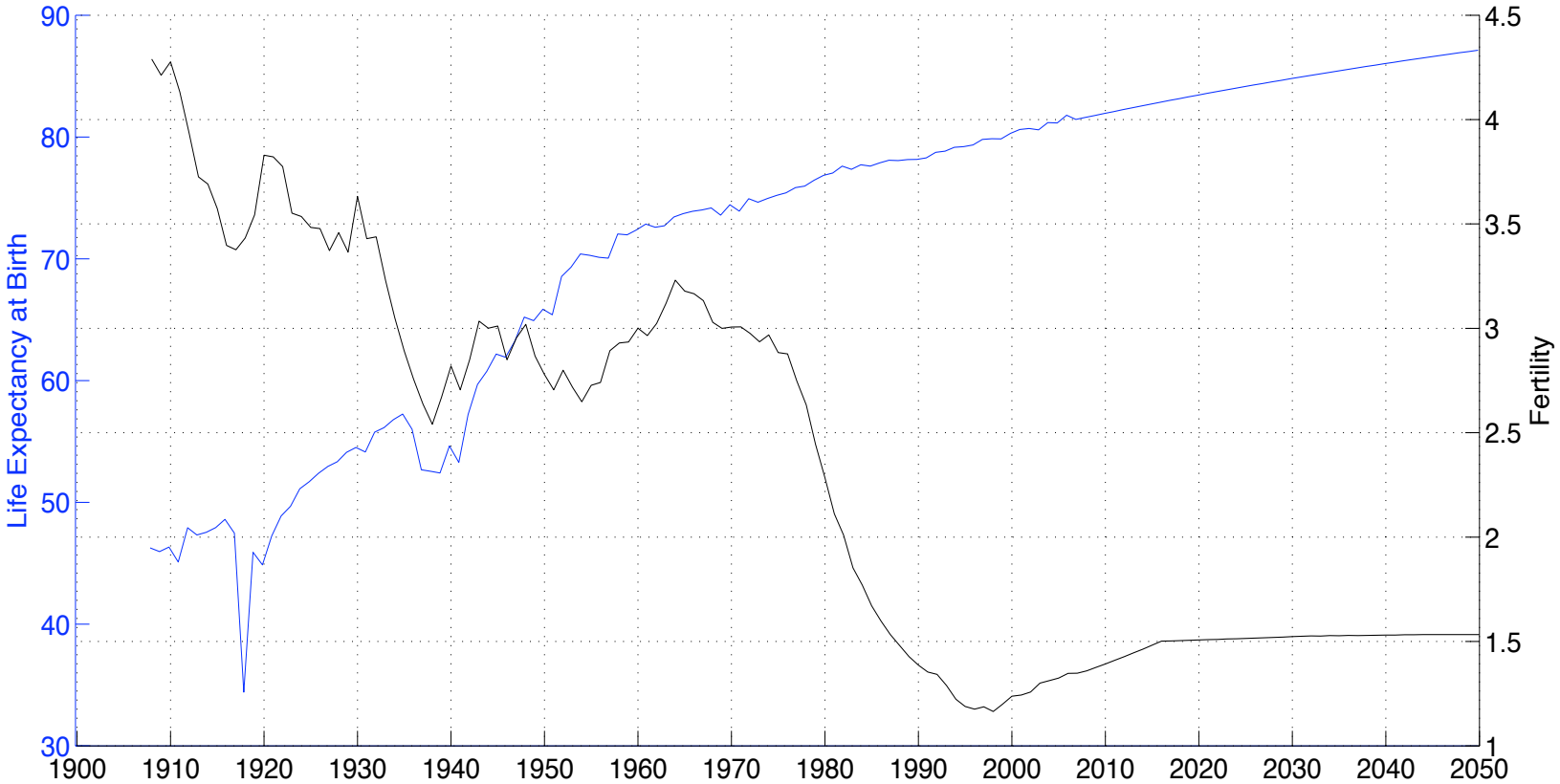

Figure: Spain: Life Expectancy at Birth and TFR, 1908-2050

Source: Author's calculations using HMD and Eurostat.

Transfer Wealth

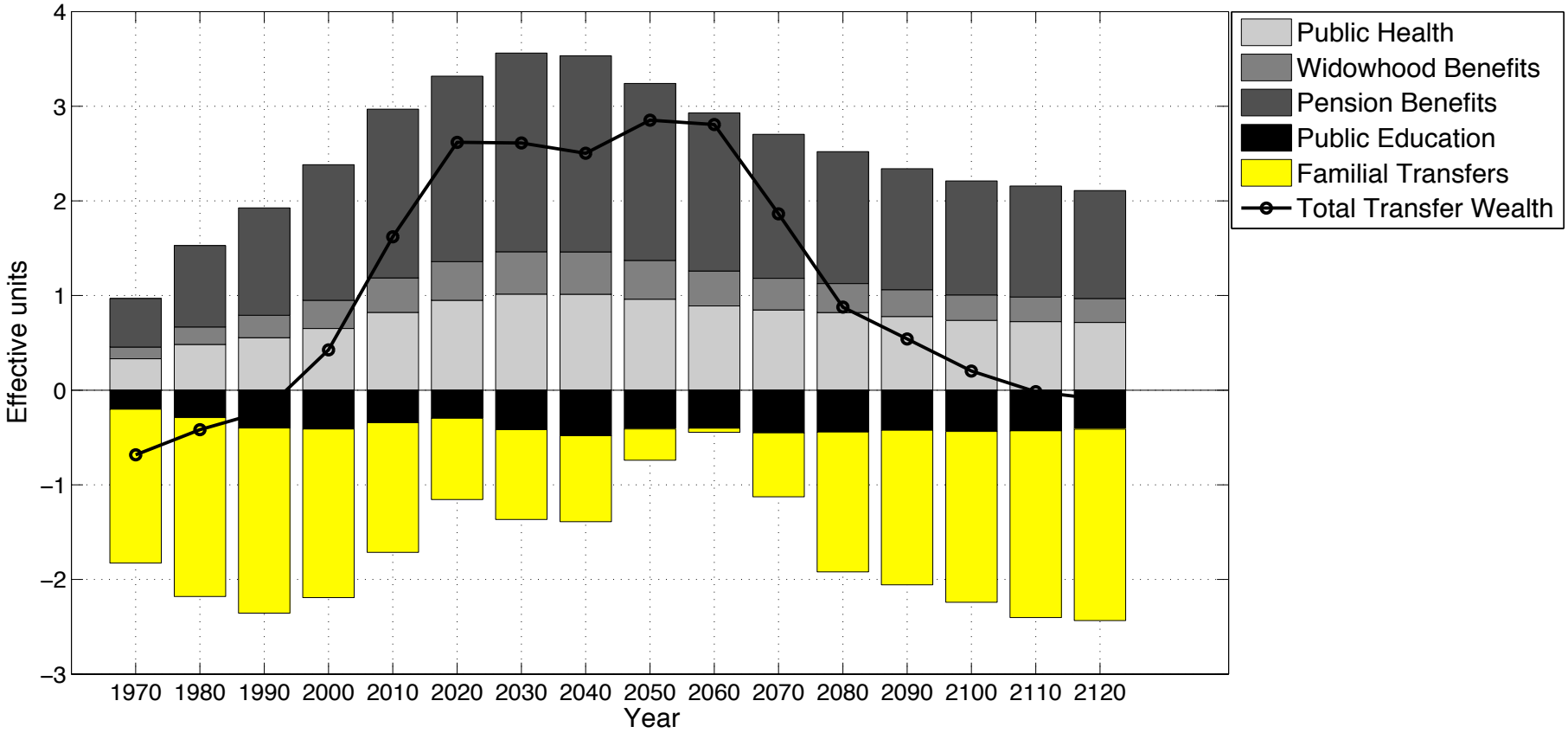

Figure: Simulated Aggregate Transfer Wealth: Spain, 1970-2120.

Evolution of the Demand for Wealth Market

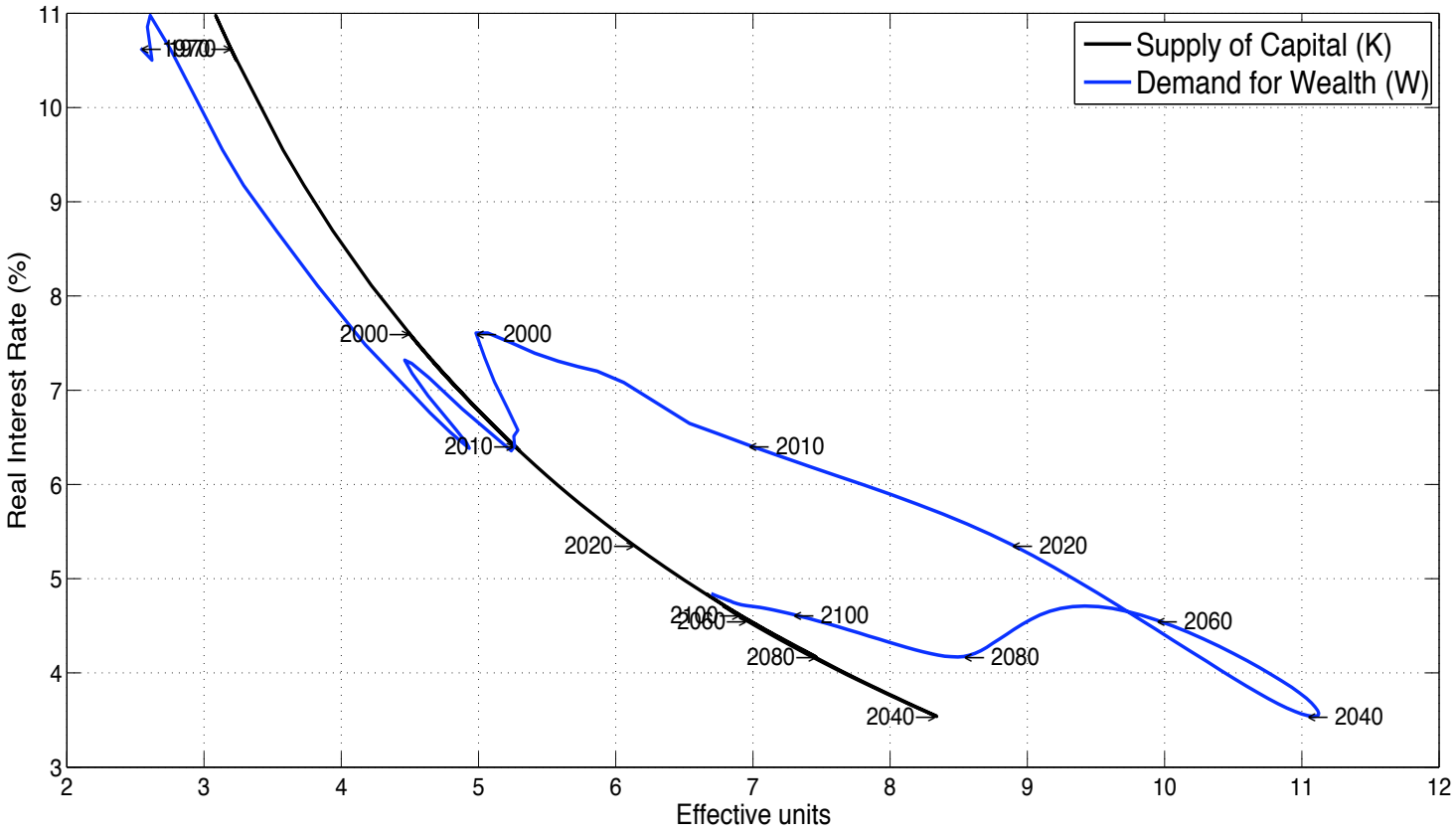

Figure: Equilibrium Interest Rate and Demand for Wealth (Total and Real): Spain, 1970-2120.

Conclusions

- OLG meets NTA
  - 75% of the Spanish Budget is modeled.
  - We replicate the Spanish LCD in year 2000.

- Holding the transfer set constant, before year 2000 Transfer Wealth is negative, whereas T turns out positive during the XXI century.
  - Aggregate public transfer wealth (positive) increases because of the Baby Boom.
  - Aggregate private transfer wealth becomes almost positive because of the Baby Boom-Baby Bust.

- Population aging will lead to a continuous decline in consumption from 2060 up to the new steady-state is reached.

THANK YOU

Ronald D. Lee, Andy Mason, Gretchen Donehower and David Reher.