Julius-Maximilians-
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Taxation and Intra/Intergenerational Equity

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9th International Winter School on Inequality and Social Welfare Theory - January 13-16, 2014

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$\Rightarrow$ **Redistribution towards rich future cohorts optimal!**

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- include the precautionary savings motive for self insurance;
- compare distortion cost and insurance benefits from government programs;
- consider alternative risk-sharing mechanisms (human capital investment, family insurance).

$\rightarrow$ Policy recommendations are different!

Structure of Stochastic OLG Model

Households

$\rightarrow$ belong to specific skill class within a cohort;

$\rightarrow$ work for 45 years, retire at age 65;

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- $\rightarrow$ are liquidity constraint (no borrowing).

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Incomplete market structure No insurance markets.

Should capital income be taxed?

Lucas (1990): Supply-Side Economics

"Capital income taxation will initially be high, imitating a capital levy on the initial stock. If the system converges to a balanced growth path, capital taxation will converge to zero."

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Conesa/Kitao/Krueger (2009):
Optimal long-run income tax structure:

- flat income tax with 23% tax rate and basic allowance of 7200$
- capital income tax rate 36%

Explanation: Insurance benefits dominate distortions!

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Why is this optimal?

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Standard time-separable expected utility

$$W(c, 1-l) = E\left[\sum_{j=1}^{J} \beta^{j-1} u(c_j, 1-l_j)\right]$$

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Dynamic budget constraint:

$$(1+\tau_c)c + a' = [1 + r_t(1-\tau_{k,t})]\,(a + Tr_t) + y + SS_t - \tau_{SS,t}\min[y, \bar{y}] - T_t(y_{\text{tax}})$$

with $y = w_t \cdot \alpha \cdot \epsilon \cdot \eta \cdot l$

Should capital income be taxed?

Government policy:

$$G_t + (1 + r_t)B_t = \tau_c C_t + T_{\text{inc}} + (1 + n)B_{t+1}$$

- Public consumption $\{G_t\}_{t=1}^{\infty}$ and consumption tax τ_c exogenous
- Progressive income tax schedule

$$T(y_{\text{tax}}) = \begin{cases} \kappa_0 \cdot \left[y_{\text{tax}} - (y_{\text{tax}}^{-\kappa_1} + \kappa_2)^{-1/\kappa_1} \right] & \text{otherwise} \\ \kappa_0 \cdot y_{\text{tax}} + \kappa_2 & \text{if } \kappa_1 \to 0 \\ \kappa_0 \cdot \max\left[y_{\text{tax}} - \kappa_2 \, ; \, 0 \right] & \text{if } \kappa_1 \to \infty \end{cases}$$

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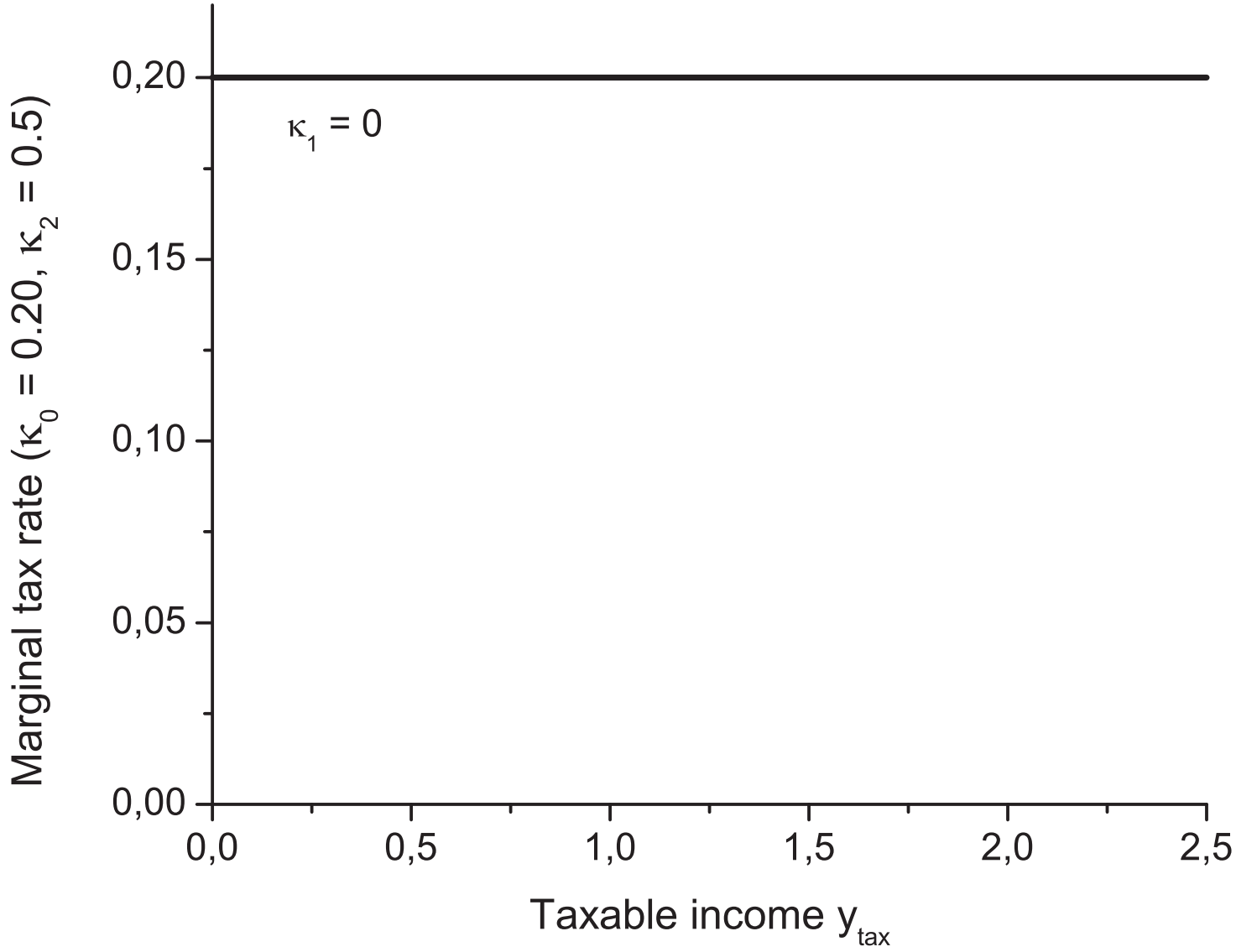

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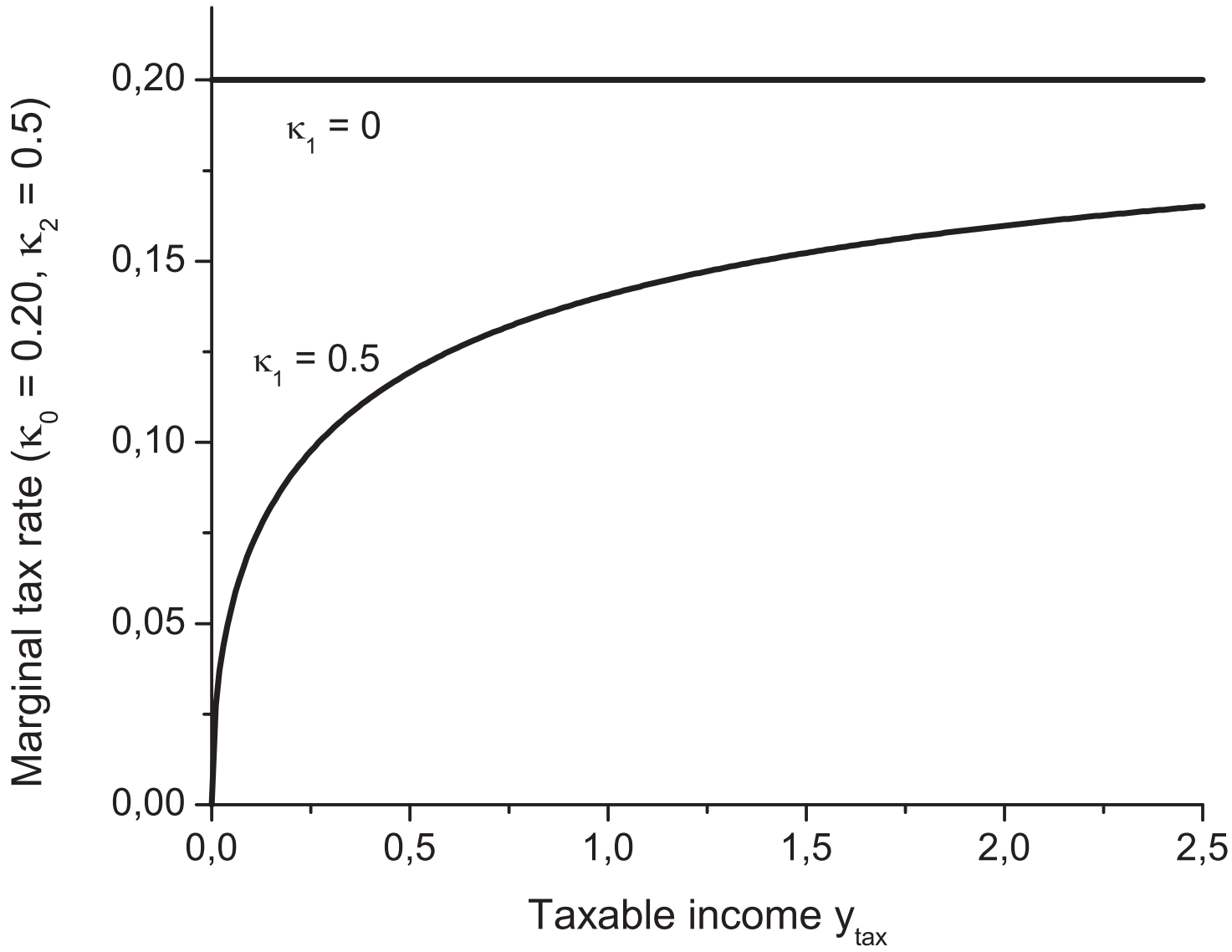

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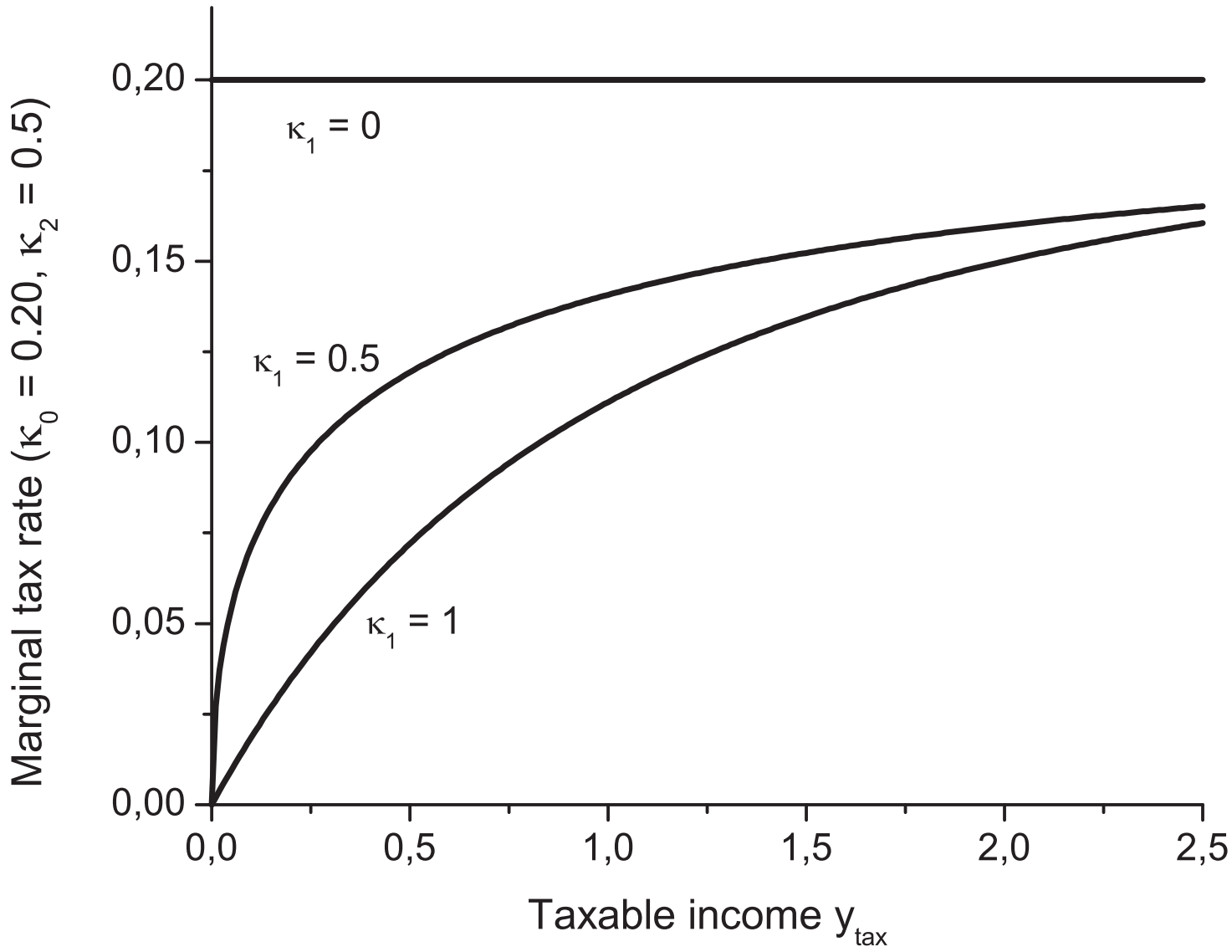

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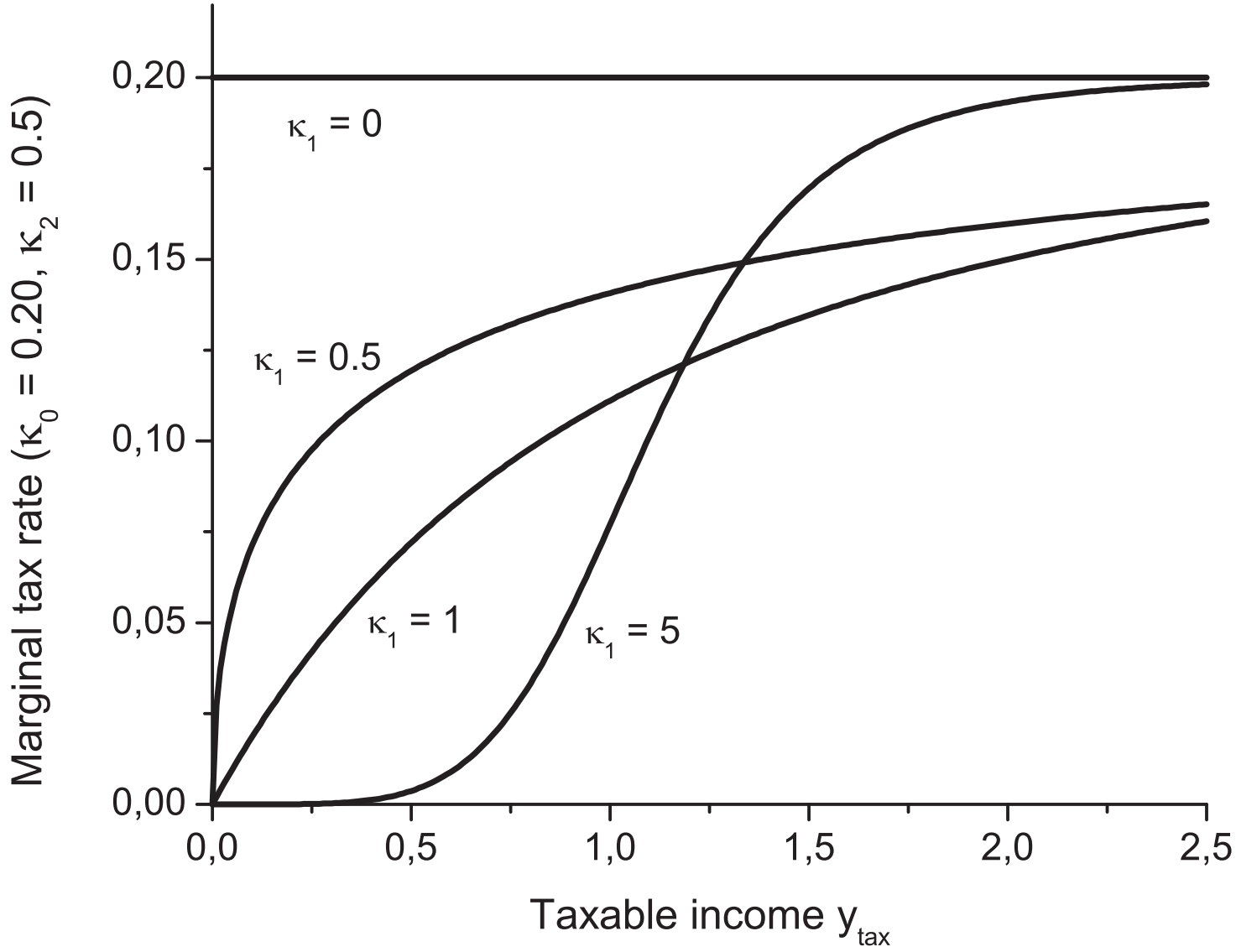

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Simulation methodology:

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- κ_2 balances intertemporal budget
- Debt balances periodic budget

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- One-time, unannounced change in income tax policy ($\tau_k, \kappa_0, \kappa_1$)
- κ_2 balances intertemporal budget
- Debt balances periodic budget
- Transition path and new long-run equilibrium
- Calculate welfare effects for different generations
- Determine efficiency effects of the income tax policy

Should capital income be taxed?

Simulation results: Long-run welfare

	Conesa et al. (2009)	optimal scheme
τ_k	0.36	0.43
κ_0	0.23	0.20
κ_1	7	∞
κ_2	34711	12108
Hours worked	-0.66	0.69
Labor supply N	-0.18	1.18
Capital stock K	-6.50	-8.16
Debt B/Y	0.00	0.00
Output Y	-2.50	-2.29
Consumption C	-1.45	-0.34
Long run CEV	**1.31**	**1.48**

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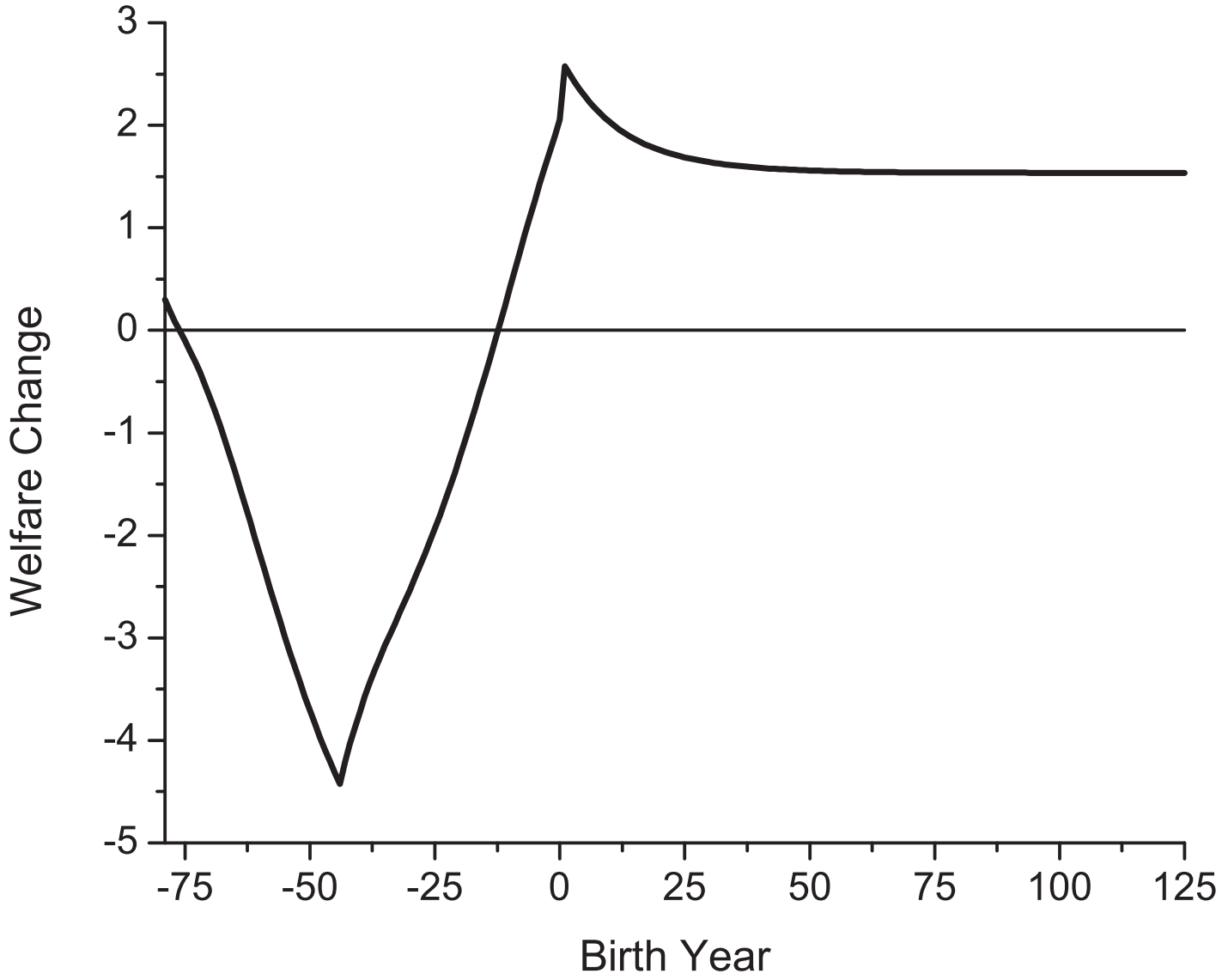

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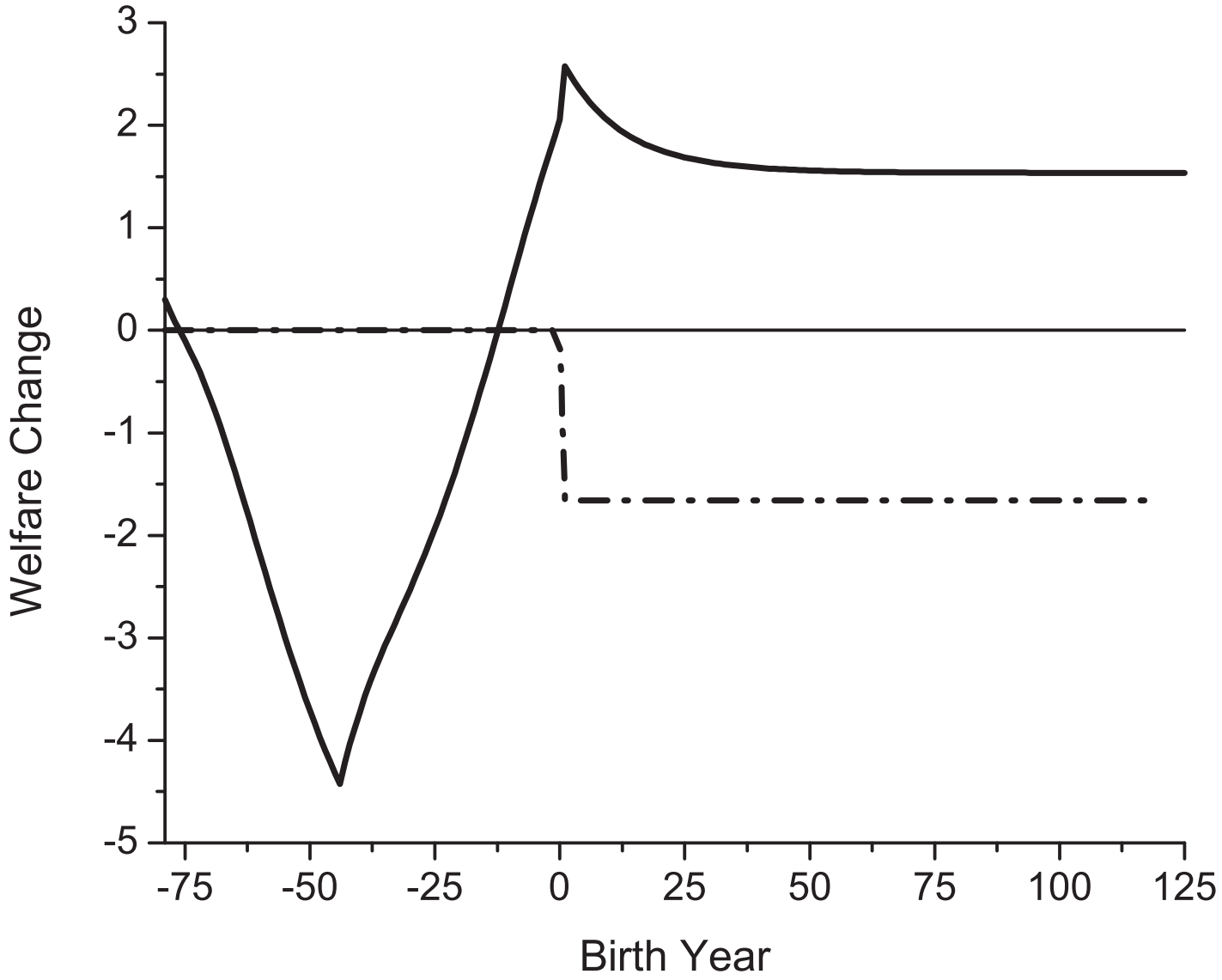

Should capital income be taxed?

	Long-run welfare		aggregate efficiency	
	Conesa et al. (2009)	optimal scheme	base case	optimal scheme
τ_k	0.36	0.43	0.43	0.14
κ_0	0.23	0.20	0.20	0.17
κ_1	7	∞	∞	0
κ_2	34711	12108	12195	712
Hours worked	-0.66	0.69	0.72	5.84
Labor supply N	-0.18	1.18	1.19	5.04
Capital stock K	-6.50	-8.16	-8.02	11.14
Debt B/Y	0.00	0.00	-0.72	2.98
Output Y	-2.50	-2.29	-2.23	7.20
Consumption C	-1.45	-0.34	-0.30	7.59
Long run CEV	**1.31**	**1.48**	1.54	-0.66
CEV^c (g.e.)			**-1.66**	**1.07**

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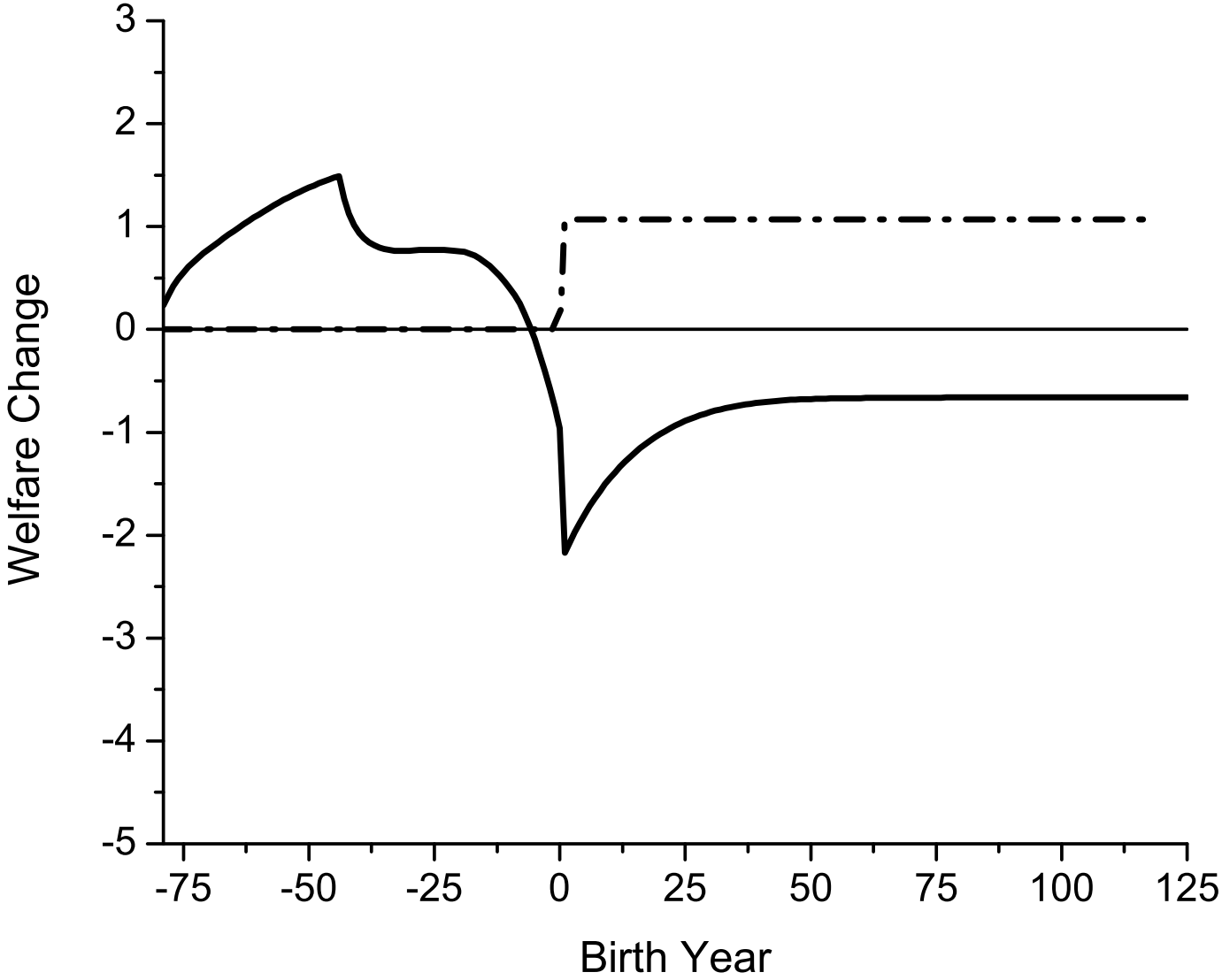

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- Immediate switch to optimal long-run policy comes at efficiency costs
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- Efficiency perspective $\rightarrow$ still optimal to tax capital income, but at much lower rates
- Optimal capital income tax rate:
  - 14 percent in closed economy
  - 6 percent in open economy

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- Efficiency perspective $\rightarrow$ still optimal to tax capital income, but at much lower rates
- Optimal capital income tax rate:
  - 14 percent in closed economy
  - 6 percent in open economy
- Low interest elasticity of precautionary savings $\rightarrow$ the smaller the share of precautionary savings, the lower the interest rate tax

Should pensions be progressive?

Pension reforms in recent years have mainly focused on labor market distortions

- Tax-benefit linkage increased;
- Progressivity of pension benefits decreased; (OECD progressivity index (average) in 2002: 51.5 in 2006: 39.8);
- The objective to prevent poverty in old-age received less weight.

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Fehr and Habermann (2008).

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Why Germany? Expected increase in old-age poverty!

Should pensions be progressive?

Government structure

Tax System

- consumption, (progressive) labor and capital income taxes, public debt
- consumption tax rate is used to balance budget

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Pension System

- pays old-age benefits and disability benefits
- $p_j = AF(j_R) \times ep_{j_R} \times APA$
- $ep_{j+1} = ep_j + \left[(1-\lambda)\frac{y_j}{\bar{y}} + \lambda\right]$

  $\lambda = 0 \quad \Rightarrow \quad$ perfectly earnings related

  $\lambda = 1 \quad \Rightarrow \quad$ perfectly flat

Should pensions be progressive?

Table: Macroeconomic effects of flat pensions (base model)

Year	2009	2020	2030	2050	∞
Macroeconomic aggregates					
Labor input	-5.6	-4.9	-4.8	-4.7	-4.7
Capital	0.0	-2.2	-2.8	-3.0	-3.0
Prices					
Wage	2.1	0.9	0.5	0.4	0.4
Interest rate	-0.3	-0.1	-0.1	-0.1	-0.1
Consumption tax rate	1.6	2.0	2.2	2.4	2.4
Pension system					
Expenditure (in % of GDP)	-0.1	0.1	0.4	0.5	0.5
Contribution rate	0.5	0.8	1.2	1.3	1.4

Should pensions be progressive?

Table: Welfare effects of flat pensions (base model)*

Birth year	Age in 2009	without LSRA						with LSRA
		by skill level			by productivity			
Retirees		*low*	*mid*	*high*				
1920	89	-2.44	-2.32	-2.08				0.00
1940	69	-2.22	-2.09	-1.87				0.00
Workers		*low*	*mid*	*high*	*low*	*mid*	*high*	
1960	49	0.93	0.23	-0.63	2.50	-0.15	-1.18	0.00
1980	29	1.03	0.50	-0.58	2.07	0.21	-0.77	0.00
Future Generations								
2000	9		0.35					-0.46
2020	–		0.18					-0.46
2060	–		0.22					-0.46
∞	–		0.20					-0.46

Should pensions be progressive?

Table: Aggregate efficiency of alternative progressivity levels*

model version	λ = 0.10	0.20	0.30	0.40	0.50	...	0.90	1.00
base	0.05	**0.08**	0.06	0.04	-0.00	...	-0.33	-0.46
+ disability	0.18	0.31	**0.35**	0.32	0.22	...	-0.45	-0.60
+ retirement	0.17	0.31	**0.37**	0.34	0.23	...	-0.43	-0.58

*In percent of initial resources.

Should pensions be progressive?

- Positive insurance effect is stronger than the efficiency losses from labor supply distortions for a wide range of parameter combinations;
- Pensions should be more progressive at least in Germany;
- International trend towards less pension progressivity might be suboptimal;

Should pensions be means-tested?

Welfare analysis of means-testing has to trade-off:

- reduction of labor supply distortions;
- changes in savings distortions;
- insurance provision against old-age poverty risk;
- (liquidity effects;)

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Research questions:

- When is means-testing optimal?
- What resources should be tested for?
- What is the optimal taper rate?

Previous Literature (UK, AU)

- **Means-testing improves long-run welfare**
  $\rightarrow$ Sefton, van de Ven and Weale (EJ 2008, 2009)
  $\rightarrow$ Kumru and Piggott (WP 2010)
- **Means-testing deteriorates welfare**
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Our paper: Reform of the UK pension system

- We consider transition path to long-run equilibrium;
- Isolate aggregate efficiency effects of policy reforms;
- Single vs. two-tier system, alternative basic pension, etc.

Should pensions be means-tested?

Pension system

- **Means-tested flat tier** (progressive):

$$b_j^m = \max\left\{\overline{b} - \varphi\left[\theta \max(a_j - \kappa\ ; 0) + b_j^e\right]\ ; \underline{b}\right\}.$$

Relevant parameters:
$\overline{b}$ - minimum income guarantee
$\varphi \in [0,1]$ - taper rate
$\theta \in [0,1]$ - imputed return on assets
$\underline{b}$ - basic state pension

- **Earnings-related second tier** (non-progressive):

$$b_j^e = \Gamma(\hat{w}_{J_R}).$$

Should pensions be means-tested?

Calibration and simulation

1. Preferences and income process as in Sefton et al. (2008) and Kumru and Piggott (2010);
2. Small open economy: No factor price effects;
3. Initial equilibrium: UK 2003
   $\Rightarrow \quad \overline{b} = 0.3\bar{w}, \varphi = 1.0, \theta = 0.1;$
4. Policy reforms: Reductions of φ, θ
5. Compute transition path after reform: welfare effects
6. Compute transition path with compensation payments: aggregate efficiency effects

Should pensions be means-tested?

Simulation Results: Single tier - only asset test($\varphi = 0.0$)

Macroeconomic effects[a]			Welfare and efficiency[b]			
	Period 1	reform ∞	Age in low year	Skill level median	high	LSRA
Labor supply	-1.1	0.6	65-69	4.8	10.4	12.5
Consumption	-0.9	-0.1	45-49	0.3	1.7	2.3
Private assets	0.0	-3.8	25-29	-1.3	-0.7	-0.3
Consumption tax[c]	1.6	0.4	15-19		-1.2	
Contribution rate[c]	4.9	4.9	∞		-1.2	

[a] Changes in percent over value in initial equilibrium.
[b] Changes are reported in percentage of initial resources.
[c] Changes in percentage points.

Should pensions be means-tested?

Simulation Results: Two-tier system - optimal design

	Taper rate Pension income	Taper rate Private Wealth	Efficiency effect (%)
Initial Equilibrium	1.0	1.0	
Pension Credit	0.4	0.4	-1.4
Universal Benefits	0.0	0.0	-0.4
Pension-taper reform	0.0	1.0	-2.7
Asset-taper reform	1.0	0.0	+0.8
Higher MIG-level ($\bar{b} = 0.4\bar{w}$)	1.0	1.0	-1.6
Basic Pension ($\underline{b} = 0.15\bar{w}$)	1.0	1.0	+0.6

Should pensions be means-tested?

Conclusions

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- Benefits from pension-testing compensate cost from asset-testing! (due to low savings elasticity!)
- 100% taper rate is efficient in a resource-tested two-tier system (i.e. pension credit reform in UK reduces economic efficiency)!
- Elimination of asset-testing while keeping pension-testing is optimal policy!

Conclusions and Outlook

Central result of stochastic life-cycle models:

- Social security and progressive tax systems offer substantial insurance gains;
- Public policy has focussed too much on labor market and savings distortions!
- Trade-off between equity and efficiency might be overstated!

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Future work:

- Modelling institutional features such as housing and families;
- Modelling other sources of risk (aggregate risk) and intergenerational risk-sharing;