High Marginal Tax Rates on the Top 1%? Lessons from a Life Cycle Model with Idiosyncratic Income Risk By Fabian Kindermann and Dirk Krueger

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High Marginal Tax Rates on the Top 1%?

Can very high marginal tax rates on the top 1% be optimal from a social perspective?

1) Taxing high incomes income in General Equilibrium OLG.

2) Revenue- and welfare-maximizing tax rates.

3) Optimal marginal earnings tax rate for 1% roughly 80% (US Calibration).

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Why do we care?

Recent discussion around higher marginal income tax.
General Equilibirium Argument.

Overview

Context of Literature

Static Model

Dynamic Model

Quantitative Results

Conclusion

Appendix

Context of Literature

Context of Literature

- Piketty and Saez (2003) & Alvaredo et al (2013)
- Diamond and Saez (2011)
  - Static, Partial Equilibrium
  - Revenue/Welfare maximizing tax rate on top 1% at 73%
- Badel, Huggett & Luo (2020)
  - High marginal tax rates with endogenous human capital accumulation (dynamic framework)

Static Model

A Static Model

- **Households**: Choose consumption and labour supply. Ex-post two productivities $\{l,\ h\}$. Probability of low type $\mathbf{\Phi}_l$
- **Government** Collects taxes with an (extra) tax on the highly productive type. Revenues as lumpsum transfer to all.
- Set top-income tax rate to maximize government revenue
  $\max_{\tau_h} : T(z_h) = \tau_h(z_h - \bar{z}) - R$
  $\implies \tau_h = \frac{1}{1+a\,\epsilon(z_h)}$ (revenue-maximizing tax rate)
- Two mechanism: Tax increase & response of agents

A Static Model

However, revenue-maximizing is not necessarily welfare-maximizing.

- Share $1 - \boldsymbol{\Psi}$ of households know the type in advance, others face uncertainty (3 types!). Change of utility function to exclude income effects.

- Consumption Equivalence Variation for welfare:
$$\mathcal{V}(\tau_h; \boldsymbol{\Psi}) = (1 - \boldsymbol{\Psi}) \Big[\boldsymbol{\Phi}_l T_l(\tau_h) + (1 - \boldsymbol{\Phi}_l) T_h(\tau_h) \Big] + \boldsymbol{\Psi} T_u(\tau_h)$$

- Takeaway: The more uncertainty, the higher the tax. If there is no uncertainty, best no tax.

- Welfare-maximizing rate is generally lower than the revenue-maximizing rate.

Dynamic Model

Households

- Live J periods w. survival probability ψ_j. Retirement at age j_r
- Ex-ante heterogeneity in education $s \in \{n, c\}$. $c =$ college-educated w. share ϕ_s.
- Idiosyncratic risk η follow Markov chain w. transition $\pi_s(\eta'|\eta)$

$$V(j, s, \alpha, \eta, a) = \max_{c,n,a'} U(c, n) + \beta\psi_{j+1} \sum_{\eta'} \pi_s(\eta'|\eta) V(j+1, s, \alpha, \eta', a') \tag{1}$$

subject to

$$(1 + \tau_c)c + a' + T(z) + T_{ss}(z) = (1 + r_n)a + b_j(s, \eta) + z \tag{2}$$

where $z = \omega e(j, s, \alpha, \eta)n$

Getting the households to the data

1) Distribution of Households $\mathbf{\Phi}$
2) η can have 7 education-specific states. 5 normal states and 2 very high states. Jump from 1-5 to 6 but only from 6 to 7.
3) $U(c, n) = \frac{c^{1-\gamma}}{1-\gamma} - \lambda \frac{n^{1+\frac{1}{\chi}}}{1+\frac{1}{\chi}}$ with $\chi = 0.6$
4) If highly productive, wages are independent of age and education ($\ln e(.) = \eta$) otherwise it is dependent ($\ln e(.) = \alpha + \epsilon_{j,s} + \eta$)

Exogenous Calibration Endogenous Calibration

Firm and Government

1. Firms
   a) Representative, competitive firm with $Y = \Omega K^{\epsilon} L^{1-\epsilon}$.
   b) Capital depreciates at rate δ and pay wages ω
2. Government
   a) Budget constraint:

$$r\tau_k(K+B)+\tau_c C+\int T(z(j,s,\alpha,\eta,a))d\mathbf{\Phi} = G+(r-g_n)B \quad (3)$$

   b) PAYG system:

$$\int p(s,\alpha,\eta)\mathbf{1}_{j>j_r}d\mathbf{\Phi} = \tau_{ss}\int \min\{\bar{z}_{ss}, z(.)\}d\mathbf{\Phi} \quad (4)$$

   c) Distribution of bequests:

$$Tr = \frac{\int(1+r_n)(1-\psi_{j+1})a'(.)d\mathbf{\Phi}}{\int \mathbf{1}_{j\leq j_r}d\mathbf{\Phi}} \quad (5)$$

Marginal Tax Schedule

Quantitative Results

Quantitative Results

TABLE 7—LABOR EARNINGS DISTRIBUTION IN BENCHMARK ECONOMY

	Share of total sample (in %)								
	Quintiles					Top (%)			
	1st	2nd	3rd	4th	5th	90-95	95-99	99-100	Gini
Model	0.0	5.6	10.9	17.3	66.2	10.9	18.9	22.6	0.648
US Data	-0.1	4.2	11.7	20.8	63.5	11.7	16.6	18.7	0.636

TABLE 8—WEALTH DISTRIBUTION IN BENCHMARK ECONOMY

	Share of total sample (in %)								
	Quintiles					Top (%)			
	1st	2nd	3rd	4th	5th	90-95	95-99	99-100	Gini
Model	0.0	0.9	4.3	11.6	83.3	14.1	25.3	30.4	0.808
US Data	-0.2	1.1	4.5	11.2	83.4	11.1	26.7	33.6	0.816

Earnings & Wealth Calibration

Thought Experiment

We start from the initial steady state and impose one-time unexpected tax reform. Observe:

- Higher τ_l coincides with lower τ_l and lower $\bar{z}_l$ (Intertemporal Budget Constraint & definition of top 1%)

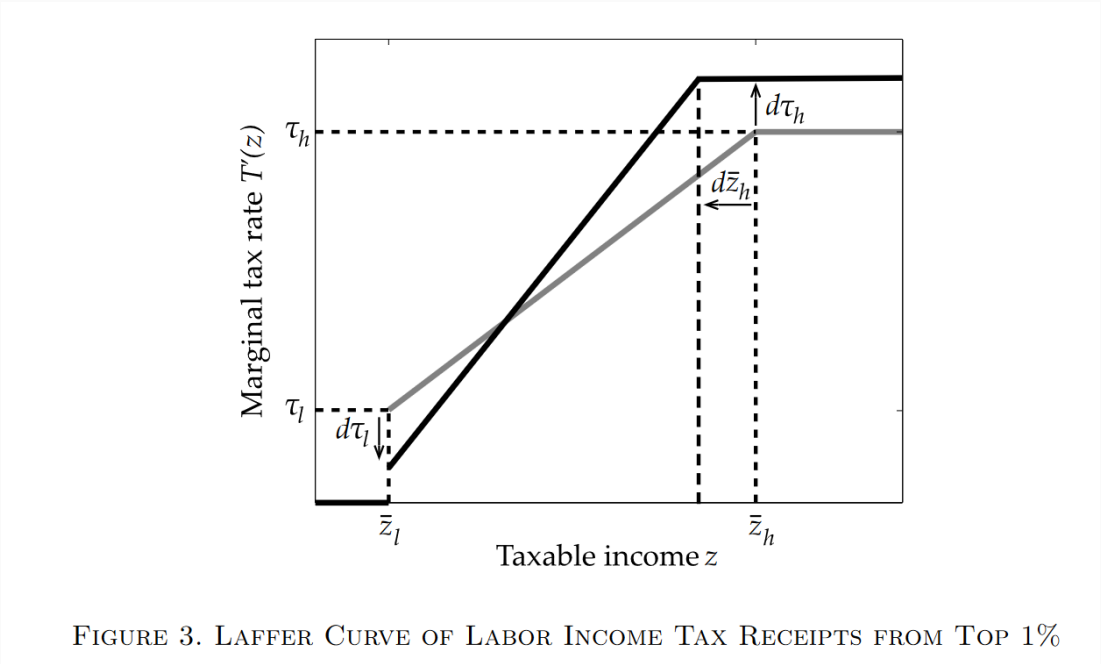

FIGURE 3. LAFFER CURVE OF LABOR INCOME TAX RECEIPTS FROM TOP 1%

Figure 1: Tax Plan after Reform

Thought Experiment II

Procedure as in partial equilibrium to find revenue-maximizing tax.

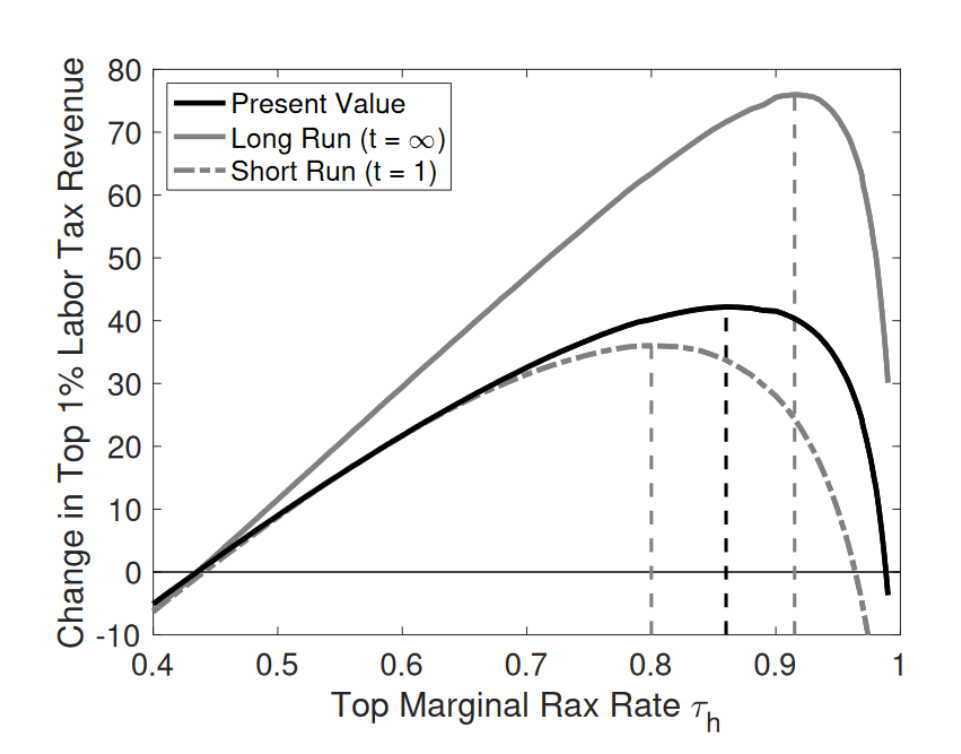

Figure 2: Revenue-Maximizing Marginal Tax Rate

1.) Time horizon matters! $\Longrightarrow$ Transition dynamics important.

2.) Generally high marginal tax rate

Thought Experiment III

Procedure as in partial equilibrium to find welfare-maximizing tax.
Constant flow of cons. during transition & new steady state.

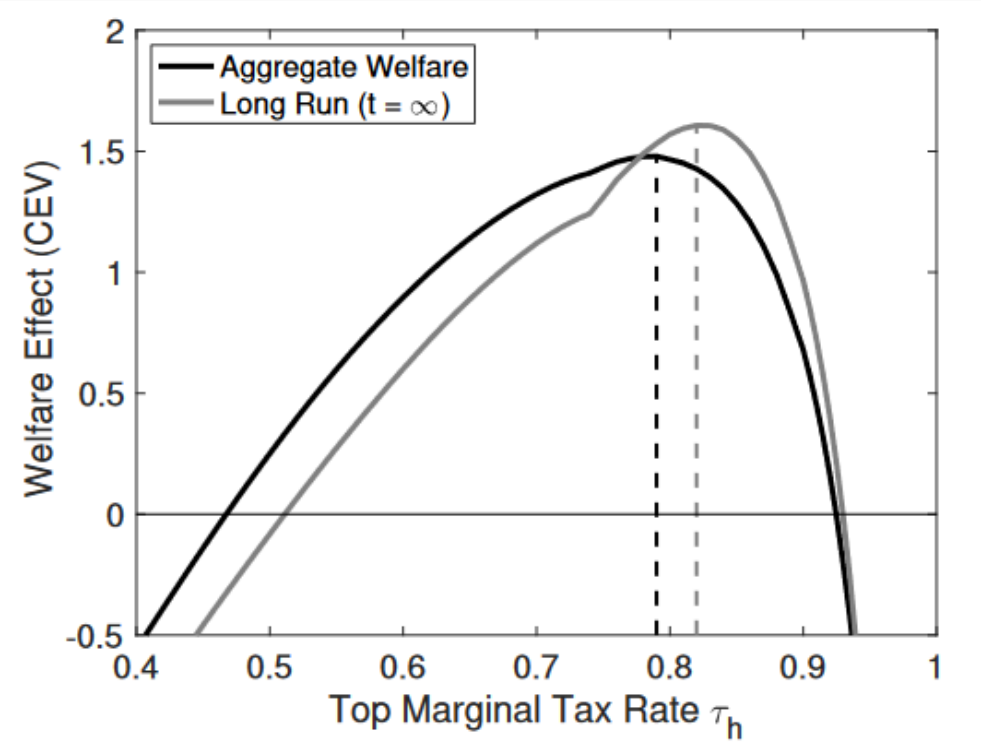

Figure 3: Welfare-Maximizing Marginal Tax Rate

Still high but lower than revenue-maximizing!

Transition Dynamics

- Labour supply of 'superstars' drops a lot. $\Longrightarrow$ rising wages cause partial recovery
- Rich smooth consumption by reducing wealth $\Longrightarrow$ Loss in aggregate capital
- Stark drop in aggregate output and consumption.
- Public debt issued to finance transition between tax systems. On impact, loss in earnings capital income tax. In the long run higher returns from both, but lower consumption tax returns.

Transition Graphs I | Transition Graphs II | Transition Graphs III

Transition Dynamics II

How are the dynamics over cohorts?

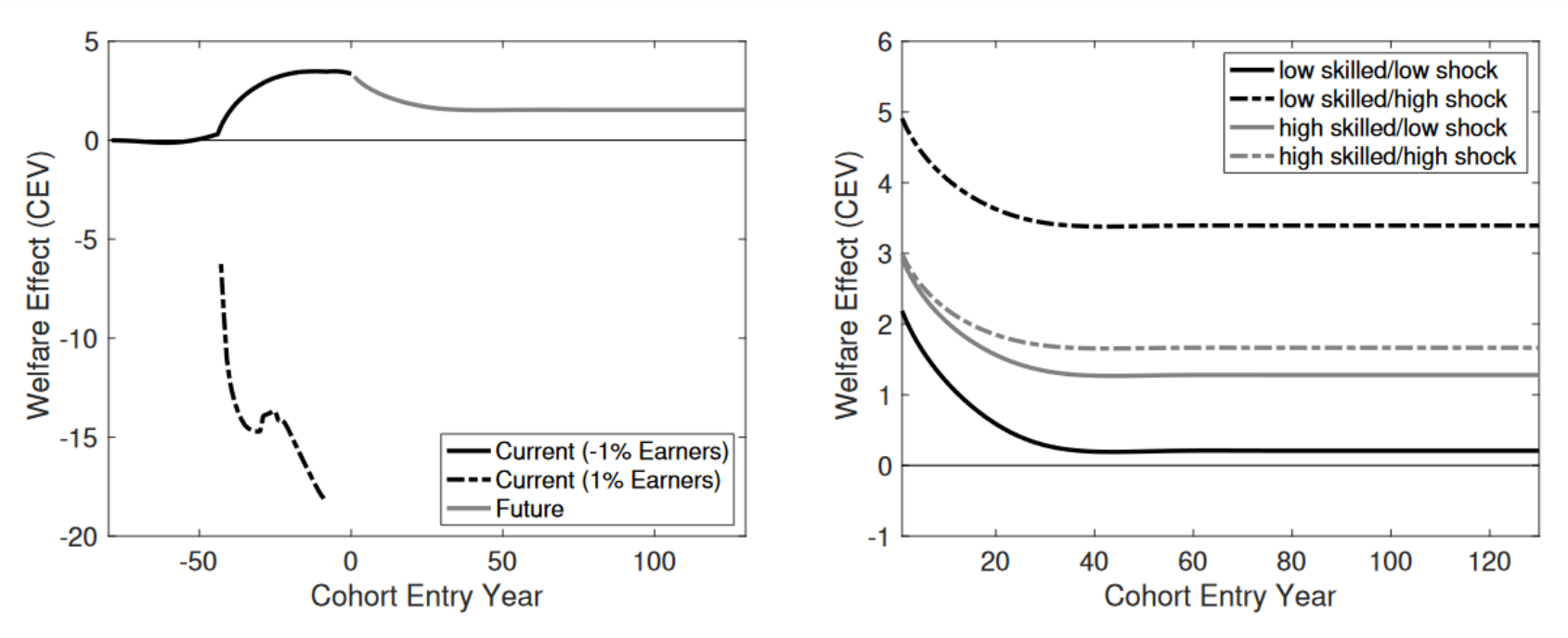

Figure 4: Welfare effects over Generations

Conclusion

Conclusion

- Revenue-maximizing marginal tax rate not necessarily socially optimal
- Top Marginal Income Tax rate can be up to 80%.
- Crucially relies on the modeling of the transition matrix.

Appendix

Exogenous Calibration

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TABLE 4—EXOGENOUSLY CHOSEN PARAMETERS

Parameter	Value	Target/Data
Survival probabilities $\{\psi_j\}$		HMD 2010
Population growth rate g_n	1.1%	
Capital share in production ϵ	33%	
Threshold positive taxation $\bar{z}_l$	35%	as fraction of y^{med}
Top tax bracket $\bar{z}_h$	400%	as fraction of $\bar{y}$
Top marginal tax rate τ_h	39.6%	
Consumption tax rate τ_c	5%	
Capital income tax τ_k	28.3%	
Government debt to GDP B/Y	60%	
Government consumption to GDP G/Y	17%	
Bend points b_1, b_2	0.184, 1.114	SS data
Replacement rates r_1, r_2, r_3	90%, 32%, 15%	SS data
Pension Cap $\bar{z}_{ss}$	200%	$\tau_p = 0.124$
Frisch elasticity χ	0.60	

Endogenous Calibration

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TABLE 5—ENDOGENOUSLY CALIBRATED PARAMETERS

Parameter	Value	Target/Data
Technology level Ω	0.921	$w = 1$
Depreciation rate δ_k	7.5%	$r = 4\%$
Initial marginal tax rate τ_l	11.2%	Budget balance
Time discount factor β	0.981	$K/Y = 2.9$
Disutility from labor λ	24	$\bar{n} = 33\%$
Coeff. of Relative Risk Aversion γ	1.509	$\epsilon(z_m) = 0.21$

Marginal Tax Schedule

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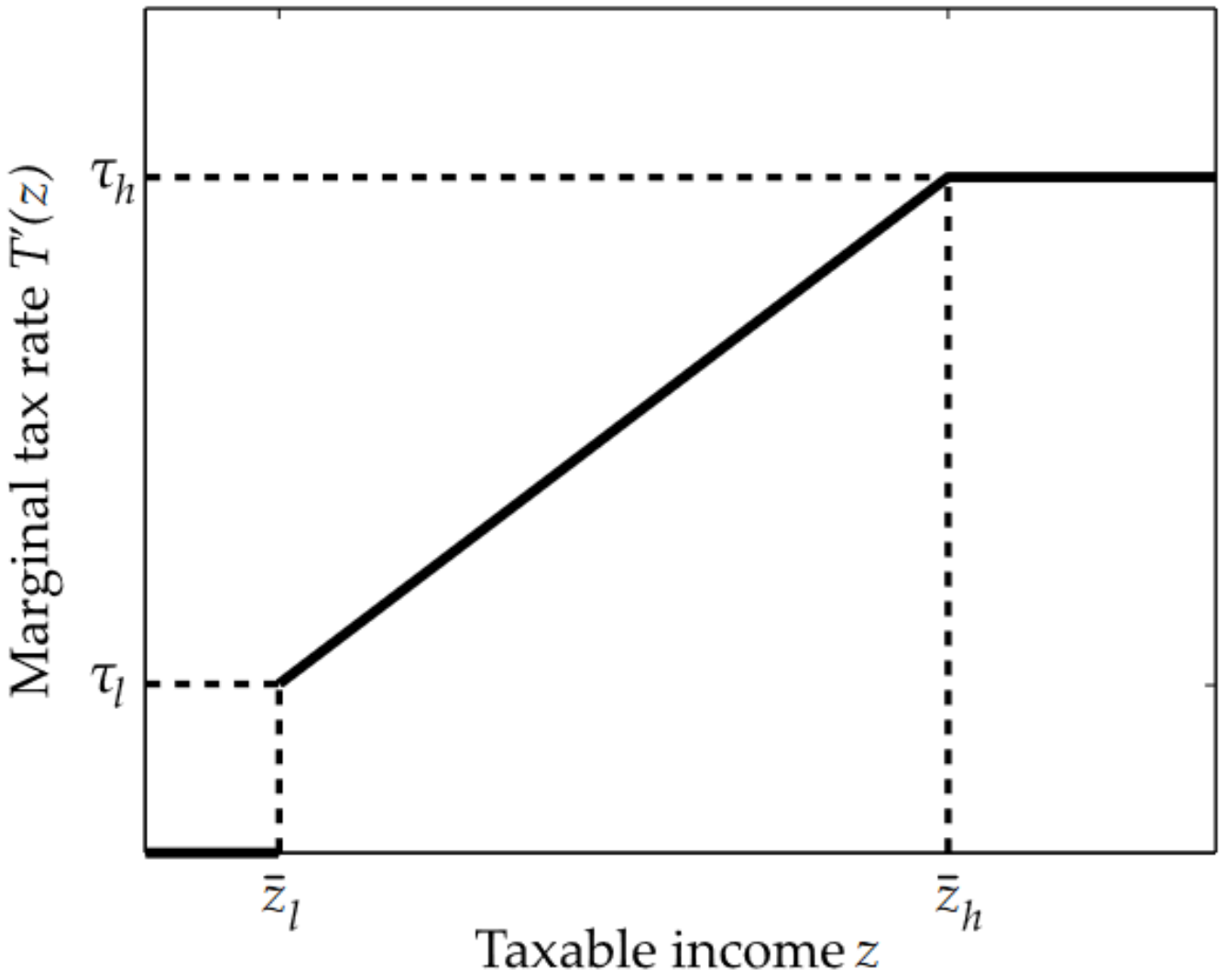

Income and Wealth Calibration

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Parameters		Targets
Prob. to high wage region $(s = n)$	$\pi_{\cdot 6,n}$	95-99% Earnings
Prob. to high wage region $(s = c)$	$\pi_{\cdot 6,c}$	99-100% Earnings
Persistence high shock $(s = n)$	$\pi_{66,n}$	Share college in 95-99% Earnings
Persistence high shock $(s = c)$	$\pi_{66,c}$	Share college in 99-100% Earnings
Prob. to highest wage $(s = n)$	$\pi_{67,n}$	Gini Earnings
Prob. to highest wage $(s = n)$	$\pi_{67,c}$	95-99% Wealth
Persistence highest shock	$\pi_{77,n} = \pi_{77,c}$	99-100% Wealth
High wage shock $(s = n)$	$\eta_{n,6}$	Share college in 95-99% Wealth
High wage shock $(s = c)$	$\eta_{c,6}$	Share college in 99-100% Wealth
Highest wage shock	$\eta_{n,7} = \eta_{c,7}$	Gini Wealth

Transition Dynamics I

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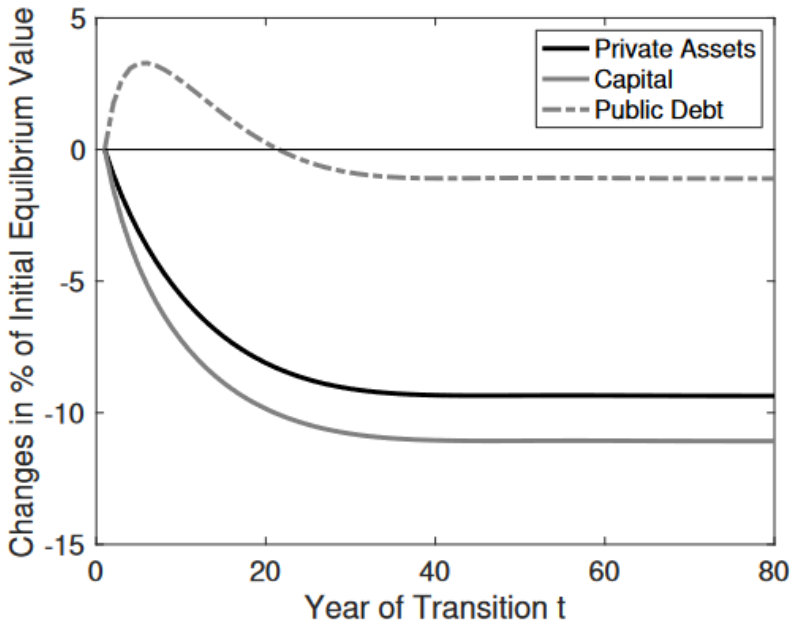

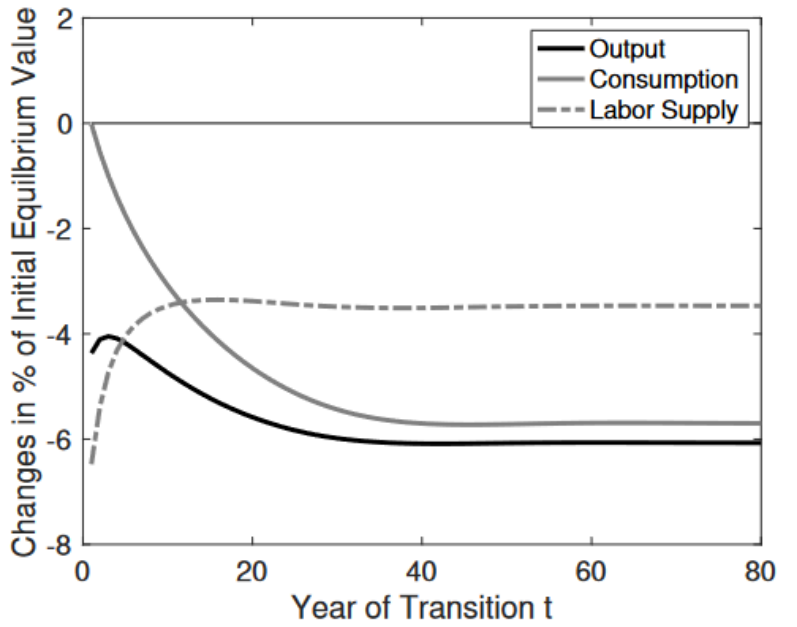

Transition Dynamics II

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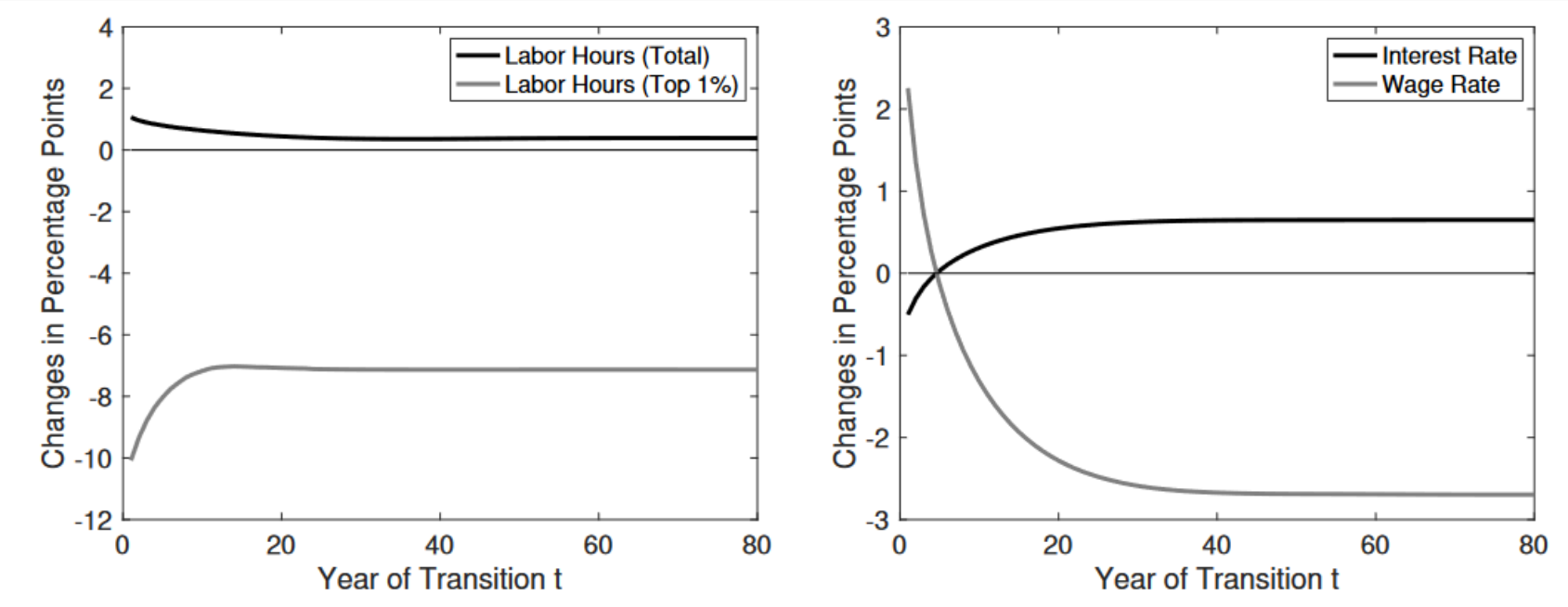

Transition Dynamics III

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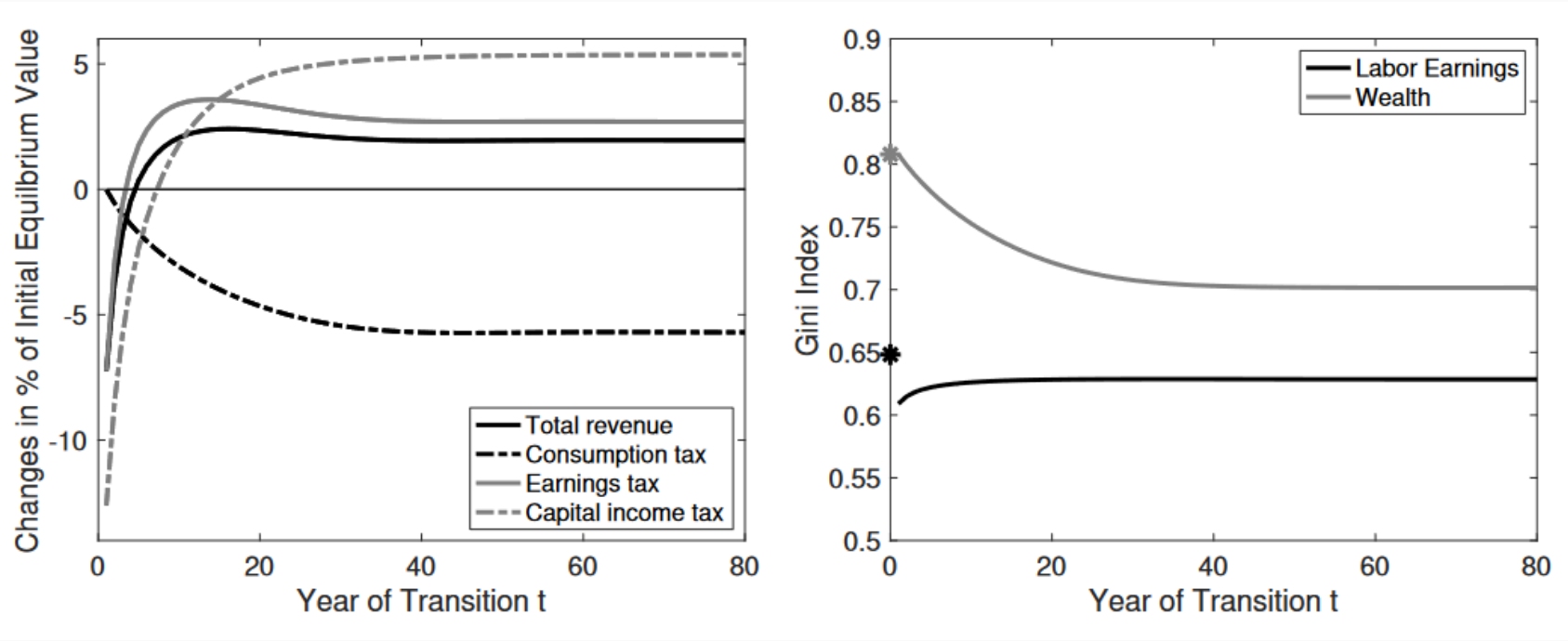

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