The Looming Fiscal Reckoning: Tax Distortions, Top Earners and Revenues.

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Before We Start - Deadlines

- June 15: submission of the the final version to the Editors (with any responses to referees if necessary).

- June 30: submission of the accepted final version of the paper, including codes+data to the Elsevier system.

Tom Cooley - Macroeconomics of Public Policy

- Cooley and Ohanian (JPE, 1997) - Postwar British Economic Growth and the Legacy of Keynes
  - "Britain taxed capital income at a much higher rate than the US during the war and for much of the post war period... Welfare costs of Keynes's policies were very high."
- Cooley and Soares (JPE, 1999) - A Positive Theory of Social Security Based on Reputation
  - Caucutt, Cooley and Guner (J of E. Growth) - The Farm, the City, and the Emergence of Social Security

Motivation

- A fiscal winter is coming. CBO estimates a need of additional federal revenues of about 3.4-4.8% of GDP annually.
- Upshot: non-trivial tax hikes are in the horizon.
- How should the U.S. generate tax revenue in the medium and long term?
  1. Quantitatively, what are the dynamic effects of tax hikes?
  2. What options minimize the welfare costs of tax hikes?
  3. What is the role of tax progressivity in minimizing welfare costs?

What we do

- Develop a life-cycle economy with heterogeneity and endogenous labor choice.
- Parameterize this model to be consistent with facts on earnings *and* wealth inequality and taxes paid for the US economy.
    - Ex-ante differences in labor endowments and discount factors, plus standard uninsurable shocks.
- Use this framework to evaluate alternative ways to achieve tax revenue increases.
    - Main analysis targets a 30% increase in revenue (2.4% of benchmark GDP)
- Find an optimal mix of fiscal policy instruments.

Preview of Findings

- Linear consumption tax consistently emerges as part of optimal mix of fiscal policy instruments.
  - Substantial transfers are concomitant with a high consumption tax rate.

- Optimal mix leads to non-trivial output losses – about 7.9% for a 30% increase in Federal revenues.

- In optimal mix, progressivity of income tax *declines* relative to benchmark case.
  - Larger reductions associated to larger revenue needs.

- We find little or no revenue increases associated with a wealth tax. No role in optimal mix.

Model

- Standard life-cycle economy with heterogeneity and endogenous labor choice
- Life-cycle economy, $j = 1, ..., R, ...N$.
- All agents retire at age R and can live up to age N.
- Population structure is stationary, with population growing at rate n.
- Agents face idiosyncratic labor productivity risk and lifetime uncertainty.
- Agents can save in the form of riskless capital.

Model – Preferences

- Agents value consumption and dislike work

$$E\left[\sum_{j=1}^{N}\beta^{j}\left(\prod_{i=1}^{j}s_i\right)u(c_j,l_j)\right],$$

where

$$U\left(c,l\right) \;=\; \log(c)-\varphi\frac{l^{1+\frac{1}{v}}}{1+\frac{1}{v}}$$

- v – Frisch elasticity

Model – Heterogeneity

- Labor productivity of an working-age agent evolves according to

$$\ln e(\Omega, j) = \theta + \bar{e}_j + z_j$$

with

$$z_j = \rho z_{j-1} + \varepsilon_j, \text{ with } z_0 = 0,$$

and

$$\Omega \equiv (z, \theta) \in \mathbf{\Omega}$$

  - θ is individual fixed effect (initial, permanent heterogeneity)
    - A fraction π of the population have θ^* – *superstars*
    - The rest draw θ from $N(0, \sigma_\theta^2)$
  - $\bar{e}_j$ is the age-dependent deterministic component.
  - z_j is a persistent shock, with $\varepsilon_j \sim N(0, \sigma_\varepsilon^2)$

Model – Heterogeneity

- Conditional on a value for the permanent shock, individuals draw a discount factor from a distribution $Q_\beta(\beta|\theta)$. Hence, permanent shocks and discount factors are potentially correlated.

- Discount factors do not change over the life cycle.

Model – Government

- Federal Taxes:
  - Tax household income with a progressive tax schedule $T(.)$.
  - Flat tax on capital income τ_k.
  - Payroll tax τ_p on labor earnings that finances a public pension system.
- State-level Taxes: Flat-rate income tax τ_l and consumption tax τ_c.
- Provides means-tested transfers and pension (social security) benefits.

Model – Budget Constraints

Budget constraint for an agent with $e(\Omega, j)$ and assets a_j

$$c_j + a_{j+1} = we(\Omega, j)l_j(1-\tau_p) + a_j(1+r) + TR(I_j) + B_j$$

$$-\underbrace{(T(I_j) + \tau_k ar)}_{\text{federal taxes}} - \underbrace{\tau_I\ I_j}_{\text{state income tax}}$$

$$-\underbrace{\tau_c\left(we(\Omega, j)l_j + ra_j - (a_{j+1} - a_j) + B_j + \phi TR(I_j)\right)}_{\text{state consumption tax}}$$

$I_j \rightarrow$ income. $I_j \equiv we(\Omega, j)l_j + a_j r$

$TR_j(I)\ \rightarrow$ means-tested transfer. $B_j\ \rightarrow$ Social Security Transfer, 0 if $j \leq R$. $\phi\ \rightarrow$ fraction of means-tested transfers taxed.

Model – Production

- Standard

$$Y = K^{\alpha}(XL)^{1-\alpha}$$

with $X'/X = (1+g)$.

- Aggregate Resource Constraint

$$C + K' + G = K^{\alpha}(X\ L)^{1-\alpha} + (1-\delta)K$$

Decision Problem

Let $x = (\hat{a}, \Omega, \beta)$.

$$V(x, j) = \max_{(\hat{l}, \hat{a}')} u(\hat{c}, l) + \beta s_{j+1} E[V(\hat{a}', \Omega', j+1)|x]$$

s.t.

$$\begin{cases} \hat{c} + \hat{a}'(1+g) \leq \hat{a}(1+\hat{r}) + (1-\tau_p)\hat{w}e(\Omega, j)l + \hat{B}_j + TR(x,j) - T(x,j) \\ \hat{c} \geq 0, \quad \hat{a}' \geq 0, \quad \hat{a}' = 0 \ \text{ if } j = N \\ V(x, N+1) \equiv 0 \end{cases}$$

Parameter Values

- We set $\rho = 0.958$ and $\sigma_\varepsilon^2 = 0.017$ – Kaplan (2012).
- Choose π (fraction of superstars), θ^* (superstar productivity) and σ_θ^2 (variance of individual fixed effects) so that:
  - each cohort has 1% of superstars;
  - share of labor income by top 1% in line with data;
  - household earnings Gini in line with data (SCF).
- Select discount factors to reproduce moments of the wealth distribution (SCF). One for each permanent type. Values
- Frisch elasticity: $\upsilon = 1$.

Other Parameters

Parameter Values – Taxes

- Effective tax function

$$1 - \text{average tax rate} = 1 - t(\tilde{I}) = (1 - \gamma_0)\tilde{I}^{-\gamma_1}$$

  $\tilde{I} \equiv$ income relative to mean income. $\gamma_1 = 0.053$ — Guner, Kaygusuz and Ventura (2014), $\gamma_0 = 0.051$.
  Average Tax Rates Distribution of Taxes Paid

- Set $\tau_l = 0.05$ — average state and local taxes on income, Guner, Kaygusuz and Ventura (2014).

- Set $\tau_k = 0.065$ — matches corporate tax collections.

- $\tau_c = 0.048$ — matches state consumption tax revenue.

- Set $\tau_p = 0.162$ — earnings replacement ratio of 55%.

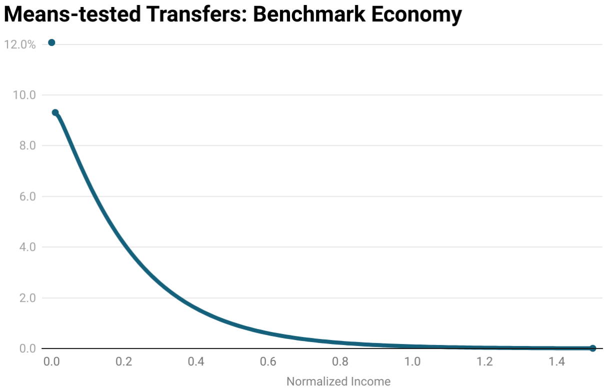
Transfers

- Guner, Rauh, and Ventura (2023) use SIPP to estimate transfer function associated to means-tested transfers.
- Estimate a flexible functional form:

$$TR(\tilde{I}) = \exp(\omega_1)\exp(\omega_2 \tilde{I})\tilde{I}^{\omega_3} \text{ if } \tilde{I} > 0,$$

$$TR(\tilde{I}) = \omega_0 \text{ if } \tilde{I} = 0$$

Include Temporary Assistance to Needy Families (TANF), Supplemental Nutrition Assistance Program (SNAP), Supplemental Nutrition Program for Women, Infants, and Children (WIC), Supplemental Security Insurance (SSI) and Housing Subsidies.


Means-tested Transfers: Benchmark Economy
12.0%
10.0
8.0
6.0
4.0
2.0
0.0
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
Normalized Income

Earnings and Wealth Distribution

Percentiles	Data Labor	Model Labor	Data Wealth	Model Wealth
Quantile				
1st (bottom 20%)	1.3	2.6	0.2	0.0
2nd (20-40%)	7.3	7.0	1.4	0.2
3rd (40-60%)	13.2	12.1	4.3	4.3
4th (60-80%)	21.9	20.5	10.7	12.0
5th (80-100%)	56.3	57.9	83.4	82.8
Top				
10%	39.7	41.6	70.9	70.1
5%	28.5	29.7	58.7	59.3
1%	12.9	12.9	32.0	31.8
Gini Coefficient	0.55	0.55	0.81	0.81

Data: Survey of Consumer Finances (SCF), including households with non-negative income and non-negative wealth. For earnings, only households with a head 25 and 64 years old.

Distribution of Taxes Paid

Quantitative Exercises

1. Explore effects of changes in income tax (curvature and level).
2. Explore effects of linear consumption tax – tax rate plus transfer.
3. Explore effects of wealth tax.
4. Find optimal mix of instruments that minimize welfare cost (taking transitions into account).

Tax instruments selected at $t = t_0$ to generate a given increase in Federal revenues in long run.

Quantitative Exercises

Details:

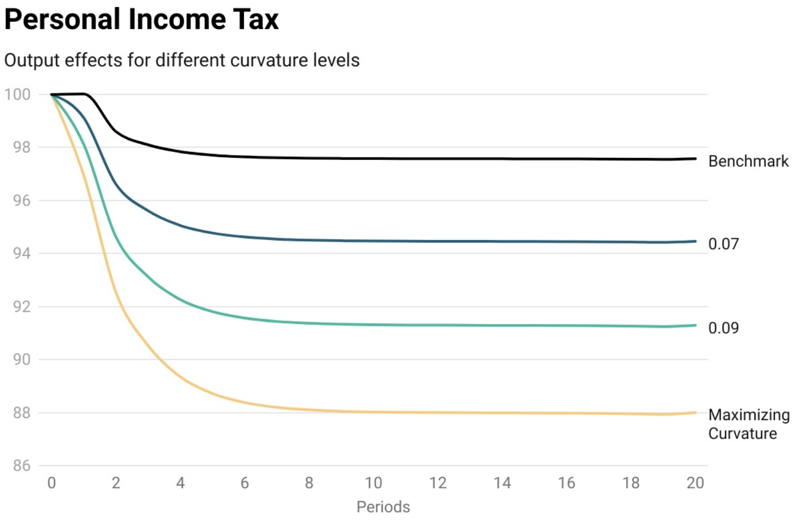
- Income tax: fix different levels of curvature (γ_1) and find the 'level' (γ_0) consistent with revenue target.
- Consumption tax: set transfer level and find the consumption tax rate that is consistent with revenue target.
- Wealth taxes: tax rates applied to wealth holdings above top 1% levels.

30% Revenue Increase: Income Tax

	$\gamma_1 = 0.053$	$\gamma_1 = 0.07$	$\gamma_1 = 0.09$	$\gamma_1 = 0.114$
Output	97.6	94.5	91.3	88.0
Hours	98.6	97.7	96.2	94.4
Labor	99.5	97.7	95.9	90.7
Tax Level (γ_0)	0.083	0.080	0.078	0.077
Revenues				
Federal Income Tax	130.0	130.0	130.0	130.0
State and Local Taxes	96.5	93.7	90.7	87.7
Welfare				
Welfare (%)	-4.3	-3.9	-3.6	-2.7
% in Favor	0.0	0.5	8.8	13.0

NOTE: Benchmark: $\gamma_1 = 0.053$, $\gamma_0 = 0.051$. Welfare rises with progressivity. Average Tax Rates

30% Revenue Increase: Income Tax



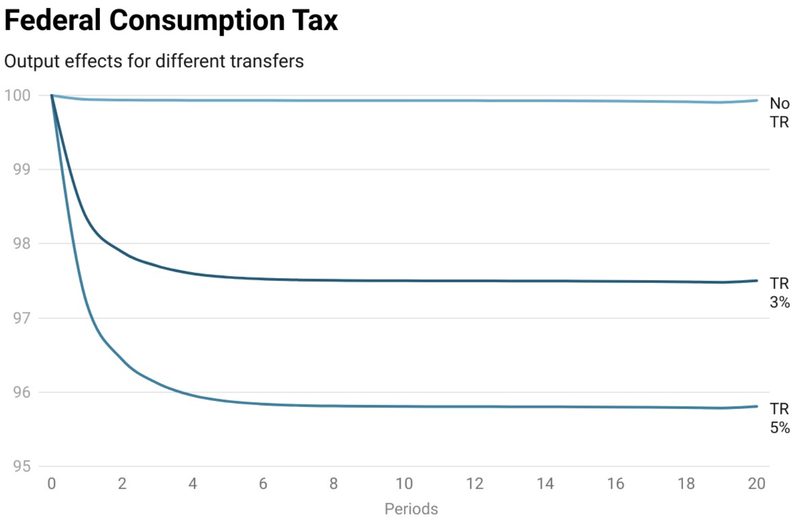
Average Tax Rates

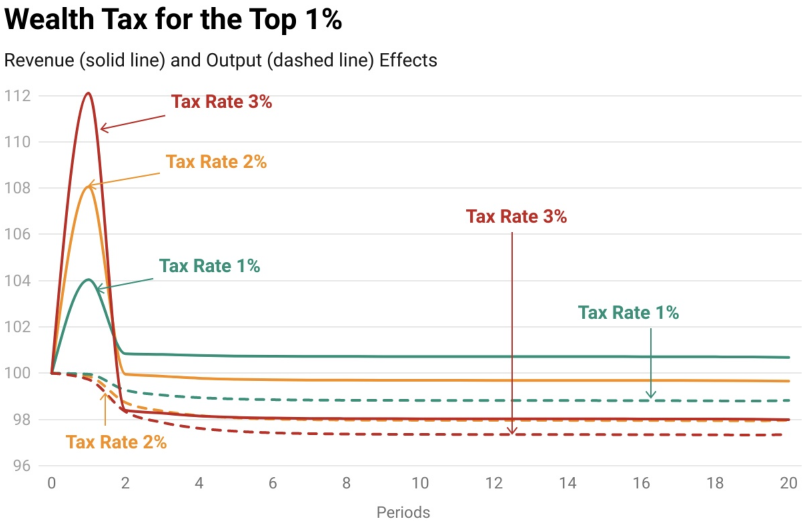
30% Revenue Increase: Consumption Tax

	No transfer	Transfer 3%	Transfer 5%
Output	99.9	97.5	95.8
Hours	99.9	94.8	91.3
Labor	99.9	97.3	95.4
Consumption Tax Rate (%)	4.5	9.6	13.4
Revenues			
Federal	130.0	130.0	130.0
State and Local	99.9	99.3	98.8
All Taxes	116.6	115.7	115.6
Welfare			
Welfare (%)	-4.7	-3.4	-2.8
% in Favor	0.0	9.2	18.4

NOTE: Transfers are % of benchmark GDP per capita. Welfare rises sharply with transfers.

30% Revenue Increase: Consumption Tax





Wealth Tax for the Top 1%
Revenue (solid line) and Output (dashed line) Effects
112
110
108
106
104
102
100
98
96
Tax Rate 3%
Tax Rate 2%
Tax Rate 1%
Tax Rate 3%
Tax Rate 1%
Tax Rate 2%
0
2
4
6
8
10
12
14
16
18
20
Periods

Optimal Mix of Tax Changes

Keep 'level' of income tax function fixed. We then select consumption tax rate, transfer and curvature level so that:

- Generate a given increase in revenues in the long run;
- Minimize welfare cost for those alive at t_0.

Optimal Mix of Tax Changes

	Benchmark	15% Increase	30% Increase	45% Increase
Output	100.0	91.3	92.1	93.1
Hours	100.0	77.1	78.4	77.9
Labor	100.0	88.6	89.5	89.7
Consumption				
Tax Rate (%)	-	27.5	27.8	30.3
Transfer (%)	-	13.0	12.0	11.9
Curvature (γ_1)	0.053	0.034	0.033	0.025
Welfare				
Welfare (%)	-	0.7	-2.0	-4.6
% in Favor	-	42.3	33.0	25.3

NOTE: transfer levels in optimal mix are relatively high. About $12,000 per household under a 30% increase. Inequality

Findings in Perspective

- How important are *large* transfers? Graph: Role of Transfers

  A: Not much.

- What is the quantitative importance of lump-sum transfers vis-a-vis the reduction of progressivity in the optimal mix? Which of the two channels is more important?

  A: Transfers. They account for the bulk of the reduction in welfare costs. Table

Findings in Perspective

- What if, additionally, other tax changes are included in the optimal mix?

  A: Further reductions in welfare costs are of second-order importance. Optimal mix involves a zero capital income tax rate (τ_k).

- There are no welfare gains of adding wealth taxes to the optimal mix.

30% Revenue Increase: More Instruments

	Benchmark	Optimal Mix (include τ_k)	Optimal Mix (include γ_0)	Optimal Mix (baseline)
Output	100.0	93.4	91.3	92.1
Consumption Tax Rate (%)	-	31.2	26.1	27.8
Transfer (%)	-	13.0	12.0	12.0
Curvature (γ_1)	0.053	0.035	0.030	0.033
Level (γ_0)	0.051	0.051	0.07	0.051
τ_k, %	6.5	0.0	6.5	6.5
Welfare (%)	-	-1.8	-2.0	-2.0
% in Favor	-	34.0	32.1	33.0

Wealth Taxes and Debt

	Benchmark	Optimal Mix (1% wealth tax)	Optimal Mix (2% wealth tax)	Optimal Mix (baseline)
Output	100.0	92.5	91.5	92.1
Tax Rate (%)	-	27.8	28.5	27.8
Transfer (%)	-	12.4	12.2	12.0
Curvature (γ_1)	0.053	0.020	0.020	0.033
Level (γ_0)	0.051	0.051	0.051	0.051
Welfare (%)	-	-2.2	-2.7	-2.0
% in Favor	-	31.6	29.7	33.0

NOTE: real rate of return on debt 2.35%.

Concluding Remarks

- Linear consumption tax emerges as welfare cost-minimizing alternative. Associated transfer is large.
- Output losses in an optimal tax mix are substantial.
- Since transfers are expensive, *progressivity declines* in optimal mix. The larger the revenue need, the larger the decline is. Taxing top incomes becomes costlier in revenue terms.
- If additional tax rate on capital income is allowed in the optimal mix, it becomes *zero*.

EXTRA SLIDES

Discount Factors

Discount Factor	Value
β_1	1.013
β_2	0.993
β_3	0.969
β_4	0.955
β_5	0.990
β_6	0.994
Mean	0.973
Corr (β, z)	-0.17

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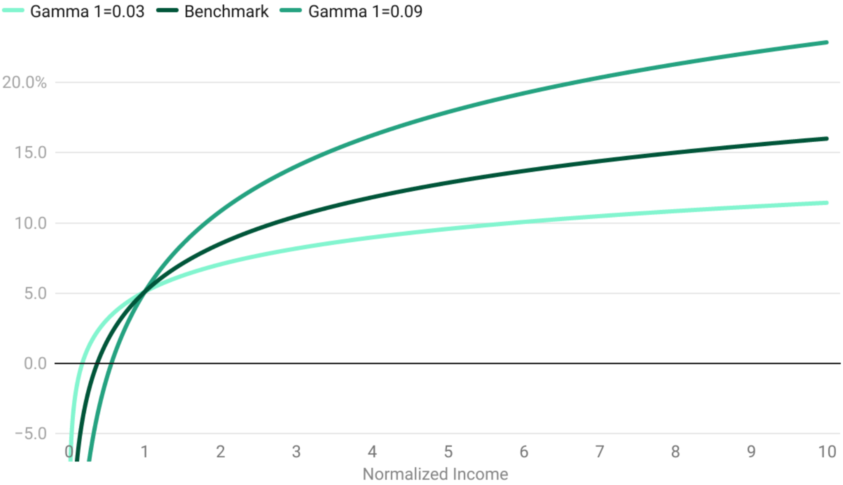
Personal Federal Income Tax: Average Tax Rates



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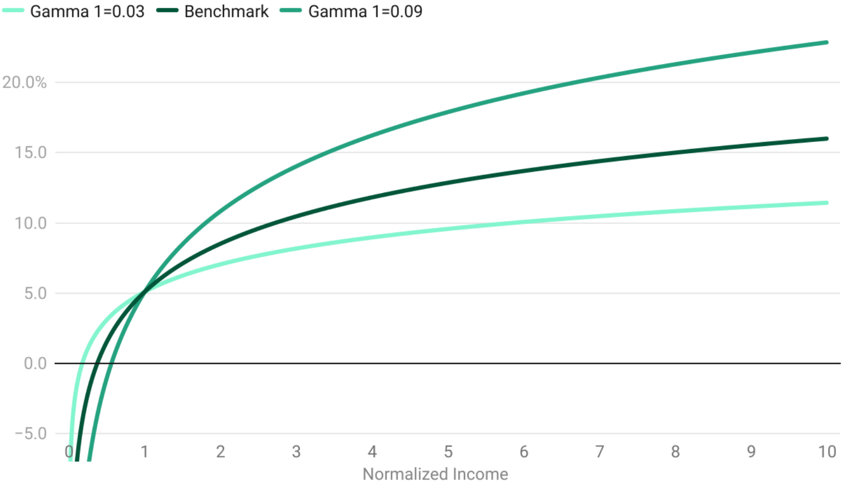
Personal Federal Income Tax: Average Tax Rates



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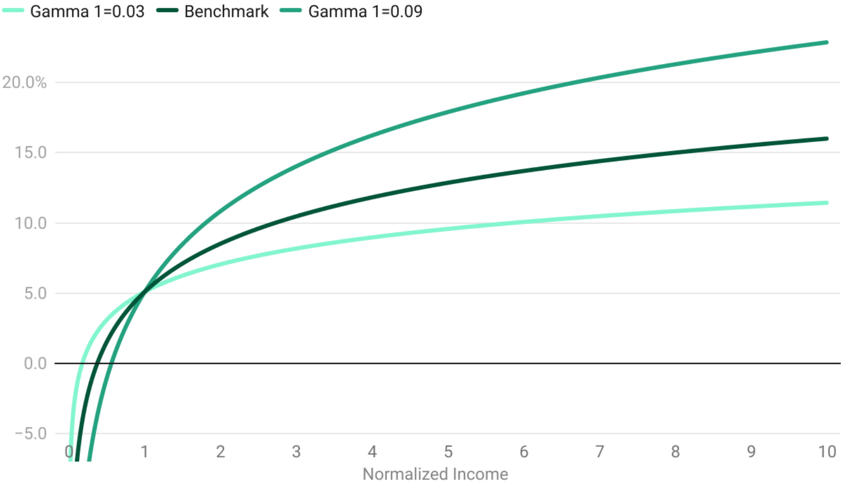
Personal Federal Income Tax: Average Tax Rates



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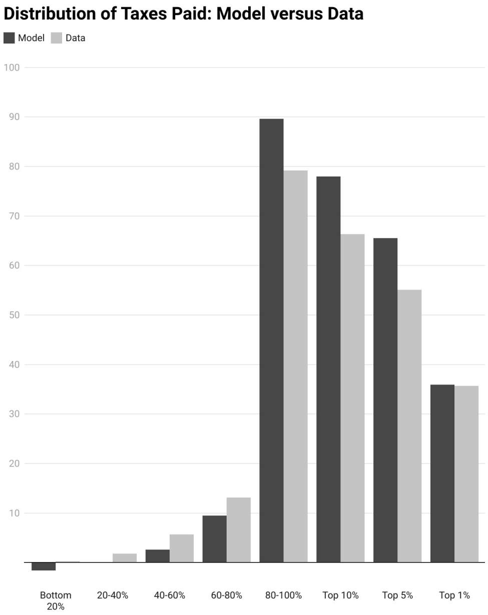
Distribution of Taxes Paid: Model versus Data
Model
Data
100
90
80
70
60
50
40
30
20
10
Bottom 20%
20-40%
40-60%
60-80%
80-100%
Top 10%
Top 5%
Top 1%

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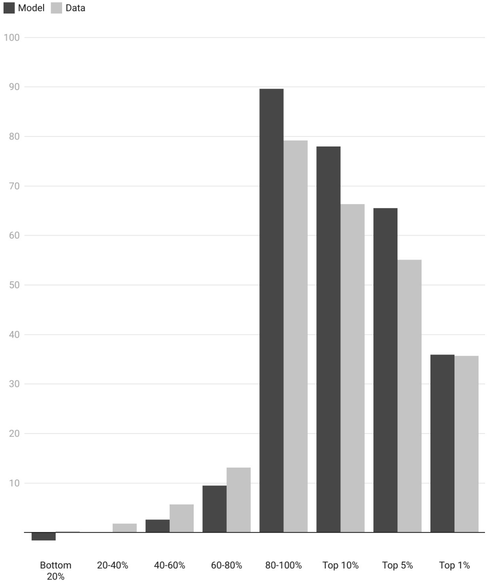
Distribution of Taxes Paid: Model versus Data



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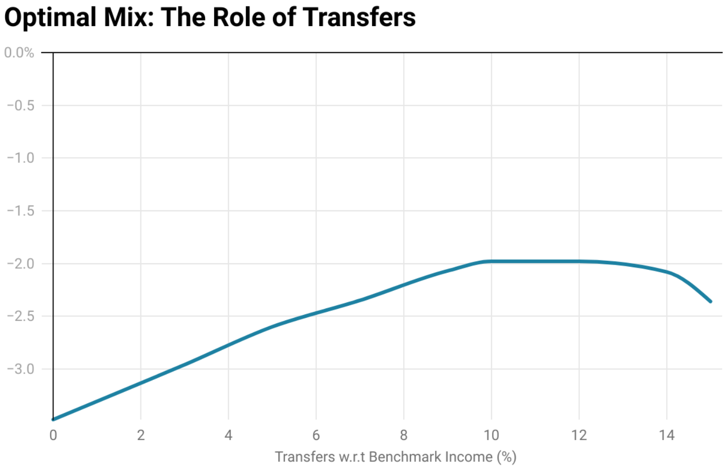

As transfers increase, welfare gains in optimal mix are flat after a while. Smaller transfers are nearly optimal.

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Optimal Mix of Tax Changes

	Benchmark	15% Increase	30% Increase	45% Increase
Output	100.0	91.3	92.1	93.1
Hours	100.0	77.1	78.4	77.9
Labor	100.0	88.6	89.5	89.7
Consumption				
Tax Rate (%)	-	27.5	27.8	30.3
Transfer (%)	-	13.0	12.0	11.9
Curvature (γ_1)	0.053	0.034	0.033	0.025
Welfare				
Gini Earninigs	0.55	0.60	0.59	0.60
Gini Wealth	0.81	0.86	0.86	0.87
Welfare (%)	-	0.7	-2.0	-4.6
% in Favor	-	42.3	33.0	25.3

NOTE: inequality increases under optimal mix.

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Constrained Mix of Tax Changes

30% Revenue Increase

	Benchmark	Benchmark γ_1	No Transfer	Optimal Mix
Output	100.0	91.1	90.6	92.1
Hours	100.0	81.7	95.7	78.4
Labor	100.0	90.2	93.7	89.5
Consumption				
Tax Rate (%)	-	23.4	3.6	27.8
Transfer (%)	-	10.0	-	12.0
Curvature (γ_1)	0.053	0.053	0.11	0.03
Welfare				
Welfare (%)	-	-2.1	-3.6	-2.0
% in Favor	-	31.3	10.7	33.0

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Parameter	Value	Comments
Population Growth Rate (n)	0.007	U.S. Data
Labor Efficiency Growth Rate (g)	0.016	U.S. Data
Mean Discount Factor (β)	0.973	-
Correlation (discount factor, z)	-0.17	-
Intertemporal Elasticity (υ)	1.0	Literature
Disutility of Market Work (φ)	6.55	Calibrated - matches hours worked
Capital Share (α)	0.38	Calibrated
Depreciation Rate (δ_k)	0.04	Calibrated
Autocorrelation Permanent Shocks (ρ)	0.958	Kaplan (2012)
Variance Permanent Shocks (σ_θ^2)	0.45	Calibrated – matches Earnings Gini
Variance Persistent Shocks (σ_ϵ^2)	0.017	Kaplan (2012)
Share of Superstars (π)	0.01	
Value of Superstars Productivity (θ^*)	2.9	Calibrated – matches labor income share of top 1%
Payroll Tax Rate (τ_p)	0.162	Calibrated
Capital Income Tax Rate (τ_k)	0.065	Calibrated
Income Tax Rate (τ_l)	0.050	Guner et al (2014)
Consumption Tax Rate (τ_c)	0.048	Calibrated
Tax Function Level (γ_0)	0.051	Calibrated
Tax Function Curvature (γ_1)	0.053	Guner et al (2014)

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