Taxing the Rich II: Entrepreneurs and Ideas

Lutz Hendricks

2026-04-22

UNC Chapel Hill

Entrepreneurs

Basic Idea

Entrepreneurs invest in building up their businesses.

- If others earn rents from high productivity (workers?), don't tax them.

Model generation 1:

- Just stick progressive taxes into a Cagetti & De Nardi (2006) model of wealth distribution.
- E.g., İmrohoroğlu, et al. (2023)

Model generation 2:

- Entrepreneurs create ideas that benefit the whole economy.
- Jones (2022)

İmrohoroğlu, et al. (2023): Model Ingredients

Essentially a Cagetti & De Nardi (2006) model with progressive taxes:

- Stochastic aging (two "ages": young and old, as in Castañeda et al.)
- Two sectors: corporate (Cobb-Douglas) and entrepreneurial
- Entrepreneurs run a DRS technology: $f(k, n) = \theta\left(k^{\gamma}(l + n)^{1-\gamma}\right)^{\nu}, \nu < 1$
  - θ: entrepreneurial ability (stochastic)
  - Choose own labor l, hire workers n, invest capital k
- Occupational choice: each period, young agents choose worker vs. entrepreneur
- Borrowing constraint: $k \leq (1 + d)a$ (collateral-based)

Key difference from KK: taxes fall on **total income** (labor + capital), not just labor earnings.

Results

Revenue- and welfare-maximizing top marginal rate on the top 1%: **55%**

But: when only **labor income** is taxed (as in KK), the optimal rate rises to **80%**.

Intuition:

- Entrepreneurs earn mostly capital income
- Taxing capital income distorts business investment and capital allocation
- This is the main margin that lowers the optimal rate
- Without it, the result looks like Kindermann-Krueger

Discussion

Not much has changed relative to the superstar model.

But: **entrepreneurs don't do anything useful**.
Their businesses benefit only themselves.
So why not tax them?

Jones (2022): Taxing Innovators

Motivation

Question

What if top earners create ideas that benefit the whole economy?

The obvious answer:

- subsidize R&D
- tax high incomes

This is not implementable.

Much innovation happens outside formal R&D:

- Walmart, Uber, Goldman Sachs report zero R&D
- Cannot be targeted by R&D tax credits
- The income tax is the only instrument available

Motivation

Key insight:
Entrepreneurs generate knowledge spillovers.

Tax the rich

$\rightarrow$ reduce R&D effort
$\rightarrow$ reduce other firms' productivities
$\rightarrow$ large welfare losses

Jones: Model Structure

Reference: Jones (2022)

An R&D growth model of increasing varieties - with a twist:

- **R&D uses effort**

That is the decision that taxes distort.

With free entry as the distorted margin:

- Lower profits after innovation.
- The interest rate must fall to restore zero profits.
- The effect of taxes becomes very indirect.

Jones: Demographics

Population grows at rate n.

Occupational choice is fixed:

- $N_t = \overline{N} e^{nt}$ workers
- $M_t = \overline{M} e^{nt}$ managers
- $S_{at} = \overline{S}_a e^{nt}$ entrepreneurs

Taxes distort effort, not occupational choice.

All agents live forever

Jones: Preferences

$$\max_{c,e} \int_0^\infty \left[\phi \log c - \frac{\epsilon}{1+\epsilon} e^{(1+\epsilon)/\epsilon}\right] \exp(-\delta t) dt \tag{1}$$

e is effort

- managers and innovators only

Taxes reduce effort.

- That is the only distorted margin in this model.

Jones: Technologies - Final Goods

$$Y_t = \tilde{M}_t^{\psi} \int_0^{A_t} x_{it}^{1-\psi} di \tag{2}$$

- uses managers $\widetilde{M}$ and intermediates
- $\widetilde{M} = \mathbb{E}[\theta e] \cdot M$
- θ = ability
- e = effort (a choice)

All growth comes from increasing varieties A_t.

Note: Ability heterogeneity does not do anything in this model.

Jones: Intermediate goods

$$x_{it} = \ell_{it} \tag{3}$$

One unit of worker labor per unit of output

- Marginal cost = worker wage w_t

Each variety i produced by a monopolist with a patent

- Monopoly markup over marginal cost

Jones: Applied R&D

Aggregate idea production function:

$$\dot{A}_t = \overline{a}\tilde{S}_{at}^{\lambda} A_t^{\varphi_a} B_t^{\beta_a} \tag{4}$$

- $\tilde{S}_{at} = S_{at} \cdot \mathbb{E}[\theta e]$: effective entrepreneurial input (talent $\times$ effort)
- A_t: existing stock of applied ideas
- B_t: stock of basic research

Why two types of R&D?

- Sidestep the objection "just tax income and subsidize R&D"
- Applied R&D is not taxable.

Jones: Basic R&D

$$\dot{B}_t = \bar{b} S_{bt}^{\lambda} B_t^{\varphi_b} \tag{5}$$

with $\varphi_b < 1$

Government chooses number of basic researchers S_{bt}.

They come out of worker pool: $N_t = L_t + S_{bt}$

Growth of B_t is effectively exogenous.

Looking ahead: Balanced growth rate of B_t must satisfy

$$\lambda n + (\varphi_b - 1) g(B) = 0 \tag{6}$$

Jones: Resource Constraints

Labor

Workers supply labor to intermediate goods production or become basic researchers.

$$N_t = L_t + S_{bt} \tag{7}$$

- $L_t = \int_0^{A_t} \ell_{it} di$
- Entrepreneurs (S_{at}) and managers (M_t) are separate, exogenous populations.

Goods

$$Y_t = C_t \tag{8}$$

All output is consumed.
Workers make no choices.

Jones: Tax System and Government

Two-bracket tax schedule:

- Income below $\overline{w}$: taxed at base rate τ_0
- Income above $\overline{w}$: taxed at top marginal rate τ

All entrepreneurs and managers earn above $\overline{w}$.
Basic researchers and workers earn below $\overline{w}$.

Government budget constraint:

$$T = \tau_0 Y + (\tau - \tau_0)\underbrace{[\rho Y - \overline{w}(S_a + M)]}_{\text{rich, above } \overline{w}} = \Omega Y \tag{9}$$

- ρ: income share of entrepreneurs and managers
- Ω: required government spending as a share of GDP

Outline of the Analysis

1. Derive balanced growth rates of A, B, and Y.
   These are fixed multiples of the population growth rate n.
   Why?
2. Derive balanced growth levels of A and Y.
   These look like A equals labor inputs to some fixed power.
   Why?
3. Derive the elasticity of output with respect to effort e.
   e changes by 1%
   $\Rightarrow$ labor input changes by 1%
   $\Rightarrow$ output changes by a fixed percentage.
4. Derive the elasticity of output with respect to the keep rate $(1 - \tau)$.
   $1 - \tau$ changes by 1% $\Rightarrow$ e changes by a fixed percentage …
5. Solve the agents' problems to find how effort responds to taxes.

Semi-endogenous growth

Step 1: We derive the balanced growth rates.

Reproducible factors:

$$\dot{A}_t = \overline{a}\tilde{S}_{at}^{\lambda} A_t^{\varphi_a} B_t^{\beta_a} \tag{10}$$

$$\dot{B}_t = \overline{b} S_{bt}^{\lambda} B_t^{\varphi_b} \tag{11}$$

Assume $\varphi_a + \beta_a, \varphi_b < 1$

- diminishing returns to knowledge

$\rightarrow$ semi-endogenous growth

Jones: Balanced Growth of A

$$g(A) \equiv \dot{A}_t / A_t = \overline{a} \tilde{S}_{at}^{\lambda} A_t^{\varphi_a - 1} B_t^{\beta_a} \tag{12}$$

On the BGP, $g(A)$ is constant.

- The growth rate of the RHS of eq. 12 must be zero.
- $\tilde{S}_{at}$ grows at rate n.

$$\lambda n + (\varphi_a - 1) g(A) + \beta_a g(B) = 0 \tag{13}$$

Solving:

$$g(A) = \frac{\lambda n + \beta_a g(B)}{1 - \varphi_a} \tag{14}$$

Jones: Balanced Growth of A

Recall

$$g(B) = \lambda n/(1-\varphi_b) \tag{15}$$

Define $\beta \equiv \beta_a/(1-\varphi_b)$

Then

$$g(A) = \frac{\lambda n}{1-\varphi_a}(1+\beta) \tag{16}$$

Intuition?

Jones: Balanced Growth of Y

$$Y_t = \tilde{M}_t^{\psi} \int_0^{A_t} x_{it}^{1-\psi} di \tag{17}$$

With symmetry: $x_{it} = \frac{L_t}{A_t}$

$$Y_t = A_t^{\psi} \tilde{M}_t^{\psi} L_t^{1-\psi} \tag{18}$$

On the BGP: effort constant; $\widetilde{M}_t$ and L_t grow at rate n.

Log derivative:

$$g(Y) = \psi g(A) + \psi n + (1-\psi)n = \psi g(A) + n \tag{19}$$

Jones: Balanced Growth of Y

Recall

$$g(A) = \frac{\lambda n}{1 - \varphi_a}(1 + \beta) \tag{20}$$

Define $\gamma \equiv \psi\lambda/(1 - \varphi_a)$

Then per capita growth is:

$$g(y) = g(Y) - n = \gamma(1 + \beta)n \tag{21}$$

Step 2: Balanced Growth Level of A

With semi-endogenous growth, balanced growth A_t is proportional to labor inputs taken to some fixed power.

$$A_t^* = \left(\nu_a \tilde{S}_{at} S_{bt}^{\beta}\right)^{\gamma/\psi} \tag{22}$$

Intuition:

- This is exactly what happens in a **Solow model**!
- Increase labor input $\Rightarrow$ increase saving $\Rightarrow$ increase in capital stock.
- When does the rise in K stop?
  When MPK falls low enough.

Derivation of A_t^*

Solve solution for $g(A)$ for A_t

$$A_t^{1-\varphi_a} = (\overline{a}/g(A))\tilde{S}_{at}^{\lambda} B_t^{\beta_a} \tag{23}$$

Solve solution for $g(B)$ for B_t

$$B_t = \left[\left(\overline{b}/g(B)\right) S_{bt}^{\lambda}\right]^{1/(1-\varphi_b)} \tag{24}$$

Substitute $B_t^{\beta_a}$ into the eq. 23 using $\beta \equiv \beta_a/(1-\varphi_b)$:

$$A_t^{1-\varphi_a} = (\overline{a}/g(A))\left(\overline{b}/g(B)\right)^{\beta}\left(\tilde{S}_{at} S_{bt}^{\beta}\right)^{\lambda} \tag{25}$$

Collect all multiplicative constants into ν_a to obtain eq. 22

Step 3: What Do Taxes Do?

Taxes only distort effort e.

What happens when effort changes by 1 percent?

Effective labor inputs change by 1 percent:

- $\tilde{S}_{at} = S_{at} \cdot \mathbb{E}[\theta e]$
- $\widetilde{M}_t = M_t \cdot \mathbb{E}[\theta e]$.

From $A_t^* = \left(\nu_a \tilde{S}_{at} S_{bt}^{\beta}\right)^{\gamma/\psi} \Rightarrow A_t$ changes by γ/ψ percent.

Output $Y_t = A_t^{\psi} \widetilde{M}_t^{\psi} L_t^{1-\psi}$ changes by

- $\psi \cdot \gamma/\psi = \gamma$ percent via A
- ψ percent via $\widetilde{M}$.

What Do Taxes Do?

The elasticity of output with respect to effort is

- γ for entrepreneurs (idea channel)
- ψ for managers (labor supply channel)

What happens when the keep rate $(1-\tau)$ changes by 1 percent?

- Entrepreneurs: effort changes by ζ^v percent $\Rightarrow Y$ changes by $\gamma\zeta^v$ percent
- Managers: effort changes by ζ^m percent $\Rightarrow Y$ changes by $\psi\zeta^m$ percent

What Do Taxes Do?

The elasticity of output with respect to the keep rate:

$$\eta_{Y,1-\tau} \equiv \frac{d \log Y}{d \log(1-\tau)} = \gamma \zeta^v + \psi \zeta^m \tag{26}$$

where ζ^v and ζ^m are the effort elasticities of entrepreneurs and managers.

What then does solving the model accomplish?

- In principle, it solves for ζ^v and ζ^m.
- In practice, not much (other than practice for you!)

Jones: Why Ideas Change Everything

Two channels from taxes to GDP: $\eta_{Y,1-\tau} = \gamma\zeta^v + \psi\zeta^m$

Manager channel ($\psi\zeta^m$):

- Managers enter **inside** the CRS part of the production function
- ψ competes with other factor shares $\rightarrow$ bounded, small (≈ 0.15)
- This is essentially the standard labor supply channel

Idea channel ($\gamma\zeta^v$):

- Ideas enter **outside** the CRS part (because ideas are nonrival)
- γ is **not part of a sum that equals one** $\rightarrow$ can be large
- This is the new force: taxing entrepreneurs slows innovation, which lowers **everyone's** income

Jones: Revenue-Maximizing Top Rate

Scenario	Revenue max	Welfare max
$\gamma = 0$ (no ideas)	92%	76%
$\gamma = \frac{1}{8}$	91%	57%
$\gamma = \frac{1}{2}$ (baseline)	65%	9%
$\gamma = 1$ (strong ideas)	52%	–43%

$(\zeta_u = 0.2, \Omega = 0.2, \alpha = 1)$

Revenue maximization and welfare maximization diverge sharply.

With $\gamma = \frac{1}{2}$: moving from $\tau = 0.75$ to the welfare optimum raises GDP $\approx$ 15%.

Step 4: Solving the Agents' Problems

All we really need is the elasticity of effort w.r.to the keep rate.

- for entrepreneurs: ζ^v
- for managers: ζ^m

Jones: Entrepreneur's Problem

The entrepreneur is an employee of the innovating firm.

- earns wage w_t.

$$\max_{c,e} \int_0^\infty \left[\phi \log c - \frac{\epsilon}{1+\epsilon} e^{(1+\epsilon)/\epsilon}\right] \exp(-\delta t) dt \tag{27}$$

Budget constraint (continuous time):

$$\dot{v} = (r-n)v + \underbrace{\overline{w}(\tau - \tau_0) + w_t \theta e (1-\tau)}_{\text{net earnings}} + R - c \tag{28}$$

- $w_t \theta e$: earnings from innovation (proportional to talent $\times$ effort)
- R: lump-sum rebate (depends on θ)

Similar for managers (with wage w_m)

Jones: Effort FOC from the Hamiltonian

Current-value Hamiltonian:

$$\mathcal{H} = \phi \log c - \frac{\epsilon}{1+\epsilon} e^{(1+\epsilon)/\epsilon} + \mu[(r-n)v + \overline{w}(\tau - \tau_0) + w_t \theta e(1-\tau) + R - c] \tag{29}$$

First-order conditions:

- $\partial \mathcal{H} / \partial c = 0$: $\quad \mu = \phi / c$
- $\partial \mathcal{H} / \partial e = 0$: $\quad e^{1/\epsilon} = \mu w_t \theta (1-\tau)$
- Costate:

$$\dot{\mu} = (\delta - r + n)\mu \tag{30}$$

Jones: Optimal Effort

Combining the two intratemporal FOCs:

$$e_t = \left(\frac{\phi w_t \theta (1 - \tau)}{c_t} \right)^{\epsilon} \tag{31}$$

Effort still depends on $c_t \rightarrow$ need to specify the rebate $R(\theta)$.

Jones: Why a Rebate is Needed

On the BGP, $g(c(\theta)) = g(w)$.

Budget constraint:
present value of consumption = present value of earnings + present value of rebate

Without a rebate ($R = 0$), consumption is proportional to after-tax earnings:

$$c_t(\theta) \propto w_t \theta e(1 - \tau) \tag{32}$$

Substitute into the FOC

$$e^{1/\epsilon} = \frac{\phi w_t \theta (1 - \tau)}{c_t} \tag{33}$$

$$\Rightarrow e = \text{constant} \tag{34}$$

Intuition

We wrote down a model with a balanced growth path.

Wages grow over time.

Substitution effect: $c \uparrow$ and $e \uparrow$

- Substitute from leisure to consumption.

Income effect: $c \uparrow$ and $e \downarrow$

Preferences consistent with balanced growth imply that income and substitution effects must cancel.

But then taxes do not affect effort.

Why does Effort Respond to Taxes?

The rebate $R(\theta)$ rises with individual tax payments.

Now we have an additional income effect:

- Higher tax increases the rebate.
- The income effect reduces effort.

The Rebate

Assumption: the rebate function is set such that

$$e^* = [\phi(1-\tau)^\alpha]^{\epsilon/(1+\epsilon)} \tag{35}$$

Effort depends on the keep rate $(1-\tau)$, **not on talent** θ.

α parameterizes how the rebate varies with the tax rate

- $\alpha = 0$: rebate is constant and taxes don't matter
- $\alpha = 1$: full rebate; only substitution effects

Jones works out some of the details…

Jones: Effort and the Elasticity

$$e^* = [\phi(1-\tau)^\alpha]^{\epsilon/(1+\epsilon)} \tag{36}$$

Elasticity of effort wrt the keep rate:

$$\zeta_u \equiv \frac{d \log e^*}{d \log(1-\tau)} = \frac{\alpha\epsilon}{1+\epsilon} \tag{37}$$

- $\alpha = 1$: ζ_u equals the Frisch elasticity $\epsilon/(1+\epsilon)$.
  - Frisch elasticity: response of effort to the keep rate, holding marginal utility of consumption (u_c) constant.
- $\alpha < 1$: income effect lowers ζ_u $\rightarrow$ taxes distort less.

ζ_u is the elasticity calibrated in Tables 2–4.

Jones: R&D Firms and Externalities

The aggregate idea production function is

$$\dot{A}_t = \overline{a}\tilde{S}_{at}^{\lambda} A_t^{\varphi_a} B_t^{\beta_a} \tag{38}$$

But each individual R&D firm takes the productivity of the idea sector as given:

$$\dot{A}_t = \overline{v}_t \tilde{S}_{at} \tag{39}$$

with $\overline{v}_t = \overline{a}\tilde{S}_{at}^{\lambda-1} A_t^{\varphi_a} B_t^{\beta_a}$

Externalities:

- Duplication ($\lambda < 1$): doubling all researchers less than doubles new ideas
- Knowledge spillovers (φ_a, β_a): the existing stocks A_t and B_t raise productivity, but no firm internalizes its contribution to A_t

The firm's problem:

$$\max_{\tilde{S}_a} P_{At}\overline{v}_t\tilde{S}_{at} - w_{st}\tilde{S}_{at} \tag{40}$$

taking the price of ideas P_{At}, productivity $\overline{v}_t$, and wage w_{st} as given.

Free entry requires $P_{At}\overline{v}_t = w_{st}$.

Jones: Discussion

Take-away message:

When top earners create externalities, taxing them is very costly.

Limitation:

- The strength of the externality paramater γ is not known.
- Cannot estimate "the" optimal tax rate.

Jones: Discussion

This is a **proof-of-concept paper**:
Here is a non-crazy model where taxing innovation is a bad idea.

> The point is that the discovery of nonrival ideas by entrepreneurs appears to have a first-order effect on the calculation and should be included in future work.
>
> — Jones (2022) p. 2265

An important open issue:
Can the magnitudes be pinned down better?

Taking Stock

The Big Picture

Paper	Source of top earnings	Key margin	Optimal rate
Kindermann-Krueger	Luck	Labor supply	79%
Guner-Ventura	Persistent ability	Labor supply	37%
Badel-Huggett-Luo	HC investment	Skill investment	49%
İmrohoroğlu et al.	Business income	Capital alloc.	55%
Jones	Innovation	Innovation effort	$\approx$ 22%

Open question: How to model the distribution of earnings?

References

References

- Badel, A., M. Huggett, and W. Luo (2020). "Taxing Top Earners: A Human Capital Perspective." *The Economic Journal*, 130(629), 1200–1225.
- Cagetti, M. and M. De Nardi (2006). "Entrepreneurship, Frictions, and Wealth." *Journal of Political Economy*, 114(5), 835–870.
- Castañeda, A., J. Díaz-Giménez, and J.-V. Ríos-Rull (2003). "Accounting for the U.S. Earnings and Wealth Inequality." *Journal of Political Economy*, 111(4), 818–857.
- Guner, N., M. Lopez-Daneri, and G. Ventura (2016). "Heterogeneity and Government Revenues: Higher Taxes at the Top?" *Journal of Monetary Economics*, 80, 69–85.
- İmrohoroğlu, A., C. Kumru, J. Lian, and A. Nakornthab (2023). "Revisiting Taxes on High Incomes." *Review of Economic Dynamics*, 51, 1159–1184.
- Jones, C. I. (2022). "Taxing Top Incomes in a World of Ideas." *Journal of Political Economy*, 130(9), 2227–2274.
- Kindermann, F. and D. Krueger (2022). "High Marginal Tax Rates on the Top 1%? Lessons from a Life-Cycle Model with Idiosyncratic Income Risk." *American Economic Journal: Macroeconomics*, 14(2), 319–366.