Taxing Top Incomes in a World of Ideas

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The Saez (2001) Calculation

- Income: \( z \sim \) Pareto(\( \alpha \))

- Tax revenue:

\[
T = \tau_0 \bar{z} + \tau (z_m - \bar{z})
\]

where \( z_m \) is average income above cutoff \( \bar{z} \)

- Revenue-maximizing top tax rate:

\[
z_m - \bar{z} + \tau z'_m(\tau) = 0
\]

mechanical gain behavioral loss

- Divide by \( z_m \Rightarrow \) elasticity form and rearrange:

\[
\tau^* = \frac{1}{\frac{1}{1 + \alpha \cdot \eta_{z_m,1-\tau}}}
\]

where \( \alpha = \frac{z_m}{z_m - \bar{z}} \).
\[ \tau^* = \frac{1}{1 + \alpha \cdot \eta_{z_m,1-\tau}} \]

- Intuition
  - Decreasing in \( \eta_{z_m,1-\tau} \): elasticity of top income wrt \( 1 - \tau \)
  - Increasing in \( \frac{1}{\alpha} = \frac{z_m - \bar{z}}{z_m} \): change in revenue as a percent of income = Pareto inequality

- Diamond and Saez (2011) Calibration
  - \( \alpha = 1.5 \) from Pareto income distribution
  - \( \eta = 0.2 \) from literature

\[ \Rightarrow \quad \tau_{d-s}^* \approx 77\% \]
This Paper

• How does this calculation change when:
  ◦ New ideas drive economic growth
  ◦ The reward for a new idea is a top income
  ◦ Creation of ideas is broad
    – A formal “research subsidy” is imperfect (Walmart, Amazon)

• Adds a new force to the Saez (2001) calculation
  ◦ $\tau \uparrow \Rightarrow w \downarrow \Rightarrow$ Lowers revenue from other brackets
  ◦ Also lowers consumption throughout the economy

• The efforts of a relatively small number of entrepreneurs is responsible for the bulk of economy-wide income growth
Literature Review

• **Human capital**: Badel and Huggett, Kindermann and Krueger

• **Superstars/inventors**: Scheuer and Werning, Chetty et al

• **Spillovers**: Lockwood-Nathanson-Weyl

• **Miryees w/ Imperfect Substitution**: Sachs-Tsyvinski-Werquin

• **Inventors and taxes**: Akcigit-Baslandze-Stantcheva, Moretti and Wilson, Akcigit-Grigsby-Nicholas-Stantcheva

• **Growth and taxes**: Stokey and Rebelo, Jaimovich and Rebelo
This paper does not calculate “the” optimal top tax rate

- Many other considerations in the literature
  - Rent seeking
  - Occupational choice (other brackets, concavity)
  - Top tax diverts people away from finance to ideas?
  - Social safety net, lenient bankruptcy insure the downside
  - How sensitive are entrepreneurs to top tax rates?
  - Empirical evidence on growth and taxes (later)

- Still, including economic growth and ideas seems important
Basic Setup
Overview

- BGP of an idea-based growth model. Romer 1990, Jones 1995
  - Semi-endogenous growth
    - Basic R&D (subsidized directly), Applied R&D (top tax rate)
    - BGP simplifies: static comparison vs transition dynamics
- Three alternative approaches to the top tax rate:
  - Revenue maximization
  - Maximize welfare of median worker
  - Maximize utilitarian social welfare
The Economic Environment

- Consumption goods produced by managers \( \tilde{M} \), labor \( L \), and “applied” ideas \( A \):
  \[
  Y = A^y \tilde{M}^\psi L^{1-\psi}
  \]  
  (1)

- Applied ideas produced from entrepreneurs, effort \( e \), talent \( z \), and basic research \( B \):
  \[
  A = \nu_a \mathbb{E}[ez] S_a B^\beta
  \]  
  (2)

- Fundamental ideas produced from basic research:
  \[
  B = \nu_b S_b
  \]  
  (3)

- \( \tilde{M}, L, S_a, S_b \) exogenous. \( e, z \) endogenous (unspecified for now)
Nonrivalry of Ideas (Romer): \[ Y = A^{\gamma} \tilde{M}^{\psi} L^{1-\psi} \]

- Constant returns to rival inputs $\tilde{M}, L$
  - Given a stock of nonrival blueprints/ideas $A$
  - Standard replication argument

- $\Rightarrow$ Increasing returns to ideas and rival inputs together
  - $\gamma > 0$ measures the degree of IRS

- Hints at why effects can be large
  - One computer or year of school $\Rightarrow$ 1 worker more productive
  - One new idea $\Rightarrow$ any number of people more productive

*Distortions of the computer/schooling have small effects.*

*Distorting the creation of the idea...*
BGP from a Dynamic Growth Model

- Production of basic ideas

\[
\dot{B}_t = \bar{b} S_b^\lambda B_t^\phi_b
\]

- Production of applied ideas

\[
\dot{A}_t = \bar{a}(\mathbb{E}(ez)S_a t)^\lambda A_t^\phi_a B_t^\alpha
\]

- BGP implies that stocks are proportional to flows:
  
  - $A$ and $B$ are proportional to $S_a$ and $S_b$ (to some powers)
  
  - $S_a$, $S_b$, $L$ all grow at the same exogenous population growth rate.
Output = Consumption:

- Combining (1) - (3):

\[ Y = \left( \nu \mathbb{E}[ez] S_a S_b^{\beta} \right)^\gamma \tilde{M}^\psi L^{1-\psi}. \]  (4)

- Output per person: \( y \propto (S_a S_b^{\beta})^\gamma \)
- Intuition: \( y \) depends on stock of ideas, not ideas per person
- LR growth: \( \gamma(1 + \beta)n \) where \( n \) is population growth

- Taxes distort \( \mathbb{E}(ez) \), not \( S_a \) or \( S_b \) here
  - Simplicity
  - Cutoff \( \Rightarrow \) rich nonlinear tax could get it right?
  - Middle rate \( \Rightarrow \) right number become entrepreneurs...
Nonlinear Income Tax Revenue

\[
T = \tau_0 [wL + wS_b + w_a \mathbb{E}(ez)S_a + w_m \mathbb{E}(ez)M]
\]

all income pays \( \tau_0 \)

\[
+ (\tau - \tau_0) [(w_a \mathbb{E}(ez) - \bar{w})S_a + (w_m \mathbb{E}(ez) - \bar{w})M]
\]

income above \( \bar{w} \) pays an additional \( \tau - \tau_0 \)

- Full growth model: entrepreneurs paid a constant share of GDP

\[
\frac{w_a \mathbb{E}(ez)S_a}{Y} = \rho_s \quad \text{and} \quad \frac{w_m \mathbb{E}(ez)M}{Y} = \rho_m.
\]

and \( Y = wL + w_b S_b + w_a \mathbb{E}(ez)S_a + w_m \mathbb{E}(ez)M \), \( \rho \equiv \rho_s + \rho_m \)

\[
\Rightarrow T = \tau_0 Y + (\tau - \tau_0) [\rho Y - \bar{w}(S_a + M)]
\]
The Top Tax Rate that Maximizes Revenue
Revenue-Maximizing Top Tax Rate

- Two key equations:

\[ T = \tau_0 Y + (\tau - \tau_0) \left[ \rho Y - \bar{w}(S_a + M) \right] \]

\[ Y = \left( \nu \mathbb{E}[ez]S_a S_b^\beta \right)^\gamma (\mathbb{E}[ez]M)^\psi L^{1-\psi} \]

- Choose \( \tau \) to maximize tax revenue (given \( \tau_0 \) for now)

- A higher \( \tau \) reduces the effort of entrepreneurs,
  - Leads to less innovation
  - which reduces everyone's income (\( Y \))
  - which lowers tax revenue received via \( \tau_0 \)
Solution

$$\max_{\tau} T = \tau_0 Y(\tau) + (\tau - \tau_0) [\rho Y(\tau) - \bar{w} S_a]$$

- FOC:
  
  $$\underbrace{(\rho - \bar{\rho}) Y}_{\text{mechanical gain}} + \underbrace{\frac{\partial Y}{\partial \tau} \cdot [(1 - \rho) \tau_0 + \rho \tau]}_{\text{behavioral loss}} = 0$$

  where \(\bar{\rho} \equiv \frac{\bar{w}(S_a + M)}{Y}\)

- Rearranging with \(\Delta \rho \equiv \rho - \bar{\rho}\)

  $$\tau^*_r m = \frac{1 - \tau_0 \cdot \frac{1 - \rho}{\Delta \rho} \cdot \eta_{Y,1-\tau}}{1 + \frac{\rho}{\Delta \rho} \eta_{Y,1-\tau}}$$
**Interpretation**

\[
\tau_{rm}^* = \frac{1 - \tau_0 \cdot \frac{1 - \rho}{\Delta \rho} \cdot \eta_{Y,1-\tau}}{1 + \frac{\rho}{\Delta \rho} \eta_{Y,1-\tau}} \quad \text{vs} \quad \tau_{ds}^* = \frac{1}{1 + \alpha \cdot \eta_{zm,1-\tau}}
\]

- **Remarks: Two key differences**
  - \( \eta_{Y,1-\tau} \) versus \( \eta_{zm,1-\tau} \)
    \[ \eta_{Y,1-\tau} \Rightarrow \text{How GDP changes if researchers keep more} \]
    \[ \eta_{zm,1-\tau} \Rightarrow \text{How average top incomes change} \]
  - **If \( \tau_0 > 0 \), then \( \tau^* \) is lower**
    
    Distorting research lowers GDP
    
    \( \Rightarrow \) lowers revenue from other taxes!
Guide to Intuition

\[ \eta_{Y,1-\tau} \quad \text{The economic model} \]

\[ \rho \eta_{Y,1-\tau} \quad \text{Behavioral effect via top earners} \]

\[ (1 - \rho) \eta_{Y,1-\tau} \quad \text{Behavioral effect via workers} \]

\[ \Delta \rho \equiv \rho - \bar{\rho} \quad \text{Tax base for } \tau, \text{ mechanical effect} \]

\[ 1 - \Delta \rho \quad \text{Tax base for } \tau_0 \]
What is $\eta_{Y,1-\tau}$?

\[ Y = \left( \nu \mathbb{E}[ez] S_a S_b^\beta \right)^\gamma (\mathbb{E}[ez] M)^\psi L^{1-\psi} \Rightarrow \eta_{Y,1-\tau} = (\gamma + \psi) \zeta \]

- $\gamma = \text{degree of IRS via ideas}$
- $\psi = \text{manager’s share} = 0.15 \text{ (not important)}$
- $\zeta$ is the elasticity of $\mathbb{E}[ez]$ with respect to $1 - \tau$.
  - Standard Diamond-Saez elasticity: $\zeta = \eta_{zm,1-\tau}$
  - How individual behavior changes when the tax rate changes
  - Cool insight from PublicEcon: all that matters is the value of this elasticity, not the mechanism!
  - So for now, just treat as a parameter (endogenized later)
Calibration

- Parameter values for numerical examples

\[ \gamma \in \left[ \frac{1}{8}, 1 \right] \]

\[ g_{tfp} = \gamma (1 + \beta) \cdot g_s \approx 1\% \]

\[ \frac{\zeta}{1 - \zeta} \in \{0.2, 0.5\} \]

Behavioral elasticity. Saez values

\[ \tau_0 = 0.2 \]

Average tax rate outside the top.

\[ \Delta \rho = 0.10 \]

Share of income taxed at the top rate; top returns account for 20\% of taxable income.

\[ \rho = 0.15 \]

So \( \frac{\rho}{\Delta \rho} = 1.5 \) as in Saez pareto parameter, \( \alpha \).
### Revenue-Maximizing Top Tax Rate, $\tau^*_\text{rm}$

#### Behavioral Elasticity

<table>
<thead>
<tr>
<th>Case</th>
<th>0.20</th>
<th>0.50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diamond-Saez formula:</td>
<td>0.800</td>
<td>0.667</td>
</tr>
<tr>
<td>$\gamma = 0$ and $\tau_0 = 0$:</td>
<td>0.964</td>
<td>0.930</td>
</tr>
<tr>
<td>$\gamma = 0$ and $\tau_0 = 0.20$:</td>
<td>0.923</td>
<td>0.851</td>
</tr>
</tbody>
</table>

#### Degree of IRS, $\gamma$

<table>
<thead>
<tr>
<th>$\gamma$</th>
<th>0.20</th>
<th>0.50</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1/8$</td>
<td>0.863</td>
<td>0.742</td>
</tr>
<tr>
<td>$1/4$</td>
<td>0.806</td>
<td>0.644</td>
</tr>
<tr>
<td>$1/2$</td>
<td>0.702</td>
<td>0.477</td>
</tr>
<tr>
<td>$1$</td>
<td>0.524</td>
<td>0.221</td>
</tr>
</tbody>
</table>
Intuition

- Suppose we double the “keep rate” $1 - \tau$. What is the long-run effect on GDP?
  - Answer: $2^{\eta_y,1-\tau} = 2^{\gamma\zeta}$
  - Baseline: $\gamma = 1/2$ and $\zeta = 1/6 \Rightarrow 2^{1/12} \approx 1.06$

Going from $\tau = 75\%$ to $\tau = 50\%$ raises GDP by just 6%!

- With $\Delta \rho = 10\%$, the revenue cost is 2.5% of GDP
  $\Rightarrow$ 6% gain to all $>$ redistributing 2.5% to the bottom half!

- 6% seems small, but achieved by a small group of researchers working 15% harder...
Maximizing Worker Welfare

– Revenue-max ignores effect on consumption
– Worker welfare yields a clean closed-form solution
Choose $\tau$ and $\tau_0$ to Maximize Worker Welfare

- Workers:
  \[ c^w = w(1 - \tau_0) \]
  \[ u_w(c) = \theta \log c \]

- Government budget constraint
  \[ \tau_0 Y + (\tau - \tau_0)[\rho Y - \bar{w}(S_a + M)] = \Omega Y \]

Exogenous government spending share of GDP = $\Omega$

- Therefore:
  \[
  \max_{\tau, \tau_0} \log(1 - \tau_0) + \log Y(\tau) \quad \text{s.t.}
  \]
  \[ \tau_0 Y + (\tau - \tau_0)[\rho Y - \bar{w}(S_a + M)] = \Omega Y. \]
First Order Conditions

• The top rate that maximizes worker welfare satisfies

$$
\tau_{ww}^* = \frac{1 - \eta_{Y,1-\tau} \left( \frac{1-\rho}{\Delta \rho} \cdot \tau_0^* + \frac{1-\Delta \rho}{\Delta \rho} \cdot (1 - \tau_0^*) - \frac{\Omega}{\Delta \rho} \right)}{1 + \frac{\rho}{\Delta \rho} \eta_{Y,1-\tau}}.
$$

• Three new terms relative to Saez:

1. \( \eta \frac{1-\rho}{\Delta \rho} \cdot \tau_0^* \)  
   Original term from RevMax

2. \( \eta \frac{1-\Delta \rho}{\Delta \rho} \cdot (1 - \tau_0^*) \)  
   Direct effect of a higher tax rate reducing GDP  
   \( \Rightarrow \) reduce workers consumption

3. \( \eta \frac{\Omega}{\Delta \rho} \)  
   Need to raise \( \Omega \) in revenue
Solution

• Combining with the Govt Budget Constraint:

\[
\tau^*_{ww} = \frac{1 - \eta_{Y,1-\tau} \left[ \frac{1-\Delta\rho}{\Delta\rho} - \frac{\Omega}{\Delta\rho} \left( 1 + \frac{\bar{\rho}}{1-\Delta\rho} \right) \right]}{1 + \frac{\rho}{\Delta\rho} \eta_{Y,1-\tau} + \frac{\bar{\rho}}{1-\Delta\rho} \eta_{Y,1-\tau}},
\]

• Another intuition: when is “flat tax” optimal?

\[
\tau \leq \tau_0 \text{ and } \kappa \geq \kappa_0 \iff \eta_{Y,1-\tau} \geq \frac{\Delta\rho}{1-\Delta\rho}.
\]

○ Raise \(c^w\) by \(\downarrow \tau\): raises GDP by \(\eta_{Y,1-\tau}\)

○ Redistribution cost: take from \(\Delta\rho\) people, give to \(1 - \Delta\rho\)

• Baseline parameters: \(\frac{\Delta\rho}{1-\Delta\rho} = \frac{1}{6}\) and \(\eta_{Y,1-\tau} = \frac{1}{6} (\gamma + \psi)\).

So \(\gamma + \psi > \frac{2}{3} \Rightarrow \tau < \tau_0\).
Tax Rates that Maximize Worker Welfare

<table>
<thead>
<tr>
<th>Degree of IRS, $\gamma$</th>
<th>Behavioral elast. = 0.2</th>
<th>Behavioral elast. = 0.5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\tau_{ww}^*$</td>
<td>$\tau_0^*$</td>
</tr>
<tr>
<td>1/8</td>
<td>0.639</td>
<td>0.151</td>
</tr>
<tr>
<td>1/4</td>
<td>0.490</td>
<td>0.168</td>
</tr>
<tr>
<td>1/2</td>
<td>0.217</td>
<td>0.198</td>
</tr>
<tr>
<td>1</td>
<td>-0.247</td>
<td>0.250</td>
</tr>
</tbody>
</table>

*The top rate that maximizes worker welfare can be negative!*
Maximizing Utilitarian Social Welfare
Entrepreneurs and Managers

- Utility function depends on consumption and effort:

\[ u(c, e) = \theta \log c - \zeta e^{1/\zeta} \]

- Researcher with talent \( z \) solves

\[
\max_{c, e} u(c, e) \quad \text{s.t.}
\]

\[
c = \bar{w}(1 - \tau_0) + [w_s e z - \bar{w}](1 - \tau) + R
\]

\[
= \bar{w}(1 - \tau_0) - \bar{w}(1 - \tau) + w_s e z (1 - \tau) + R
\]

\[
= \bar{w}(\tau - \tau_0) + w_s e z (1 - \tau) + R
\]

where \( R \) is a lump sum rebate.

- FOC:

\[ e^{1/\zeta} - 1 = \frac{\theta w_s z (1 - \tau)}{c} \]
SE/IE and Rebates

- Log preferences imply that SE and IE cancel: $\frac{\partial e}{\partial \tau} = 0$

- Standard approach is to rebate tax revenue to neutralize the IE.
  - Tricky here because IE’s are heterogeneous!

- Shortcut: heterogeneous rebates that vary with $z$ to deliver

  $$c_z = w_s e z (1 - \tau)^{1-\alpha}$$

  $$e_z = e^* = [\theta (1 - \tau)^{\alpha}]^{\zeta},$$

  where $\alpha$ parameterizes the elasticity of effort wrt $1 - \tau$

  - $\eta_{Y,1-\tau} = \alpha \zeta (\gamma + \psi)$

  - governs tradeoff with redistribution
Utilitarian Social Welfare

- Social Welfare:

\[ SWF \equiv Lu(c^w) + S_b u(c^b) + S_a \int u(c^s_z, e^s_z) dF(z) + M \int u(c^m_z, e^m_z) dF(z) \]

- Substitution of equilibrium conditions gives

\[ SWF \propto \log Y + \ell \log(1 - \tau_0) + s[(1 - \alpha) \log(1 - \tau) - \zeta(1 - \tau)^\alpha] \]

where \( s \equiv \frac{S_a + M}{L + S_b + S_a + M} \), \( \ell \equiv 1 - s \),
Proposition 2 gives the tax rates, written in terms of the “keep rates” $\kappa \equiv 1 - \tau$ and $\kappa_0 \equiv 1 - \tau_0$.

Two well-behaved nonlinear equations:

$$\alpha \zeta \kappa_0^\alpha + \frac{\kappa}{\kappa_0} \cdot \frac{\ell}{1 - \Delta \rho} (\Delta \rho + \bar{\rho} \eta) = \eta \left( 1 + \frac{\bar{\rho} \ell}{1 - \Delta \rho} \right) + s(1 - \alpha)$$

$$\kappa_0 (1 - \Delta \rho) + \kappa \Delta \rho = 1 - \Omega.$$
Maximizing Social Welfare: $\alpha = 1$
## Tax Rates that Maximize Social Welfare ($\alpha = 1$)

<table>
<thead>
<tr>
<th>Degree of IRS, $\gamma$</th>
<th>Behavioral elast. = 0.2</th>
<th>GDP loss if $\tau = 0.75$</th>
<th>Behavioral elast. = 0.5</th>
<th>GDP loss if $\tau = 0.75$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1/8$</td>
<td>0.649</td>
<td>0.7%</td>
<td>0.400</td>
<td>3.6%</td>
</tr>
<tr>
<td>$1/4$</td>
<td>0.502</td>
<td>2.8%</td>
<td>0.163</td>
<td>9.6%</td>
</tr>
<tr>
<td>$1/2$</td>
<td>0.231</td>
<td>8.9%</td>
<td>-0.255</td>
<td>23.6%</td>
</tr>
<tr>
<td>1</td>
<td>-0.238</td>
<td>23.4%</td>
<td>-0.919</td>
<td>49.3%</td>
</tr>
</tbody>
</table>
Tax Rates that Maximize Social Welfare ($\alpha = 1/2$)

<table>
<thead>
<tr>
<th>Degree of IRS, $\gamma$</th>
<th>Behavioral elast. = 0.2</th>
<th>Behavioral elast. = 0.5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\tau^*$</td>
<td>GDP loss if $\tau = 0.75$</td>
</tr>
<tr>
<td>1/8</td>
<td>0.445</td>
<td>0.8%</td>
</tr>
<tr>
<td>1/4</td>
<td>0.369</td>
<td>1.9%</td>
</tr>
<tr>
<td>1/2</td>
<td>0.222</td>
<td>4.6%</td>
</tr>
<tr>
<td>1</td>
<td>-0.047</td>
<td>11.3%</td>
</tr>
</tbody>
</table>
## Summary of Calibration Exercises

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Top rate, $\tau$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No ideas, $\gamma = 0$</strong></td>
<td></td>
</tr>
<tr>
<td>Revenue-maximization, $\tau_0 = 0$</td>
<td>0.96</td>
</tr>
<tr>
<td>Revenue-maximization, $\tau_0 = 0.20$</td>
<td>0.92</td>
</tr>
<tr>
<td><strong>With ideas</strong></td>
<td></td>
</tr>
<tr>
<td>Revenue-maximization</td>
<td>$\gamma = 1/2$</td>
</tr>
<tr>
<td>Maximize worker welfare</td>
<td>0.70</td>
</tr>
<tr>
<td>Maximize utilitarian welfare</td>
<td>0.22</td>
</tr>
<tr>
<td></td>
<td>$\gamma = 1$</td>
</tr>
<tr>
<td></td>
<td>0.52</td>
</tr>
<tr>
<td></td>
<td>-0.25</td>
</tr>
<tr>
<td></td>
<td>-0.05</td>
</tr>
</tbody>
</table>

Incorporating ideas sharply lowers the top tax rate.
Extensions
The Social Return to Research

- How big is the gap between equilibrium share and optimal share to pay for research?

- Jones and Williams (1998) social rate of return calculation here:

\[ \tilde{r} = gY + \lambda g_y \left( \frac{1}{\rho_s(1 - \tau)} - \frac{1}{\gamma} \right) \]

⇒ After tax share of payments to entrepreneurs should equal \( \gamma \)

- Simple calibration: \( \tau = 1/2 \Rightarrow \tilde{r} = 39\% \) if \( \rho_s = 10\% \)
  
  ○ Consistent with SROR estimates e.g. Bloom et al. (2013)
  
  ○ But those are returns to formal R&D...
Evidence on Growth and Taxes? Important and puzzling!!!

- Stokey and Rebelo (1995)
  - Growth rates flat in the 20th century
  - Taxes increased a lot!

- But other things were not equal!
  - Massive government investments in basic research after WWII
  - Decline in basic research investment in recent decades?

- Short-run vs long-run?
  - Shift from goods to ideas may reduce GDP in short run...
Growth in U.S. GDP per person (smoothed)


Percent: -2, 0, 2, 4, 6, 8, 10

YEAR

1880 1900 1920 1940 1960 1980 2000

PERCENT

-2 0 2 4 6 8 10
Taxes in the United States

Top marginal tax rate (left scale)

Total government revenues as a share of GDP (right scale)
GEMS Entrepreneurs versus Taxes

ENTREPRENEURS, PERCENT OF 18-64 YEAR OLDS (GEMS)

EFFECTIVE TOP TAX RATE, 2000-2011

- United States
- Canada
- Turkey
- Scotland
- Greece
- Spain
- Japan
- Italy
- Germany
- Austria
- France
- Belgium
- Sweden
- Denmark
- Iceland
- Norway
- Luxembourg
- Switzerland
- Portugal
- Ireland
- United Kingdom
- Finland
Final output

\[ Y_t = \int_0^{A_t} x_{it}^{1-\psi} \, di \, (\mathbb{E}(ez)M_t)^\psi \]

Production of variety \( i \)

\[ x_{it} = \ell_{it} \]

Resource constraint (\( \ell \))

\[ \int \ell_{it} \, di = L_t \]

Resource constraint (\( N \))

\[ L_t + S_{bt} = N_t \]

Population growth

\[ N_t = \bar{N} \exp(nt) \]

Entrepreneurs

\[ S_{at} = \bar{S}_a \exp(nt) \]

Managers

\[ M_t = \bar{M} \exp(nt) \]

Applied ideas

\[ \dot{A}_t = \bar{a}(\mathbb{E}(ez)S_{at})^\lambda A_t^{\phi_a} B_t^{\alpha} \]

Basic ideas

\[ \dot{B}_t = \bar{b}S_{bt}^{\lambda} B_t^{\phi_b} \]

Talent heterogeneity

\[ z_i \sim F(z) \]

Utility (\( S_a, M \))

\[ u(c, e) = \theta \log c - \zeta e^{1/\zeta} \]
Conclusion

• Lots of unanswered questions
  ◦ What is the “right” top tax rate? Many other considerations...
  ◦ Why is evidence on growth and taxes so murky?
  ◦ What is true effect of taxes on growth and innovation? Akcigit et al (2018) makes progress...

• Still, innovation is a key force that needs to be incorporated
  ◦ Taxes affect entrepreneurship and innovation
  ◦ Innovation is largely responsible for economic growth
  ◦ Distorting the behavior of a small group of innovators can affect all our incomes