Public Finance and Development

Tim Besley and Torsten Persson

Handbook Conference

Berekely, December 2011

"It is shortage of resources, and not inadequate incentives, which limits the pace of economic development. Indeed the importance of public revenue from the point of view of accelerated economic development could hardly be exaggerated." Nicholas Kaldor, 'Taxation for Economic Development," *Journal of Modern African Studies*, 1963, page 7

"The fiscal history of a people is above all an essential part of its general history. An enormous influence on the fate of nations emanates from the economic bleeding which the needs of the state necessitates, and from the use to which the results are put." (Joseph Schumpeter, *The Crisis of the Tax State*, 1918)

Motivation

- Long tradition of viewing raising tax revenues a constraint on development as well as the product of under-development.

- The key challenge is to understand how a state can go from raising around 10% tax in GDP to around 40%

- Large literature but interest in such issues is episodic.

- Tax administration and compliance are central issues.

Our Approach

- Key concept is a state's fiscal capacity, ii.e. its ability to generate revenues.

- We model this as dynamic investments which introduce new tax bases and expand the scope of others.

- The following chart illustrates one aspect of this:

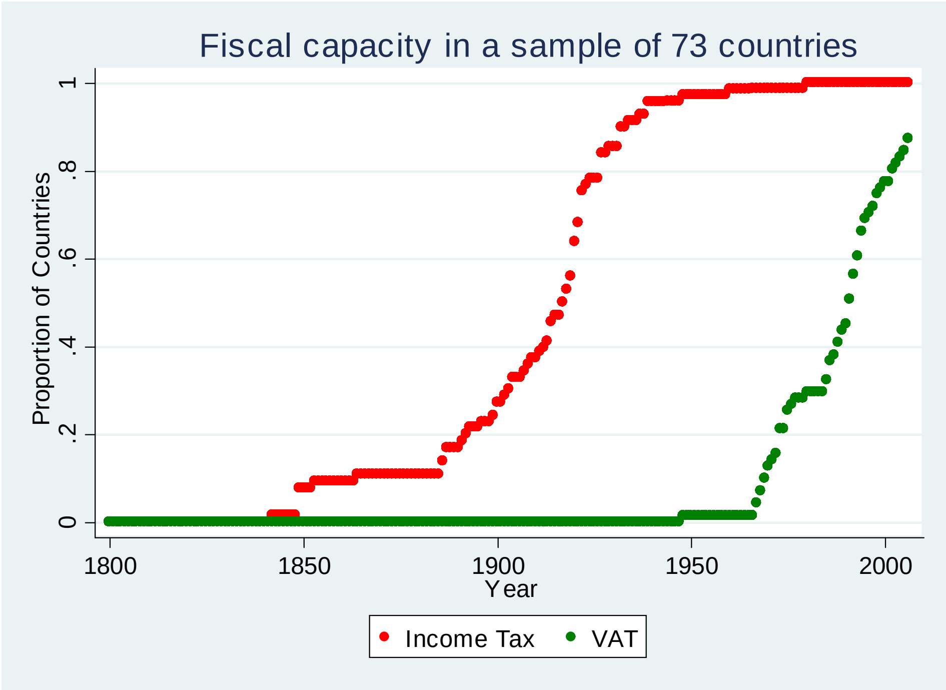

Figure 1: Historical evolution of fiscal capacity

Outline

1. Background facts

2. Model of fiscal capacity investment

3. Use framework to discuss:

   (a) economic structure

   (b) political institutions

   (c) social structure

(d) demand for public goods

(e) non-tax revenues

(f) compliance technologies

(Stylized) Facts

Stylized Fact 1: *Rich countries have made successive investments in their fiscal capacities over time.*

Stylized Fact 2: *Rich countries collect a much larger share of their income in taxes than do poor countries*

Stylized Fact 3: *Rich countries rely to a much larger extent on income taxes as opposed to trade taxes than do poor countries.*

Stylized Fact 4: *High-tax countries rely to a much larger extent on income taxes as opposed to trade taxes than do low-tax countries.*

Stylized Fact 5: *Rich countries collect much higher tax revenue than poor countries despite comparable statutory rates.*

(Stylized) Facts

- These appear to be cross-sectional and time series facts
- We use data from an (unofficial) IMF source for cross section
- Data on time series for twentieth century come from Mitchell (2007) – we are conservative in picking a sample of 18 countries where data is reliable and comparable over time.
  - The countries in this sample are Argentina, Australia, Brazil, Canada, Chile, Colombia, Denmark, Finland, Ireland, Japan, Mexico, Netherlands, New Zealand, Norway, Sweden, Switzerland, United Kingdom, and the United States.

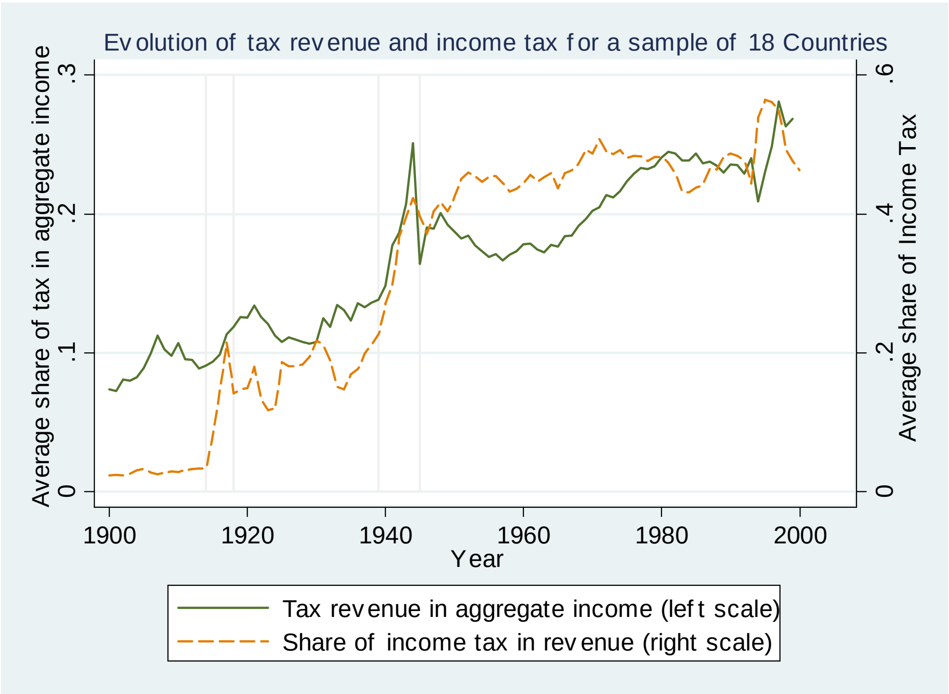

Figure 2: Taxes and share of income tax over time

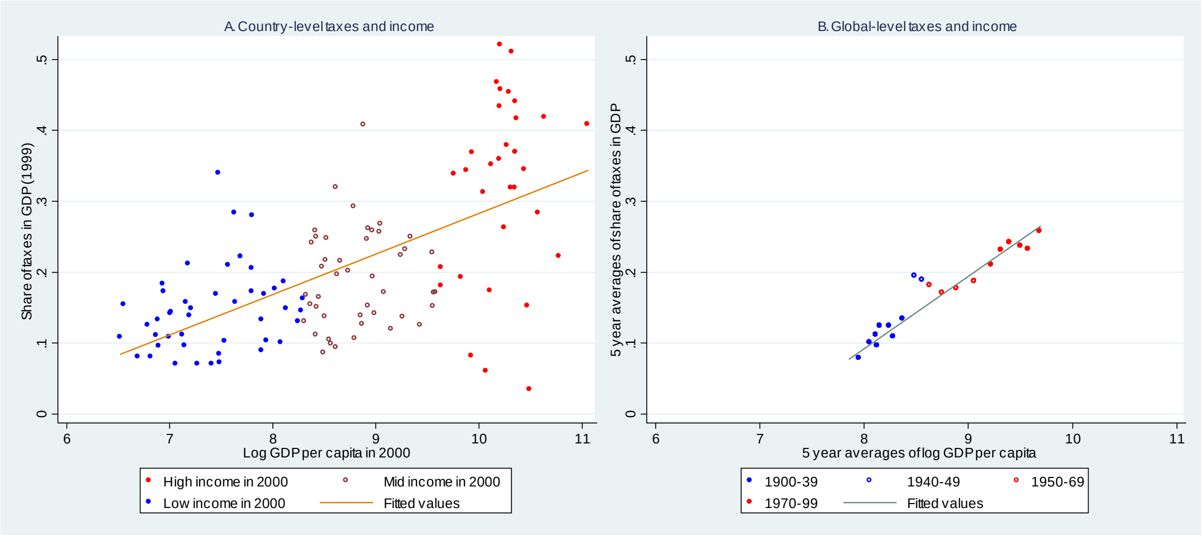

Figure 3: Tax revenue and GDP per capita

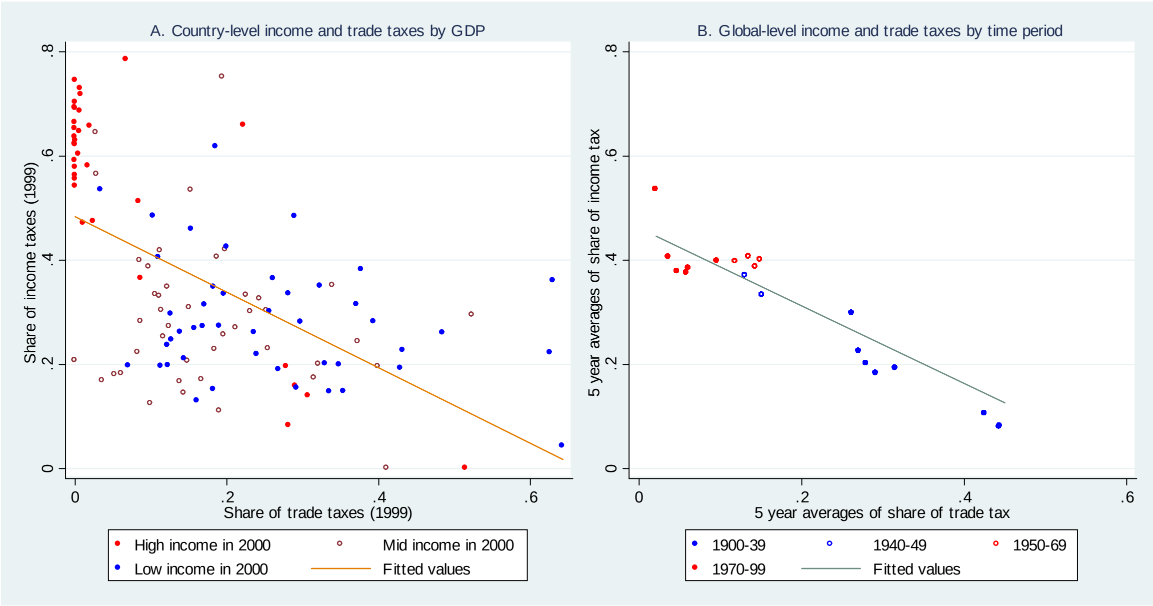

Figure 4: Income taxes and trade taxes

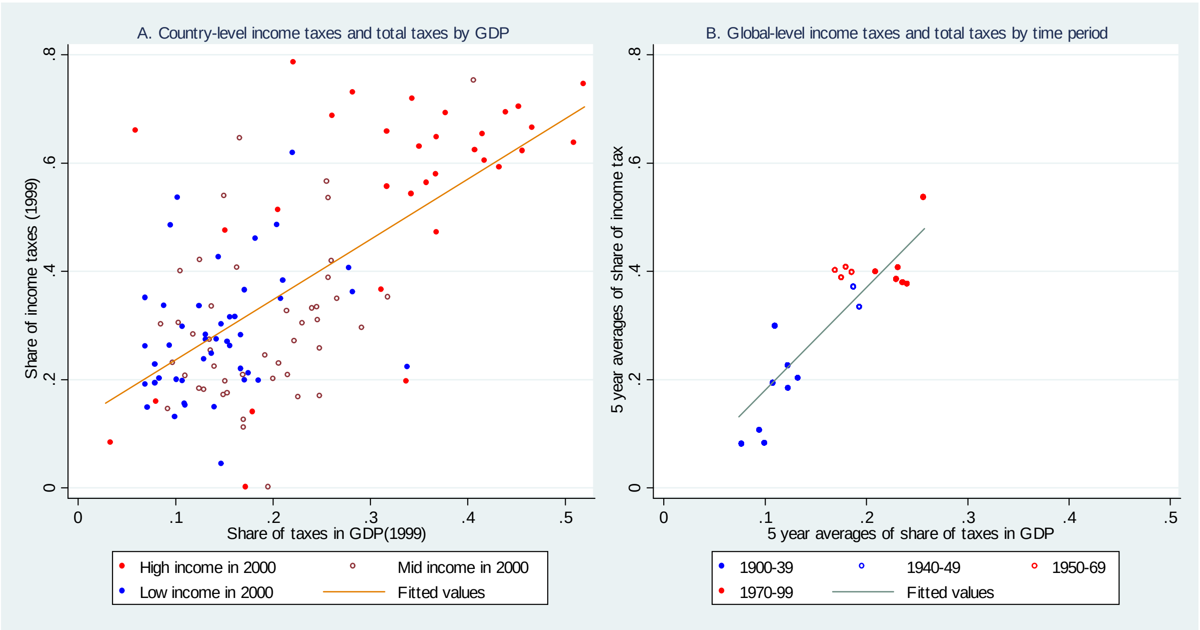

Figure 5: Income taxes and total taxes

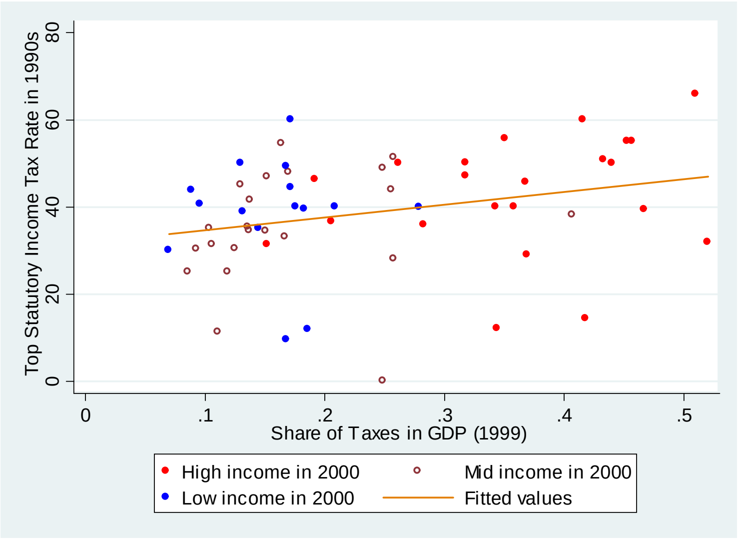

Figure 6: Top statutory income tax rate and total tax take

Framework

- Population with $\mathcal{J}$ distinct groups, denoted by $J = 1, ...\mathcal{J}$, and where group J is homogenous and comprises a fraction ξ^J of the population.

- Two time periods $s = 1, 2$.

- $N + 1$ consumption goods, indexed by $n \in \{0, 1, ..., N\}$.

- Consumption of these goods by group J in period s are denoted by $x_{n,s}^J$.

- A public good g_s.

- Individuals in group J supply labor, L_s^J, and choose how to allocate their income across consumption goods.

- Small open economy with pre-tax prices of $p_{n,s}$.

- Wage rates ω_s^J are potentially group-specific and variable over time.

Taxation

- Government may levy taxes on goods/labor except the non-taxed numeraire good 0

- Post-tax price of each good is:

$$p_{n,s}\left(1+t_{n,s}\right), \quad n=1,2,..,N \ ,$$

  while the net wage is:

$$\omega_s^J\left(1-t_{L,s}\right)$$

- Let $\mathbf{t}_s=\left\{t_{1,s},...,t_{N,s},t_{L,s}\right\}$ be the vector of tax rates.

- Tax payments to the government:

$$t_{n,s}\left[p_{n,s}x_{n,s}^{J}-e_{n,s}\right] \ ,$$

- Main interpretation of $e_{n,s}$ is consumption/labor supply in the informal sector.

- This is assumed to be costly $c\left(e_{n,s},\tau_{n,s}\right)$, where c is increasing and convex in $e_{n,s}$.

- Parallel expression for labor taxes

$$t_{L,s}\left[\omega_{s}^{J}L_{s}-e_{L,s}\right]$$

with cost $c\left(e_{L,s},\tau_{L,s}\right)$.

Fiscal-capacity investments

- Costs of non-compliance depend on investments in fiscal capacity $\boldsymbol{\tau}_s = \left\{\tau_{1,s}, ..., \tau_{N,s}, \tau_{L,s}\right\}$

- For each tax base, $k = 1, ..., N, L$, we assume:

$$\frac{\partial c\left(e_{n,s}, \tau_{n,s}\right)}{\partial \tau_{n,s}} > 0 \text{ and } \frac{\partial^2 c\left(e_{n,s}, \tau_{n,s}\right)}{\partial e_{n,s} \partial \tau_{n,s}} \geq 0 \text{ ,}$$

  such that greater fiscal capacity makes avoiding taxes more difficult.

- Assume $c\left(e_{n,s}, 0\right) = 0$

- Investment cost is:

$$\mathcal{F}^k(\tau_{k,2} - \tau_{k,1}) + f^k(\tau_{k,2}, \tau_{k,1}) \; for k = 1, ..., N, L,$$

for investing in dimension k of fiscal capacity.

- First part of the investment cost function $\mathcal{F}^k$ is convex in $\tau_{k,2}$, with $\frac{\partial \mathcal{F}^k(0)}{\partial \tau_{k,2}} = 0$, i.e., the marginal cost at zero is negligible.

- May be fixed-cost component (paid once)

$$f^k(\tau_{k,2}, \tau_{k,1}) = \begin{cases} f^k \geq 0 \text{ if } \tau_{k,1} = 0 \text{ and } \tau_{k,2} > 0 \\ 0 \text{ if } \tau_{k,1} > 0 \end{cases} .$$

- Let

$$\mathcal{F}(\boldsymbol{\tau}_2, \boldsymbol{\tau}_1) = \sum_{k=1}^{L} \mathcal{F}^k(\tau_{k,2} - \tau_{k,1}) + f^k(\tau_{k,2}, \tau_{k,1})$$

be the total costs of investing in fiscal capacity.

Household decisions

- Preferences are quasi-linear and given by:

$$x_{0,s}^J + u\left(x_{1,s}^J, .., x_{N,s}^J\right) - \phi\left(L_s^J\right) + \alpha_s^J H\left(g_s\right).$$

  where u is a concave utility function and ϕ the convex disutility of labor.

- α_s^J parametrizes the value of public goods.

- Individual budget constraint:

$$\begin{aligned} & x_{0,s}^J + \sum_{n=1}^{N} p_{n,s}\left(1 + t_{n,s}\right) x_{n,s}^J \\ \leq \; & \omega_s^J \left(1 - t_{L,s}\right) L_s^J + r_s^J + \sum_{k=1}^{L} \left[t_{k,s} e_{k,s} - c\left(e_{k,s}, \tau_{k,s}\right)\right] \; . \end{aligned}$$

- r_s^J is a group-specific cash-transfer.

- Standard condition for choice of $e_{k,s}$

$$t_{k,s} = c_e\left(e^*_{k,s}, \tau_{k,s}\right) \text{ for } k = 1, ..., N, L \text{ if } \tau_{k,s} > 0 \ . \tag{1}$$

- $e^*_{k,s}\left(t_{k,s}, \tau_{k,s}\right)$ decreasing in the fiscal capacity investment, tax base by tax base.

- Household "profits" from non-compliance:

$$q\left(t_{k,s}, \tau_{k,s}\right) = t_{k,s}e_{k,s} - c\left(e_{k,s}, \tau_{k,s}\right) \ ,$$

which are increasing in $t_{k,s}$ and decreasing in $\tau_{k,s}$.

- Let

$$Q\left(\mathbf{t}_s, \boldsymbol{\tau}_s\right) = \sum_{k=1}^{L} q\left(t_{k,s}, \tau_{k,s}\right)$$

be the aggregate per-capita profit from efforts devoted to tax-reducing activities where $\mathbf{t}_s = \left\{t_{1,s}, ..., t_{N,s}, t_{L,s}\right\}$ is the vector of tax rates.

- Indirect utility function

$$\begin{aligned} V^J\left(\mathbf{t}_s, \boldsymbol{\tau}_s, g_s, \omega_s^J, r_s^J\right) &= v(p_1\left(1 + t_{1,s}\right), ..., p_{N,s}\left(1 + t_{N,s}\right)) \\ &\quad + v^L(\omega_s^J\left(1 - t_{L,s}\right)) \qquad (2) \\ &\quad + Q\left(\mathbf{t}_s, \boldsymbol{\tau}_s\right) + \alpha_s^J H\left(g_s\right) + r_s^J \qquad (3) \end{aligned}$$

The policy problem

- Let

$$B\left(\mathbf{t}_s, \boldsymbol{\tau}_s\right) = \sum_{n=1}^{N} t_{n,s}(p_{n,s}x_{n,s} - e_{n,s}) + \sum_{J=1}^{\mathcal{J}} \xi^J t_{L,s}(\omega_s^J L_s^J - e_{L,s})$$

be the tax revenue from goods and labor.

- Government budget constraint:

$$B\left(\mathbf{t}_s, \boldsymbol{\tau}_s\right) + R_s \geq g_s + \sum_{J=1}^{\mathcal{J}} \xi^J r_s^J + m_s \ , \tag{4}$$

where

$$m_s = \begin{cases} \mathcal{F}(\boldsymbol{\tau}_2, \boldsymbol{\tau}_1) & \text{if} \quad s = 1 \\ 0 & \text{if} \quad s = 2 \end{cases}$$

is the amount invested in fiscal capacity (relevant only in period 1) and R_s is any (net) revenue from borrowing, aid or natural resources.

- Social objective:

$$\sum_{J=1}^{\mathcal{J}} \mu^J \xi^J V^J \left(\mathbf{t}_s, \boldsymbol{\tau}_s, g_s, \omega_s^J, r_s^J\right)$$

where $\sum_{J=1}^{\mathcal{J}} \mu^J \xi^J = 1$ and μ^J is a Pareto weight.

Optimal taxation

- Let

$$Z_{n,s}(\mathbf{t}_s, \boldsymbol{\tau}_s) = p_{n,s} x_{n,s} - e_{n,s} \tag{5}$$

and (6)

$$Z_{L,s}(t_{L,s}, \tau_{L,s}) = \sum_{J=1}^{\mathcal{J}} \xi^J \omega_s^J L_s^J - e_{L,s} \ , \tag{7}$$

where $x_{n,s}$ and L_s^J are per capita commodity demands and (group-specific) labor supplies.

- Ramsey like tax rule for commodities is

$$
\begin{aligned}
(\lambda_s - 1) Z_{n,s}(\mathbf{t}_s, \boldsymbol{\tau}_s) + \lambda_s \sum_{n=1}^{N} t_{n,s} \frac{\partial Z_{n,s}(\mathbf{t}_s, \boldsymbol{\tau}_s)}{\partial t_{n,s}} &= 0 \quad \text{for } n = 1, \ldots N \quad \text{if } \tau_n \\
t_{n,s} &= 0 \quad \text{if } \tau_{n,s} = 0 \ ,
\end{aligned}
$$

where λ_s is the value of public funds.

- Income tax rule:

$$\begin{aligned} -\tilde{Z}_{L,s} + \lambda_s \left[Z_{L,s}\left(t_{L,s}, \tau_{L,s}\right) + t_{L,s} \frac{\partial Z_{L,s}\left(t_{L,s}, \tau_{L,s}\right)}{\partial t_{L,s}} \right] &= 0 \text{ if } \tau_{L,s} > 0 \\ t_{L,s} &= 0 \quad \text{if } \tau_{L,s} = 0 \ . \end{aligned}$$

where $\tilde{Z}_{L,s} = \sum_{J=1}^{\mathcal{J}} \mu^J \xi^J \omega_s^J L_s^J - e_{L,s}$ is weighted net taxable labor income allowing for heterogenous wages.

- For illustration if $\omega_s^J = \omega_s$, then

$$\frac{t^*_{L,s}}{1 - t^*_{L,s}} = \frac{(\lambda_s - 1) - (\kappa - 1)\,\varepsilon}{\kappa\eta}\ , \tag{8}$$

where η is the elasticity of labor supply with regard to the after-tax wage, ε is the elasticity of evasion with respect to the income tax rate and $\kappa = \omega_s L_s / \left(\omega_s L_s - e_{L,s}\right) > 1$ reflects the extent of non-compliance.

- Hence

$$\frac{\partial t^*_{L,s}}{\partial \varepsilon} < 0 \ \text{ and } \frac{\partial t^*_{L,s}}{\partial \kappa} < 0\ .$$

Optimal public spending

- Value of transfers from $\mu^{\max} = \max_J \left\{\mu^J; J = 1, .., \mathcal{J}\right\}$.

- If

$$\sum_{J=1}^{\mathcal{J}} \mu^J \xi^J \alpha_s^J H_g \left(B\left(\mathbf{t}_s^*\left(\mu^{\max}\right), \boldsymbol{\tau}_s\right) + R_s - m_s\right) > \mu^{\max}$$

then all spending will be allocated to public goods, i.e.,

$$\lambda_s = \sum_{J=1}^{\mathcal{J}} \mu^J \xi^J \alpha_s^J H_g \left(B\left(\mathbf{t}_s^*\left(\lambda_s\right), \boldsymbol{\tau}_s\right) + R_s - m_s\right)$$

- Otherwise $\lambda_s = \mu^{\max}$, tax revenues are $B\left(\mathbf{t}_s^*\left(\mu^{\max}\right), \boldsymbol{\tau}_s\right)$, public goods have an interior solution, and the remaining revenue is spent on transfers to the group defining $\mu^{\max}$.

Investments in fiscal capacity

- Let

$$W\left(\boldsymbol{\tau}_s, R_s + m_s; \{\mu^J\}\right) = \max\left\{\sum_{J=1}^{\mathcal{J}} \mu^J \xi^J V^J\left(\mathbf{t}_s^*, \boldsymbol{\tau}_s, g_s, \omega_s^J, r_s^J\right)\right\}. \tag{9}$$

subject to (4)

- The choice of $\boldsymbol{\tau}_2$ maximizes:

$$W\left(\boldsymbol{\tau}_1, R_1 - \mathcal{F}\left(\boldsymbol{\tau}_2, \boldsymbol{\tau}_1\right); \{\mu^J\}\right) + W\left(\boldsymbol{\tau}_2, R_2; \{\mu^J\}\right). \tag{10}$$

- First-order conditions can be written as:

$$\begin{aligned} \lambda_2 \frac{\partial B\left(\mathbf{t}_2^*, \boldsymbol{\tau}_2\right)}{\partial \tau_{k,2}} + \frac{\partial Q\left(\mathbf{t}_2^*, \boldsymbol{\tau}_2\right)}{\partial \tau_{k,2}} - \lambda_1 \frac{\partial \mathcal{F}\left(\boldsymbol{\tau}_1, \boldsymbol{\tau}_2\right)}{\partial \tau_{k,2}} &\leqslant 0 \text{ for } k = 1, 2, ..N \qquad (11) \\ \text{c.s. } \tau_{k,2} &\geqslant \tau_{k,1} > 0. \end{aligned}$$

- Three terms:

  1. Added revenue from better fiscal capacity weighted by the period-2 marginal value of public funds.

  2. Marginal cost imposed on citizens by higher fiscal capacity

  3. the marginal cost of investing, weighted by the marginal cost of public funds in period 1.

Economic Development

- Simplify so that $H(g_s) = g_s$, and the value of public goods to be equal across groups, i.e., $\alpha_s^J = \alpha_s = \lambda_s > \mu^{\max}$.

- Spending is only on public goods

- Assume

$$\omega_s^J = \Lambda_s \omega \ ,$$

- Set $n = 1$, then income tax introduced if

$$\Lambda_s \omega \int_0^{t^*_{L,2}} \left[\alpha_2 L^* \left(\Lambda_2 \omega (1 - t^*_{L,2}) \right) - L^* \left(\Lambda_2 \omega (1 - t) \right] dt \qquad (12)$$

$$+[q \left(t^*_{L,2}, \tau^*_{L,2} \right) - (\alpha_2 - 1) t^*_{L,2} e^* \left(t^*_{L,2}, \tau^*_{L,2} \right)] \geq \alpha_1 [\mathcal{F}^L \left(\tau^*_{L,2} \right) + f^L]$$

where $\tau^*_{L,2}$ solves a first order condition.

- Three terms:

  1. Value of transferring funds from private incomes to public spending, recognizing that there there is deadweight loss associated with lower labor supply.

  2. Non-compliance considerations:

  3. Costs incurred by introducing a new tax base – fixed costs and the cost of the investment in fiscal capacity of $\tau^*_{L,2}$.

Endogenous economic differences

- Assume:

$$\omega_s^J = \Lambda_s \omega(\pi_s),$$

where scalar π_s represents endogenous government investment in the productive side of the state and where $\omega(\pi_s)$ is an increasing function.

- Government can invest to increase π_2

- Costs are now:

$$m_s = \begin{cases} \mathcal{F}(\boldsymbol{\tau}_2, \boldsymbol{\tau}_1) + \mathcal{L}(\pi_2, \pi_1) & \text{if } \; s = 1 \\ 0 & \text{if } \; s = 2 \end{cases}.$$

- First-order condition for investment in π_2

$$[1 + (\alpha_2 - 1) t^*_{L,2} L^*_2 \Lambda_2] \frac{\partial \omega}{\partial \pi_2} - \alpha_1 \frac{\partial \mathcal{L}(\pi_2 - \pi_1)}{\partial \pi_2} = 0 \qquad (13)$$

- Fiscal capacity is complementary with productive investments by the state.

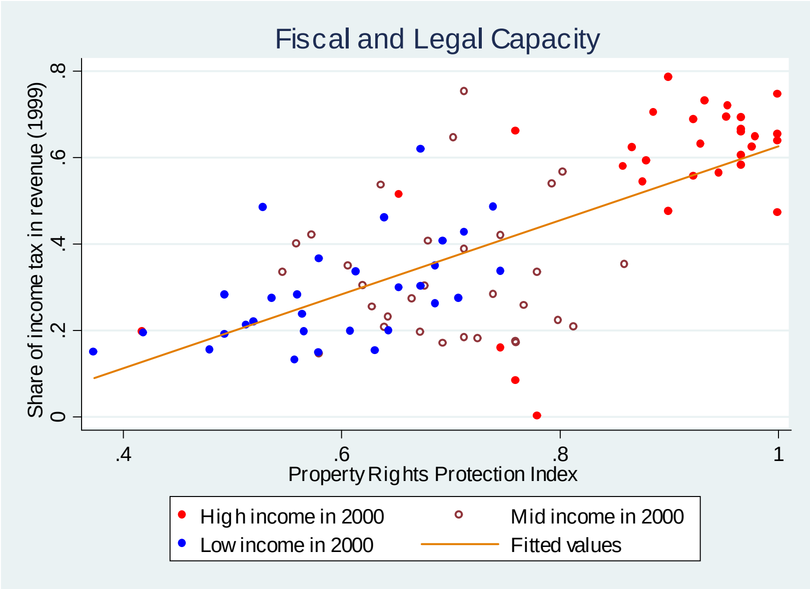

Figure 7: Share of income tax in revenue and protection of property rights

Politics

I Cohesive institutions

- Government in power acts on behalf of a specific group in the spirit of a citizen-candidate approach to politics

- No agency problem within the incumbent group; whoever in the group holds power, she cares about the average welfare of its members.

- Constraint modeled as:

$$r_s^J \geq \theta r_s^I, \text{ for } J \neq I \ .$$

where $\theta \in [0,1]$ represents the "cohesiveness" of institutions.

- Using this, we can solve for transfers allocated to the incumbent group and all the groups in opposition $J = O$:

$$\begin{aligned} r_s^I &= \beta^I\left(\xi^I, \theta\right)\left[B\left(\mathbf{t}_s, \boldsymbol{\tau}_s\right) + R_s - g_s - m_s\right] \quad \text{and} \\ r_s^O &= \beta^O\left(\xi^I, \sigma\right)\left[B\left(\mathbf{t}_s, \boldsymbol{\tau}_s\right) + R_s - g_s - m_s\right] \end{aligned}$$

where

$$\beta^I\left(\xi^I, \theta\right) = \frac{1}{\theta + (1-\theta)\xi^I} \quad \text{and} \quad \beta^O\left(\xi^I, \sigma\right) = \frac{\theta}{\theta + (1-\theta)\xi^I} \tag{14}$$

- Spending is on public goods if $\alpha_s^I > \beta^I\left(\xi^I, \theta\right)$ and $\lambda_s^I = \alpha_s^I$.

- Otherwise spending on transfers with $\lambda_s^I = \beta^I\left(\xi^I, \theta\right)$.

- Investment decision:

$$\lambda_2^I \frac{\partial B\left(\mathbf{t}_2^*, \boldsymbol{\tau}_2\right)}{\partial \tau_{k,2}} + \frac{\partial Q\left(\mathbf{t}_2^*, \boldsymbol{\tau}_2\right)}{\partial \tau_{k,2}} - \lambda_1^I \frac{\partial \mathcal{F}\left(\boldsymbol{\tau}_1, \boldsymbol{\tau}_2\right)}{\partial \tau_{k,2}} \leqslant 0 \quad (15)$$
$$\text{c.s.}\, \tau_{k,2} \geqslant \tau_{k,1}\ .$$

- So the value of public funds now depends on political institutions since it affects the way in which revenues are deployed.

- Otherwise essentially same as planner's solution.

II Political turnover

- This will change things as it is like a "time inconsistent" planner's problem.
  - Static and dynamic political distortions have rather different implications

- Specialize to two groups with γ probability of a political transition

- Period-s payoff of being either the incumbent or the opposition, $J = I_s, O_s$:

$$W^J(\boldsymbol{\tau}_s, R_s - m_s) = V_s^J\left(\mathbf{t}_s^*\left(\lambda_s^{I_s}, \boldsymbol{\tau}_s\right), \boldsymbol{\tau}_s, g_s^*\left(\lambda_s^{I_s}, \boldsymbol{\tau}_s\right), \omega_s^J, \beta^J(\theta)\, b_s\left(\lambda_s^{I_s}, \boldsymbol{\tau}_s\right.$$

where

$$b_s\left(\lambda_s^{I_s}, \boldsymbol{\tau}_s\right) = \left[B\left(\mathbf{t}_s^*\left(\lambda_s^{I_s}, \boldsymbol{\tau}_s\right), \boldsymbol{\tau}_s\right) + R_s - m_s - g_s^*\left(\lambda_s^{I_s}, \boldsymbol{\tau}_s\right)\right]$$

is the total budget available for transfers, and $\beta^I(\theta) = \beta^I\left(\frac{1}{2}, \theta\right)$ and $\beta^O(\theta) = \beta^O\left(\frac{1}{2}, \theta\right)$ are the shares of transfers going to the incumbent and opposition groups.

- Fiscal capacity maximizes

$$W^I(\boldsymbol{\tau}_1, R_1 - \mathcal{F}(\boldsymbol{\tau}_1, \boldsymbol{\tau}_2)) + (1-\gamma) W^I(\boldsymbol{\tau}_2, R_2) + \gamma W^O(\boldsymbol{\tau}_2, R_2). \tag{16}$$

where turnover matters.

- First order condition:

$$[\lambda_2^I + \gamma(\lambda_2^O - \lambda_2^I)]\frac{\partial B\left(\mathbf{t}_2^*, \boldsymbol{\tau}_2\right)}{\partial \tau_{k,2}} + \boldsymbol{\Delta}_2^O + \frac{\partial Q\left(\mathbf{t}_2^*, \boldsymbol{\tau}_2\right)}{\partial \tau_{k,2}} - \lambda_1^I \frac{\partial \mathcal{F}\left(\boldsymbol{\tau}_1, \boldsymbol{\tau}_2\right)}{\partial \tau_{k,2}} \leqslant 0($$

$$\text{c.s.}\tau_{k,2} \geqslant \tau_k$$

where

$$\boldsymbol{\Delta}_2^O \equiv \gamma \frac{\partial V_2^O\left(\mathbf{t}_2^*\left(\lambda_2^{I_2}, \boldsymbol{\tau}_2\right), \boldsymbol{\tau}_2, g_2^*\left(\lambda_2^{I_2}, \boldsymbol{\tau}_2\right), \omega_2^J, \beta^J(\theta)\, b_s\left(\lambda_s^{I_s}, \boldsymbol{\tau}_s\right)\right)}{\partial \mathbf{t}_2^*(\boldsymbol{\tau}_2)} \cdot \frac{\partial \mathbf{t}_2^*\left(\lambda_2^{I_2}\right.}{\partial \tau_{k,}}$$

(18)

and

$$\lambda_2^O = \begin{cases} \alpha_2^{I_1} & \text{if } \alpha_2^{I_1} \geq \beta^I(\theta) \\ \beta^O(\theta) & \text{otherwise .} \end{cases}$$

- The term $\boldsymbol{\Delta}_2^O$ represents a strategic policy effect.

Three types of state

- 1. A common-interest state:
  - As long as α_2 is high enough relative to the value of transfers, we have:

$$\lambda_2^I = \lambda_2^O = \lambda_2 = \alpha_2 > \beta^I(\theta) \ . \tag{19}$$

    In this case, all incremental tax revenue is spent on public goods and there is agreement about the future value of public funds.

- 2. A redistributive state

  - When

$$\alpha_2 > \beta^I(\theta) \ . \tag{20}$$

    with the marginal dollar raised being spent on transfers to the incumbent, i.e. $\lambda_2^I = \beta^I(\theta)$.

  - Expected value of public revenues in period 2 to the period-1 incumbent is now:

$$\lambda_2^{I_1} = (1-\gamma)\,\beta^I(\theta) + \gamma\beta^O(\theta)$$

  - Redistributive state is where γ is low.

- 3. A weak state
  - As in 2. but with γ high.
  - Poor incentives incentives to invest in fiscal capacity

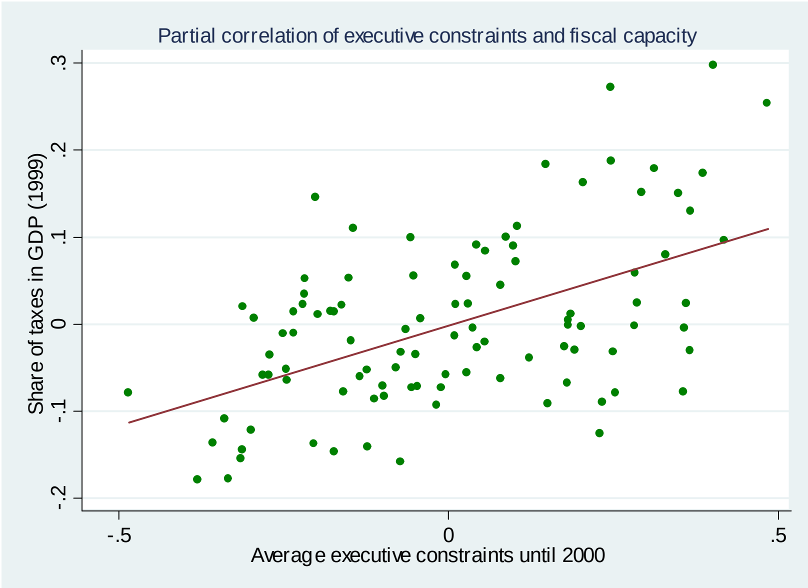

Figure 8: Share of tax revenue and executive constraints

Social Structure

- Introduce:
  - Group size heterogeneity and elite rule
  - Income inequality
  - Polarization

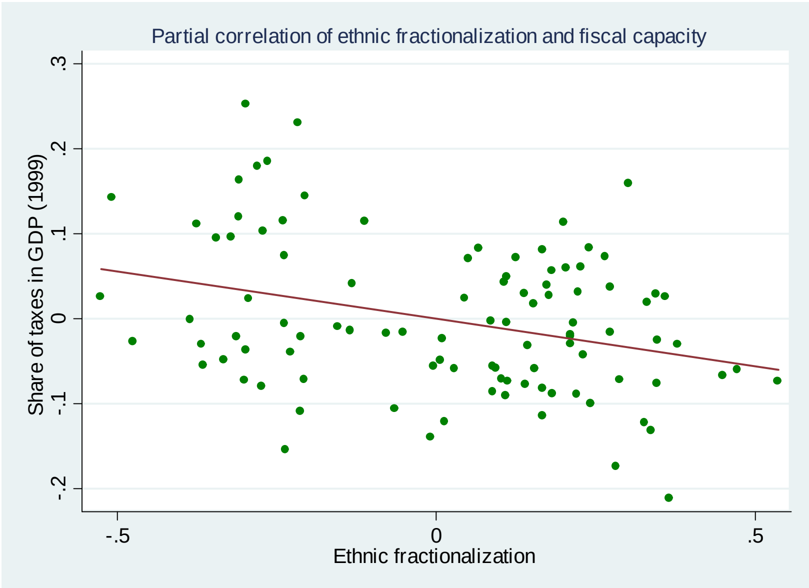

Figure 9: Share of taxes and ethnic fractionalization

The Value of Public Spending

- One force that affects α_s is the prospect of war (important in historical accounts of building tax systems)

- Identifying public projects is also important
  - role of RCTs

- Corruption may also reduce the effectiveness of spending and lower λ_2

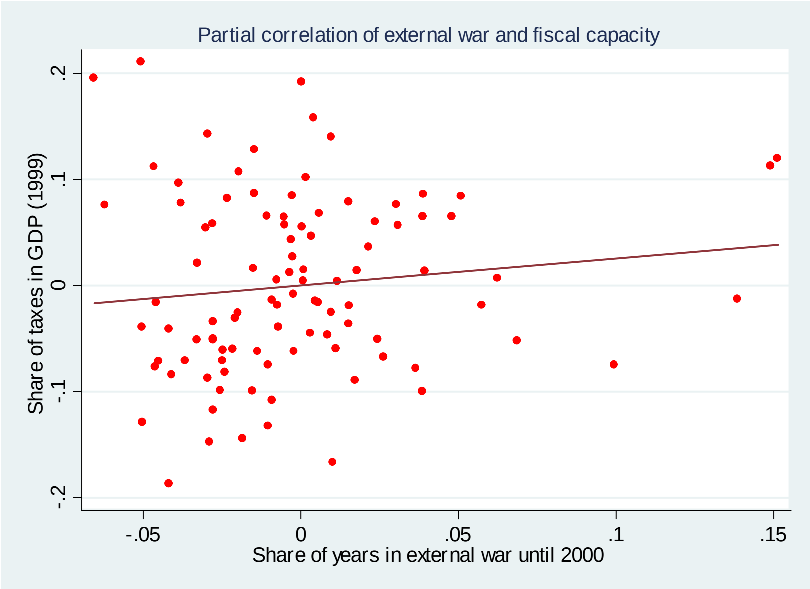

Figure 10: Share of taxes in GDP and external war

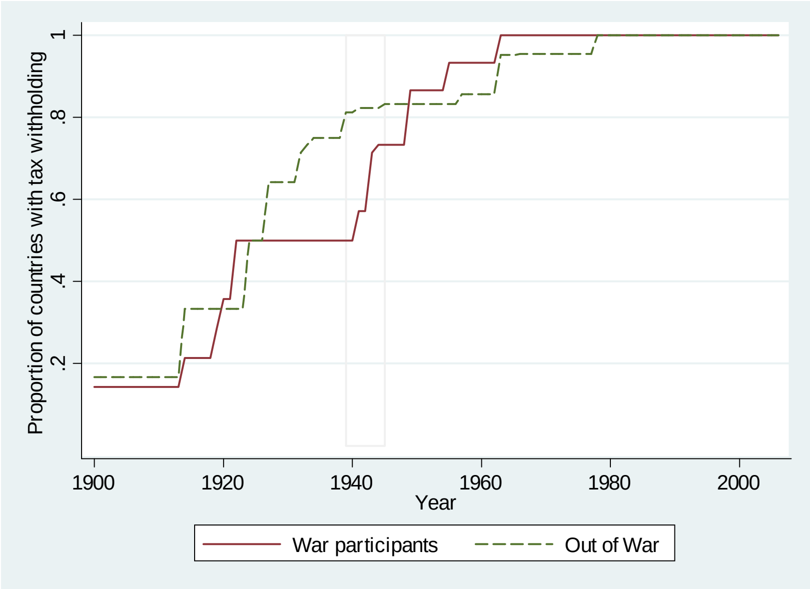

Figure 11: Introduction of tax withholding and war

Non-Tax Revenues

- With curviture in the $H(\cdot)$ function, this affect λ_1 and λ_2.

- Aid and development finance and resource revenues

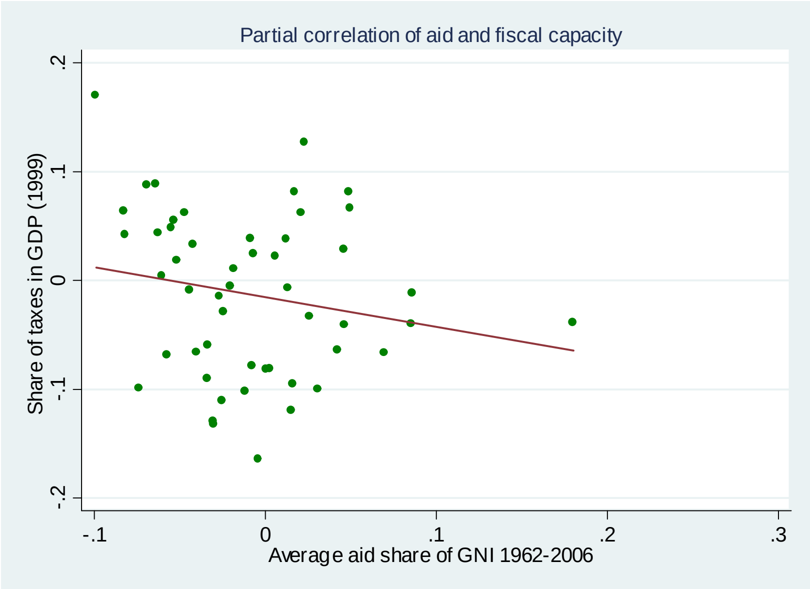

Figure 12: Share of taxes in GDP and aid

Informal taxation:

- Suppose that there are ways of extracting revenues outside of formal taxation such as
  - corruption
  - informal coercion
- Denote these tax rates by $T_{n,s}$

- Then budget constraint is

$$\begin{aligned} & x_{0,s}^{J}+\sum_{n=1}^{N} p_{n,s}\left(1+t_{n,s}+T_{n,s}\right) x_{n,s}^{J} \\ \leq \; & \omega_{s}^{J}\left(1-t_{L,s}-T_{L,s}\right) L_{s}^{J}+r_{s}^{J}+\sum_{k=1}^{L}\left[t_{k,s} e_{k,s}-c\left(e_{k,s}, \tau_{k,s}\right)\right] \; . \end{aligned}$$

and the earnings from informal taxation are

$$B^{I}(\mathbf{T})=\sum_{n=1}^{N} T_{n,s} p_{n,s} x_{n,s}+\sum_{J=1}^{\mathcal{J}} \xi^{J} T_{L,s} \omega_{s}^{J} L_{s}^{J}.$$

- Has static effects on tax revenues and dynamic effects on fiscal capacity building

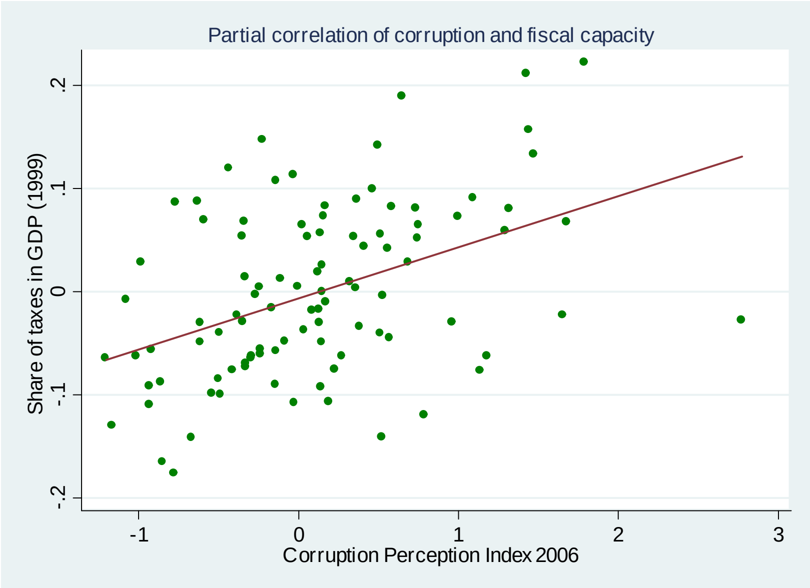

Figure 13: Share of taxes in GDP and corruption

Compliance

- Simple microfoundation (almost Allingham and Sandmo)

- Let $\phi(e)$ be a non-pecuniary punishment for non-compliance with the tax code, increasing and convex in the amount of evasion e and let $\upsilon(\tau)$ be the probability of detection, increasing in τ.

- Then

$$c(e,\tau) = \upsilon(\tau)\,\phi(e)\,.$$

Topic I:

Social norms and tax morale:

- Shame or stigma from noncompliance in a particular tax base depends on the average amount of non-compliance in the population as a whole, $\bar{e}$.
  - Thus
  $$c(e, \tau; \bar{e}) = \upsilon(\tau)\, \phi(e; \bar{e}) \ ,$$
  with $\phi_{\bar{e}}(e; \bar{e}) < 0$ i.e., an increasing amount of non-compliance in the population as a whole lowers the stigma/shame from cheating.
  - Now
  $$t_{k,s} = \upsilon\left(\tau_{k,s}\right) \phi_e\left(e^*_{k,s}; e^*_{k,s}\right) \text{ for } k = 1, ..., N, L \text{ if } \tau_{k,s} > 0 \ .$$

With $\phi_{e\bar{e}} < 0$, we get the possibility of multiple Pareto-ranked tax-evasion equilibria, since the reaction functions for evasion slope upwards.

Topic II

Incentives for tax inspectors

- Inspectors put in evasion effort, χ

- Probability that a non-complier is caught is given by $\upsilon(\tau,\chi)$ with $\upsilon_\chi(\tau,\chi) > 0$.

- Equilibrium non-compliance is

$$e^*(t,\tau;\chi) = \arg\max_e \{et - \upsilon(\tau,\chi)\phi(e)\} \ .$$

It is easy to see that $e^*(t,\tau;\chi)$ is decreasing in χ. Let $q(t,\tau,\chi)$ now be the private profit per capita from non-compliance when tax inspectors put in effort χ.

- Look at incentive schemes for inspectors

  1. Efficiency wages

  2. Tax farming

Topic III

Exploiting local information

- Using cross reporting mechanisms when two parties to a transaction are known.

- Use of formal sector employment to collect taxes and improve compliance

- Cross reporting built into VAT systems.

To Add

- More discussion of corporate taxes (what to say?)
- Capital taxation
- Seignorage
- More on debt
- Anything else?