how can we explain the observed historical and comparative **development of tax structures**?

A rapid survey about State's capacity to raise taxes

- Besley, Persson (2007a), "The origin of state capacity: property rights, taxation, and politics" – NBER
- Besley, Persson (2007b), "War and State capacity" – CIFAR
- Besley, Persson (2009), "State capacity, conflict and development" – NBER
- Kleven, Kreiner, Saez (2009) "Why can modern governments tax so much? An agency model of firms as fiscal intermediaries" – NBER

Introduction

- <u>Statement:</u> Governments' power to tax cannot be taken for granted (Cf. LDC Vs DC)

→ What could be the determinants of the historical evolution of fiscal systems?

  – **Kleven, Kreiner, Saez (2009):** as firms size increase, public accurate business records enable "third party" tax enforcement, even with low penalties and low audits rates.
  – **Besley, Persson (2007a, 2007b, 2009):** political stability and shared interests in common public goods increase investments in (legal and) fiscal capacities.

  NB: Besley, Persson (2009b) "Repression or Civil Wars" endogenized political stability in poor and weakly institutionalized countries (Natural resources rents, poverty levels, institutional framework, …)

Outlines

- **A - Kleven et al's** agency model of firms as fiscal intermediaries

    1. An agency model of tax enforcement

    2. Embedding the agency model on a macroeconomic growth model

- **B - Besley and Persson's** economic and political determinants of state capacity

    1. A model of state capacity investment under prospect of conflicts

    2. Correlates of War data analysis

A.1. Kleven et al (2009) – agency model

- **Firms** = private/public employers, banks, investment funds, pension funds.
- **Taxable income** = profits, compensation paid to employees, capital income paid to clients.

→Firms report taxable income directly to the Government and act as third-party between households and the Government

NB: Other studies suggest that, as a first approximation, tax enforcement is successful *iif* third-party reporting covers a large fraction of taxable income (Kleven et al. (2009c) and Eurostat (2007))

A.1. Kleven et al (2009) – agency model

- **Firm's trade-off** in the use of detailed business records:
  - The larger the firm, the more valuable are detailed records for productivity
  - The wider the use of records, the higher the risk that employees know about and have access to them
  - → Exogenous and then endogenized. In the LR, records are profitable

- **Employee's dilemma**: collusion or breakdown?
  - Firm and its employee could collude to report smaller incomes (salaries and profits)
  - However: imperfect information and absence of ex-ante commitment
  - → In practice: random shock can occur (conflicts between employees and employers, moral concerns…), or reward can be promised by the Government to report cheating

Assumption: each employee has access to the firm's records

NB: **Kopczuk and Slemrod (2006)** showed how firm-to-firm transaction information enforces value-added tax raising. Here, we deal with within-firm information to raise income tax.

A.1. Kleven et al (2009) – agency model

$$Total\ value\ added\ V = W + \pi = S - P,\ \ W = \sum_n w_n$$

$$same\ tax\ rate\ \tau\ on\ W\ and\ \pi \Rightarrow V = W'$$

$$both\ firm\ and\ employees\ report\ employees'\ wages \Rightarrow agreement:\ \bar{w} = (\bar{w}_1, \dots, \bar{w}_n)$$

$$records \Rightarrow (w, \bar{w})\ is\ common\ knowledge\ within\ the\ firm$$

→ Random shock model
→ Rational whistleblower model

A.1. Kleven et al (2009) – agency model

Random shock model:

$$y_n = w_n - \tau \cdot \bar{w}_n - (1 - (1-\varepsilon)^N) \cdot \tau \cdot (1+\theta) \cdot (w_n - \bar{w}_n)^+$$

$$\frac{\partial Y}{\partial \bar{w}_n} = \begin{cases} \tau \cdot \left(-1 + (1+\theta)(1-(1-\varepsilon)^N)\right) \text{ when } \bar{w}_n < w_n \\ -\tau \quad \text{when } \bar{w}_n \geq w_n \end{cases}$$

(a) If $(1-\varepsilon)^N \leq \theta/(1+\theta)$, there is no tax evasion at all: $\bar{w} = w$.

(b) If $(1-\varepsilon)^N > \theta/(1+\theta)$, there is complete tax evasion: $\bar{w} = 0$.

(c) For any $\theta > 0$ and $\varepsilon > 0$, there is $\bar{N}$ such as firms do not evade when $N \geq \bar{N}$.

→ When firms become large enough, tax evasion is not sustainable even with low fines and low audit rates

A.1. Kleven et al (2009) – agency model

Rational whistleblower model:

$$y_n = \begin{cases} w_n - \tau \bar{w}_n - a(1+\theta)\tau(w_n - \bar{w}_n)^+ & if \ she \ doesn't \ whistleblow \ and \ a = 0 \ or \ 1 \\ w_n - \tau \bar{w}_n - (1+\theta)\tau(w_n - \bar{w}_n)^+ + \dfrac{\delta(1+\theta)\tau \sum_s (w_s - \bar{w}_s)^+}{N_w} & if \ she \ does \ and \ a = 1 \end{cases}$$

Same method: we look at a cooperative solution which maximizes the total surplus Y

(a) If $N > 1/\delta$, then there can be no tax evasion at all: $\bar{w} = w$. Hence large firms do not evade taxes even if $\delta > 0$ is very small.
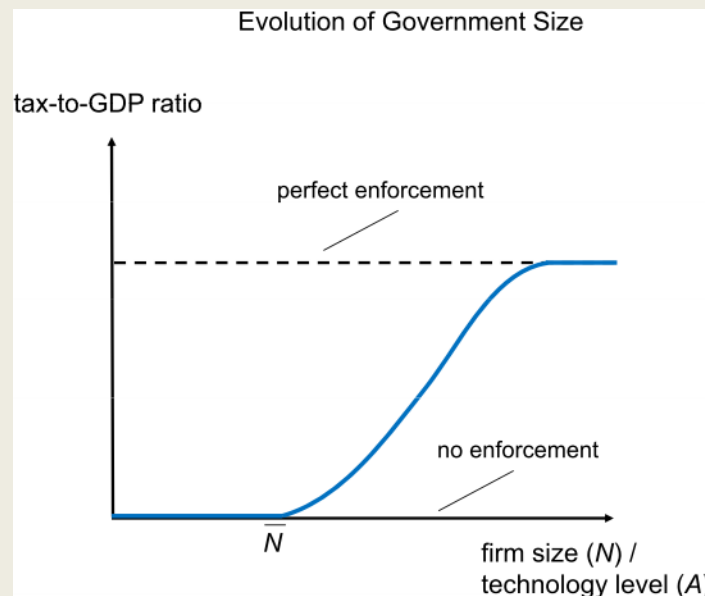
(b) If $N \leq 1/\delta$, then some evasion is sustainable, and an outcome without evasion is Pareto dominated by a sustainable evasion equilibrium. In the evasion equilibrium, the lowest-paid employee always reports zero wages (full evasion). All other employees may report positive wages (less than full evasion), but evade by at least as much as the lowest-paid employee in absolute terms. If wages $w_1, ..., w_N$ are equal, then all employees report zero wages.

A.2. Kleven et al (2009) – Macroecon. Growth Model

- Firm's average product of labor = function of N and of the exogenously growing Technical Progress (TP)

- Assumption: (i) TP is complementary to labor input, (ii) Free-entry of firms

Look at the influence of under-reporting on the firm's profit under the scheme of the whistleblower model:

→ For a given TP: a firm that evades has to limit its size to a level depending on the reward for no employee to whistleblow
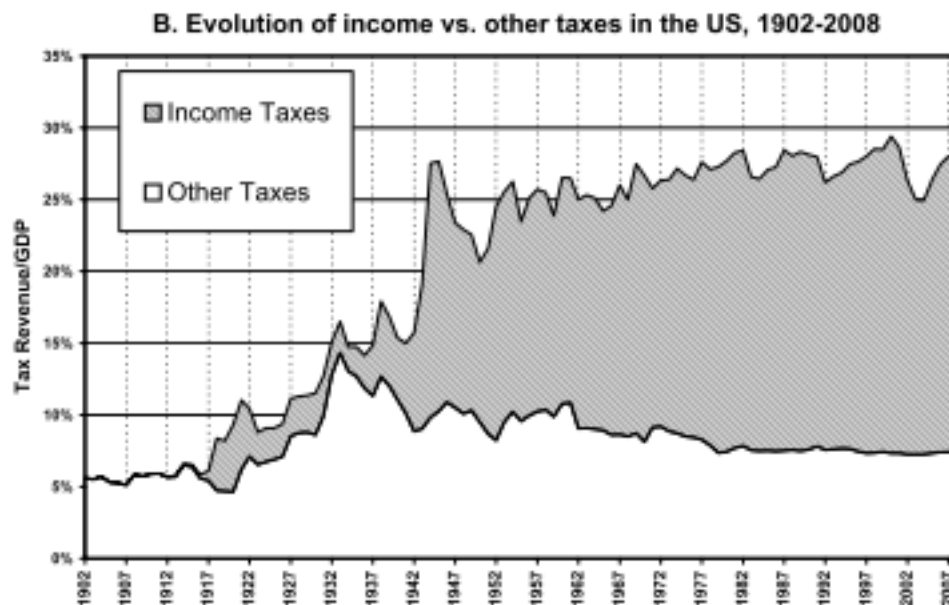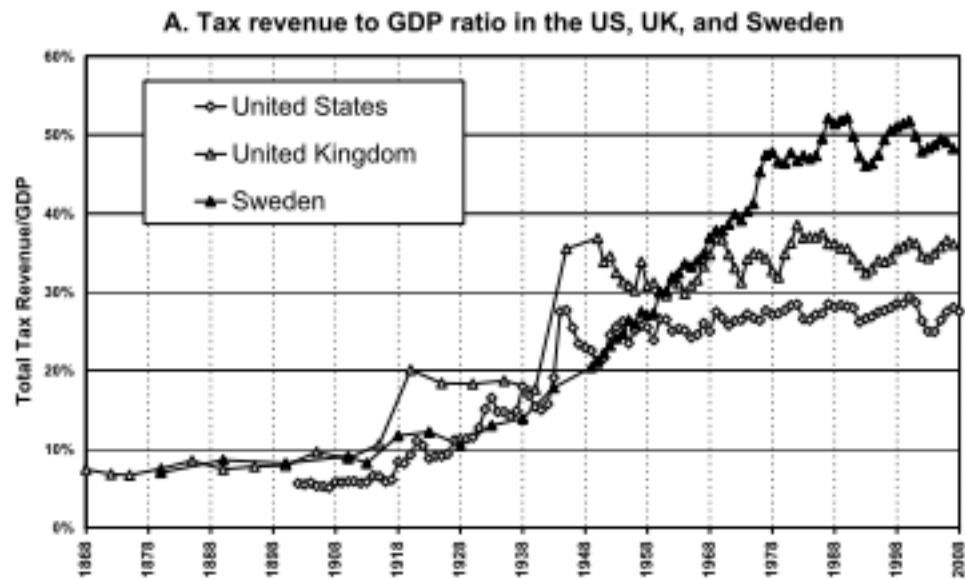
→ As TP increases:

Evolution of Government Size

tax-to-GDP ratio

perfect enforcement

no enforcement

firm size (N) / technology level (A)

$\overline{N}$

A. Tax revenue to GDP ratio in the US, UK, and Sweden

B. Evolution of income vs. other taxes in the US, 1902-2008

FIGURE 2
Evolution of Tax Revenue to GDP in Three Advanced Economies

B.1. Besley et al. (2007, 2009a) – investing in state (fiscal) capacity

- Two periods: s=1,2
- Private consumption in both periods, no savings
- In each period, Government's taxes/spending decisions
- s=1: Government's investment decision in "**state capacity**"
- Population: 2 groups J=A,B, in shares β^A ; $\beta^B = 1 - \beta^A$
- Within each group: same wealth level

→ We'll focus on taxes/spending/**fiscal** capacity…
(not on borrowing/property rights/legal capacity)

B.1. Besley et al. (2007, 2009a) – investing in state (fiscal) capacity

- <u>Taxation and investment in fiscal capacity:</u>

Motives for raising taxes: (i) investing is fiscal capacity, (ii) redistributing, (iii) financing public goods

At the end of each period:

- Power can be peacefully transferred with exogenous proba. γ

(crude measure of **political instability**)

- Tax (or redistribution) rate in "s" is constrained: $t_s^J \leq \tau_s$

→ $\tau_1 = initial\ stock\ of\ "fiscal\ capacity"$

- Investment in fiscal capacity: $cost = F(\tau_2 - \tau_1); F(0) = 0; F\ convex$

- Spending on public goods. They have stochastic *iid* benefits:

$P_r(\alpha_s = \alpha > 0) = \varepsilon; P_r(\alpha_s = 0) = 1 - \varepsilon$

B.1. Besley et al. (2007, 2009a) – investing in state (fiscal) capacity

Schematic mechanism:

1. Incumbent government maximizes the sum of both groups' utilities, but with different weights - NB: the possibility to raise an army -by compensating soldiers- to keep the power can be added (**civil war**)…

2. Depending on the **value** of public goods α_s (e.g. **external war**) , it chooses the level of tax/transfer and the level of spending in public goods.

Results:

- low incomes facilitate insurgency, political instability and civil war

- When α_s is low, an increase in the expected proba. of civil war → decreased investment in fiscal capacity

- Expected external conflicts → increased prob. high α_s → increases investment in fiscal capacity

Table 2: Economic and Political Determinants of Fiscal Capacity

	(1) One Minus Share of Trade Taxes in Total Taxes	(2) One Minus Share of Trade and Indirect Taxes in Total Taxes	(3) Share of Income Taxes in GDP	(4) Share of Taxes in GDP
Incidence of External Conflict up to 1975	0.762*** (0.250)	0.598*** (0.241)	0.579*** (0.220)	0.555*** (0.162)
Incidence of Democracy up to 1975	0.143 (0.077)	– 0.078 (0.100)	0.091 (0.059)	0.088 (0.059)
Incidence of Parliamentary Democracy up to 1975	0.031 (0.083)	0.122 (0.103)	0.212*** (0.078)	0.160** (0.068)
English Legal Origin	– 0.038 (0.058)	- 0.012 (0.061)	– 0.034 (0.043)	- 0.015 (0.042)
Socialist Legal Origin	0.136** (0.058)	– 0.222*** (0.037)	– 0.109*** (0.065)	– 0.119 (0.031)
German Legal Origin	0.175*** (0.052)	0.196*** (0.090)	0.171* (0.010)	0.010*** (0.083)
Scandinavian Legal Origin	0.189** (0.077)	0.068** (0.084)	0.258** (0.134)	0.292*** (0.087)
Observations	103	103	103	103
R-squared	0.356	0.305	0.600	0.576

Notes to Table: Robust standard errors in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%

- Fiscal capacity hard to measure → proxies assuming past levels of investments
- Data from 1800 to 1975 - Regional dummies were added
- Legal origins shape the cost of investment…
- Countries with little fiscal capacity tend to use border taxes (1) /(2); Similar pattern for (3) and (4)

Table 1: Fiscal capacity and different types of war

	(1) Taxes as a percentage of GDP	(2) Taxes as a percentage of GDP	(3) Income taxes as a percentage of total taxes	(4) Income taxes as a percentage of total taxes	(5) Average percentage inflation rate	(6) Average percentage inflation rate
Any internal war during 1945-1997	– 6.993*** (1.843)	– 2.723** (1.310)	– 7.953** (3.960)	– 3.094 (3.574)	14.346*** (4.790)	12.551** (5.567)
Any external war during 1945-1997	6.911*** (2.267)	1.604 (1.569)	16.157*** (3.713)	6.653** (3.317)	3.586 (5.863)	6.676 (6.628)
Share of years in democracy during 1945-1997		5.028** (2.368)		1.902 (7.020)		– 3.979 (11.157)
Share of years in parliamentary democracy during 1945-1997		6.529*** (1.939)		7.553 (6.401)		– 5.403 (4.395)
Mean (log of) income during 1945-1997		3.302*** (1.067)		7.936*** (2.231)		0.974 (3.934)
Observations	125	105	125	105	116	100
R-squared	0.489	0.739	0.390	0.598	0.307	0.370

Robust standard errors in parentheses (* significant at 10%; ** significant at 5%; *** significant at 1%)
In addition to the variables shown, all specifications include a set of dummies for (eight) regions and (five) legal origins.

- Data from 1945 to 1997
- Inflation ~ seignorage, as taxation with weak fiscal capacities
- Some changes when adding control variables… - What about dictatorships?

Conclusions

- **Potential** determinants of historical evolution of fiscal systems:
  - **Kleven et al (2009):** firm's growing sizes (and complementary TP) enabled the enforcement of optimal taxation rates even with low tax/audit rates
  - **Besley et al (2007, 2009):** political stability (e.g. internal conflicts), value of public goods (eg. external conflicts), political representativity, and costs of investments in fiscal capacity shape the historical trend.

- Policy implications?
  - **Allingham-Sandmo (1972):** frequency of controls and level of penalties seem to be substitutes to avoid tax evasion... However, question of socially fair amount of penalties!
  - Kleven et al: Be sensible to transition periods in the corporate sector development in LDC.... However, what the role of the state remains unclear.
  - Besley et al: First, historical comprehension. Second, enhance political stability and representative political systems to keep focused on common public good interests and enable taxation... Beware of interference in Public Aid interventions.

Thank you!

<u>References:</u>

- Besley, Persson (2007a), "The origin of state capacity: property rights, taxation, and politics" – NBER

- Besley, Persson (2007b), "War and State capacity" – CIFAR

- Besley, Persson (2009), "State capacity, conflict and development" – NBER

- Kleven, Kreiner, Saez (2009) "Why can government tax so much? An agency model of firms as fiscal intermediaries" – NBER

- Sandmo (2004) "The theory of tax evasion: a retrospective view"

- Siems (2006) "Legal Origins, Reconciling law and finance, and comparative law" Uni. Of Cambridge

Comments

- Slide 3:
  - In A: will not talk about embedding this model in the standard Allingham and Sandmo (1972) model of tax evasion…
  - In B: will not talk about investing in "legal capacity", and will focus on Government's choices…
- Slide 4:
  - **Kleven et al. (2009c):** income tax audit experiment in Denmark and find that purely self-reported income = 8% of total reported income, But it accounts for about 90% of detected evasion!!
  - **Eurostat (2007)** uses a questionnaire on undeclared work in the European Union and shows that it is <u>concentrated primarily among the self-employed providing direct services to households.</u>
- Slide 6:
  - Same Tho for Pi and W → No incentive for profit/wage shifting → can be treated symetrically.
  - (w1, …, w2) is agreed among ALL the employees!!!
- Slide 12:
  - (1-Tho) is the fraction of her returns that she could get in the informal sector (where she avoid taxation)
  - (1-t) in the fraction of her returns that she could get in the formal (taxed) sector
  - F convex i.e. investment becomes cheaper as the economy develops
  - Tho = fiscal infrastructure = set of competent auditors, necessary institutions to tax income or to impose a value-added tax, etc
- Slide 14:
  - Data from www.correlatesofwar.org
  - Years between 1800 and 1975 – data on about 180 countries
  - Democracy = indicator "polity2" >0, polity2=democracy score (do people vote?, exist constrain on the executive?) + autocracy score (openness to political institutions)
  - Indirect taxes: VAT, excise duty and consumption taxes, other taxes on products (incl. import duties), other taxes on production
  - Direct taxes: mainly personal and corporate income
  - Recall in EU27: indirect taxes (~consumption tax) - 10-15%; direct taxes (~income tax) – 10-15%; social contributions – 10-15%; total taxes – 40% of GDP
  - Data on "legal origins": http://www.nationmaster.com/graph/gov_leg_ori-government-legal-origin, https://www.cia.gov/library/publications/the-world-factbook/fields/2100.html?countryName=&countryCode=&regionCode=p; Paper by Siems (2006) "Legal Origins, Reconciling law and finance, and comparative law" Uni. Of Cambridge