The Political Economy of Development: PPHA 41120
Lecture 2

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Importance of the State

"In 1960 the Philippines and South Korea had about the same standard of living as measured by their per-capita GDPs of about $640 U.S. 1975. The two countries were similar in many other respects. There were 28 million people in the Philippines and 25 million in Korea, with slightly over half of both populations of working age. 27% of Filippinos lived in Manila, 28% of South Koreans lived in Seoul. In both countries, all boys of primary school age were in school, and almost all girls, but only about one quarter of secondary school age children were in school. Only 5% of Koreans in their early 20s were in college, as compared to 15% in the Philippines. 26% of Philippine GDP was generated in agriculture, and 28% in industry. In Korea the comparable numbers were 37 and 20 percent. 96% of Philippine merchandise exports consisted of primary commodities and only 4% of manufactured goods. In Korea, primary commodities made up 86% of exports and manufactured goods 14 (of which 8 were textiles). - Robert E. Lucas (1993) Making a Miracle

What Happened Next?

- We know the answer..

    "I do not think it is in any way an exaggeration to refer to this continuing transformation of Korean society as a miracle.. How did it happen? Why did it happen in Korea and Taiwan and not the Philippines?"

- The explanation Lucas provides is then based on differential patterns of learning by doing and human capital accumulation related to openness.
- Human capital certainly accumulated a lot faster in Korea...
- But Lucas' discussion of what was different about Korea and the Philippines in 1960 is a bit narrow. A huge difference was that Korea was able to lay claim to a long history of centralized, bureaucratized, state authority with a homogeneous national identity. The Philippines was not.

States and Historical Development

- There is a vast qualitative literature in social science outside of economics on the critical role of 'state formation' in generating economic development.

- This surfaced particularly in the literature trying to explain the East Asian growth success (Chalmers Johnson, *MITI and the Japanese Miracle*, Peter Evans, *Embedded Autonomy*) and revisionism read it back into the European experience (John Brewer, *The Sinews of Power*).

- In public finance we take for granted that there is a state that can raise taxes, implement policies and regulations and dispense justice, and establish even more basic things such as the monopoly of violence.

- But none of these can be taken for granted in poor countries today or historically.

Terminology

- There is a lot of terminology used in this context, most of it not well defined.
- Many talk about 'state capacity' breaking this down into 'strong states' and 'weak states' where by strong and weak they mean something like the ability to get things done.
- I think just as important is 'state willingness' (though nobody talks about that except me..)
- Others (the sociologist Michael Mann) argue that 'strength' as many dimensions. He distinguishes between

  1. Infrastructural power - the capacity of the state to penetrate civil society and to use this penetration to enforce policy throughout its entire territory.
  2. Despotic power - distributive power of state elites over civil society. It derives from the range of actions that state elites can undertake without routine negotiation with civil society.

What we'd like to Know

- We'd like to know to what extent state capacity or structure (however measured) was actually an important source of variation in economic development.

- We'd also like to know why this varies.

- Remarkably enough there is hardly any good econometric evidence on either of these topics. (I discuss Dell-Lane-Querubín next lecture).

- Let me start backwards and talk today about variation in state 'capacity', or even something more basic 'state existence', since without a first-stage we can't even discuss the impact on development, right?

Where do States Come From?

- The literature in sociology and political science has developed some big hypotheses about comparative state development

  1. Role of inter-state warfare central: 'states made war and war made states' (Charles Tilly) Latin American states did not become rational-legal because too little warfare.
  2. The 'Rentier State': states which have access to natural resource wealth do not became rational-legal.
  3. Population density: states only develop where population density is high, possibly because of agricultural potential (Diamond Guns, Germs and Steel): Jeffrey Herbst argued (*States and Power in Africa*) that Africa lacked rational-legal states because population density was too low (or they had the tse-tse fly..).
  4. Trade: states arose in places where there was a lot of trade hence high demand for public goods (order, contract enforcement) and potential to regulate/extract rents (Niger bend states of Ghana, Mali and Songhay, or states of the Kathmandu valley in Nepal).

State Formation or State Capacity?

- The Besley and Persson model is useful as a first step in thinking about what incentives might drive state formation, or at least the development of state capacity in specific dimensions.
- But it assumes that a state already exists and has to decide whether to become stronger. Could be that some of the comparative statics are very conditional on this particular setting (e.g. with respect to the Rentier state).
- Though politics is important in their model, it is the start of the discussion. In political science the main reason that politics undermines the way states work is via 'patrimonialism'.
- The best empirical work on the origin of states in Raúl Sánchez de la Sierra's paper.

Pillars of Prosperity
The Political Economics of Development Clusters

Chapter 2: Fiscal Capacity

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Existing research

- Ignored, or assumed, in mainstream economics
  - (macro) development economics sees income per capita, not fiscal institutions, as central outcome
  - capacity to raise revenue from certain tax bases basically assumed in development, public finance, political economics, ...

- Important in political and economic history
  - fiscal powers important in themselves, for military success and state development, more generally (Hintze, Schumpeter, Tilly)
  - war major motive to build fiscal capacity

  "war made the state and the state made war" (Tilly, 1990)

Expansion of taxation in rich countries – Figure 2.1

- Last century – vast expansion of government size
  - ▶ 1910: total taxes around 10% of GDP in Europe and US, while today's figures are 30-50%
  - ▶ number of innovations and expansions of infrastructure underpin the capacity to raise so much revenue
- Investments in fiscal capacity over time
  - ▶ dating of reforms in 75 (mostly) rich countries
    introduction of income tax 1840s-1970s, income-tax withholding later, VAT still not complete
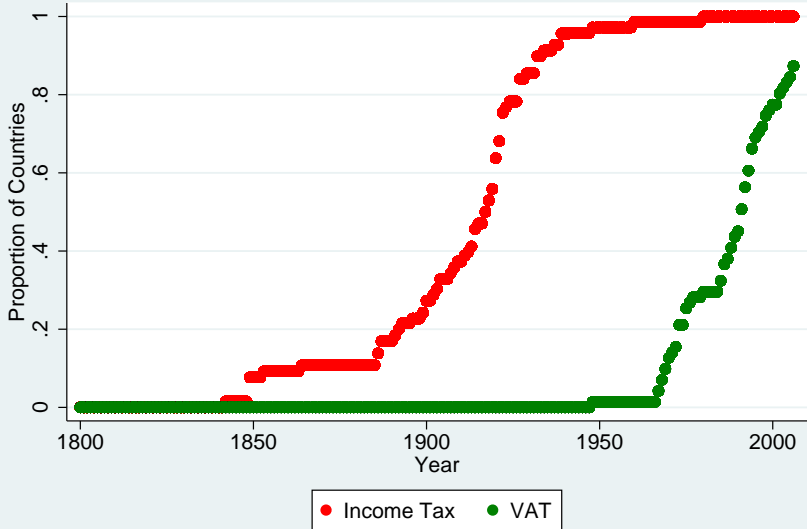
Figure 2.1 The historical evolution of fiscal capacity

But weak states in poor countries – Figures 2.2 and 2.3

- Tax take today
  - poor countries raise much less revenue than rich countries
  - rely on primitive tax bases, such as trade, to much greater extent
- Illustration of these stylized facts
  - shares of total revenue raised from income and trade taxes (other sources of income: sales, property taxes, royalties,...omitted)
  - tilted towards income in *rich* countries and *high-tax* countries
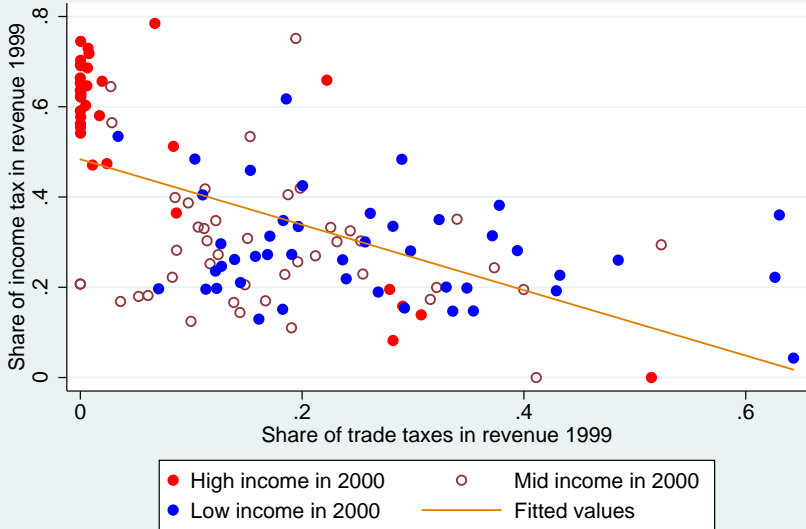
Figure 2.2 Income taxes and trade taxes conditional on income
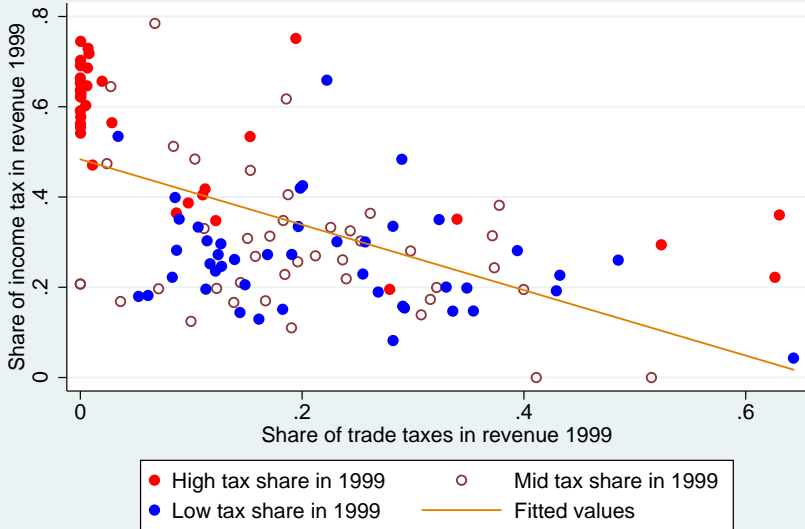
Figure 2.3 Income taxes and trade taxes conditional on total tax take

Basic Structure of Simplest Core Model

- Two time periods, $s = 1, 2$
- Two groups of individuals, A, B
  - each has share $\frac{1}{2}$ of population
  - total population size normalized to 1

- Incumbents and opponents
  - at beginning of $s = 1$, one group holds power
    we call this group the incumbent $I_1 \in \{A, B\}$
  - the other group is the opponent $O_1 \in \{A, B\}$
  - with exogenous probability γ, there is a peaceful transition of power
    until $s = 2$
  - thus, γ measures political instability/turnover
    (to be endogenized in chs 4 and 7)

Private income and utility

- Exogenous income
  - everybody earns income ω (to be endogenized in ch 3)
- Linear utility functions
  - buys us risk neutrality
  - and a model that is *recursive* in policy and investments

$$u_s^J = c_s^J + \alpha_s g_s$$

  - c_s^J private consumption of group-J member at s
  - no savings (one of extensions in Chapter 3)
  - g_s utility from consumption of public goods, α_s their value; think about as "defense", and "threat of external conflict" (adding curvature one of extensions in ch 2)

Value of public goods

- Value of public goods stochastic
  - α_s has two-point distribution $\alpha_s \in \{\alpha_L, \alpha_H\}$,
    where $\alpha_H > 2 > \alpha_L > 1$, and $\text{Prob}[\alpha_s = \alpha_H] = \phi$
    (continuous distribution one of extensions in ch 2)
  - shocks to α *iid* over time
  - realization of α_s known when policy set in s

Taxation and fiscal capacity

- Government has discretion over current taxation
  - ▶ taxes income at rate t_s, but is constrained by existing fiscal capacity, i.e., $t_s \leq \tau_s$

- Microeconomic foundations, see below
  - ▶ individual can earn some income in informal (untaxed) sector, but incentives to hide depend on risk and cost of getting caught

- Investments in fiscal capacity
  - ▶ e.g., tax authority, compliance structures, infrastructure to enforce income tax (or impose value-added tax)
  - ▶ initial stock τ_1 is given, but can be augmented
  - ▶ to achieve fiscal capacity τ_2 requires non-negative investment $\tau_2 - \tau_1$ at $s = 1$ (depreciation, at rate δ, and reversibility in ch 2)
  - ▶ convex cost $\mathcal{F}(\tau_2 - \tau_1)$, where $\mathcal{F}_\tau(0) = 0$

Government budget

- Budget items at s
  - g_s, t_s, $\{r_s^J\}_{J=I,O}$, m_s, and investments

  $$m_s = \left\{ \begin{array}{ll} \mathcal{F}(\tau_2 - \tau_1) & \text{if } s = 1 \\ 0 & \text{if } s = 2 \end{array} \right. .$$

  - budget constraint is

  $$R + t_s \omega = g_s + m_s + \frac{r_s^I + r_s^O}{2}$$

  where r_s^J is a non-negative targeted transfer to group J
  - R is additional (constant) revenue source accruing to government
    interpret as natural resource rents, or foreign (cash) aid
    R is randomly distributed on support $[R_L, R_H]$

Political institutions

- Model as constraint on incumbent
  - ▶ incumbents must give fixed share σ to opposition
    of any given unit of transfers to its own group
  - ▶ by the budget constraint

$$r_s^J = \beta^J [R + t_s \omega - g_s - m_s]$$

  - ▶ where $\beta^I = 2(1 - \theta)$ and $\beta^O = 2\theta$ and where O 's share
    $\theta = \frac{\sigma}{1+\sigma} \in [0, \frac{1}{2}]$ represents more *cohesive* institutions
    the closer is θ to its maximum of $\frac{1}{2}$
  - ▶ interpret as more checks and balances on executive,
    or better representation of opposition
    (micropolitical foundations in ch 7)

Timing

1. We begin with an initial stock of fiscal capacity, τ_1, and an incumbent group, I_1. Nature determines α_1 and R.

2. I_1 chooses a set of period-1 policies $\{t_1, g_1, r_1^I, r_1^O\}$ and determines (through investment) the period-2 stock of fiscal capacity τ_2.

3. I_1 remains in power with probability $1 - \gamma$, and nature determines α_2.

4. I_2 chooses period-2 policy $\{t_2, g_2, r_2^I, r_2^O\}$.

- goal is to solve for a subgame-perfect equilibrium in policy, and fiscal capacity investments – treat them in that order

Policymaking in period s

- Policy objective
  - linearity makes model recursive, so that we can study policy choice at stages 2 and 4 separately from investments
  - whoever holds power, chooses $\left\{(r_s^J), t_s, g_s\right\}$ to maximize

  $$\alpha_s g_s + (1 - t_s)\omega + r_s^I$$

  subject to

  $$t_s \leq \tau_s, \quad r_s^O \geq \sigma r_s^I$$

  and the government budget constraint

- Optimal policy design?
  - can be described by three observations

Observation 1 – public goods

- Equilibrium public-goods provision
  - linear preferences give us a "bang-bang", corner solution
  - the level of public goods provided is

$$G\left(\alpha_s, t_s\right) = \left\{ \begin{array}{ll} R + t_s\omega - m_s & \text{if } \alpha_s \geq 2\left(1-\theta\right) \\ 0 & \text{if } \alpha_s < 2\left(1-\theta\right) \end{array} \right.$$

  - depending on whether public goods is worth more to the incumbent than transfers to her own group (1st row), or not (2nd row)

Observation 2 – taxes

- Equilibrium tax rate

$$t_s = \tau_s$$

- Interpretation
  - always worthwhile to fully utilize all fiscal capacity, since gain of higher tax rate is, at least, $2(1-\theta)\omega$, while loss is ω

Observation 3 — transfers

- Equilibrium transfers
  - follow from
  $$r_s^J = \beta^J \left[R + \tau_s \omega - G\left(\alpha_s, \tau_s\right) - m_s \right]$$
- Interpretation — recall $\beta^I = 2(1 - \theta)$ and $\beta^O = 2\theta$
  - higher value of the opposition's share, θ, reflects more cohesive political institutions
  - as stated earlier, this may reflect more minority protection by constitutional checks and balances, or more representation through PR elections or parliamentary form of government
  - if $\theta = 1/2$, transfers shared equally across the two groups

Indirect utility and value functions

- Plug in optimal policy in utility at s to get

$$
\begin{aligned}
W(\alpha_s, \tau_s, m_s, \beta^J) \;=\; & \alpha_s G\left(\alpha_s, \tau_s\right) + (1 - \tau_s)\omega + \\
& \beta^J[R + \tau_s \omega - G\left(\alpha_s, \tau_s\right) - m_s]
\end{aligned}
$$

  - period s utility of group J

- Define "value functions"

$$
U^I\left(\tau_2\right) = \phi W\left(\alpha_H, \tau_2, 0, \beta^I\right) + (1 - \phi)\, W\left(\alpha_L, \tau_2, 0, \beta^I\right)
$$

- and

$$
U^O\left(\tau_2\right) = \phi W\left(\alpha_H, \tau_2, 0, \beta^O\right) + (1 - \phi)\, W\left(\alpha_L, \tau_2, 0, \beta^O\right)
$$

  - for being incumbent or opposition group in period 2 depending on the single state variable

Pigovian planner

Proposition 2.1

Suppose that the fiscal-capacity investment is made by a Pigouvian planner with Utilitarian preferences. Then:

1. *There is positive investment in fiscal capacity.*
2. *Higher ϕ or ω (or higher α_H and α_L) raise investment in fiscal capacity.*

- Useful benchmark. It is equivalent to a special case of the model with $\theta = 1/2$ and $\gamma = 0$.
- Intuition

$$E(\lambda_2) = \phi\alpha_H + (1 - \phi)\alpha_L \geq 1$$

  - all period 2 spending on public goods, which are more valuable than private consumption (which has value of 1)

Implications for determinants of investment

- Income
  - investment is higher if tax base, ω, is larger
    i.e., higher income boosts investment (cf. motivating data)

- War risk
  - higher risk, ϕ, boosts the expected value of public funds
    expanding fiscal capacity consistent with Hintze-Tilly hypothesis

- Natural resources, aid and tax base
  - define GDP/capita as $y = R + \omega$
  - if y given, larger income share of resources/aid,
    i.e., lower ω, cuts planner's investment in state capacity
    consistent with literature on "rentier states"
  - if R given, planner raises fiscal capacity with higher y

Political equilibria

- What happens when politics determines decisions?
  - depends on two critical conditions:

Cohesiveness: $\alpha_L \geq 2(1 - \theta)$

- more likely to hold when θ close to $\frac{1}{2}$ and /or α_L is large, i.e., the stronger are common-interest vs. redistributive motives.
- condition implies $\lambda_2^l \geq 1$

Stability: $\phi\alpha_H + (1 - \phi)2[(1 - \gamma)(1 - \theta) + \gamma\theta] \geq 1$

- relevant when Cohesiveness fails
- more likely to hold when γ is low (given that θ is low) e.g., holds as $\gamma \to 0$ even if $\phi \to 0$
- condition implies $E(\lambda_2) \geq 1$

Common-interest state

- Equivalence with planning solution

Proposition 2.2

If Cohesiveness holds, then the outcome is exactly as in Proposition 2.1.

- all future tax revenue used for public goods
- the earlier comparative statics hold
- (if α continuous rather than binary, we get undersupply of public goods for $2(1 - \theta) > \alpha_s \geq 1$, and some inefficiency)

Redistributive State

Proposition 2.3

If Cohesiveness fails and Stability holds, the state is redistributive with public revenues used to finance transfers when $\alpha_s = \alpha_L$. Then:

1. *There is investment in fiscal capacity.*

2. *An increase in ϕ or ω raises investments.*

3. *A lower value of γ unambiguously raises investments, whereas an increase in θ raises (cuts) investments if γ is above (below) $\frac{1}{2}$.*

- Intuition
  - expansion of fiscal capacity now also driven by desire for redistribution, when $\alpha_2 = \alpha_L$
  - when θ is low, the higher is political stability (lower γ), the more an incumbent becomes a residual claimant on state resources
  - case study of England in the 18th century
  - with enough stability, an incumbent may invest more than a Pigovian social planner (with the same α_L)

Weak state

Proposition 2.4

If Cohesiveness and Stability fail, the state is weak. There is no incentive to invest in fiscal capacity.

- Intuition
    - expected value of public funds so low that incumbent does not find it worthwhile to invest, as she fears redistribution away from her own group when $\alpha_2 = \alpha_L$
    - weak state materializes when ϕ and θ are low and γ is high; higher γ relevant only when institutions non-cohesive (θ low)
    - if $\delta > 0$, fiscal capacity declines, as lost fiscal capacity not replaced

Welfare economics of three states

- Common-interest state
  - allocation is Pareto optimal
- Redistributive state
  - still have Pareto optimality, although welfare tilted towards an entrenched incumbent group
- Weak state
  - groups would be better off if agreed to boost fiscal capacity and restrict use of transfers – but this is not credible, beyond the institutional commitment entailed in the value of θ
  - this lack of commitment is a major friction in the model

Summarize model predictions

- Higher external war risk – higher ϕ
  - raises fiscal capacity τ in common-interest, redistributive states, but not in weak states; i.e., expect stronger effect when θ is high
  - conditionally, war indeed raises fiscal capacity as Tilly argued
- Higher income – higher ω
  - simple model: raises state capacity within common-interest, redistributive states, but not in weak states, i.e., when θ high (but already in next section/chapter, income endogenous)
- Higher political stability – lower γ
  - should mainly raise investment when θ is low
- More homogeneity – lower ι
  - should raise fiscal capacity

Measuring fiscal capacity – Table 2.1

- Five proxies for *present* fiscal capacity (IMF, World Bank data)
  - ratio of total tax revenue to GDP, at end of 1990s
  - share of income taxes in total revenue, at end of 1990s
  - share of *non*-trade taxes in revenue at end of 1990s
  - difference between income-tax and trade-tax share
  - $1-$ share of informal economy in GDP around 2006

- quite strongly, but not perfectly correlated

Table: Table 2.1 Correlations between fiscal capacity measures

	Tax revenue share in GDP	Income tax share	Non-trade tax share	Income tax bias	Formal sector share
Tax revenue share in GDP	1				
Income tax share	0.818	1			
Non-trade tax share	0.675	0.638	1		
Income tax bias	0.839	0.949	0.848	1	
Formal sector share	0.55	0.561	0.52	0.599	1

Measuring parameters of the model

- Use various proxies for *past* positive determinants of investment
  - common interests: proportion years in external war from 1816 (or independence) until 2000 (Correlates of War data)
  - nonpolarization/homogeneity: 1− degree of ethnic fractionalization (Fearon, 2003 data on (0,1))
  - cohesive institutions: average from 1800 (or independence) to 2000 of constraints on executive ("Xconst" in Polity IV data, 1-7 scale normalized to (0,1)
  - political stability: same period average of non-open and non-competitive recruitment of executive (normalized scores on Polity IV, "Xrcomp" and "Xropen")

Partial correlations
Figures 1.8 - 1.9 Tables 2.2-2.4

- Compute partial correlations
  - regress measure of state capacity on suggested determinants.
  - absolutely no claim of causal interpretation.
- Basic correlations in line with theory
  - for different measures of fiscal as well as legal capacity
- Auxiliary predictions of theory?
  - interaction effects are mixed success, at best
  - current income (2000 GDP/capita from PWT) and past inequality (from Deininger and Squire, 1996) have basically the expected correlations (though proviso about exogenous income)
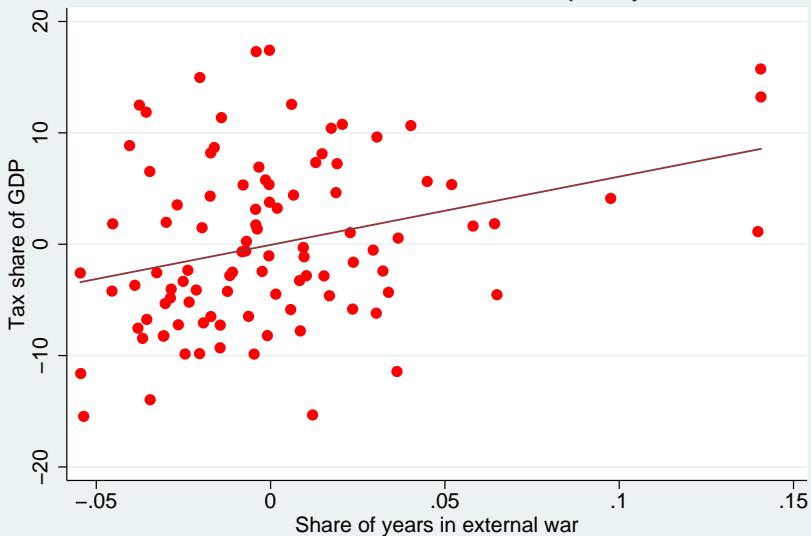
Figure 1.8 Fiscal capacity and external war
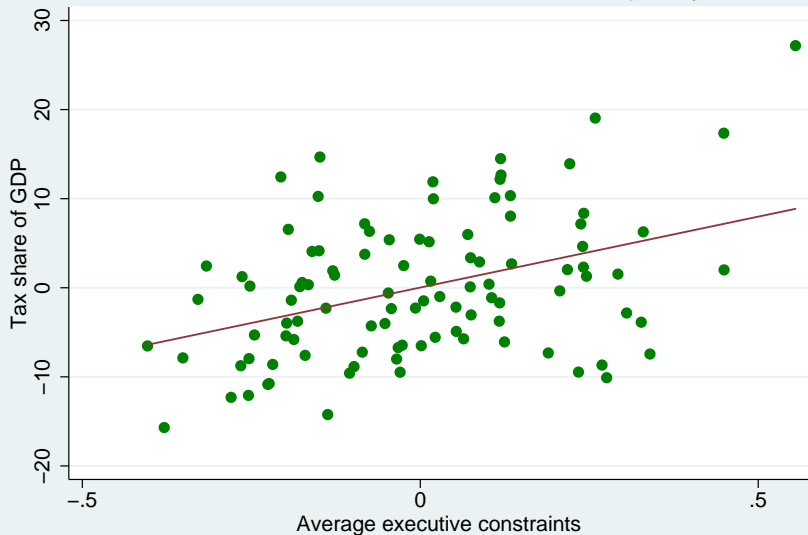
Figure 1.9 Fiscal capacity and executive constraints

	(1) Tax revenue share in GDP	(2) Income tax share	(3) Non-trade tax share	(4) Income tax bias	(5) Formal sector share
Prevalence external war before 2000	1.992 (1.145)*	1.290 (0.956)	2.416 (0.918)***	2.037 (0.962)**	1.482 (0.675)**
Average executive constraints before 2000	2.089 (0.376)***	2.263 (0.335)***	1.115 (0.311)***	1.962 (0.308)***	1.790 (0.358)***
Average nonopen executive recruitment before 2000	1.044 (0.435)**	1.216 (0.455)***	0.531 (0.394)	1.026 (0.395)***	1.512 (0.449)***
Ethnic homogeneity (1- ethnic fractionalization)	1.019 (0.31)***	0.398 (0.277)	0.631 (0.311)**	0.569 (0.275)**	0.647 (0.306)**
Observations	101	101	100	100	105
R-sqaured	0.493	0.455	0.293	0.472	0.308

	(1) Tax revenue share in GDP	(2) Income tax share	(3) Non-trade tax share	(4) Income tax bias	(5) Formal sector share
Prevalence external war before 2000	3.220 (2.917)	1.245 (3.088)	8.075 (2.480)***	4.751 (2.231)**	-2.443 (2.828)
External war × high executive constraints dummy	-1.553 (3.031)	-.092 (3.190)	-6.426 (2.497)**	-3.178 (2.365)	4.593 (2.909)
Average nonopen executive recruitment before 2000	1.809 (1.129)	1.963 (0.686)***	1.081 (0.533)**	1.782 (0.631)***	1.234 (0.565)**
Nonopen executive recruitment × low executive constraints dummy	-1.263 (1.099)	-1.047 (0.771)	-.832 (0.634)	-1.076 (0.693)	1.047 (0.616)*
High executive constraints dummy	0.321 (0.408)	0.044 (0.386)	-.147 (0.407)	-.070 (0.375)	-.671 (0.454)
Average executive constraints before 2000	1.316 (0.625)**	1.941 (0.569)***	1.262 (0.531)**	1.868 (0.523)***	2.965 (0.663)***
Ethnic homogeneity (1- ethnic fractionalization)	0.828 (0.324)**	0.262 (0.294)	0.445 (0.352)	0.393 (0.293)	0.941 (0.335)***
Observations	101	101	100	100	105
R-squared	0.525	0.473	0.333	0.49	0.357

Table: Table 2.4 Fiscal capacity and covariates: additional controls

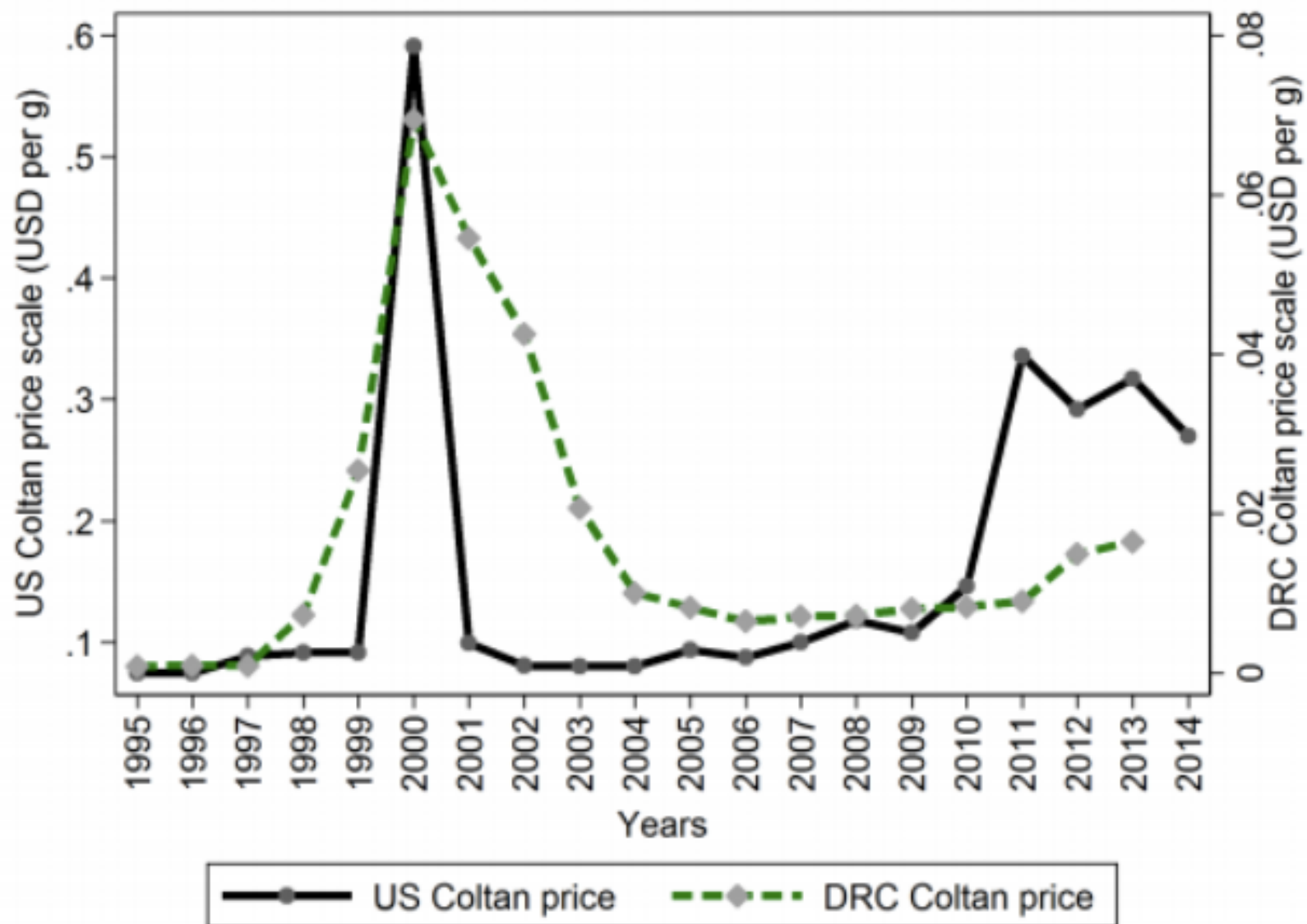|	(1) Tax revenue share in GDP	(2) Income tax share	(3) Formal sector share	(4) Tax revenue share in GDP	(5) Income tax share	(6) Formal sector share
Prevalence external war before 2000	1.605 (1.087)	0.92 (0.871)	0.775 (0.615)	0.858 (1.361)	0.573 (0.867)	1.026 (0.578)*
Average executive constraints before 2000	1.574 (0.416)***	1.715 (0.382)***	0.863 (0.39)**	1.139 (0.45)**	1.185 (0.397)***	1.109 (0.415)***
Average nonopen executive recruitment before 2000	0.663 (0.41)	0.83 (0.413)**	0.99 (0.425)**	0.862 (0.476)*	0.418 (0.395)	1.244 (0.466)***
Ethnic homogeneity (1- ethnic fractionalization)	0.702 (0.371)*	0.059 (0.339)	-.132 (0.371)	0.406 (0.388)	-.003 (0.321)	-.084 (0.394)
Log(GDP per capita) in 2000	0.204 (0.108)*	0.222 (0.101)**	0.442 (0.106)***	0.346 (0.117)***	0.349 (0.084)***	0.433 (0.116)***
Low value of inequality				0.528 (0.304)*	0.351 (0.152)**	-.165 (0.179)
Observations	100	100	105	80	80	87
R-squared	0.52	0.487	0.408	0.579	0.565	0.489

Stationary Bandits

- Sánchez de la Sierra is inspired by the ideas of Mancur Olson about how the origin of state formation is when a warlord, or 'bandit', decides to become stationary - control a permanent territory. He is more likely to do this when the territory becomes more valuable.
- He tests this idea with a remarkable piece of data collection in the Eastern Democratic Republic of the Congo.
- Collected data at 650 locations between 1995 and 2013 using retrospective surveys. This region has little central state presence and instead is victimized by warlords and various rebel groups.
- In 2005 the price of coltan rocketed from $90 per kilo to $590 per kilo, before collapsing. Soon after the price of gold increased.
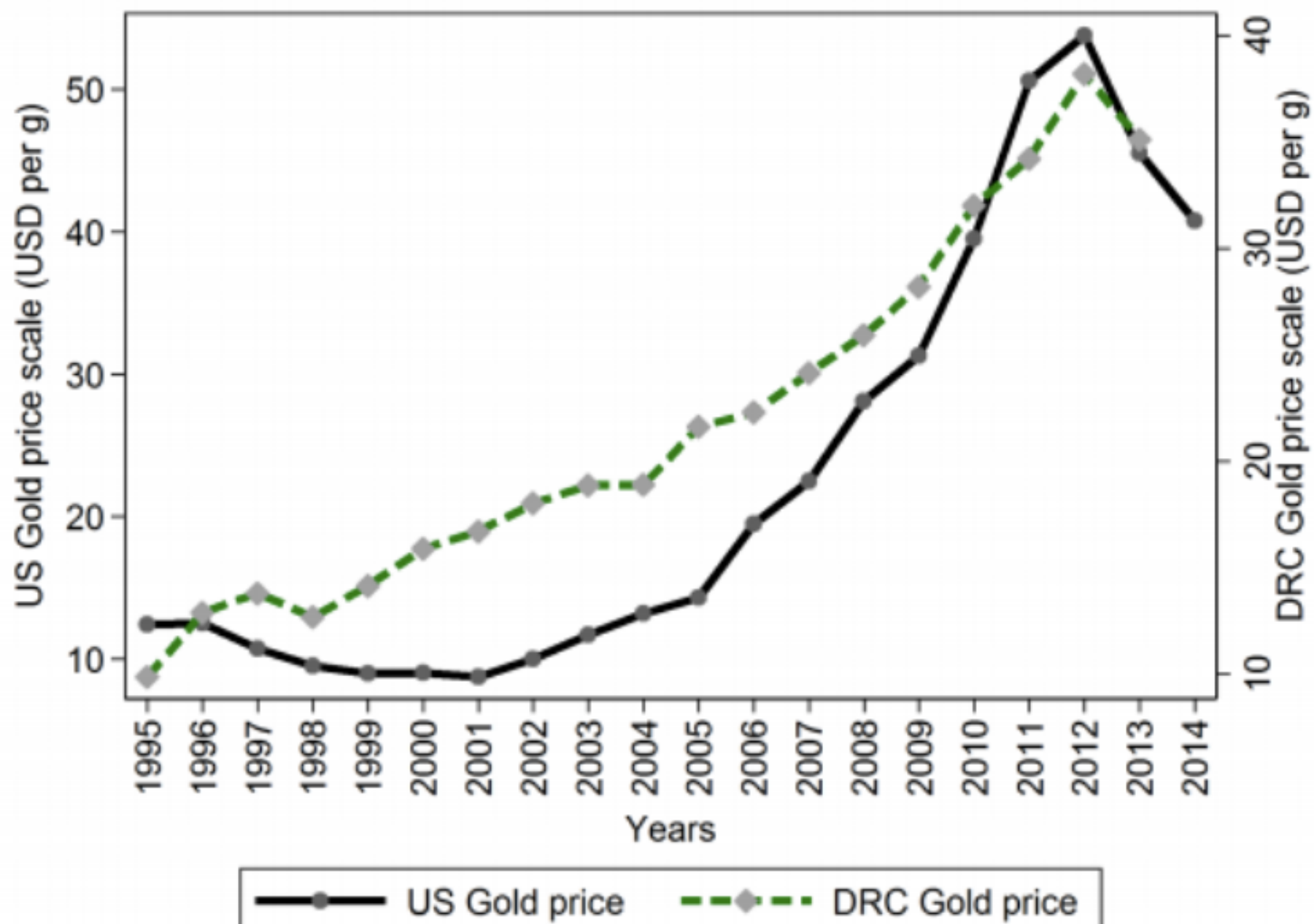
Hypotheses about State Formation

- The basic idea is that the boom in coltan prices gave bandits an incentive to become more 'state-like', in particular control territory around coltan mines.

- Gold prices have similar incentives but gold is harder to tax, so it is better to control the villages where gold income gets spent (rather than the mines) and develop fiscal system to tax away the rents.

- The paper is very rich, looking at the 'extensive margin' of state formation (controlling territory) and the intensive margin (one you have controlled territory how bureaucratic do you become.
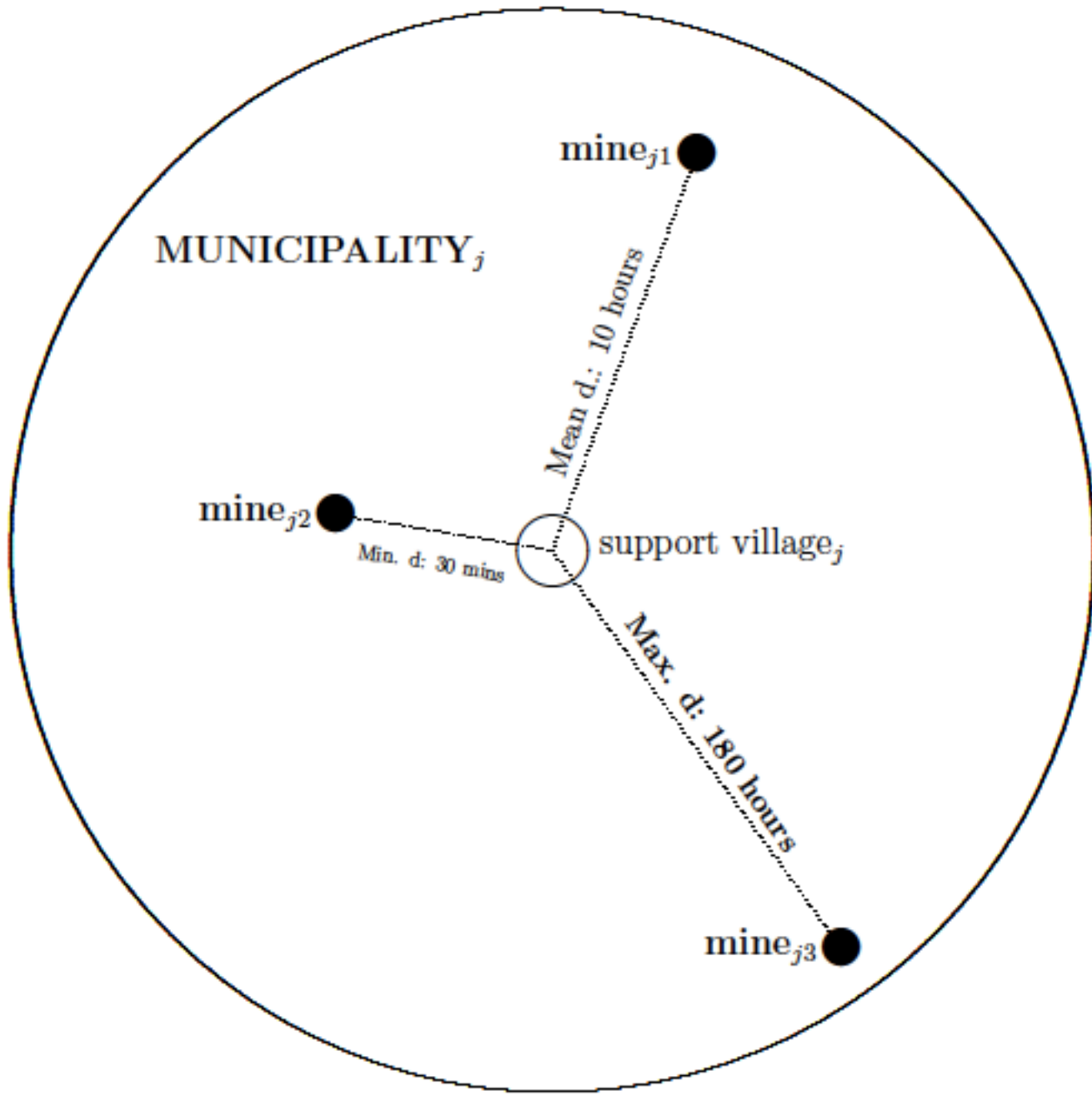
Figure 1: Prices of coltan and gold in the US and the DRC

PANEL A: Price of coltan

PANEL B: Price of gold

Legend: US Gold price — DRC Gold price

MUNICIPALITY$_j$

mine$_{j1}$

Mean d.: 10 hours

mine$_{j2}$

Min. d.: 30 mins

support village$_j$

Max. d.: 180 hours

mine$_{j3}$

Tshopo

North Kivu

Lac Edouard

Rwanda

Lac Kivu

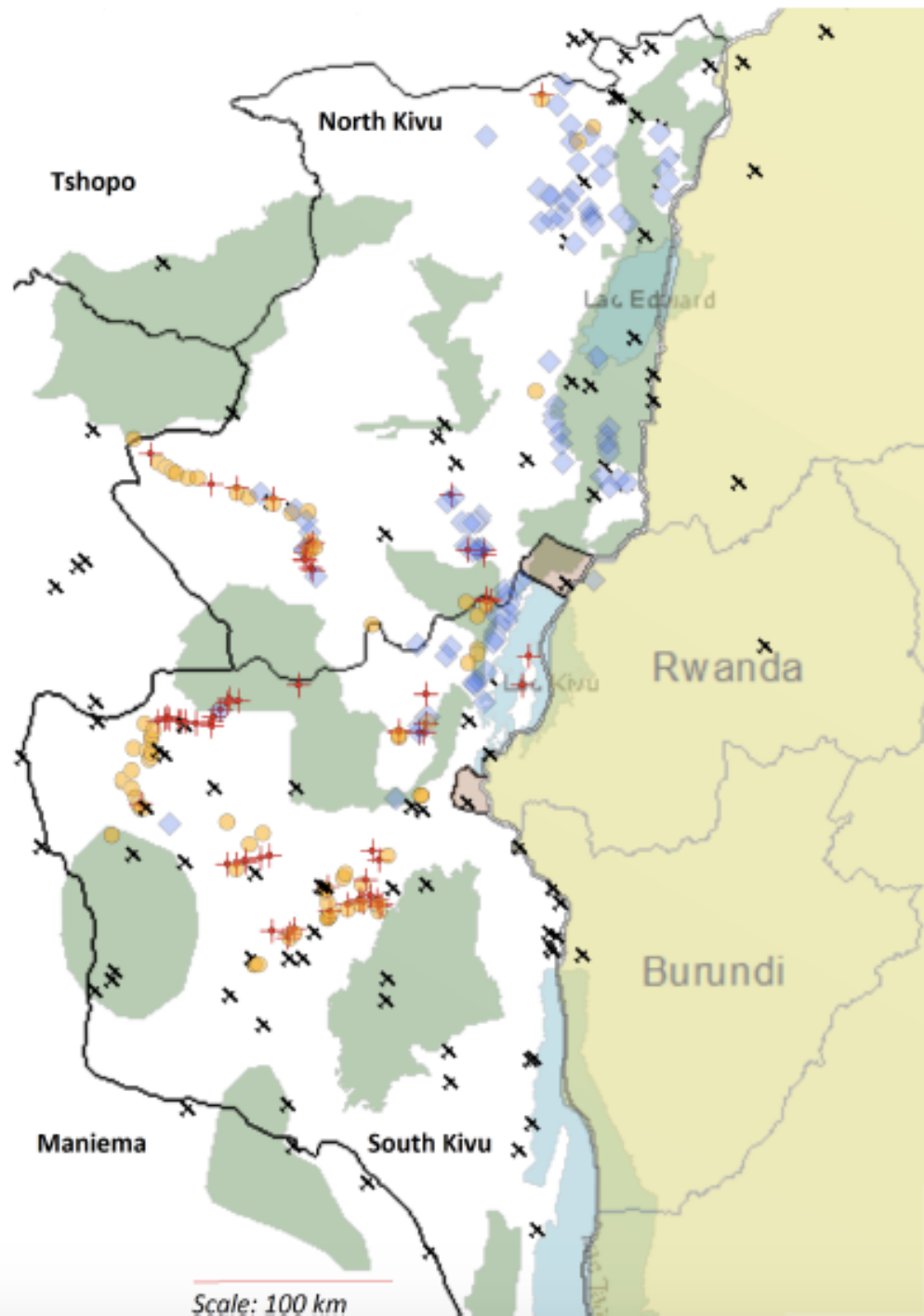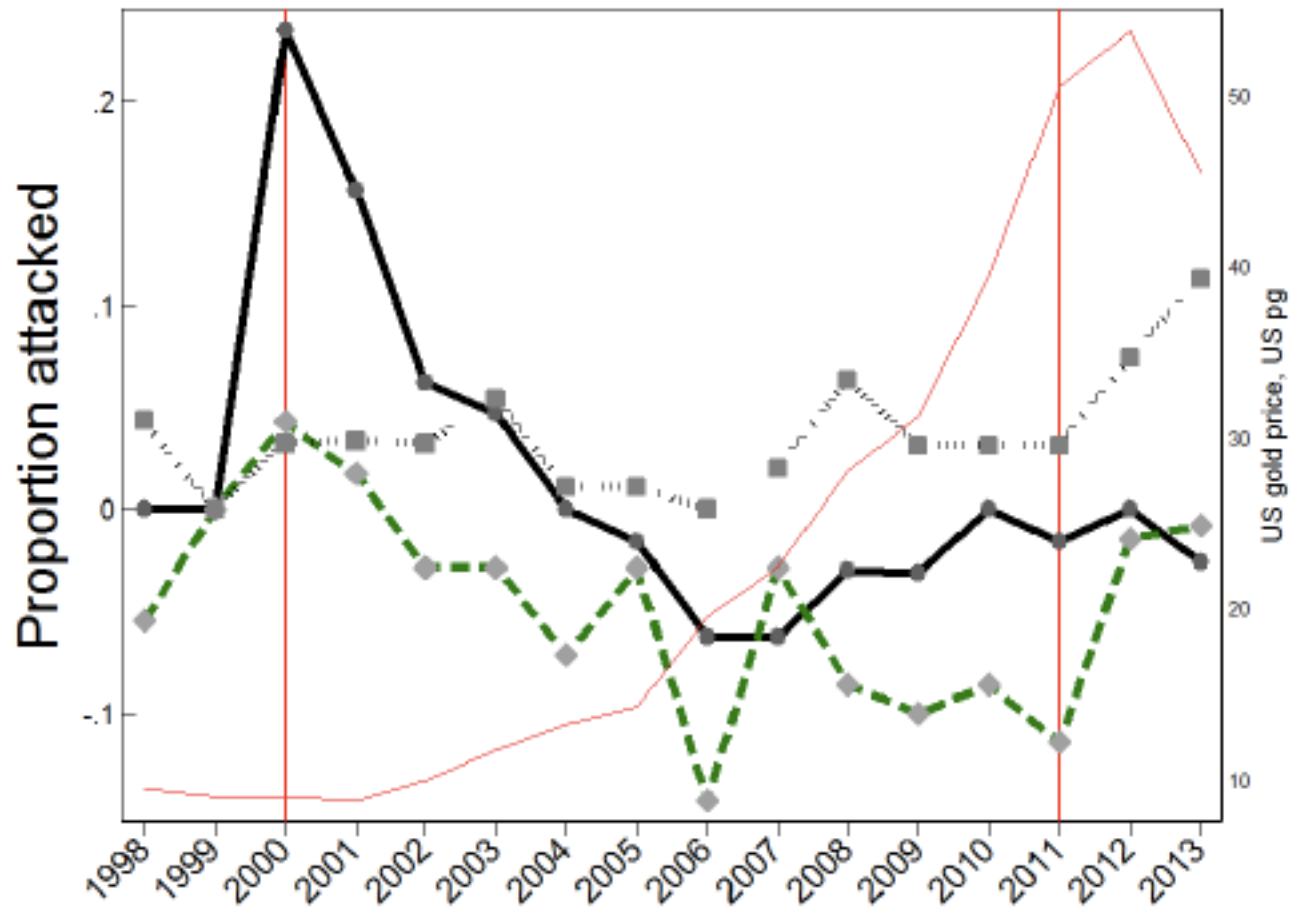Burundi

Maniema

South Kivu

Scale: 100 km

Figure 4: Bandits' location — Attacks

PANEL A: mines (n=411)
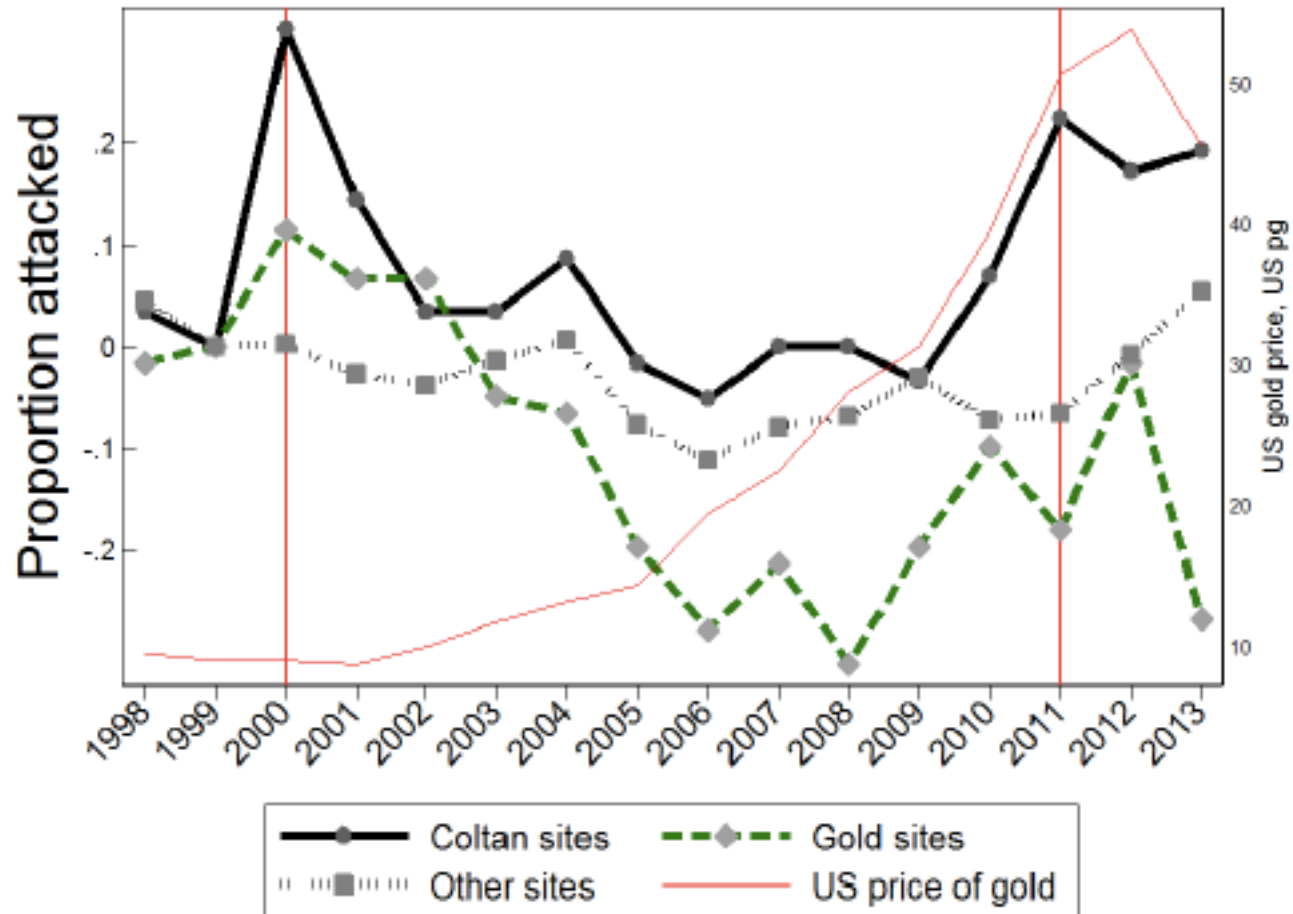
PANEL B: support village (n=239)

Table 1: Extensive margin of state formation

PANEL A: Mines (n=411)

VARIABLES	(1) Output Taxation	(2) Labor Taxation	(3) Stationary bandit	(4) Security Service	(5) Extensive Index
Coltan(i) X pc(t)	0.10***	0.04**	0.08***	0.06***	0.23***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.05)
Gold(i) X pg(t)	-0.05***	0.04**	0.01	0.01	0.00
	(0.02)	(0.02)	(0.02)	(0.02)	(0.05)
Constant	0.45***	0.27**	-0.10	-0.17	-0.62*
	(0.12)	(0.12)	(0.17)	(0.15)	(0.36)
Observations	3,655	3,742	3,702	3,791	3,517
R-squared	0.76	0.75	0.65	0.65	0.68

VARIABLES	(1) Village Taxation	(2) Stationary bandit	(3) Security Service	(4) Extensive Index
PANEL B: Support village (n=239)				
Coltan(i) X pc(t)	0.01	0.03	-0.00	0.03
	(0.03)	(0.03)	(0.03)	(0.05)
Gold(i) X pg(t)	0.07***	0.08***	0.09***	0.21***
	(0.03)	(0.03)	(0.03)	(0.05)
Constant	-0.19	0.01	0.07	-1.34***
	(0.24)	(0.26)	(0.24)	(0.50)
Observations	3,818	3,706	3,706	3,706
R-squared	0.54	0.49	0.43	0.54

Table 5: Welfare implications of stationary bandits — decomposition of the extensive margin effect

	Output and labor supplies			Consumption and savings		Public goods		Revealed preference: Migration	
	(1) Mine surplus dummy	(2) Household in mining	(3) Household in agriculture	(4) Household savings index	(5) Village # weddings	(6) Mine Security service	(7) Village curfew	(8) Village # immigrants	(9) Village # emigrants
VARIABLES									
C(i) X pc(t)	0.01	0.02**	0.01	0.03	3.41***	-0.11***	-0.20**	4.05	4.27
	(0.02)	(0.01)	(0.01)	(0.03)	(0.60)	(0.02)	(0.08)	(17.23)	(18.97)
C(i) X pc(t) X SB(it)	0.02***	0.01**	-0.01***	0.01	-0.22	0.13***	-0.07***	3.57	0.77
	(0.01)	(0.00)	(0.00)	(0.01)	(0.17)	(0.01)	(0.02)	(4.57)	(5.04)
C(i) X pc(t) X SB(it) X Militia(it)	0.02***	0.01***	-0.00	0.02***	0.76***	-0.00	0.12***	28.60***	0.24
	(0.01)	(0.00)	(0.00)	(0.01)	(0.16)	(0.01)	(0.03)	(4.53)	(4.98)
Constant	0.55***	0.02	0.40***	-0.10	1.74	0.18***	0.48***	7.68	8.93
	(0.03)	(0.02)	(0.02)	(0.06)	(1.12)	(0.03)	(0.06)	(31.05)	(33.54)
Observations	3,356	1,960	1,960	2,090	3,014	3,484	947	3,039	3,089
R-squared	0.71	0.63	0.78	0.14	0.54	0.71	0.49	0.22	0.17

Thinking about the demand side

- In Besley and Persson state elites decide on fiscal capacity. In Sánchez de al Sierra warlords decide whether to control territory.
- But what about citizens? Wouldn't an interesting source of variation be demands from citizens?
- Recent work by Jon Weigel "The taxman cometh: A virtuous cycle of compliance and state legitimacy in the D.R. Congo" (https://jonathanweigel.com/jwresearch/compliance) partially gets at this issue.

- Weigel organized a randomized property tax collection in Kananga in the DRC.
- He randomly selected half of the cities' 431 neighborhoods to receive a property tax campaign whereby a group of three tax collectors went house by house, registering property and asking for the $2 payment.
- Prior to this campaign tax payment was basically zero except for a few businesses in the center of the city. About 10% of people treated paid.
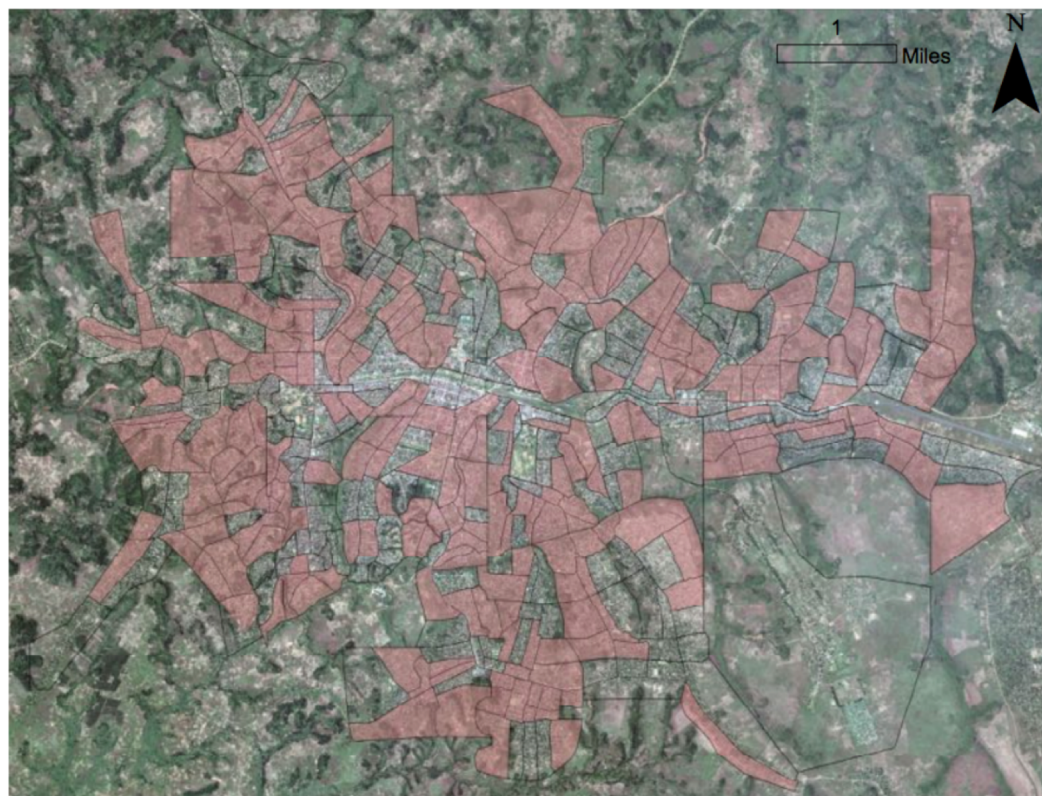
9.2 The 2016 property tax campaign

Figure 17: *Defining neighborhoods (the unit of randomization) in Kananga. Treated neighborhoods are shaded red.*

Figure 18: *Example receipts from the 2016 property tax campaign in Kananga.*

The Results

- Weigel shows that wealth and education help to predict payment, but interestingly so does your approval of the government. Is this capturing 'legitimacy'?

- The perceptions of the threat of punishment does not predict payment.

- Then he shows that treated people actually improve their opinions about the government and that this is driven by actually seeing the new technology. People who saw this even improved their beliefs about the likelihood that tax revenues would be spent on public goods.

- There are a lot of questions one could ask about these findings but it is a start at looking at a more "bottom up" perspective on the state which in many ways is more consistent with the public finance approach.

Table 2: Effect of the tax program on compliance

	Paid property tax		
	(1)	(2)	(3)
Program	0.102***	0.082***	0.081***
	(0.007)	(0.008)	(0.009)
Progam X Baseline wealth (high)		0.042***	
		(0.013)	
Baseline wealth (high)		-0.007	
		(0.007)	
Progam X Baseline education (high)			0.044***
			(0.015)
Baseline education (high)			-0.011
			(0.008)
Stratum FE	Yes	Yes	Yes
R^2	0.054	0.057	0.057
Observations	27596	27596	27596
Clusters	360	360	360
Control Mean	0.001	0.001	0.001

Standard errors clustered by polygon. $^*p < 0.1,^{**}p < 0.05,^{***}p < 0.01$.

Table 13: Heterogeneous effects by baseline beliefs about the state

	Paid	Paid	Paid	Paid	Paid
Program	0.115***	0.091***	0.083***	0.111***	0.103***
	(0.018)	(0.023)	(0.018)	(0.022)	(0.021)
Punishment probability (high) X Program		0.057			
		(0.037)			
Punishment probability (high)		-0.005			
		(0.011)			
Government approval (high) X Program			0.113***		
			(0.043)		
Government approval (high)			-0.014		
			(0.013)		
Government trust (high) X Program				0.009	
				(0.034)	
Government trust (high)				-0.001	
				(0.011)	
Spending expectations (high) X Program					0.031
					(0.039)
Spending expectations (high)					-0.005
					(0.010)
Covariates	Yes	Yes	Yes	Yes	Yes
Stratum FE	Yes	Yes	Yes	Yes	Yes
R^2	0.101	0.107	0.120	0.101	0.103
Observations	642	642	642	642	642
Clusters	312	312	312	312	312
OutcomeMean	0.000	0.000	0.000	0.000	0.000

Standard errors clustered by polygon. *$p < 0.1$,** $p < 0.05$,*** $p < 0.01$.

Data: baseline survey matched with administrative data on tax compliance.

Table 16: Effects of the tax campaign on beliefs about the government

	Punishment probability (1)	Government approval (2)	Government trust (3)
Program	0.029	0.087**	0.040
	(0.041)	(0.040)	(0.049)
Covariates	Yes	Yes	Yes
Stratum FE	Yes	Yes	Yes
R^2	0.037	0.039	0.073
Observations	3513	3414	3468
Clusters	360	360	360
Outcome Mean	-.0089	-.059	-.045

Standard errors clustered by polygon.

Table 18: Effects of technology of collector and government legitimacy

	Punishment probability (1)	Government approval (2)	Government trust (3)
Saw collector with technologies	0.052 (0.052)	0.205*** (0.047)	0.100* (0.056)
Covariates	Yes	Yes	Yes
Stratum FE	Yes	Yes	Yes
R^2	0.086	0.063	0.099
Observations	1376	1298	1309
Clusters	211	210	210
Outcome Mean	.006	.041	.031

Standard errors clustered by polygon. Treated neighborhoods only.

Table 19: Effects of technology of collector and government legitimacy

	Amount of $1000 collected in campaign submitted to state	Amount of $1000 received by state spent on public goods	Net amount of $1000 collected in campaign spent on public goods
	(1)	(2)	(3)
Saw collector with	84.341***	37.041*	73.515***
technologies	(17.423)	(21.216)	(21.217)
Covariates	Yes	Yes	Yes
Stratum FE	Yes	Yes	Yes
R^2	0.080	0.072	0.074
Observations	1282	1303	1280
Clusters	209	209	209
Outcome Mean	.6	.61	.6

Standard errors clustered by polygon. Treated neighborhoods only.

Data: Endline survey matched with administrative data on compliance.

- Next lecture....