Pillars of Prosperity
State Capacity in Economic Development

2010 Yrjö Jahnsson Lectures

Lecture 3, June 15

Timothy Besley and Torsten Persson, LSE, IIES and CIFAR

The story so far

Determinants of state capacity

   we have developed a framwork to analyze investments in the
      extractive and productive parts of the state
      fiscal and *legal capacity*

Up to now, politics has been kept in the background

   the nature of political institutions (*cohesiveness*), and the
      rate of political turnover (*instability*)
   still these parameters crucially shape the motives
      for building the state

D. Investments in political violence

Motivation – Conflict and state building

Risk of external violence

    by earlier argument, such conflict can promote state building

    boosts common interest vs. redistributive (group) interest

How about internal political violence – civil war, repression?

    not common interests – rather, extreme redistributive struggle

    may entail radically different incentives to invest in state

    we want to (partly) endogenize political instability

      i.e., γ becomes only a proximate determinant of state capacity

    of course, better understanding of political violence is also
      important in and of itself

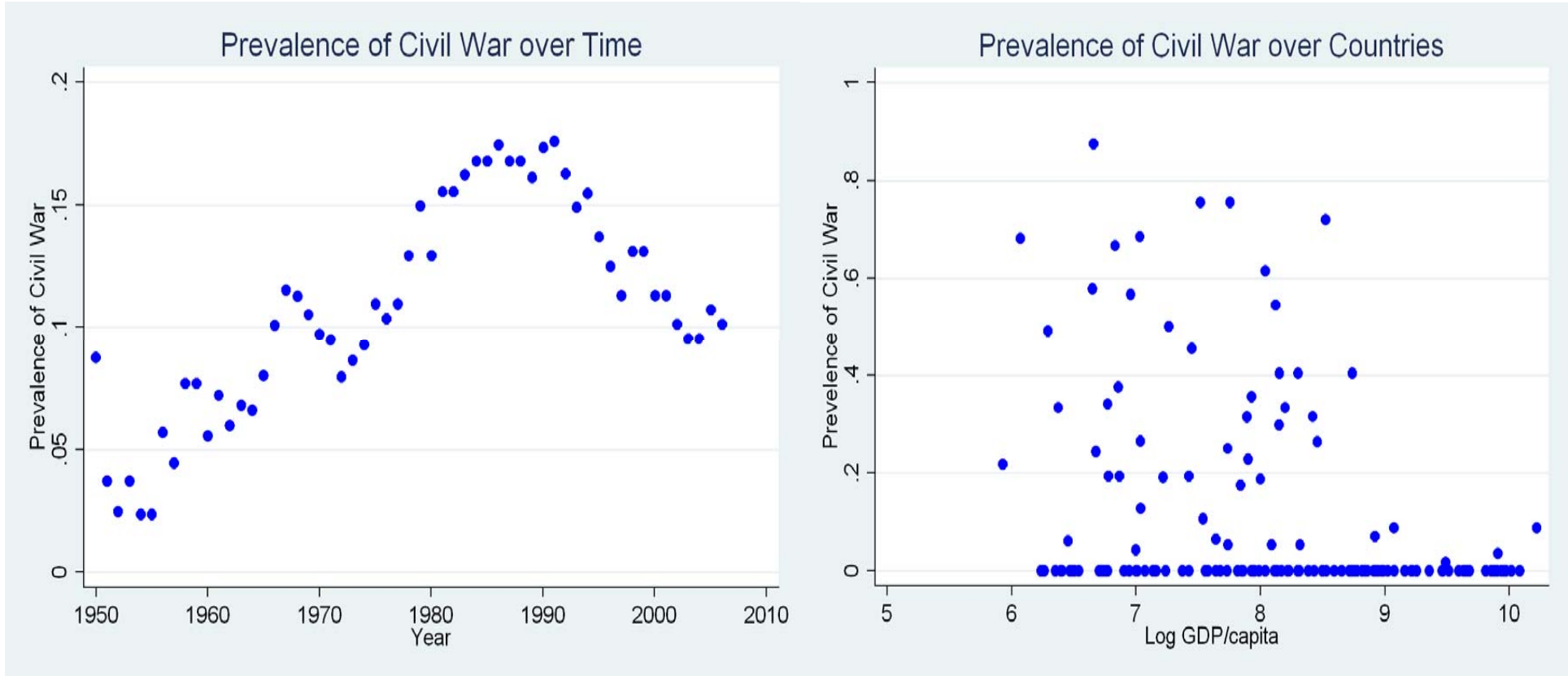# Facts about civil war – Figure 10

Unfortunately, this is a common phenomenon

civil war has plagued many nations in postwar period
prevalence over all nations and years since 1950 above 10%,
cumulated death toll exceeds 15 million

Two big facts

prevalence varies greatly over years,
peaks above 15% in early 1990s

prevalence varies greatly over countries,
civil war and poverty (low GDP/capita) strongly correlated

Figure 10 The prevalence of civil war

# Facts about government repression – Figure 5

One-sided political violence

> many governments use violent means to raise their probability
> of staying in power without civil war breaking out

> such repression shows up in violations of human rights:
> executions, political murders, imprisonments, brutality, ...

Prevalence?

> by strict measure, purges, about 8% of country-years since 1950

> by wider measure, human-rights violations, about 32%, 1976-2006

Relation to civil war facts

> purges have opposite trend to civil wars until early 1990s
> peaks among higher-income countries than civil war

> hint of substitutability between the two
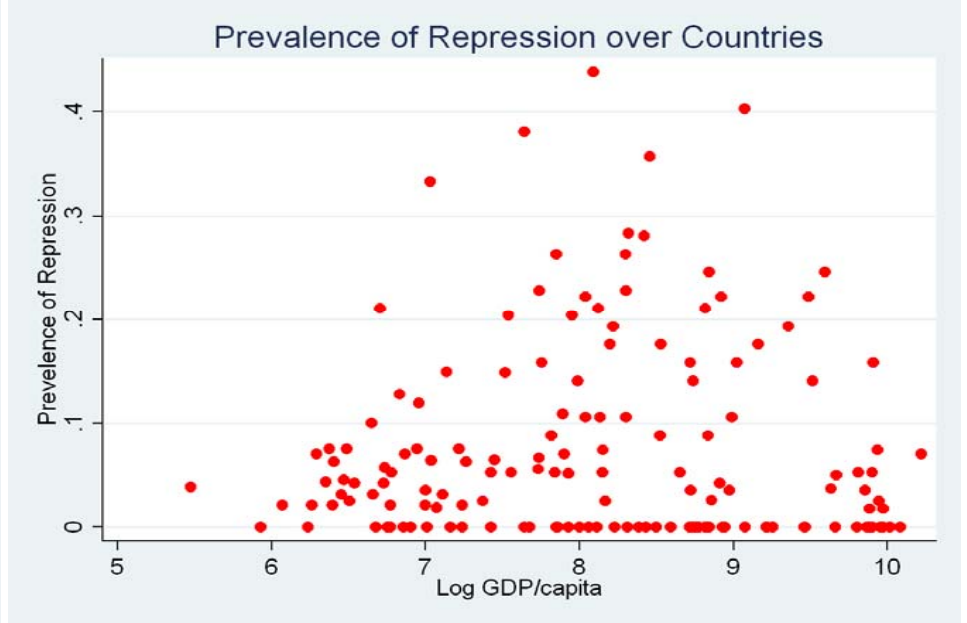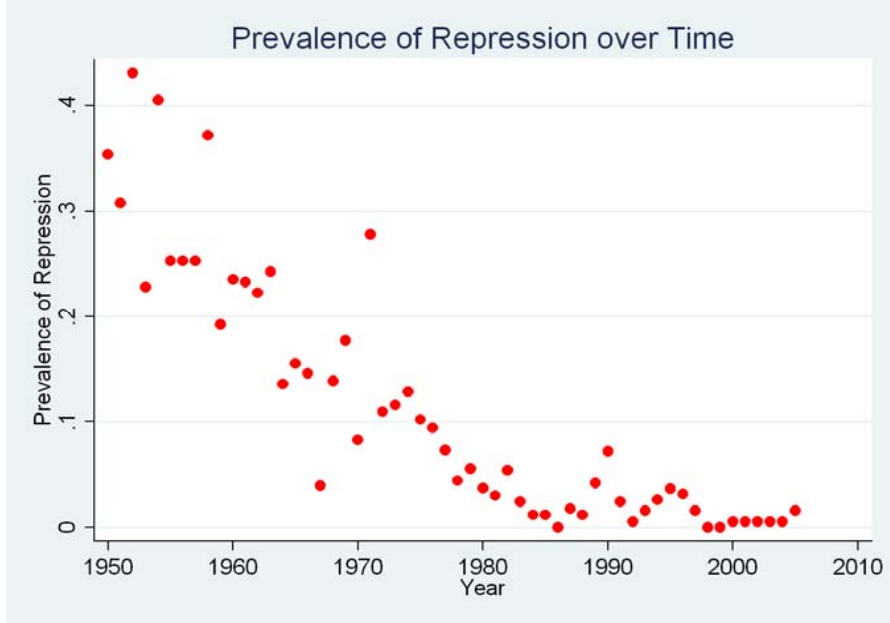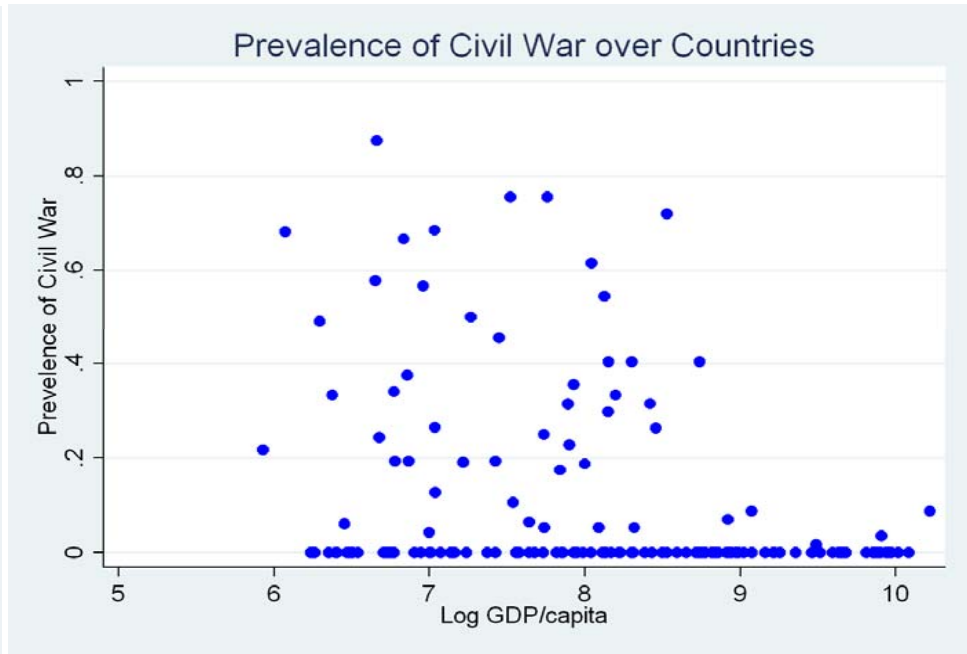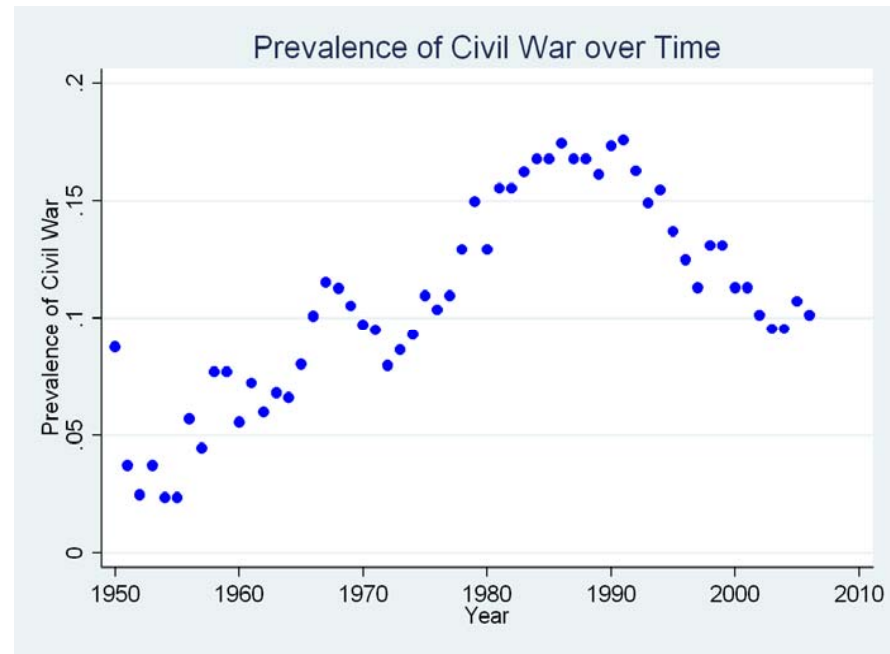
Figure 5   Prevalence of civil war and repression

Existing research

Theory of civil conflict

    little role for institutions, including state capacities

Empirical work on civil war and repression

    weak connections to theory, so difficult to interpret results

    takes income as given, though violence and income likely have
        similar determinants – e.g., parallel 'resource curse' literatures

    separate literatures on civil war and repression, though both
        reflect that institutions fail to resolve conflicts of interest

Analytical approach to address these issues

    build framework to analyze political violence, then
        embed in earlier framework for state capacity

Need for theoretical work

Political violence, income, and state capacity?

>   political violence clusters with income – cf. Fig 5
>   as well as state capacity – recall Fig 2
>
>   two-way relations amongst these outcomes
>
>   same economic and political determinants may cause all three

Complex relations in the data calls for explicit theory

>   existing theory does not take institutions well into account
>
>   need explicit theory to build bridge to empirical work
>
>   explicit theory may also help us understand relation between
>   civil war and repression – and their relation to state capacity

Analytical approach

First step

    study a simple model of political violence, building on model in **C,** but treat legal and fiscal capacity decisions as given

    confront conflict model's implications with data

Second step

    reintroduce state-capacity investments in new framework

    return briefly to the data

Agenda for part D

1. **A model of political violence**
2. From theory to evidence
3. Data and empirical results
4. Investments in state capacity revisited
5. Summary of argument so far

1. A model of political violence

Modifications of earlier setup

    start out from exactly the same model of policy and
      state-capacity investments as in part **C**

    treat state capacity at $s = 1, 2$ as given

    but replace earlier exogenous transition of power by
      outcome of (potential) conflict, triggered by investment in violence

    also allow for stochastic resource rents (aid) R_s and
      wages $\omega(\pi_s)$, to more naturally approach the data

Violence and transitions of power

Incumbent and opposition can simultaneously invest in violence

period 1 opposition group O_1 can mount insurgency with
army $L^O \leq \overline{L}^O$, paid within group, at marginal cost of funds ν

incumbent group I_1 can invest in army $L^I \leq \overline{L}^I$,
paid out of the public purse, at marginal cost λ_1

no conscription: each soldier just paid the period-1
wage $\omega(\pi_1)$

Probability of opposition takeover – conflict technology

$\gamma(L^O, L^I; \boldsymbol{\xi})$ increasing in L^O, decreasing in L^I

winner becomes next period's incumbent, $I_2 \in \{A, B\}$
loser becomes new opposition, $O_2 \in \{A, B\}$

Peaceful transitions

if nobody arms, transition probability is $\gamma(0, 0; \boldsymbol{\xi})$

Timing in (partial) model of violence

1. Start with state capacity τ_1, π_1 and incumbent group I_1, nature determines $\alpha_1, R_1,$ and ω_1 (for given π_1)

2. I_1 chooses a set of first-period policies $\{(p_1^J), (r_1^J), t_1, g_1\}$ and investments in period-2 state capacities τ_2 and π_2.

3. At the same time as 2, I_1 and O_1 simultaneously invest in violence L^I and L^O.

4. I_1 remains in power with probability $1 - \gamma(L^O, L^I, \boldsymbol{\xi})$ nature determines $\alpha_2, R_2,$ and ω_2 (for given π_2)

5. New incumbent I_2 chooses current policy $\{(p_2^J), (r_2^J), t_2, g_2\}$

   we will study subgame perfect equilibrium in investments in violence and policy at stages 3-5

   in Section 4 below, we will study state-capacity investments τ_2 and π_2 at stage 2

Stage 5 – New incumbent I_2 policymaker

Period 2 budget and policy instruments

    exactly as before with budget constraint

$$R_2 + \frac{t[\omega(p_2^I) + \omega(p_2^O)]}{2} = g_2 + \frac{r_2^I + r_2^O}{2}$$

Equilibrium policies

    exactly same outcome as in part **C**

Indirect utility

    in earlier notation, for group $J = I_2, O_2$ at stage 5

$$U^J = \alpha_2 G(\alpha_2, \tau_2) + (1 - \tau_2)\omega(\pi_2) + \beta^J[R_2 + \tau_2\omega(\pi_2) - G(\alpha_2, \tau_2)]$$

Stage 3 – Preliminaries

Prospective tradeoff

   incumbent and opposition decide how much to invest: weigh
cost of investment against higher probability of policy control

Preliminaries to study this tradeoff

   define wage-adjusted expected redistributive budget

$$Z = \frac{E(R_2) + \tau_2 E(\omega(\pi_2)) - E(G(\alpha_2, \tau_2))}{\omega(\pi_1)}$$

   impose following restrictions on conflict technology

Assumption 1 *For all $L^J \in \left[0, \overline{L}^J\right]$, we have:*

  a. if $\gamma \in (0,1)$, $\gamma_O > 0, \gamma_I < 0, \gamma_{OO} < 0, \gamma_{II} > 0$,

  b. $\frac{-\gamma_I(0,0;\boldsymbol{\xi})}{\gamma_O(0,0;\boldsymbol{\xi})} \geq \frac{\alpha_H}{\nu}$, *and*

  c. $\frac{\gamma_I \gamma_{OO}}{\gamma_O} \geq \gamma_{IO} \geq \frac{\gamma_O \gamma_{II}}{\gamma_I}$

Stage 3 – Objective functions

Expected utility when investing in violence

using the definition of Z, we can write the group objectives

$$
\begin{aligned}
E[U^I] - \lambda_1 \omega(\pi_1) L^I = {} & E(\omega(\pi_2))(1 - \tau_2) + E(\alpha_2 G(\alpha_2, \tau_2)) + \\
& 2[(1 - \theta) - \gamma(L^O, L^I; \boldsymbol{\xi})(1 - 2\theta)]\omega(\pi_1)Z \\
& -\lambda_1 \omega(\pi_1) L^I
\end{aligned}
$$

$$
\begin{aligned}
E[U^O] - \nu \omega(\pi_1) L^O = {} & E(\omega(\pi_2))(1 - \tau_2) + E(\alpha_2 G(\alpha_2, \tau_2)) + \\
& 2[\theta + \gamma(L^O, L^I; \boldsymbol{\xi})(1 - 2\theta)]\omega(\pi_1)Z \\
& -\nu \omega(\pi_1) L^O
\end{aligned}
$$

3rd terms: incumbent and opposition's expected transfers
  reflect institutional constraint and probability of change in power
4th terms: L^I from public purse, L^O from group income

Peaceful resolution of conflict game

Suppose $\alpha_2 = \alpha_H > 2 \geq 2(1 - \theta)$

  then, $G(\alpha_H, \tau_2) = R_2 + \tau_2 \omega(\pi_2)$,
    i.e., no transfers will be paid at stage 4

Suppose $\alpha_2 = \alpha_L \geq 2(1 - \theta)$

  then, Cohesiveness holds, and we have a common-interest state
    i.e., any residual revenue is again spent on public goods

  in both cases expected payoff for J is decreasing in L^J,
    whichever group gets into power, so $L^J = 0, J = I, O$

Proposition 5 *If $\alpha_L \geq 2(1 - \theta)$ or if $\phi \to 1$,*
  no group invests in violence

  there is always peace in common-interest states,
    or in states with high risk of external violence.

Characterize solution to conflict subgame

Proposition 6 *If Assumption 1 holds and $\alpha_L < 2(1-\theta)$, or $\phi < 1$, there are two thresholds $Z^I(\theta, \phi; \boldsymbol{\xi})$ and $Z^O(\theta, \phi; \boldsymbol{\xi})$ with $Z^I_\theta, Z^O_\theta > 0$ and*

$$Z^I(\theta, \phi; \boldsymbol{\xi}) = -\frac{\lambda_1}{\gamma_I(0, 0; \boldsymbol{\xi})(1-\phi)2(1-2\theta)}$$

$$< \quad Z^O(\theta, \phi; \boldsymbol{\xi}) = \frac{\nu}{\gamma_O(0, 0; \boldsymbol{\xi})(1-\phi)2(1-2\theta)}$$

such that:

1. *if $Z \leq Z^I$, there is peace with $\widehat{L}^O = \widehat{L}^I = 0$*

2. *if $Z \in \left(Z^I, Z^O\right)$, there is repression with $\widehat{L}^I > \widehat{L}^O = 0$*

3. *if $Z \geq Z^O$, there is civil conflict with $\widehat{L}^I, \widehat{L}^O > 0$.*

Moreover, $\widehat{L}^O$ and $\widehat{L}^I$, whenever positive, increase in Z

Anatomy of three regimes

1. Peace: $Z < Z^I$

   wages ω_1 high, non-tax income $E(R_2)$ low, opposition's share θ high; too expensive to fight, or not enough to fight over

2. Repression: $Z \in \left[Z^I, Z^O \right]$

   ω_1 lower/$E(R_2)$ higher/θ lower, so more redistribution at stake, and incumbent's arming threshold lower, by Assumption 1b.

3. Civil war: $Z > Z^O$

   even more at stake, so both parties invest in violence, and nobody stops fighting as Z goes up, by Assumption 1c

Parallels with state-capacity determinants

Common-interest states

    never have violence; recall they always invest in state capacity

Redistributive states

    sometimes have violence; variables that trigger more violence
        also generate low state capacity

    high resource-rent or cash-aid share, high $E(R_2)$ gives high Z

    low cohesiveness of political institutions, low θ gives low Z^I, Z^O

    low demand for public goods, low ϕ gives low Z^I, Z^O

    low income (given τ and π), low ω_1 gives high Z

Weak states

    often have violence; recall that weak states – in countries
        with low θ, and low ϕ – do not invest in the state at all

Lecture 2

Political stability

Common vs. redistributive interests
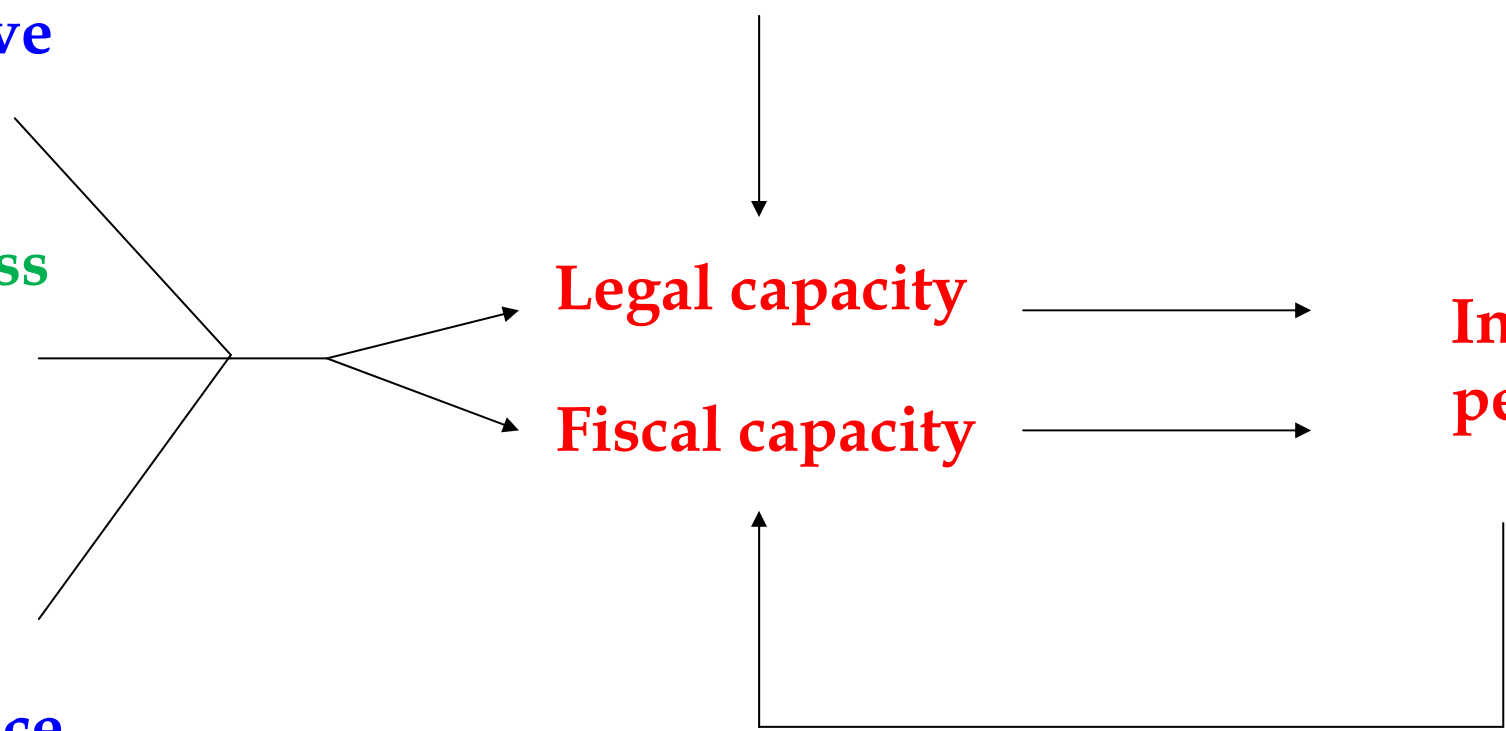
Cohesiveness of political institutions

Resource or (cash) aid independence

Legal capacity

Fiscal capacity

Income per capita
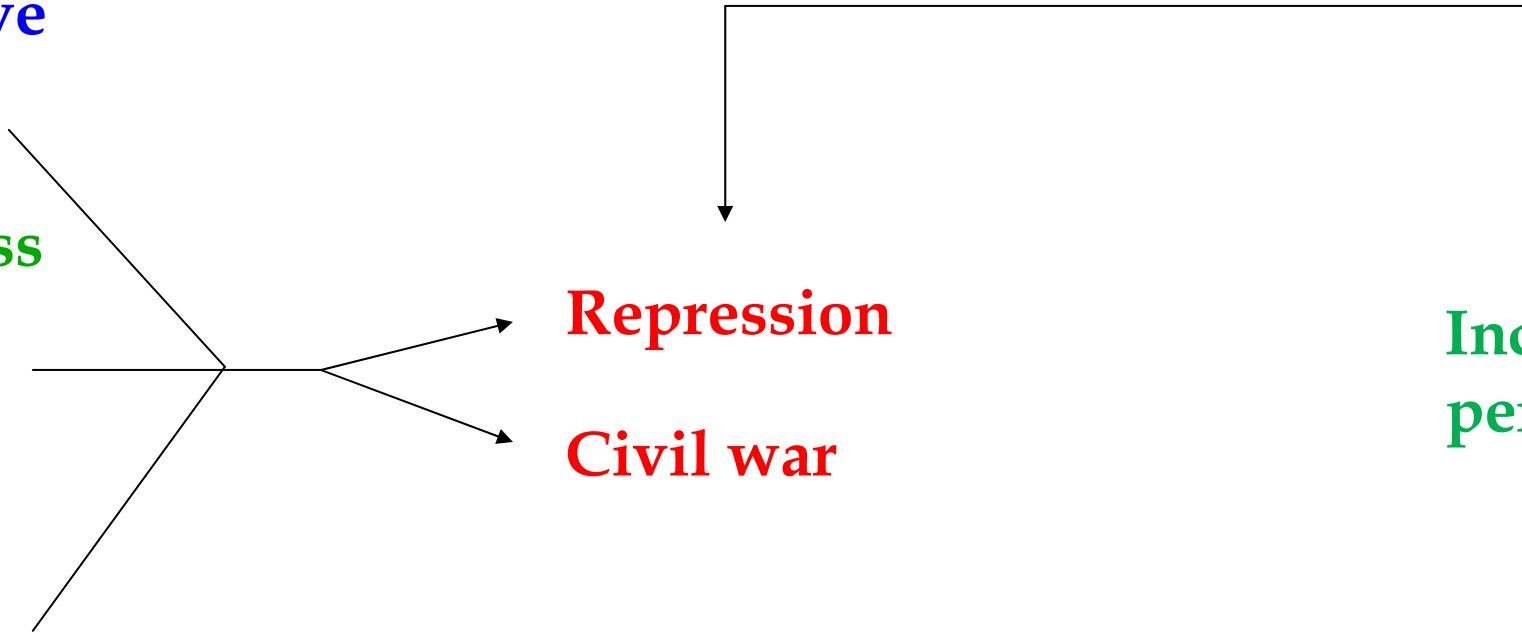
Lecture 3

Common vs. redistributive interests

Cohesiveness of political institutions

Resource or (cash) aid independence

Repression

Civil war

Income per capita

Role of political stability

State capacity framwork in part **C**

    there, stability treated as parametric – a high value of γ
      implies weak motives to invest in state capacity

Political violence framework

    here, γ is endogenous

How do the forces highlighted in the two frameworks interact?

    indeed a natural question – posed and answered in **4** below

... first a detour, however, into the empirics of political violence

Road map

1. A model of political violence
2. **From theory to evidence**
3. Data and empirical results
4. Investments in state capacity revisited
5. Summary of argument so far

2. From theory to evidence
Preliminaries – observability

Which parts of Z_s and Z_s^I observed for a certain country, at time s ?

can measure, or find decent proxies for ω_s and θ

if we assume rational expectations

$$R_{s+1} + \tau_{s+1}\omega_{s+1} - E[R_{s+1} + \tau_{s+1}\omega_{s+1}]$$

is an unobserved random variable

genuinely hard to measure $\phi, \gamma_O(0, 0; \boldsymbol{\xi}_s)$ and $\gamma_I(0, 0; \boldsymbol{\xi}_s)$

Unobserved randomness in determinants of violence

treat (τ, π) as given and write random variable $Z_s - Z_s^I$ as

$$Z_s - Z_s^I = \frac{R_{s+1}}{\omega_s} - \overline{Z}^I - \frac{\varepsilon_s^I}{\omega_s}$$

where $\overline{Z}^I$ is a constant and ε_s^I an "error term" with c.d.f. $F^I(\varepsilon)$

Similarly, we can write

$$Z_s - Z_s^O = \frac{R_{s+1}}{\omega_s} - \overline{Z}^O - \frac{\varepsilon_s^O}{\omega_s}$$

where error ε_s^O has c.d.f. $F^O(\varepsilon)$

Incidence of violence ?

we do not directly observe Z_s, Z_s^I and Z_s^O

but do observe if there is civil war, or repression, in s
and may observe $\alpha_s = \alpha_H$ (if interpret as external conflict)

Conditional probability of civil war

By Proposition 6, civil war in country c at date t if

$$Z_s - Z_s^O \geq 0$$

the conditional probability – i.e., the likelihood – to
observe this event is

$$F^O(R_{s+1} - \overline{Z}^O \omega_s)$$

Prediction

higher R_{s+1} or lower ω_s raises probability of to observe civil war
but, by Proposition 5, no effect if ϕ close to 1 or $\alpha_L \geq 2(1 - \theta)$
can test this with time-varying measures of R and ω

Conditional probability of other violence states

Conditional probability of observing peace

but not civil war, at date s

$$1 - F^I(R_{s+1} - \overline{Z}^I \omega_s)$$

down with R_{s+1} up with ω_s *unless $\phi \to 1$ or $\alpha_L \geq 2(1 - \theta)$*

Conditional probability of observing repression

$$F^I(R_{s+1} - \overline{Z}^I \omega_s) - F^O(R_{s+1} - \overline{Z}^O \omega_s)$$

effects of shocks, now depend on densities

Alternative way of stating model predictions

higher R_{s+1} or lower ω_s raise the probability
of observing some form of political violence
states of peace, repression, and civil war *ordered* in Z_s
calls for estimating ordered logit

Identification – what variation to use in data?

How clean inference from unobserved determinants?

using cross-sectional variation risks confounding variables
of interest, like R and ω, with nuisance parameters, like $\boldsymbol{\xi}_s$

instead estimate panel regressions with fixed *country* effects
equivalent to estimating, e.g., for civil war

$$F^O(R_{s+1} - \overline{Z}^O \omega_s) - E\{F^O(R_{s+1} - \overline{Z}^O \omega_s)\}$$

Heterogeneity in incidence of violence over time

now driven by time variation in R and ω

add fixed *year* effects to allow for world-wide shocks,
non-parametric trends in violence – recall Figure 5
exploit only *country-specific* time variation in R and ω

Identification – further issues

How take fact that predictions conditional on θ into account?

let $\Theta = 1$ be cohesive political institutions $(\alpha_L \geq 2(1-\theta))$
and $\Theta = 0$ non-cohesive political institutions
represent index function, in country c period s, as

$$R_{c,s+1} - \overline{Z}^O \omega_{c,s} = a_c\left(\Theta_c\right) + a_t\left(\Theta_c\right) + b\left(\Theta_c\right)\widetilde{Z}_{c,s}$$

where $\widetilde{Z}_{c,s}$ are time-varying regressors proxying for $R_{c,s+1}$ and $\omega_{c,s}$
according to the theory $b\left(0\right) > 0$, while $b\left(1\right) = 0$

Still need exogenous variation in $\widetilde{Z}_{c,s}$

within-country variation no panacea, unless we can also
credibly argue that variation in $\widetilde{Z}_{c,s}$ is exogenous to violence

Road map

1. A model of political violence
2. From theory to evidence
3. **Data and empirical results**
4. Investments in state capacity revisited
5. Summary of argument so far

3. Data and empirical results
Political violence data

Civil war

    binary indicator from Uppsala/PRIO data set, 1950-2005

    alternative: COW data, but shorter series (end in 1997)

Repression

    purges variable from Banks (2005) data set, 1950-2005

    alternative: PTS data, but shorter series (begin in 1976) and
        doubts about US State Department's coding during cold war

Construct ordered dependent variable

    combine repression and civil war measures as follows
      peace $= 0$, repression/but not civil war $= 1$, civil war $= 2$

Political institutions data

Main indicator of weak and strong institutions

indicator for highest score (7 on 1-7 scale) for
Executive Constraints variable in the Polity IV data set

corresponds best to θ in the theory

set indicator for the whole panel $\Theta_c = 1$ only if
(i) positive prevalence pre-1950 *and* (ii) sample prevalence > 0.6

conservative criterion: selects less than 20% of sample

Alternative measure

indicator based on parliamentary democracy taken
from Polity IV and Persson-Tabellini data sets

analogous (i)-(ii) definition for $\Theta_c = 1$

Three forms of shocks to $\widetilde{Z}_{c,s}$

Natural disasters – negative shocks to ω or positive shocks to R

    from EM-DAT data set, 1950-2005

    indicator for having at least one out of four disaster events:
      heat-wave, flood, slide, or tidal wave – cuts 2.5% of GDP/capita

Cold-war, security-council membership – positive shocks to R

    members likely to get more *aid* due to geopolitical
      importance during cold war (Kuziemko–Werker 2006, for US)

    agnostic about effect of membership, in general

(Booms in resource rents – positive shocks to R

    from UNCTAD, NBER/UN data sets on trade flows
      and world market prices, 1960-2005

    construct country-specific export-price indexes for 45 (non-oil)
      commodities – fixed weights based on 1980 export/GDP shares)

Some initial observations

By Prop 5 – no violence when $\phi \to 1$ $(E(\alpha_{s+1}) = \alpha_H)$?

   very few observations in our panel have external
      and internal war at the same time

   0.003 of all country-years since 1950

By Prop 5 – no violence when $\alpha_L \geq 2(1 - \theta)$?

   32 countries in our panel classified as $\Theta_c = 1$

      only 8 (25%) of those has some year with either
        civil war or repression from 1950 to 2005

   125 countries classified as $\Theta_c = 0$

      97 (80%) of those has some year with either
        civil war or repression in same period

Basic results – Table 4

Estimate ordered logits implied by the theory

columns 1-3

fixed-effect ordered logits – implement as suggested by Ferrrer-i-Carbonell and Frijters (2004)

security-council memberships plus natural disasters in full sample and subsamples based on constraints on the executive

columns 4-5

ditto for subsamples based on parliamentary democracies

Results in line with theoretical predictions

only significant effects on violence with expected sign in samples with low executive constraints or non-parliamentary democracies

statistically robust: results hold up when bootstrap standard errors

Table 4 Shocks and Ordered Political Violence

	(1)	(2)	(3)	(4)	(5)
Natural Disaster	0.263**	0.602	0.274**	-0.212	0.311***
	(0.107)	(0.536)	(0.111)	(0.407)	(0.106)
Security council member	-1.048***	37.726	-1.248***	1.862	–1.381***
	(0.399)	(5,298)	(0.416)	(1.162)	(0.457)
Security council member in cold war	1.275***	-39.300	1.560***	–2.371*	1.668***
	(0.439)	(5,298)	(0.457)	(1.361)	(0.497)
Sample	All 1950-2005	High executive constraints 1950-2005	Low executive constraints 1950-2005	Parliamentary Democracies 1950-2005	Non-Parliamentary Democracies 1950-2005
Method of Estimation	FE Ordered Logit	FE Ordered Logit	FE Ordered Logit	FE Ordered Logit	FE Ordered Logit
Observations	4251	440	3811	437	3814
Countries	97	8	89	8	89

Notes: The dependent variable is an ordered variable coded 0 for peace, 1 for repression, and 2 for civil war.. All specifications include year dummy variables and country fixed effects. Standard errors in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%

Look at alternative violence margins – Table 5

Estimate conditional logits implied by the theory

    conditional (fixed effect) logit for two margins where theory
      has bite: peace vs. violence, and non-civil war vs. civil war

    full sample and subsamples

Results again, basically, in line with theoretical predictions

    only see significant effects on both forms violence
      with low executive constraints

    statistically robust: hold up when bootstrap standard errors

Table 5   Shocks and Different Margins of Violence

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	Political violence	Political violence	Political violence	Civil war	Civil war	Civil war
Natural Disaster	0.278** (0.109)	0.602 (0.536)	0.289*** (0.113)	0.370** (0.152)	–0.874 (1.162)	0.417*** (0.157)
Security council member	–1.110*** (0.412)	37.726 (5298.433)	–1.318*** (0.429)	–1.359** (0.545)		–1.414*** (0.545)
Security council member in cold war	1.267*** (0.453)	–39.300 (5298.433)	1.557*** (0.472)	1.073* (0.633)		1.202** (0.633)
Sample	All 1950-2005	High executive constraints 1950-2005	Low executive constraints 1950-2005	All 1950-2005	High executive constraints 1950-2005	Low executive constraints 1950-2005
Estimation Method	FE Conditional logit	FE Conditional Logit	FE Conditional Logit	FE Conditional Logit	FE Conditional Logit	FE Conditional Logit
Observations	4251	440	3811	2061	112	1949
N. Countries	97	8	89	49	2	47

Notes: All specifications include year and country dummy variables. Standard errors in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%

Inspecting the mechanism – Table 6

Go further than the reduced form in earlier tables?

columns 1-2

fixed-effect OLS (linear probability model); useful check on robustness and results easier to interpret in quantitative terms

columns 3-4

naive OLS: almost surely invalid due to simultaneity

columns 5-6

"first stage" effects on total aid (OECD data) and GDP per capita (PWT data) of natural disasters and UN Security Council

columns 7-8

"second stage" of fixed-effects IV; at best a diagnostic, as the exclusion restrictions not necessarily satisfied

Results reasonably consistent with predictions

Table 6 Political Violence -- Inspecting the mechanism

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Political violence	Civil war	Political violence	Civil war	Log(GDP per capita)	Log(Total aid flows)	Political violence	Civil war
Natural Disaster	0.024* (0.013)	0.029** (0.012)			−0.026* (0.016)	0.104** (0.043)		
Security council member	−0.066** (0.027)	−0.051** (0.021)			0.078** (0.028)	−0.269*** (0.092)		
Security council member in cold war	0.090** (0.040)	0.034 (0.029)			−0.064* (0.034)	0.434*** (0.113)		
Log (GDP per capita)			−0.065*** (0.017)	−0.046*** (0.016)			−0.026 (0.531)	−0.347 (0.366)
Log (Total aid flows)			−0.004 (0.005)	−0.012*** (0.004)			0.264* (0.144)	0.065 (0.112)
Sample	All	All	All	All	All	All	All	All
	1950-2005	1950-2005	1960-2005	1960-2005	1950-2005	1950-2005	1950-2005	1950-2005
Estimation method	FE OLS	FE OLS	FE OLS	FE OLS	FE OLS	FE OLS	FE IV	FE IV
Observations	5880	5880	4664	4584	6504	5067	3961	3961
Countries	158	158	129	129	178	150	123	123

Notes: Clustered standard errors in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.
All specifications include year as well as country dummy variables.

Where next?

How does risk of violence affect investment incentives?

    integrate the political violence model in our state capacity
        framework from Lecture 2 – i.e., let τ_2, π_2 and γ be
        jointly determined

    revisit the clustering of institutions, income and violence

When should we expect strong motives for political reform?

    study the conditions under which incumbent wants to change
        the cohesiveness of political institutions – i.e., endogenize θ

What are the consequence for development assistance?

    use comprehensive model framework to discuss different
        types of foreign interventions in different types of states