Pillars of Prosperity
State Capacity in Economic Development

2010 Yrjö Jahnsson Lectures

Lecture 3, June 15

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The story so far

Determinants of state capacity

we have developed a framework 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., $\gamma$ 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 $L^O \leq \bar{L}^O$, paid within group, at marginal cost of funds $\nu$
incumbent group $I_1$ can invest in army $L^I \leq \bar{L}^I$,
paid out of the public purse, at marginal cost $\lambda_1$
no conscription: each soldier just paid the period-1
wage $\omega(\pi_1)$

Probability of opposition takeover – conflict technology
$\gamma(L^O, L^I; \xi)$ 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 $\gamma(0, 0; \xi)$
Timing in (partial) model of violence

1. Start with state capacity $\tau_1, \pi_1$ and incumbent group $I_1$, nature determines $\alpha_1, R_1$, and $\omega_1$ (for given $\pi_1$)

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 $\tau_2$ and $\pi_2$.

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 $1 - \gamma(L^O, L^I, \xi)$ nature determines $\alpha_2, R_2$, and $\omega_2$ (for given $\pi_2$)

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 $\tau_2$ and $\pi_2$ at stage 2
Stage 5 — New incumbent $I_2$ policymaker

Period 2 budget and policy instruments

exactly as before with budget constraint

$$R_2 + \frac{t[\omega(p^I_2) + \omega(p^O_2)]}{2} = g_2 + \frac{r^I_2 + r^O_2}{2}$$

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 \( L^J \in \left[ 0, L^J \right] \), we have:

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

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

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

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

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 $Z^I(\theta, \phi; \xi)$ and $Z^O(\theta, \phi; \xi)$ with $Z^I_\theta, Z^O_\theta > 0$ and

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

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

such that:

1. if $Z \leq Z^I$, there is peace with $\hat{L}^O = \hat{L}^I = 0$
2. if $Z \in \left(Z^I, Z^O\right)$, there is repression with $\hat{L}^I > \hat{L}^O = 0$
3. if $Z \geq Z^O$, there is civil conflict with $\hat{L}^I, \hat{L}^O > 0$.

Moreover, $\hat{L}^O$ and $\hat{L}^I$, whenever positive, increase in $Z$.
Anatomy of three regimes

1. Peace: \( Z < Z^I \)

   wages \( \omega_1 \) high, non-tax income \( E(R_2) \) low, opposition’s share \( \theta \) high; too expensive to fight, or not enough to fight over

2. Repression: \( Z \in [Z^I, Z^O] \)

   \( \omega_1 \) lower/\( E(R_2) \) higher/\( \theta \) 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 $\theta$ gives low $Z^I, Z^O$
low demand for public goods, low $\phi$ gives low $Z^I, Z^O$
low income (given $\tau$ and $\pi$), low $\omega_1$ gives high $Z$

Weak states

often have violence; recall that weak states – in countries with low $\theta$, and low $\phi$ – do not invest in the state at all
Lecture 2

- Common vs. redistributive interests
- Cohesiveness of political institutions
- Resource or (cash) aid independence

Political stability

- 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 framework in part C

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

Political violence framework

here, $\gamma$ 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
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 \( Z^I_s \) observed for a certain country, at time \( s \)?

can measure, or find decent proxies for \( \omega_s \) and \( \theta \)

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 \( \phi, \gamma_O(0, 0; \xi_s) \) and \( \gamma_I(0, 0; \xi_s) \)

Unobserved randomness in determinants of violence

treat \( (\tau, \pi) \) as given and write random variable \( Z_s - Z^I_s \) as

\[
Z_s - Z^I_s = \frac{R_{s+1}}{\omega_s} - \frac{\bar{Z}^I}{\omega_s} - \frac{\varepsilon^I_s}{\omega_s}
\]

where \( \bar{Z}^I \) is a constant and \( \varepsilon^I_s \) an "error term" with c.d.f. \( F^I(\varepsilon) \)
Similarly, we can write

\[ Z_s - Z^O_s = \frac{R_{s+1}}{\omega_s} - Z^O - \frac{\varepsilon^O_s}{\omega_s} \]

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

Incidence of violence?

we do not directly observe \( Z_s, Z^I_s \) and \( Z^O_s \)

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

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

Prediction

higher $R_{s+1}$ or lower $\omega_s$ raises probability of to observe civil war but, by Proposition 5, no effect if $\phi$ close to 1 or $\alpha_L \geq 2(1 - \theta)$

can test this with time-varying measures of $R$ and $\omega$
Conditional probability of other violence states

Conditional probability of observing peace
but not civil war, at date $s$

$$1 - F^I(R_{s+1} - \bar{Z}^I \omega_s)$$
down with $R_{s+1}$ up with $\omega_s$ unless $\phi \to 1$ or $\alpha_L \geq 2(1 - \theta)$

Conditional probability of observing repression

$$F^I(R_{s+1} - \bar{Z}^I \omega_s) - F^O(R_{s+1} - \bar{Z}^O \omega_s)$$
effects of shocks, now depend on densities

Alternative way of stating model predictions

higher $R_{s+1}$ or lower $\omega_s$ 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 $\omega$, with nuisance parameters, like $\xi_s$

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

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

Heterogeneity in incidence of violence over time

now driven by time variation in $R$ and $\omega$

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 $\omega$
Identification – further issues

How take fact that predictions conditional on $\theta$ 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

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

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

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

within-country variation no panacea, unless we can also credibly argue that variation in $\tilde{Z}_{c,s}$ 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 $\theta$ 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 $\tilde{Z}_{c,s}$

Natural disasters – negative shocks to $\omega$ 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 $\phi \rightarrow 1 \ (E(\alpha_{s+1}) = \alpha_H)$? 

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
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<td>Natural Disaster</td>
<td>0.263**</td>
<td>0.602</td>
<td>0.274**</td>
<td>-0.212</td>
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<td>member in cold war</td>
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<td>(5,298)</td>
<td>(0.457)</td>
<td>(1.361)</td>
<td>(0.497)</td>
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Sample

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<td>Method of Estimation</td>
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<td>FE Ordered Logit</td>
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<td>Countries</td>
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<td>89</td>
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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
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<td>Dependent Variable</td>
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<td>Civil war</td>
<td>Civil war</td>
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<td>Natural Disaster</td>
<td>0.278** (0.109)</td>
<td>0.602 (0.536)</td>
<td>0.289*** (0.113)</td>
<td>0.370** (0.152)</td>
<td>-0.874 (1.162)</td>
<td>0.417*** (0.157)</td>
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<td>-1.318*** (0.429)</td>
<td>-1.359** (0.545)</td>
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<td>-1.414*** (0.545)</td>
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<td>Security council member in cold war</td>
<td>1.267*** (0.453)</td>
<td>-39.300 (5298.433)</td>
<td>1.557*** (0.472)</td>
<td>1.073* (0.633)</td>
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<td>1.202** (0.633)</td>
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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
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<th>Dependent Variable</th>
<th>(1) Political violence</th>
<th>(2) Civil war</th>
<th>(3) Political violence</th>
<th>(4) Civil war</th>
<th>(5) Log(GDP per capita)</th>
<th>(6) Log(Total aid flows)</th>
<th>(7) Political violence</th>
<th>(8) Civil war</th>
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<td>Security council member in cold war</td>
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<tr>
<td>Log (GDP per capita)</td>
<td></td>
<td></td>
<td>-0.065***</td>
<td>-0.046***</td>
<td>-0.026</td>
<td>-0.347</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.017)</td>
<td>(0.016)</td>
<td>(0.531)</td>
<td>(0.366)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log (Total aid flows)</td>
<td></td>
<td></td>
<td>-0.004</td>
<td>-0.012***</td>
<td>0.264*</td>
<td>0.065</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.005)</td>
<td>(0.004)</td>
<td>(0.144)</td>
<td>(0.112)</td>
<td></td>
<td></td>
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<tr>
<td>Observations</td>
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<td>4664</td>
<td>4584</td>
<td>6504</td>
<td>5067</td>
<td>3961</td>
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<td>Countries</td>
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<td>129</td>
<td>129</td>
<td>178</td>
<td>150</td>
<td>123</td>
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</tr>
</tbody>
</table>

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 $\tau_2, \pi_2$ and $\gamma$ 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 $\theta$

What are the consequence for development assistance?

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