Persistence of Weak States
Zeuthen Lectures

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May 24, 2012.

General Issues

- Tradition in political science and political sociology: strength of the state and state capacity important for development
- Why? And what is state capacity?
- In practice, richer and institutionally stronger countries raise a higher fraction of GDP is tax revenue.
- Perhaps strength of the state related to public good provision?
- Strength of the state also related to limiting the ability of local strongmen and local elites to pursue certain policies that may be growth-regarding.

Income and Taxes

Figure 1
Tax Revenue and Income 1990-2000

This Lecture

- Three models to understand the nature of weak states, their costs and especially their persistence.

  1. A model of weak vs. strong states: why weak states are costly for economic performance (based on Acemoglu, 2005).
  2. A model and evidence on persistence of weak states: states are often weak not because of an inability of forging strong states but because political economy considerations favor weak states or absence of states in certain parts of national territories (based on Acemoglu, Robinson and Santos, 2012).
  3. A model of persistence of civil wars: civil wars and lawlessness often continue because political elites are afraid of investing in a strong army, which under weak institutions, will likely contest power (Acemoglu, Ticchi and Vindigni, 2010).

Introduction

- Weak states are obviously bad for economic performance when this directly translates into total absence of law and order.
  - Somalia as an example of "extractive political institutions" despite the absence of a single national elite controlling power. Instead, this is because of total lack of political centralization, translating into lack of a unified market and by a large lack of law and order in most parts of the country.

- But even more generally there are obvious costs to week states that are unable to taxand penetrate and regulate society:
  - If a ruler is economically weak, because he is unable to tax, he will also underinvest in public goods.
  - If the ruler is politically weak, because he anticipates being replaced quickly, he will be unwilling to invest in public goods.
  - But if the ruler is economically or politically too strong, this is also distortionary—because of holdup of citizens.
  - So an inverse U-shaped relationship between economic and political strength and economic growth.

Consensually Strong States

- But then how do we understand Denmark or Sweden where the state is politically weak (in the sense that those at the helm can be replaced easily) but can raise a high fraction of GDP in taxes and spend (some/most of it) on public goods?
  - Or more generally, how do we understand the pattern in the figure above?

- **Consensually strong states:** states that are politically weak are consented to increase taxes and the size of government by citizens because citizens trust that they can quickly replace and discipline the government if it misbehaves.
  - Crucially depends on non-Markovian strategies.

Environment

- Time is discrete and indexed by t.
- There is a set of citizens, with mass normalized to 1, and a ruler.
- All agents discount the future with the discount factor β, and have the utility function

$$u_t = \sum_{j=0}^{\infty} \beta^j \left[c_{t+j} - k_{t+j} \right], \qquad (1)$$

where c_{t+j} is consumption and k_{t+j} is investment (effort), and we assume that the ruler incurs no effort cost.

- Each citizen i has access to the following Cobb-Douglas production technology to produce the unique final good in this economy:

$$y_t^i = \frac{1}{1-\alpha} A_t^{\alpha} \left(k_t^i \right)^{1-\alpha}, \qquad (2)$$

where A_t denotes the level of public goods (e.g., the state of the infrastructure, or the degree of law and contract enforcement between private citizens), at time t.

Environment (continued)

- The level of A_t will be determined by the investment of the ruler
  - a certain degree of state investment in public goods, the infrastructure or law-enforcement is necessary for production;
  - in fact, investment by the state is complementary to the investments of the citizens.
- The ruler sets a tax rate τ_t on income at time t.
- Each citizen can decide to hide a fraction z_t^i of his output, which is not taxable, but hiding output is costly, so a fraction δ of it is lost in the process.
- This formulation with an economic exit option for the citizens is a convenient, though reduced-form, starting point.
- Given a tax rate τ_t, the consumption of agent i is:

$$c_t^i \leq \left[(1 - \tau_t) \left(1 - z_t^i \right) + (1 - \delta) z_t^i \right] y_t^i, \tag{3}$$

where tax revenues are

$$T_t = \tau_t \int \left(1 - z_t^i \right) y_t^i \, di. \tag{4}$$

Environment (continued)

- The ruler at time t decides how much to spend on A_{t+1}, with production function

$$A_{t+1} = \left[\frac{(1-\alpha)\,\phi}{\alpha}\, G_t \right]^{1/\phi} \qquad (5)$$

where G_t denotes government spending on public goods, and $\phi > 1$, so that there are decreasing returns in the investment technology of the ruler (a greater ϕ corresponds to greater decreasing returns).

- The term $[(1-\alpha)\,\phi/\alpha]^{1/\phi}$ is included as a convenient normalization.
- In addition, (5) implies full depreciation of A_t, which simplifies the analysis below.
- The consumption of the ruler is whatever is left over from tax revenues after his expenditure and transfers,

$$c_t^R = T_t - G_t.$$

Timing of Events

- The economy inherits A_t from government spending at time $t-1$.
- Citizens choose their investments, $\left\{k_t^i\right\}$.
- The ruler decides how much to spend on next period's public goods, G_t, and sets the tax rate τ_t.
- Citizens decide how much of their output to hide, $\left\{z_t^i\right\}$.

First Best

- The first best maximizes net output.
- This is given by:

$$A_t^{fb} = \beta^{1/(\phi-1)},$$

$$k_t^{fb} = \beta^{1/(\phi-1)},$$

and

$$y_t^{fb} = \frac{1}{1-\alpha}\beta^{1/(\phi-1)}.$$

Markov Perfect Equilibrium

- Exit options:

$$z_t^i \begin{cases} = 1 & \text{if } \tau_t > \delta \\ \in [0,1] & \text{if } \tau_t = \delta \\ = 0 & \text{if } \tau_t < \delta \end{cases} . \tag{6}$$

Given (6), the optimal tax rate for the ruler is

$$\tau_t = \delta. \tag{7}$$

- Next, investment decisions:

$$k_t^i = (1-\delta)^{1/\alpha} A_t. \tag{8}$$

- Substituting (7) and (8) into (4), the equilibrium tax revenue as a function of the level of infrastructure is

$$T(A_t) = \delta y_t = \frac{(1-\delta)^{(1-\alpha)/\alpha} \delta A_t}{1-\alpha}. \tag{9}$$

Markov Perfect Equilibrium (continued)

- The ruler will choose public investment, G_t to maximize his net present value, written recursively as:

$$V\left(A_t\right) = \max_{A_{t+1}} \left\{ T\left(A_t\right) - \frac{\alpha}{(1-\alpha)\phi} A_{t+1}^{\phi} + \beta V\left(A_{t+1}\right) \right\} \qquad (10)$$

- First-order condition for the ruler:

$$\frac{\alpha}{1-\alpha} A_{t+1}^{\phi-1} = \beta V'\left(A_{t+1}\right). \qquad (11)$$

- The marginal cost of greater investment in infrastructure for next period must be equal to to the greater value that will follow from this.

- The envelope condition:

$$V'\left(A_t\right) = T'\left(A_t\right) = \frac{(1-\delta)^{(1-\alpha)/\alpha}\,\delta}{1-\alpha}. \qquad (12)$$

- The value of better infrastructure for the ruler is the additional tax revenue that this will generate, which is given by the expression in (12).

Markov Perfect Equilibrium (continued)

- Equilibrium actions of the ruler are:

$$A_{t+1} = A[\delta] \equiv \left(\frac{\beta (1-\delta)^{\frac{1-\alpha}{\alpha}} \delta}{\alpha} \right)^{\frac{1}{\phi-1}} \text{ and } G_t = \frac{\alpha}{(1-\alpha)\phi} (A[\delta])^{\phi},$$

$$(13)$$

- And therefore:

$$V^*(A_t) = \frac{(1-\delta)^{(1-\alpha)/\alpha} \delta A_t}{1-\alpha} + \frac{\beta(\phi-1)(1-\delta)^{(1-\alpha)/\alpha} \delta}{(1-\beta)(1-\alpha)\phi} A[\delta].$$

$$(14)$$

Markov Perfect Equilibrium (continued)

- Summarizing:

Proposition: There exists a unique MPE where, for all t, $\tau_t(A_t) = \delta$, $G(A_t)$ is given by (13), and, for all i and t, $z^i(A_t) = 0$ and $k^i(A_t)$ is given by (8). The equilibrium level of aggregate output is:

$$Y_t = \frac{1}{1-\alpha}(1-\delta)^{(1-\alpha)/\alpha} A[\delta]$$

for all $t > 0$ and

$$Y_0(A_0) = \frac{1}{1-\alpha}(1-\delta)^{(1-\alpha)/\alpha} A_0.$$

Second Best

- What is the level of δ—economic strength of the state—that maximizes output.

- Considered a problem

$$\max_{\delta} Y_t(\delta) = \frac{1}{1-\alpha}(1-\delta)^{(1-\alpha)/\alpha} A[\delta], \qquad (15)$$

where $A[\delta]$ is given by (13).

- The output maximizing level of the economic power of the state, denoted δ^*, is

$$\delta^* = \frac{\alpha}{\phi(1-\alpha)+\alpha}. \qquad (16)$$

Second Best (continued)

- If the economic power of the state is greater than δ^*, then the state is too powerful, and taxes are too high relative to the output-maximizing benchmark.
  - This corresponds to the standard case that the political economy literature has focused on.
- In contrast, if the economic power of the state is less than δ^*, then the state is not powerful enough for there to be sufficient rents in the future to entice the ruler to invest in public goods (or in the infrastructure, law-enforcement etc.).
- This corresponds to the case of "weak states".
  - With only limited power of the state to raise taxes in the future, the ruler has no interest in increasing the future productive capacity of the economy.

Political Power of the State

- Do the same insights applied to the political power of the state?
- Generally yes,

Extended Environment

- Citizens decide replacement: $R_t \in \{0, 1\}$.

- After replacement, the existing ruler receives 0 utility, and citizens reclaim a fraction η of the tax revenue and redistribute it to themselves as a lump sum transfer, S_t.

- Replacement is costly: the cost of replacing the current ruler with a new ruler equal to $\theta_t A_t$, where θ_t is a nonnegative random variable with a continuous distribution function $\tilde{F}_\lambda$, with (finite) density $\tilde{f}_\lambda$.

- Assume that

$$\frac{\tilde{f}_\lambda(x)}{1 - \tilde{F}_\lambda(x)} \text{ is nondecreasing in } x \text{ and } \tilde{F}_\lambda(0) < 1, \qquad \text{(A1)}$$

which is the standard monotone hazard (or log concavity) assumption.

Timing of Events

- The economy inherits A_t from government spending at time $t - 1$.
- Citizens choose their investments, $\left\{ k_t^i \right\}$.
- The ruler decides how much to spend on next period's public goods, G_t, and sets the tax rate τ_t.
- Citizens decide how much of their output to hide, $\left\{ z_t^i \right\}$.
- θ_t is realized.

Citizens choose R_t. If $R_t = 1$, the current ruler is replaced and the tax revenue is redistributed to the citizens as a lump-sum subsidy $S_t = \eta T_t$.

Markov Perfect Equilibrium

- Suppose

$$\delta \in (\delta^*, \alpha), \tag{A2}$$

  where δ^* is given by (16).

- This assumption ensures that taxes are always less than the value α that maximizes ruler utility, and also allows the potential for excessively high taxes (i.e., $\tau > \delta^*$).

- Citizens will replace the ruler, i.e., $R_t = 1$, whenever

$$\theta_t < \frac{\eta T_t}{A_t}. \tag{17}$$

- Therefore, the probability that the ruler will be replaced is $\tilde{F}_\lambda (\eta T_t / A_t)$.

Markov Perfect Equilibrium (continued)

- To simplify the notation, define

$$\mathcal{T}\left(\tau_t\right) = \frac{(1-\tau_t)^{(1-\alpha)/\alpha}\,\tau_t}{1-\alpha}. \tag{18}$$

- Also parameterize $\tilde{F}_\lambda\left(x/\eta\right) = \lambda F\left(x\right)$ for some continuous distribution function F with (finite) density f. Then

$$
\begin{aligned}
V\left(A_t\right) \;=\; & \hphantom{} \tag{19}\\
\max_{\tau_t \in [0,\delta], A_{t+1}} \quad & \left\{ (1-\lambda F\left(\mathcal{T}\left(\tau_t\right)\right)) \left(\mathcal{T}\left(\tau_t\right) A_t - \frac{\alpha}{\phi(1-\alpha)} A_{t+1}^\phi\right)\right.\\
& \left. + \beta\left(1-\lambda F\left(\mathcal{T}\left(\tau_t\right)\right)\right) V\left(A_{t+1}\right) \right\}.
\end{aligned}
$$

- Now the ruler's maximization problem involves two choices, τ_t and A_{t+1}, since taxes are no longer automatically equal to the maximum, δ.

Markov Perfect Equilibrium (continued)

- In this choice, the ruler takes into account that a higher tax rate will increase the probability of replacement.
- The first-order condition with respect to τ_t yields:

$$\frac{\partial \mathcal{T}(\tau_t)}{\partial \tau_t} \times [(1 - \lambda F(\mathcal{T}(\tau_t))) - \tag{20}$$
$$\lambda f(\mathcal{T}(\tau_t)) \left(\mathcal{T}(\tau_t) - \frac{G_t}{A_t} + \beta \frac{V(A_{t+1})}{A_t} \right)] \geq 0,$$

  and $\tau_t \leq \delta$ with complementary slackness
- The envelope condition is now

$$V'(A_{t+1}) = (1 - \lambda F(\mathcal{T}(\tau_{t+1}))) \mathcal{T}(\tau_{t+1}). \tag{21}$$

- It only differs from the corresponding condition above, (12), because with probability $\lambda F(\mathcal{T}(\tau_{t+1}))$, the ruler will be replaced and will not enjoy the increase in future tax revenues.

Markov Perfect Equilibrium (continued)

- Using this, the first-order condition with respect to A_{t+1} implies that in an interior equilibrium:

$$A_{t+1} = A[\tau_{t+1}] \equiv \left(\alpha^{-1} \beta \left(1 - \lambda F \left(\mathcal{T}\left(\tau_{t+1}\right)\right)\right) \left(1 - \tau_{t+1}\right)^{\frac{1-\alpha}{\alpha}} \tau_{t+1} \right)^{\frac{1}{\phi-1}}$$

- The optimal value of A_{t+1} for the ruler depends on τ_{t+1} since, from the envelope condition, (21), the benefits from a higher level of public good are related to future taxes.

- Also suppose:

$$\left(1 - \frac{\beta}{\phi}\left(1 - \lambda F\left(0\right)\right)\right)^2 - \left(\phi - 1\right)\frac{\beta}{\phi}\left(1 - \lambda F\left(0\right)\right) > 0. \qquad \text{(A3)}$$

- This assumption requires $\beta \left(1 - \lambda F\left(0\right)\right)$ not to be too large, and can be satisfied either if β is not too close to 1 or if $\lambda F\left(0\right)$ is not equal to zero.

Markov Perfect Equilibrium (continued)

- Then we have:

Proposition: Suppose (A1), (A2) and (A3) hold. Then, in the endogenous replacement game of this section, there exists a unique steady-state MPE. In this equilibrium, there exists $\lambda^* \in (0, \infty)$ such that output is maximized when $\lambda = \lambda^*$.

Markov Perfect Equilibrium (continued)

- Similar to the case of the economic power of the state, there is an optimal level of the political power of the state.
- Intuitively, when $\lambda < \lambda^*$, the state is too powerful and taxes are too high and citizens' investments are too low.
- When $\lambda > \lambda^*$, the state is too weak and taxes and public investments are too low.
- The intuition is also related to the earlier result.
- When the state is excessively powerful, i.e., $\lambda < \lambda^*$, citizens expect high taxes and choose very low levels of investment (effort).
- In contrast, when $\lambda > \lambda^*$, the state is excessively weak and there is the reverse holdup problem; high taxes will encourage citizens to replace the ruler, and anticipating this, the ruler has little incentive to invest in public goods, because he will not be able to recoup the costs of current investment in public goods with future revenues.

Consensually Strong States

- Neither the analysis of the economic or the political power of the state generate a pattern in which better institutional controls lead to greater government spending.
- But comparison of OECD to Africa might suggest such a pattern.
- Why would this be the case?
- One possibility: go beyond MPE
- Consensually Strong States: citizens have low costs of replacing governments, a new look at SPE, where if the government does not follow citizens' wishes, it is replaced.
- Consensually Strong States can generate the pattern of greater public good provision in situations of better controls on government.

What Is the State?

- Max Weber defined a state as

  "a human community that (successfully) claims the monopoly of the legitimate use of physical force within a given territory."

- Many states do not have such a monopoly and without it have little hope of enforcing rules, regulations, and laws, providing property rights and public goods.

- Presumption in the existing literature: this is because of the weakness of the state and 'modernization' will ultimately strengthen the state and ensure monopoly of violence.

But

- In many polities, the central state exists side-by-side, and in fact in a '*symbiotic*' relationship with non-state armed actors.
- Examples:
    - Waziristan in Pakistan;
    - Kurdish areas in Iraq;
    - the Mafia in the south of Italy;
    - Southern United States after the Hayes-Tilden agreement of 1877;
    - Colombia.
- Weak states or *symbiotic* relationship between central state and periphery?

Weak vs. Strong States in Colombia

- Imagine there is an incumbent politician/party facing an election.
- The country is divided into regions some of which are controlled by non-state armed actors.
- The incumbent decides which regions to 'take back' (in the limit establishing a monopoly of violence) and chooses a policy vector in the election.
- Non-state armed actors have preferences over policies and can coerce voters to support one candidate over another.
- This creates an electoral advantage for incumbent politicians they favor and reduces the incentives to eliminate these non-state actors.

Implications

- This would imply that paramilitaries will tend to persist to the extent that they deliver votes to the incumbent executive and that this effect is larger in areas where the President would otherwise not do well.
- Thus non-state armed actors can persist because they can be in a *symbiotic relationship* with the executive.
    - On the one hand, paramilitaries deliver votes to the President and in addition elect legislators who support the executive.
    - On the other, the executive delivers laws and the policies that the paramilitaries prefer.
- In addition, policies chosen to appease paramilitaries rather than provide public goods and services to the population.

Some Colombian Background

- In recent years Colombia has been dominated by two main non-state armed actors:
  - the 'left-wing' Fuerzas Armadas Revolucionarias de Colombia (FARC—The Revolutionary Armed Forces of Colombia) and
  - the 'right-wing' paramilitary forces which in 1997 coalesced into the Autodefensas Unidas de Colombia (AUC—United Self-Defense Organization of Colombia).

- After the foundation of the AUC in 1997 a strategic decision was taken to influence national politics (possibly taken at Santa Fé de Ralito in 2001 where members of the AUC, politicians and members of congress signed a document calling for the 'refounding of the country.')

The Involvement of Paramilitaries in Politics

- In 2005 accusations of involvement of the AUC in the elections of 2002. Scandal with the demobilization of Jorge 40 and his 2,000 strong block on March 10, 2006 in La Mesa, César.
- Jorge 40's computer fell into the hands of government officials and it contained emails ordering his men to recruit peasants to pretend to be paramilitaries during demobilization ceremonies and also listed over 500 murders, and many links between politicians and paramilitaries.
- So far around 30,000 paramilitaries have "demobilized" in this process.
- As of April 22, 2008, 62 members of Congress and the Senate were official suspects, 33 lawmakers, including Mario Uribe, President Uribe's cousin, were in jail awaiting trial for links with paramilitaries.

"What I said is that 35% of the Congress was elected in areas where there were states of the Self-Defense groups, in those states we were the ones collecting taxes, we delivered justice, and we had the military and territorial control of the region and all the people who wanted to go into politics had to come and deal with the political representatives we had there."
- Salvatore Mancuso

Map 1: Guerrilla Attacks, 1997-2005
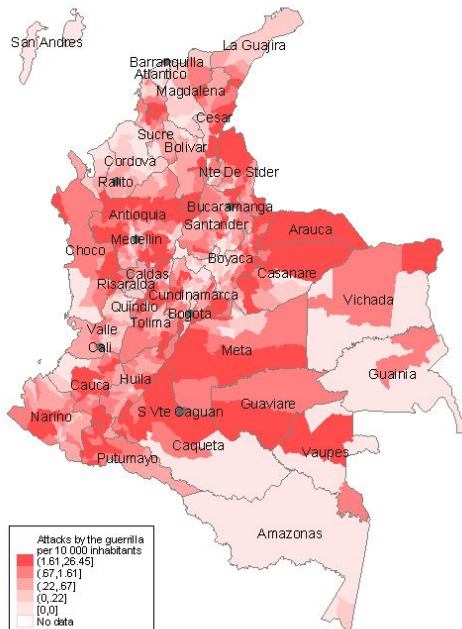
Map 2: Paramilitary Attacks, 1997-2005

Attacks by the paramilitary
per 10 000 inhabitants
(.19,3.62]
(.04,.19]
(0,.04]
[0,0]
No data
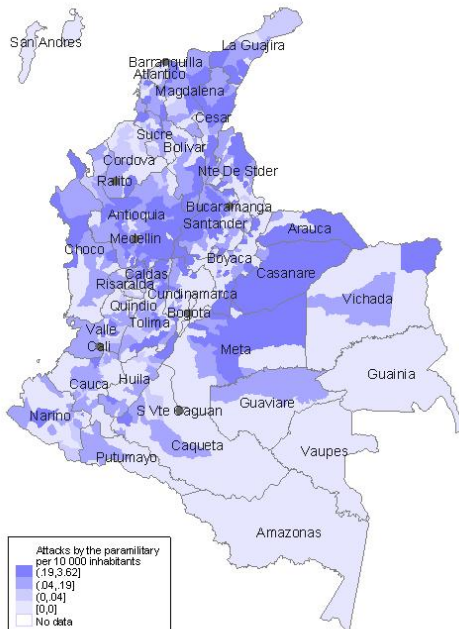
Who Are the Representatives?

Table 1: Top 20 Senators by Vote Share in Paramilitary Presence Areas

Senator	Third Parties	Votes Param. Zones	Reelection	Just.& Peace Law	Investigated/Arrested
GNECCO	Yes	61.88	Yes	Yes	No/No
PIMIENTO	Yes	54.6	Yes	Yes	No/Yes
MALOOF	Yes	49.5	Yes	Yes	No/Yes
CLAVIJO	Yes	44.76			No/Yes
SAADE	Yes	42.51	Yes		Yes/No
MARTINEZ	Yes	41.8	Yes		Yes/No
GARCIA	Yes	38.01			No/Yes
PUELLO	No	30.64	Yes		No/No
MERLANO	Yes	28.73	Yes	Yes	No/Yes
VIVES	Yes	27.52	Yes	Yes	No/Yes
MONTES	Yes	26.9	Yes	Yes	No/No
ZUCCARDI	Yes	25.09	Yes	Yes	No/No
ARAUJO	Yes	24.44		Yes	No/Yes
SERRANO	No	23.12	No		No/No
QUINTERO	Yes	23.06			No/Yes
DE LA ESPRIELLA	Yes	22.55	Yes	Yes	No/Yes
ACOSTA	Yes	22.4			No/No
BLEL	Yes	21.59	Yes	Yes	No/Yes
GIL	Yes	21.21	Yes		No/Yes
CORDOBA	No	20.14	No	No	No/No

The Model

- Consider a two-period model of political competition between two parties.
- Party A is initially (at $t = 0$) in power and at $t = 1$, it competes in an election against party B.
- The country consists of a large equal-sized number, N, of regions, with each region inhabited by a large number of individuals. We denote the collection of these regions by $\mathcal{N}$.
- The party that wins the majority of the votes over all regions wins the election at the time $t = 1$.
- Regions differ in terms of their policy and ideological preferences and, in addition, some regions are under paramilitary control.
- We assume as in standard Downsian models that parties can make commitments to their policies, but their ideological stance is fixed and captures dimensions of policies to which they cannot make commitments.

Preferences

- The utility of individual i in region $j \in \mathcal{N}$ (i.e. $j = 1, ..., N$) when party $g \in \{A, B\}$ is in power is given by

$$U_{ij}\left(q, \tilde{\theta}^g\right) = u_j\left(q\right) - Y\left(\tilde{\theta}_j - \tilde{\theta}^g\right) + \tilde{\varepsilon}_{ij}^g,$$

where $q \in Q \subset \mathbb{R}^K$ is a vector of policies, u_j denotes the utility of individuals in region j, $\tilde{\theta}_j$ is the ideological bliss point of the individuals in region $j \in \mathcal{N}$, so that $Y\left(\tilde{\theta}_j - \tilde{\theta}^g\right)$ is a penalty term for the ideological distance of the party in power and the individual.

- Finally, $\tilde{\varepsilon}_{ij}^g$ is an individual-specific utility term where

$$\tilde{\varepsilon}_{ij}^A - \tilde{\varepsilon}_{ij}^B = \xi + \varepsilon_{ij},$$

where ξ is a common valance term and ε_{ij} is an iid term.

- ξ and each ε_{ij} have uniform distributions over $\left[-\frac{1}{2\phi}, \frac{1}{2\phi}\right]$.

Summary of Results

- **Benchmark model without paramilitaries:** standard symmetric equilibrium with policy convergence to the average preference of N regions, but the party that is ideologically more popular among voters wins with higher probability.

- **Equilibrium with "passive" paramilitaries:** still policy convergence but now policies targeted to voters in non-paramilitary areas and the party that is ideologically more popular among the paramilitaries (in addition to being more popular among voters in non-paramilitary areas) wins with higher probability.

Summary of Results (Continued)

- **Persistence of paramilitaries:** now suppose that the state can reconquer areas under paramilitary control; whether it would like to do so will depend, in part, on whether the paramilitaries support the party currently controlling the government.

  - *Most importantly*: if the current government is popular with paramilitaries, it will be less likely to reconquer areas where paramilitaries are likely to provide the decisive votes for its victory.

- **Equilibrium with "active"' paramilitaries:** now paramilitaries endogenously decide which party to support; similar results, except that now both parties will change their platforms to "appease" paramilitaries.

Empirical Predictions of the Model

- We investigate the predictions of the model using Colombian data.

1. Non-state armed actors (AUC) once they became sufficiently powerful, should start influencing electoral outcomes favoring 'conservative' candidates. In presidential elections supporting President Uribe.

2. Paramilitaries located in areas that voted for Uribe in great numbers but in past elections tended to vote for more liberal politicians are more likely to persist between the presidential election in 2002 and the later years in our sample.

3. There is a policy quid pro quo between President Uribe and the Senators and Congressmen elected from high parameter areas.

Measuring Paramilitary and Guerrilla Presence

- We use two types of data on paramilitary presence and several measures:

1. The sum of *Paramilitary Attacks* between 1997 and 2005 in municipality m per 10,000 inhabitants where the population measure is the average population between 1993 and 2005.
2. A dummy that takes the value of 1 if municipality m has a value of *Paramilitary Attacks* above the 75th percentile.
3. The sum of displaced people that reported being displaced from municipality m by the paramilitaries between 1997 and 2006 per 10,000 inhabitants. The population measure is the average population between 1993 and 2005, and similarly constructed dummy.
4. Dummy combining information from Attacks and Displaced.
5. Principal component of two measures.

- Identical measures for guerrilla.

Other Data

- We classify parties into 'third,' 'traditional' (Liberals or Conservatives) and 'Socialist' (the 'Democratic Pole' alliance) and compute vote shares for senate and congress elections.
- We measure electoral concentration by the vote share of the most popular list in municipality m.
- Roll call votes were extracted from the *Gacetas del Senado*.
- Other covariates from CEDE database at the University of the Andes in Bogotá.

Basic Econometric Model

- We estimate a panel data model of the following form:

$$y_{m,t} = d_t + \delta_m + \alpha_t \cdot P_m + \beta_t \cdot G_m + \mathbf{X}'_{m,t} \cdot \boldsymbol{\pi} + \varepsilon_{m,t}, \qquad (22)$$

  where $y_{m,t}$ is the outcome variable in municipality m at time t, the d_t denote time effects, the δ_m are municipality fixed effects, $\mathbf{X}_{m,t}$ is a vector of covariates, and $\varepsilon_{m,t}$ is a disturbance term.
- P_m is paramilitary presence and G_m guerilla presence.
- The term $\alpha_t \cdot P_m$ estimates a potentially differential growth effect for every time period (relative to the baseline).
- Our working hypothesis that the AUC influenced elections after it developed a political strategy implies that we should see $\alpha_t = 0$ for dates before 2002 and $\alpha_t > 0$ after 2002.
- Also allow for time-varying measures $P_{m,t-1}$ and $G_{m,t-1}$.

Paramilitaries and Third Parties Vote Share (Senate)

Table 3: Paramilitary Presence and Third Parties Share of Votes in the Senate
Dependent Variable is Vote Share obtained by Third Parties in the Senate

	Paramilitary Presence Measured by:				
	Attacks		Attacks Dummy		Time Varying Attacks Dummy
Paramilitary Presence					-9.90
					(2.83)
Paramilitary Presence X 2002	15.08	14.85	9.98	9.46	15.84
	(2.60)	(2.64)	(1.90)	(1.98)	(3.05)
Paramilitary Presence X 2006	15.59	10.47	10.84	8.94	15.70
	(2.65)	(2.58)	(1.70)	(1.68)	(3.15)
Additional Controls		X		X	
Observations	3286	2943	3286	2943	3269

Recap of the Results

- Large quantitative effect: about 10 percentage points gained in third-party vote share relative to a base of 15%.
- Results very robust to different specifications, controls and alternative measures of paramilitary presence.
- Guerrilla presence has no effect on third-party vote share or socialist party vote share.
- Similar results for Congress elections.

Paramilitaries and Third Parties Vote Share (Congress)

Table 4: Paramilitary Presence and Third Parties Share of Votes in Congress
Dependent Variable is Vote Share obtained by Third Parties in Congress

	Attacks		Attacks Dummy		Time Varying Attacks Dummy
Paramilitary Presence					-2.85
					(3.26)
Paramilitary Presence X 2002	13.02	10.45	8.38	7.21	7.54
	(2.91)	(2.86)	(1.91)	(1.98)	(3.63)
Paramilitary Presence X 2006	18.10	13.21	10.11	8.74	7.29
	(2.61)	(2.20)	(2.04)	(1.99)	(3.79)
Additional Controls		X		X	
Observations	3289	2946	3289	2946	3272

Paramilitary Presence Measured by:

Paramilitary Presence and President Vote Share

Table 7: Paramilitary Presence and Winning Presidential Candidate Share of Votes
Dependent Variable is Winning Presidential Candidate Vote Share

	Paramilitary Presence Measured by:				
	Attacks		Attacks Dummy		Time Varying Attacks Dummy
Paramilitary Presence					-6.68
					(3.59)
Paramilitary Presence X 2002	9.77	7.58	2.88	2.52	10.14
	(1.98)	(1.58)	(0.44)	(1.09)	(3.59)
Paramilitary Presence X 2006	21.29	13.04	11.18	7.30	11.92
	(2.36)	(1.66)	(1.64)	(1.19)	(3.80)
Additional Controls		X		X	
Observations	3297	2951	3297	2951	3281

Interpretation

- Significant effect in 2002 (2.5-3 percentage points).
- Much larger in 2006 (7-11 percentage points).
- Plausible: President Uribe became much more popular with paramilitaries during his first term, particularly, because of his policies concerning demobilization and the Justice and Peace Law.
  - Jairo Angarita, former leader of the AUC's Sinú and San Jorge blocs and Salvatore Mancuso's deputy, in September 2005:

    "[proud to be working for the] reelection of the best President we have ever had".

Predicting Arrests—Econometric Model #1 (Dummy)

- A useful 'reality check' on whether our measures of paramilitary presence are informative is to examine whether or not they help to predict which members of the Senate would be arrested. This is further evidence that paramilitaries have influenced elections.

- Define ω_{IP} to be the proportion of total vote that list l receives in municipalities with high paramilitary presence. Similarly ω_{IG} is the proportion of total vote that list l receives in municipalities with high guerilla presence.

- Define Δ_l to be the proportion of Senators on list l who have been arrested for links with paramilitaries. We estimate

$$\Delta_l = \rho \cdot \omega_{IP} + \lambda \cdot \omega_{IG} + \mathbf{X}'_l \cdot \gamma + \epsilon_l \qquad (23)$$

- Since citizens vote for lists we must use the votes cast for lists to try to predict the proportion of Senators on the list that will be arrested. Our hypothesis is that $\rho > 0$.

Predicting Arrests—Econometric Model #2 (Index)

- Estimate the following model separately for each Senate list

$$v_{l,m} = \phi_{l,P} \cdot P_m + \phi_{l,G} \cdot G_m + \mathbf{X}'_m \cdot \gamma + \eta_m \qquad (24)$$

which explains the vote share of list l in municipality m, $v_{l,m}$, by the presence of paramilitaries and guerillas. We then recover the l coefficients $\tilde{\phi}_{l,P}$ and $\tilde{\phi}_{l,G}$, one for each list. These coefficients measure how sensitive the vote share of list l is to the presence of different non-state armed actors.

- We then estimate the following model

$$\Delta_l = \pi \cdot \tilde{\phi}_{l,P} + \chi \cdot \tilde{\phi}_{l,G} + \mathbf{X}'_l \cdot \gamma + \upsilon_l \qquad (25)$$

In (25) our hypothesis is that $\pi > 0$ implying that the more sensitive is the vote share of list l to the presence of paramilitaries, the greater the proportion of Senators elected from list l will be arrested for connections with the paramilitaries.

- Same strategies used for roll call votes.

Paramilitary Support and Arrests

Table 8a: Predicting Senators Arrests
Dependent Variable equals 1 if Senator was Arrested

| | | Strategy Used is: | | | |
		Share		Index	
Dummy Conservative	0.03				
	(0.11)				
Dummy Left	-0.10				
	(0.06)				
Dummy Third Parties	0.22				
	(0.09)				
Share of Votes from Paramilitary areas		1.38	1.11	1.61	1.54
		(0.42)	(0.50)	(0.50)	(0.47)
Observations	96	96	96	96	96

Paramilitary Support and Vote for Justice and Peace Law

Table 8b: Predicting Votes on Justice and Peace Law
Dep. Var. equals 1 if Senator voted Yes for Sedition and Reduction of Sentences

		Share		Index	
Dummy Conservative	0.44				
	(0.12)				
Dummy Left	-0.56				
	(0.12)				
Dummy Third Parties	0.40				
	(0.13)				
Share of Votes from Paramilitary areas		0.83	1.31	0.71	0.74
		(0.41)	(0.53)	(0.59)	(0.59)
Observations	57	57	57	57	57

Paramilitary Persistence—Econometric Model

- Baseline model

$$
\begin{aligned}
P_{m,t>2002} \;=\; & \alpha P_{m,t<2002} + \beta v_{m,2002}^{u} \qquad\qquad (26) \\
& + \gamma v_{m,2002}^{u} \cdot v_{m,1998}^{p} + \delta \cdot v_{m,1998}^{p} + \mathbf{X}_{m}' \cdot \chi + \varepsilon_{m}
\end{aligned}
$$

where $v_{m,2002}^{u}$ is the vote share of President Uribe in municipality m in 2002 and $v_{m,1998}^{p}$ is the vote share of Pastrana in 1998.

- Our model predicts that $\beta > 0$, a greater share of votes for Uribe would lead to greater paramilitary presence after 2002, and $\gamma < 0$, so that the higher was Pastrana's vote share in 1998, the more confident Uribe would be of winning a lot of votes, and the less he would need the support of the paramilitaries.

- We also use a more direct way of addressing this hypothesis by using the variable $\max\{0, v_{m,2002}^{u} - v_{m,1998}^{p}\}$, which captures the vote advantage of Uribe in 2002 relative to Pastrana's vote in 1998.

- Again, large quantitative effects.

Persistence of Paramilitaries

Table 9: Persistence of the Paramilitary and Vote Share for Alvaro Uribe
Dependent Variable is Paramilitary Presence in 2004-2005

	Attacks			Log Attacks
Sample Restricted to Municipalities with Paramilitary Presence in 2000-2001				
Paramilitary Presence is Measured by:				
max{0, Uribe-Pastrana vote share}			0.50	
			(0.19)	
Uribe Vote Share	0.26	0.33		0.28
	(0.14)	(0.13)		(0.21)
Pastrana Vote Share	-0.44	-0.46		-0.71
	(0.19)	(0.18)		(0.14)
Uribe Vote Share X Pastrana Vote Share	-1.20	-0.87		-0.84
	(0.49)	(0.53)		(0.21)
Paramilitary Presence Before 2002	0.89	0.86	0.87	0.53
	(0.12)	(0.10)	(0.11)	(0.10)
Observations	275	275	275	96

Paramilitary Support and Vote for Reelection

Table 12: Reelection and Senators Elected frpm High Paramilitary Presence Areas
Dependent Variable equals 1 if Senator voted Yes for Reelection

		Paramilitary Presence is Measured by Attacks			
		Strategy Used is:			
		Share		Index	
Dummy Conservative	0.46				
	(0.11)				
Dummy Left	-0.55				
	(0.11)				
Dummy Third Parties	0.30				
	(0.13)				
Share of Votes from Paramilitary areas		1.26	1.86	1.22	1.39
		(0.41)	(0.57)	(0.57)	(0.59)
Observations	76	76	76	76	76

Persistence of Civil Wars

- A notable feature of post-World War II civil wars is their very long average duration:
    - Between 1900 and 1944: the average length of a civil war was one and half years.
    - After World War II: the average duration of civil wars has instead tripled to over four years.

- Once again the default explanation is that this is because of the proliferation of *politically weak states* (without the Weberian monopoly of violence) since World War II and the onset of decolonization.

Alternative Perspective

- Acemoglu, Ticchi and Vindigni (2010): civil wars, and thus the lack of power of the central state in many parts of the territory, persist in many African countries because the elites are afraid of increasing the power of the military.
    - Extreme examples: Liberia, Zaire and Sierra Leone.
- The elite (often the politicians controlling the coffers) have a choice:
    - Increase the power of the military. This will end the civil war, but then will unleash a series of further political changes, either necessitating greater power sharing with the military, or other political reforms.
    - Keep the military weak. This will lead to the persistence of civil wars and weak states, but the elite can still grab rents.

Main Story: Brief Overview

- The civilian government is controlled by an elite (which derive various rents from holding power).

- The government faces armed rebellion from an opposition group causing disruption to rents and incomes.

- Small army: does not threaten the power of the elite but it is insufficient for ending (with a high probability) this armed rebellion and establishing the monopoly of violence.

- Larger army: will end the civil war, but will also open the door to the intervention of the military in domestic politics (e.g. coup attempts).

- Elite-military interaction complicated: the elite cannot credibly commit to not reforming the military once the civil war is over.

- The elite often faces a choice between a persistent civil war versus the risk of a coup.

Results

- When the elite's rents are relatively unaffected by its lack of monopoly of violence, then the elite is unwilling to build a strong army:
  $\implies$ *weak armies & persistent civil wars.*

- In contrast, when the rebels pose a more costly threat to the elite, then the elite is willing to build a strong army
  $\implies$ *no persistence of civil war*, but:
  $\longrightarrow$ either *possibility of a coup* after the end of the civil war;
  $\longrightarrow$ or *large concessions to the military* for not undertaking coups.

- Our framework also generates a *substitutability between fiscal and political capacity* of the state:
  - higher fiscal capacity raises the equilibrium cost of building strong armies (as it makes military dictatorships both more likely and more costly to the elite) and makes persistence of civil wars more likely.

Environment

- Infinite horizon economy in discrete time with a unique final good.
- The society consists of four social groups: the elite, E, the citizens, L, the rebels, $\Re$, and the military, M.
- Each agent j at time $t = 0$ maximizes

$$\mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t \left(c_{j,t} + r_{j,t} \right), \qquad (27)$$

– $\mathbb{E}_0$ is the expectation at time $t = 0$;

– $\beta \in (0, 1)$ is the discount factor;

– $c_{j,t} \geq 0$ is the consumption of the agent in terms of the final good;

– $r_{j,t} \geq 0$ is a rent appropriated by each individual whose group is in power at time t. These rents may represent non-monetary payoffs from holding power or returns from natural resources or other income sources.

Environment (continued)

- Size of the elite is normalized to 1. Each agent has productivity a.
- Size of the citizens is equal to n. Each agent has productivity $A < a$.
- Size of the military: endogenous, x_t at time t; for simplicity, only the citizens are recruited as soldiers.
- We assume that $x \in \{x_\ell, x_m, x_h\}$, where $x_\ell < x_m < x_h < n$.
- x_ℓ: minimum size of the army – necessary for maintaining law and order and national defence.
- An army of size larger than the minimum level, $x \in \{x_m, x_h\}$, can be chosen to deal with the rebels.

Environment (continued)

- There are three political states $s_t \in \{W, D, M\}$.
- $W =$ civilian regime with civil war (rebellion).
- $D =$ civilian regime (democracy) without civil war.
- $M =$ military dictatorship.
- The civilian government, with or without rebellion, is ruled by the elite and can either represent a democracy (including a captured democracy) or a non-democratic regime ruled by an oligarchy.

Environment (continued)

- In a military dictatorship, the military commander (or a group of officers) is in power.
- Initial political state $s_0 = W$ (civilian regime under a rebellion).
- If the rebellion is defeated, there will be a transition to $s = D$, but the military can attempt a coup against democracy, which will then cause a transition to $s = M$ (assumed to be absorbing).
- Coups are not possible during the civil war ($s = W$).
- Possible transitions: $W \rightarrow D \rightarrow M$.

Environment (continued)

- Both civil war and coups cause economic inefficiencies.
- Civil war disrupts economic transactions and reduces all incomes by a factor $\psi \in [0, 1]$: the income of the elite is

$$(1 - \psi)a$$

and that of each citizen is

$$(1 - \psi)A.$$

- The military is not equipped to run the economy. Thus, under a military dictatorship, all incomes are reduced by a factor $\phi \in [0, 1]$, i.e. incomes are now

$$(1 - \phi)a \text{ and } (1 - \phi)A.$$

Environment (continued)

- The government collects revenues with proportional taxation $\tau_t \in [0, 1]$.
- Tax distortions are modeled in a simple way: there are no costs of taxation until $\delta > 0$, and after $\tau = \delta$, taxation is prohibitively costly (this makes δ the peak of the Laffer curve).
- These revenues are used to pay the salaries of soldiers, $w(x_t|s_t)$.
- The government budget constraint is

$$w(x_t|s_t)x_t \leq \tau(x_t|s_t)(a_t + (n - x_t)A_t).$$

Environment (continued)

- **Defeating the rebels:** The probability that the rebels are defeated is an increasing function of the strength of the state (the size of the army). We assume that the civil war ends with probability $p(x) \in [0, 1]$ in each period, where

$$p(x_\ell) = p < p(x_m) = p(x_h) = 1.$$

When $x_t = x_\ell$, there is a "high likelihood," probability $1 - p$, that the civil war will persist because of the weakness of the state.
A moderate/intermediate size of the army $x = x_m$, or an "oversized army" $x = x_h$, is sufficient to end the civil war immediately.

- **Coup attempts:**
Small army, $x = x_\ell$, cannot attempt a coup as it is too weak.
Strong armies, $x \in \{x_m, x_h\}$, can undertake a coup against the civilian government once the civil war is over.

Environment (continued)

- **Reforming the army:** Difference between an intermediate and an oversized army.
  – An *intermediate strong army*, x_m, can be downsized by the civilian government in any given period with probability $\lambda \in [0, 1]$.
  – An *oversized army*, x_h, is strong enough to withstand any attempt to reform and can thus never be reformed and downsized by a civilian government.

Environment (continued)

- Let us now characterize the Markov Perfect Equilibrium (MPE) of the dynamic political game between the elite and the military.
- Write the values (discounted present value) of the players as functions of payoff-relevant state variables (s_t, x_t), where $s_t \in \{W, D, M\}$ and $x_t \in \{x_\ell, x_m, x_h\}$.

Preliminary Results

Political state $s = W$ (civilian regime with civil war).

- If the elite choose a small army, $x = x_\ell$, this army cannot undertake a coup after the end of the civil war and $s = D$ is permanent.

- When $x \in \{x_m, x_h\}$, the army may attempt a coup against the democratic government in the state $s_t = D$, that is, after the rebels have been defeated.
  – Consequently, in these cases the elite need to take into account the strategy of the military to set fiscal policy.
  – No coup constraint:

  $$V^M\left(D, x_i | \text{coup}\right) \leq V^M\left(D, x_i | \text{no coup}\right) \quad \text{for } i \in \{m, h\}.$$

Preliminary Results (continued)

- Feasibility condition for coup prevention with an army of size x_h:

$$\phi \geq \frac{x_h R}{\delta \left(a + (n - x_h) A \right)} \equiv \phi_h^*.$$

- Feasibility condition for coup prevention with an army of size x_m:

$$\phi \geq \frac{\beta \lambda}{1 - \beta(1 - \lambda)} \left[1 - \frac{(1 - \tau_\ell) x_m A}{\delta(a + (n - x_m)A)} \right] + \frac{x_m R}{\delta(a + (n - x_m)A)} \equiv \phi_m^*.$$

— Coups can be prevented with both armies when the income disruption generated by the military running the economy is higher than a certain threshold.

— Note also that such threshold, ϕ_m^*, for an army size x_m is increasing in the probability λ that the military can be reformed after the end of the civil war (higher $\lambda \implies$ more difficult to prevent coups).

Preliminary Results (continued)

Let us impose the following assumption, which allows us to focus on the more novel and economically interesting cases.

Assumption:
(1) $\phi \in [\phi_h^*, 1]$ and $\lambda \in [\lambda^*, 1]$.
(2) $\beta > \beta^*$.

- This assumption implies that coups cannot be prevented with intermediate sized army x_m but prevention is feasible with an oversized military x_h.

- Intuition: intermediate size army anticipates reform and thus even with maximal transfers, would like to take power to stem such reform.

Characterization of the equilibrium

- If the elite do not prevent coups:
  an intermediate sized army is always preferred to an oversized one.
- If an oversized military is employed:
  prevention of coups is always preferable to non-prevention.

Therefore, the potential strategies for the elite are:

1. form an oversized military (x_h), defeat the rebels, and prevent coups, thus remaining in power but with a very influential military;

2. form an intermediate army (x_m), defeat the rebels, but face the risk of military takeover;

3. choose a small army (x_ℓ), and thus allow for persistent civil war.

Characterization of the equilibrium (continued)

- When this condition is satisfied, $V^E(W, x_h) > V^E(W, x_m)$, and the elite prefer an oversized army to an intermediate one:

$$(\bar{\tau}_h - \bar{\tau}_m)(1 - \psi)a \hspace{4cm} (28)$$
$$\leq \frac{\beta}{1-\beta}\left[(1-\lambda)(r + \phi a) + (\tau_\ell - \delta(1-\phi))\lambda a - \frac{x_h a}{a + (n - x_h)A}R\right]$$

Characterization of the equilibrium (continued)

Proposition

There exists a unique MPE with the following structure:

1. *Suppose that (28) is satisfied and $p \in [\hat{p}, 1]$ or that (28) is not satisfied and $p \in [p^*, 1]$. Then the elite choose a small army, $x = x_\ell$ and there is persistence of civil war. After the civil war ends, the civilian government (the elite) remains in power.*

2. *Suppose that (28) does not hold and $p \in [0, p^*)$, then the elite choose an intermediate army, $x = x_m$, and the civil war ends immediately, but there is possibility of a military coup and the formation of a military dictatorship.*

3. *Suppose that condition (28) is satisfied and $p \in [0, \hat{p})$, then the elite choose an oversized army, $x = x_h$, the civil war ends immediately, and civilian government remains in power, but with high wages and concessions for the military.*

Characterization of the equilibrium (continued)

- The elite will choose a **small army**, and will not establish a monopoly of violence over its territory, when:
  – this is not too ineffective at fighting the rebels ($p > \hat{p}$ or $p > p^*$).
- However, both thresholds can be very low or negative:
  – a small army may be chosen also when it is very ineffective in establishing the monopoly of violence; in this case the civil war can persist for a very long time (or forever).
- Such an outcome is more likely when:
  – the elite receive significant rents even when the civil war is ongoing (e.g. the civil war is in peripheral areas and does not interfere with the rents that the elite receive, which may be due to corruption or income from natural resources);
  – the disruption of income generated by the civil war (ψ) is low, and the income loss ϕ (of the elite and of the citizens) high under military regimes.

Characterization of the equilibrium (continued)

- A **high fiscal capacity** (δ) also makes the adoption of weak militaries more likely because of two distinct channels:
  1. it makes a military dictatorship more costly to the elite (when this will happen along the equilibrium path);
  2. it makes a military dictatorship more attractive for soldiers, thus making it more expensive for the elite to prevent coups (when they prefer to do so).

- For reasons related to the second channel, **high rents for the military from controlling the government**, also makes the elite more likely to choose a small army and a weak state.

- In all cases, the reason why the elite prefer a small army is that they are afraid of the behavior of a stronger army following the end of the civil war.

Characterization of the equilibrium (continued)

- When the elite decide to fight the rebels more vigorously and end the civil war, they can do so using one of two different strategies.

1. Build an intermediate sized army
   because of their inability to commit to not downsizing the army after the civil war ends, they cannot satisfy the no coup constraint, and there is a positive probability of a coup along the equilibrium path.

2. Build an oversized army
   this acts as a commitment to not reforming the military in the future. This amounts to making permanent concessions (high wages and other policy concessions) to the military as the price that the elite have to pay for fighting the rebels and establishing some sort of monopoly of violence (but this is mostly in the hands of the military not in the hands of the civilian government in this case).

Characterization of the equilibrium (continued)

- An interesting implication of the model, is a novel **substitutability between fiscal and political capacity** of the state.

- High **fiscal** capacity of the state (δ) is generally thought to increase the **political** capacity of the state (e.g., Besley and Persson, 2009).

- However, a higher fiscal capacity also puts more power in the hands of the military if they decide to attempt a coup. Through this channel, it discourages the civilian government from building a strong military and the monopoly of violence necessary for political capacity.

Conclusions

- Weak states are potentially costly and understanding the nature of these costs is an important area for political economy.
- But also, it is important to view weakness of state as an equilibrium outcome, not simply because of an inability to project the power of the state.
- Weak states are often a consequence of other institutional weaknesses and precipitate these institutional problems.