A Model of Equilibrium Institutions

Bernardo Guimaraes    Kevin Sheedy

London School of Economics

27th May 2010
Motivation

- Institutions are the “rules of the game” — “the humanly devised constraints that shape human interaction” (North, 1990).
- Important in explaining disparities in income across the globe.
Institutions are the “rules of the game” — “the humanly devised constraints that shape human interaction” (North, 1990).

Important in explaining disparities in income across the globe.

Institutions may serve the interest of elites...but why does this give rise to large economic inefficiencies?
Motivation

- Institutions are the “rules of the game” — “the humanly devised constraints that shape human interaction” (North, 1990).
- Important in explaining disparities in income across the globe.
- Institutions may serve the interest of elites...but why does this give rise to large economic inefficiencies?
- Why is there no “political” Coase Theorem in general?
- Under what conditions will elite control of institutions lead to economic distortions?
- This paper builds a model to address these questions.
Starting with

- ex-ante identical individuals,
- and a conflict “technology” ...
Starting with
- ex-ante identical individuals,
- and a conflict “technology” ...

**Equilibrium institutions** are determined:
- the group in power (the elite),
- rules on how output is allocated (e.g., taxes).

Institutions are determined to maximize payoffs of those in the elite.
Starting with

- ex-ante identical individuals,
- and a conflict “technology” ...

Equilibrium institutions are determined:

- the group in power (the elite),
- rules on how output is allocated (e.g., taxes).

Institutions are determined to maximize payoffs of those in the elite.
Constraint on choice of institutions: threat of rebellions.
- Rebellions destroy existing institutions, making way for new ones.
- Both those inside and outside the elite can take part in rebellions.
Constraint on choice of institutions: threat of rebellions.
- Rebellions destroy existing institutions, making way for new ones.
- Both those inside and outside the elite can take part in rebellions.

In the absence of a rebellion, the rules laid down by the institutions are followed.
- Institutions might be able to establish credible rules.
- So a political Coase Theorem might emerge.
Constraint on choice of institutions: threat of rebellions.
- Rebellions destroy existing institutions, making way for new ones.
- Both those inside and outside the elite can take part in rebellions.

In the absence of a rebellion, the rules laid down by the institutions are followed.
- Institutions might be able to establish credible rules.
- So a political Coase Theorem might emerge.

However, once institutions have been destroyed, new ones are not constrained by any past rules or deals.
- Rebellions cannot commit to establishing particular institutions.
- Who would enforce such deals?
In a plain vanilla case, a political Coase Theorem arises. But:
Some key insights

In a plain vanilla case, a political Coase Theorem arises. But:

- In some cases, expanding the elite is the only way to make rules credible that would otherwise be time inconsistent:
  - This is even though everyone in the elite is identical ...
  - ... the threat of conflict between members of the elite makes changing the rules more difficult.
Some key insights

In a plain vanilla case, a political Coase Theorem arises. But:

- In some cases, expanding the elite is the only way to make rules credible that would otherwise be time inconsistent:
  - This is even though everyone in the elite is identical ...
  - ... the threat of conflict between members of the elite makes changing the rules more difficult.

- In equilibrium, power and rents are closely related:
  - Endogenous limits on the set of possible transfers.
  - Political Coase theorem breaks down.
Some key insights

In a plain vanilla case, a political Coase Theorem arises. But:

- In some cases, expanding the elite is the only way to make rules credible that would otherwise be time inconsistent:
  - This is even though everyone in the elite is identical ...
  - ... the threat of conflict between members of the elite makes changing the rules more difficult.

- In equilibrium, power and rents are closely related:
  - Endogenous limits on the set of possible transfers.
  - Political Coase theorem breaks down.

- Not enough power sharing (elites are too small) $\implies$ Too little investment.
Plan

1. Basic model
2. Benchmark case of public good provision
3. Private investment and capital taxation
Measure one of ex-ante identical and self-interested individuals.

- Institutions do not depend on benevolence, competence or factional affiliation of those in power.
- As in Orwell’s *Animal Farm*, the “men” and the “pigs” are the same.
- But in equilibrium some will be “more equal than others”.
Measure one of ex-ante identical and self-interested individuals.

- Institutions do not depend on benevolence, competence or factional affiliation of those in power.
- As in Orwell’s *Animal Farm*, the “men” and the “pigs” are the same.
- But in equilibrium some will be “more equal than others”.

Any group in power is constrained by threats of rebellion, but if another group were to come to power through a rebellion then it would be similarly constrained by further threats of rebellion.

- Equilibrium institutions are a fixed point.
Environment

Measure one of ex-ante identical and self-interested individuals.

- Institutions do not depend on benevolence, competence or factional affiliation of those in power.
- As in Orwell’s *Animal Farm*, the “men” and the “pigs” are the same.
- But in equilibrium some will be “more equal than others”.

Any group in power is constrained by threats of rebellion, but if another group were to come to power through a rebellion then it would be similarly constrained by further threats of rebellion.

- Equilibrium institutions are a fixed point.

No uncertainty:

- No rebellions in equilibrium.
Environment

Individuals:

- will be either producers or members of the elite.

Institutions:

- Determine composition of the elite and allocation of resources.
- Once created cannot be modified, unless a rebellion occurs.

Rebellions:

- Destroy the current institutions, allowing new ones to be formed.
- The rebels must incur a cost to launch a rebellion.

What individuals do:

- Producers receive \( q \) units of a homogeneous good.
- Members of the elite can defend their institutions.
- They can all take part in rebellions.
Environment

Individuals:
- will be either producers or members of the elite.

Institutions:
- Determine composition of the elite and allocation of resources.
- Once created cannot be modified, unless a rebellion occurs.
Environment

Individuals:
- will be either producers or members of the elite.

Institutions:
- Determine composition of the elite and allocation of resources.
- Once created cannot be modified, unless a rebellion occurs.

Rebellions:
- Destroy the current institutions, allowing new ones to be formed.
- The rebels must incur a cost to launch a rebellion.

What individuals do:
- Producers receive $q$ units of a homogeneous good.
Environment

Individuals:
- will be either producers or members of the elite.

Institutions:
- Determine composition of the elite and allocation of resources.
- Once created cannot be modified, unless a rebellion occurs.

Rebellions:
- Destroy the current institutions, allowing new ones to be formed.
- The rebels must incur a cost to launch a rebellion.

What individuals do:
- Producers receive $q$ units of a homogeneous good.
- Members of the elite can defend their institutions.
- They can all take part in rebellions.
Sequence of events

- No elite
- New institutions
- Rebellion?
- Production, taxes, payoffs
Establishing institutions

Who is in power:

- Size of the elite $a$ maximizes the average utility of its members:
  - No incentive to draft or expel any members.
  - Distribution of power reflects the interest of the elite power, not the welfare of society.
Who is in power:

- Size of the elite \( a \) maximizes the average utility of its members:
  - No incentive to draft or expel any members.
  - Distribution of power reflects the interest of the elite power, not the welfare of society.

- Given size \( a \), the composition of the elite is determined by a predetermined ordering, set by the previous rebellion (or “nature” in the first round).
Establishing institutions

Allocation of resources:

- The elite chooses:
  - $\tau(\cdot)$: distribution of (lump-sum) taxes on producers;
  - $C_a(\cdot)$: distribution consumption among elite members;

- to maximize the average utility of its members.

- Once institutions are established, each individual gets to know his $C_a(i)$ or $\tau(i)$. 
Establishing institutions

Allocation of resources:

- The elite chooses:
  - $\tau(\cdot)$: distribution of (lump-sum) taxes on producers;
  - $C_a(\cdot)$: distribution consumption among elite members;
- to maximize the average utility of its members.
- Once institutions are established, each individual gets to know his $C_a(i)$ or $\tau(i)$.

The maximization problem for choosing institutions is forward looking.
Rebellion

- Maximum fighting effort individual $i$ is willing to exert if he expects to have a place in the subsequent elite:

$$F(i) = U'_a - U(i)$$

- $U'_a$: belief about the average utility of members of the subsequent elite;
- $U(i)$: utility of individual $i$ under the current institutions.

- Incentives for rebellion will also depend on:
  - $a'$: belief about the size of the subsequent elite.
Rebellion

- Rebellion: ordering of individuals that determines who would be a member of the subsequent elite for given size of that elite.
  - Ordering is over all individuals (including the current elite).
Rebellion

- Rebellion: ordering of individuals that determines who would be a member of the subsequent elite for given size of that elite.
  - Ordering is over all individuals (including the current elite).
- Rebel army ($\mathcal{R}$): set of size $a'$ of individuals ordered first.
Rebellion

- Rebellion: ordering of individuals that determines who would be a member of the subsequent elite for given size of that elite.
  - Ordering is over all individuals (including the current elite).
- Rebel army ($\mathcal{R}$): set of size $a'$ of individuals ordered first.
- Incumbent army ($\mathcal{A}\setminus\mathcal{R}$): set of size $a - d$ comprising members of the elite not in the rebel army:
  - $a = \text{size of elite},$
  - $d = \text{measure of elite members in the rebel army}.$

The rebellion is profitable if

\[
\int_R F(\dot{\bar{y}}) \, d\dot{\bar{y}} > \delta(a - d)
\]

where $\delta$ is an (exogenous) power parameter of the incumbent army.

\[
\delta(a - d)
\]

is the cost the incumbent army imposes on the rebels.
Rebellion

- Rebellion: ordering of individuals that determines who would be a member of the subsequent elite for given size of that elite.
  - Ordering is over all individuals (including the current elite).
- Rebel army ($\mathcal{R}$): set of size $a'$ of individuals ordered first.
- Incumbent army ($\mathcal{A}\setminus\mathcal{R}$): set of size $a - d$ comprising members of the elite not in the rebel army:
  - $a =$ size of elite,
  - $d =$ measure of elite members in the rebel army.
- The rebellion is profitable if

$$\int_{\mathcal{R}} F(\iota) d\iota > \delta(a - d)$$

where $\delta$ is an (exogenous) power parameter of the incumbent army.
- $\delta(a - d)$ is the cost the incumbent army imposes on the rebels.
Assumption: any fighting would only be between those in the current or subsequent elites.

- Those who are producers and who expect to remain producers will not fight.
Rebellion

Assumption: any fighting would only be between those in the current or subsequent elites.

- Those who are producers and who expect to remain producers will not fight.

Rationale: it is much easier for armies to provide incentives to fight for those who will be in power if they win.

- Armies could deny a place in the elite to those who did not exert enough effort.
- Other forms of punishment would be costly.
Producers make $q$ units of goods (exogenous).

The “rules of the game” laid down by the prevailing institutions are followed:

- Taxes are collected and distributed among members of the elite.

Payoffs are received:

- Utility function: $u(C)$, with $U' > 0$ and $U'' \leq 0$. 
Equilibrium institutions are those that maximize

\[
\frac{1}{a} \int_{\mathcal{A}} U_a(\nu) \, d\nu
\]

subject to

\[
\int_{\mathcal{R}} (U'_a - U(\nu)) \, d\nu \leq \delta (a - d)
\]

for all sets \( \mathcal{R} \) such that \( \mathbb{P}(\mathcal{R}) = a' \); with \( d = \mathbb{P}(\mathcal{R} \cap \mathcal{A}) \).

- Solution depends on beliefs \( U'_a \) and \( a' \).
The post-rebellion institutions

How are $U'_a$ and $a'$ determined?

- Once a rebellion occurs, the new institutions are determined through an identical maximization problem.
  - After each potential rebellion, history is payoff irrelevant — the cost of conflict is sunk.
- No fundamental reason why elites would make different choices.
- Natural to focus on Markovian equilibria.
Definition of a Markovian equilibrium:
- $a, \tau(\cdot)$ and $U_a(\cdot)$ maximize the average payoff of those in the elite;
- $a = a'$;
- Same distribution of taxes over producers;
- Same distribution of payoffs in the elite.
Markovian equilibrium

Proposition

Any Markovian equilibrium must have the following properties:

1. **Equalization of producers’ payoffs:** $U_p(i) = U_p$, $\forall i$

2. **Sharing power implies sharing rents:** $U_a(i) = U_a$, $\forall i$

3. **The no-rebellion constraint can be written as:**

   $$U_p \geq U_a' - \delta \frac{a}{a'}$$

4. **Power determines rents:** $U_a - U_p = \delta$
Proposition

Any Markovian equilibrium must have the following properties:

1. Equalization of producers’ payoffs: $U_p(ı) = U_p$, $\forall ı$
2. Sharing power implies sharing rents: $U_a(ı) = U_a$, $\forall ı$
3. The no-rebellion constraint can be written as:
   $$U_p \geq U_a' - \delta \frac{a}{a'}$$
4. Power determines rents: $U_a - U_p = \delta$

In a simple endowment economy, equalization of producers’ payoffs entails tax equalization ($\tau(ı) = \tau$).
Tradeoff: Higher tax $\tau$ requires a larger elite size $a$. 
The provision of public goods

Benchmark case of provision of public goods:

- Technology that converts units of output into public goods.
- Converting $g$ units of goods per person yields public goods of value $f(g)$ per person.

Output available for consumption:

$$output = q - g + f(g)$$

A benevolent social planner would choose $g$ such that:

$$f'(g) = 1$$
The provision of public goods

Benchmark case of provision of public goods:

- Technology that converts units of output into public goods.
- Converting $g$ units of goods per person yields public goods of value $f(g)$ per person.
- Output available for consumption:

$$(1 - a)q - g + f(g)$$
The provision of public goods

Benchmark case of provision of public goods:

- Technology that converts units of output into public goods.
- Converting \( g \) units of goods per person yields public goods of value \( f(g) \) per person.
- Output available for consumption:

\[(1 - a)q - g + f(g)\]

- A benevolent social planner would choose \( g \) such that:

\[f'(g) = 1\]
The provision of public goods

Benchmark case of provision of public goods:

- Technology that converts units of output into public goods.
- Converting $g$ units of goods per person yields public goods of value $f(g)$ per person.
- Output available for consumption:
  \[(1 - a)q - g + f(g)\]

- A benevolent social planner would choose $g$ such that:
  \[f'(g) = 1\]

Does a political Coase theorem arise in this setting?
The provision of public goods

- Institutions determine $a$, $\tau$ and $g$.
- Individuals take $g$ into account when deciding whether to rebel.
The provision of public goods

- Institutions determine $a$, $\tau$ and $g$.
- Individuals take $g$ into account when deciding whether to rebel.
- Consumption of a producer:

\[ C_p = q - \tau + f(g) \]

- Consumption of a member of the elite:

\[ C_a = \frac{(1 - a)\tau - g}{a} + f(g) \]
The equilibrium institutions are the solution of:

$$\max_{a,\tau,g} U \left( \frac{(1-a)\tau - g}{a} + f(g) \right)$$

subject to

$$U'_a - \delta \frac{a}{a'} \leq u(q + f(g) - \tau) \quad \text{with} \quad a = a', \quad \tau = \tau' \quad \text{and} \quad g = g'.$$

First-order condition with respect to $g$:

$$f'(g^*) = 1$$
Equilibrium

- The public good is efficiently provided.
  - Even though the elite is purely self-interested, it acts as a meaningful government in its provision of public goods.
  - Similar result has been found in other models — a benchmark case.
- Individuals take the public good provision as well as taxes into account when deciding whether to rebel:
  - provision of public goods slackens the no-rebellion constraint;
  - taxes raised to finance them tighten the constraint.
The public good is efficiently provided.

Even though the elite is purely self-interested, it acts as a meaningful government in its provision of public goods.

Similar result has been found in other models — a benchmark case.

Individuals take the public good provision as well as taxes into account when deciding whether to rebel:

- provision of public goods slackens the no-rebellion constraint;
- taxes raised to finance them tighten the constraint.

Result is consistent with a political Coase Theorem:

- setting down rules analogous to contracting;
- threat of rebellion: there is a price attached to policy actions;
- efficient outcome, transfers ensure constraints are respected.
Extension of the model:

- Producers can exert effort to raise output in the future,
- and rebellions can occur after effort is made but before output is received.
Extension of the model:

- Producers can exert effort to raise output in the future,
- and rebellions can occur after effort is made but before output is received.

Investment proceeds changes incentives for rebellion, and thus affects the choice of institutions.

- What are the equilibrium institutions?
- Are they consistent with a political Coase Theorem?
Investment

No elite

New institutions

Rebellion? yes

Producers can invest

Rebellion? no

New institutions

Production, taxes, payoffs

New institutions

Rebellion? yes

Producers can invest

Rebellion? no

New institutions

Production, taxes, payoffs

B Guimaraes & K Sheedy (LSE)  Equilibrium Institutions  ESSIM, 27th May 2010  26 / 55
Each producer gets to know his own (idiosyncratic) effort requirement, $\epsilon : \text{Uniform}[\epsilon_L, \epsilon_H]$.
- Assumption: parameters are such that some producers will choose not to invest.

Those who make the effort receive $\kappa$ units of output (“capital”) at the production stage.

Capital is observable, effort is not.
Each producer gets to know his own (idiosyncratic) effort requirement, $\epsilon : \text{Uniform}[\epsilon_L, \epsilon_H]$.
- Assumption: parameters are such that some producers will choose not to invest.

Those who make the effort receive $\kappa$ units of output ("capital") at the production stage.

Capital is observable, effort is not.

For tractability, $U(C) = C$. 
Equilibrium institutions survive rebellion at all points.

To characterize the equilibrium:

1. We start by analysing the possibility of a rebellion at the post-investment stage.
2. Then we determine the institutions chosen at the pre-investment stage.
Suppose a rebellion succeeds.
Suppose a rebellion succeeds.

Result: the elite chooses capital tax = 100%:
- Optimal for the elite to have all producers receive the same utility $U_p$.
- Having payoffs independent of individual capital stock requires full expropriation.
- Sunk investment cost does not influence decisions about rebelling.
Suppose a rebellion succeeds.

Result: the elite chooses capital tax = 100%:
- Optimal for the elite to have all producers receive the same utility $U_p$.
- Having payoffs independent of individual capital stock requires full expropriation.
- Sunk investment cost does not influence decisions about rebelling.
- Total capital $K$ is confiscated and equally distributed among all individuals (both inside and outside the elite).
- The new elite size is independent of the capital stock.
The institutions specify:

- The size of the elite $a$;
- A lump-sum tax on all producers $\tau_q$;
- A tax on capital $\tau_k$:

Chosen to maximize the payoff of those in the elite, subject to no rebellions.
Three no-rebellion constraints.
No-rebellion constraints

Three no-rebellion constraints.

By source and timing of rebellion:

- Producers at pre-investment stage
- Producers (with no capital) at post-investment stage
- Elite at post-investment stage
No-rebellion constraints

Three no-rebellion constraints.

By source and timing of rebellion:

- Producers at pre-investment stage
- Producers (with no capital) at post-investment stage
- Elite at post-investment stage

In a Markovian equilibrium with some investment:

- The post-investment stage constraints for both producers (with no capital) and the elite are binding
- The pre-investment stage constraint is slack.
If the return on investment is sufficiently high then equilibrium capital taxes will be less than 100%, and some producers will invest.
If the return on investment is sufficiently high then equilibrium capital taxes will be less than 100%, and some producers will invest.

When some producers will invest, the equilibrium elite size will be larger than when there is no investment.
Intuition for protection of property rights

The presence of capital increases incentives for rebellion.

- Investment cost is sunk.
Intuition for protection of property rights

The presence of capital increases incentives for rebellion.

- Investment cost is sunk.

Some producers invest $\iff$ elite is larger than its equilibrium size after a rebellion at the post-investment stage.
The presence of capital increases incentives for rebellion.

- Investment cost is sunk.

Some producers invest $\Leftrightarrow$ elite is larger than its equilibrium size after a rebellion at the post-investment stage.

- Discouraging rebellion by producers (with no capital) requires either a larger elite or lower taxes.
- Discouraging rebellion by members of the elite requires either a larger elite or higher taxes.
Intuition for protection of property rights

If the pre-investment stage elite is larger than its equilibrium size after a rebellion at the post-investment stage then changing institutions is costly for the elite:

- There would not be enough places in the subsequent elite for all those in the current elite.
- Those who would lose power fight against rebellions changing the institutions.
Intuition for protection of property rights

If the pre-investment stage elite is larger than its equilibrium size after a rebellion at the post-investment stage then changing institutions is costly for the elite:

- There would not be enough places in the subsequent elite for all those in the current elite.
- Those who would lose power fight against rebellions changing the institutions.

The extra members of the elite have no special function:

- They simply deter rebellions that would dislodge them from power.
Intuition for protection of property rights

Two key assumptions:

1. Institutions cannot be modified without a rebellion.
   - In principle, elites can create institutions that tie their hands.
   - Institutions survive everything — except the collapse of the whole system.
Two key assumptions:

1. **Institutions cannot be modified without a rebellion.**
   - In principle, elites can create institutions that tie their hands.
   - Institutions survive everything — except the collapse of the whole system.

2. **Were a rebellion to occur, there can be no enforcement of deals made prior to the rebellion.**
   - Optimization along *all* institutional variables.
   - No “meta-institutions” to enforce deals concerning the choice of institutions themselves.
Elites can choose institutions that allow for a credible commitment to a capital tax less than 100%.

Will they set the capital tax rate efficiently?
Efficiency benchmark:

- Suppose a benevolent agent can impose a particular level of capital taxes on all elites.
- The elite chooses all other institutional variables in its own interests (subject to no rebellions) taking capital taxes as given.
- The benevolent agent chooses capital taxes to maximize the average utility of all individuals, taking elite control of other institutional variables as given.
There are two distortions

First distortion: too little power sharing.

- Protection of property rights requires a larger elite.
- The extra elite members must be paid more than producers.
  - Sharing power requires sharing rents.
- The elite are reluctant to share rents by increasing their size.
There are two distortions

First distortion: too little power sharing.
- Protection of property rights requires a larger elite.
- The extra elite members must be paid more than producers.
  - Sharing power requires sharing rents.
- The elite are reluctant to share rents by increasing their size.

Second distortion: investor surplus cannot be fully extracted by the elite.
- Individual investment effort is unobservable.
- The extent to which individual investors’ no-rebellion constraints are slack is unknown.
A political Coase Theorem breaks down

- Inseparability of power and rents puts an endogenous limit on the set of possible transfers.
  - It is not feasible to add individuals to the elite to ensure stable institutions, but only pay these individuals the same as a producer.
  - The low-paid members of the elite would rebel.

- Unobservability of investors’ surplus.
The extra individuals in the elite might be interpreted as a parliament. Parliaments represent those who elected them...
The extra individuals in the elite might be interpreted as a parliament.
Parliaments represent those who elected them...
... but so do democratically elected presidents.
Power sharing ensures institutions are more stable by making it costly for some members of the elite to try to change them.
“The princes who have wanted to make themselves despotic have always begun by uniting in their person all the magistracies” — Montesquieu, *The Spirit of the Laws*. 

North and Weingast (1989): that led to secure property rights and the elimination of confiscatory government.

After the Glorious Revolution, England could borrow much more, at lower rates.
  - Sharing power allows for institutions credibly protecting property rights.

Good for the country...

North and Weingast (1989): that led to secure property rights and the elimination of confiscatory government.

After the Glorious Revolution, England could borrow much more, at lower rates.

- Sharing power allows for institutions credibly protecting property rights.

Good for the country...

...but good for the King?

North and Weingast (1989): that led to secure property rights and the elimination of confiscatory government.

After the Glorious Revolution, England could borrow much more, at lower rates.

- Sharing power allows for institutions credibly protecting property rights.

Good for the country...

...but good for the King?

earlier kings fought hard against sharing power:

North and Weingast (1989): that led to secure property rights and the elimination of confiscatory government.

After the Glorious Revolution, England could borrow much more, at lower rates.

- Sharing power allows for institutions credibly protecting property rights.

Good for the country...

...but good for the King?

earlier kings fought hard against sharing power:

- Sharing power requires sharing rents.

Skip other examples
Malmendier (2009): Rome’s societas publicanorum were the earliest predecessors of modern corporations.

Their demise coincided with transition from the Roman Republic to the Roman Empire.

Possible reason: while power was decentralized (Roman Republic), it was possible to have rules that guarantee property rights.

But once power is centralized (Roman Empire), protection against expropriation was not possible any longer.
Related historical examples: Podesteria

- Many medieval Italian cities employed a podestà.
- Podestà: a leader coming from another city with military power that would rule the city for one year.
- Generously paid.
- Having the podestà allowed for inter-clan cooperation and investment.
- The podestà had to be sufficiently strong relative to the powerful clans in the city.
- In the language of the model, the elite (the total group of people with power) had to be large enough.
Empirical evidence: government expropriation of property is an important issue.

- Acemoglu and Johnson (2005) suggest “property rights” institutions are more important than “contracting institutions”.

Model: protection against government expropriation is not optimally provided (capital taxes are too high):

- Institutions credibly committed to low capital taxes are feasible...
- but require the elite to share power...
- which requires sharing rents.
And Samuel told all the words of the Lord unto the people that asked of him a king.

And he said, This will be the manner of the king that shall reign over you: He will take your sons, and appoint *them* for himself, for his chariots, and *to be* his horsemen; and *some* shall run before his chariots. . . .

And he will take your daughters *to be* confectionaries, and *to be* cooks, and *to be* bakers. . . .

He will take the tenth of your sheep: and ye shall be his servants.

And ye shall cry out in that day because of your king which ye shall have chosen you; and the Lord will not hear you in that day.
And Samuel told all the words of the Lord unto the people that asked of him a king.
And he said, This will be the manner of the king that shall reign over you: He will take your sons, and appoint *them* for himself, for his chariots, and *to be* his horsemen; and *some* shall run before his chariots. . . .
And he will take your daughters *to be* confectionaries, and *to be* cooks, and *to be* bakers. . . .
He will take the tenth of your sheep: and ye shall be his servants.
And ye shall cry out in that day because of your king which ye shall have chosen you; and the Lord will not hear you in that day.
Nevertheless the people refused to obey the voice of Samuel; and they said, Nay; but we will have a king over us;
That we also may be like all the nations; and that our king may judge us, and go out before us, and fight our battles.
Concluding remarks

Sharing power allows for commitment to rules that would otherwise be time-inconsistent.
Sharing power allows for commitment to rules that would otherwise be time-inconsistent.

As sharing power requires sharing rents, capital taxes are too high, there is too little protection of investment.
Concluding remarks

• Sharing power allows for commitment to rules that would otherwise be time-inconsistent.
• As sharing power requires sharing rents, capital taxes are too high, there is too little protection of investment.
• Possible extensions:
  • Which factors influence power sharing (and investment);
  • Other sources of inefficiency in this framework;
  • Heterogeneity, uncertainty...
Related literature

- **Downs (1957):** governments composed of self-interested agents.
  - A vast literature on political economy has developed.
  - Much of that focuses on elections, assuming an environment with well-functioning institutions.

- **Work with similar motivation has been done by:**
  - Acemoglu and Robinson (2006, 2008),
  - Besley and Persson (2009, 2010),
Coalition formation (Ray (2007)).
- Non-cooperative process to establish rules, that are implemented by assumption.
- Modelling of rebellions related to blocking in coalitions.
- Distinguishing feature: the “rebellion technology”.

- Institutions as the focal point that determines allocation of resources once production has taken place.

Conflict (Grossman and Kim (1995), Hirshleifer (1995)).
- Here, people fight to establish the rules, not over what has been produced.
- They fight in groups, not as isolated individuals.
The model with linear utility

- $U(C) = C$.
- Problem:

$$\max_{a, \tau} \frac{1 - a}{a} \tau \text{ s.t. } C_a' - \delta \frac{a}{a'} \leq q - \tau$$
How we solve it

\[
\max_{a,\tau} \frac{1-a}{a} \tau \quad \text{s.t.} \quad C_a' - \delta \frac{a}{a'} \leq q - \tau
\]

- Constraint yields an expression for \( \tau \).
- We substitute it into the objective function.
- First order condition with respect to \( a \).
- Impose equilibrium (\( a = a' \), \( C_a = C_a' \))
\[ a^* = \frac{\delta}{q + 2\delta} \]

\[ C_a = \frac{(q + \delta)^2}{q + 2\delta}, \quad C_p = \frac{(q + \delta)^2}{q + 2\delta} - \delta \]

- In equilibrium, \( C_a - C_p = \delta \).
- Results for \( \delta/q < (1 + \sqrt{5})/2 \) (otherwise consumption of producers is 0).
The model with linear utility
The model with log utility

- \( U(C) = \log(C) \).
- Problem:

\[
\max_{a, \tau} \log \left( \frac{1 - a}{a} \right) \quad \text{s.t.} \quad \log \left( C_a' \right) - \delta \frac{a}{a'} \leq \log(q - \tau)
\]
Solution

\[ a = \frac{2\delta e^{-\delta}}{1 + 2\delta e^{-\delta} + \sqrt{1 + 4\delta e^{-\delta}}} \]

\[ C_a = \frac{(1 - a)q}{a + (1 - a)e^{-\delta}} \quad , \quad C_p = \frac{e^{-\delta}(1 - a)q}{a + (1 - a)e^{-\delta}} \]

- \( a^* \) is independent of \( q \).
- Log utility: cost of conflict is proportional to \( q \).
The model with log utility