

Conflict, Evolution, Hegemony, and the Power of the State

David K. Levine and Salvatore Modica

04/15/13

Introduction

- game theory: many possible equilibria
- interpretation: many possible stable social norms or institutions
- observation: there is a wide array of different institutions both across space and time
- political systems: from relatively autocratic (exclusive) to democratic (inclusive)

Evolutionary Game Theory

- can evolutionary game theory tell us about the relative likelihood of institutions?
- Individual evolution (Kandori, Mailath and Rob, Young, Ellison) – risk dominance
- But isn't evolution driven by competition between groups? Between societies with different institutions?
- Intuition: efficiency
- Nature of competition between groups over resources?

Resource Competition

- competition through voluntary migration (Ely and some others)
 - efficiency
 - no particular tendency towards large or hegemonic states
- historically institutional success has not been through voluntary immigration into the arms of welcoming neighbors
- people and institutions have generally spread through invasion and conflict – Carthaginians did not emigrate to Rome
- institutional change most often in the aftermath of the disruption caused by warfare and other conflicts (Bowles and some others)
- which institutions are likely to be long-lived when evolution is driven by conflict?

Institutions and State Power

- U.S. institutions – low taxes, high output
- U.S.S.R. Institutions – high taxes, low output
- both generate substantial state power
- we model this trade-off through a stylized theory

A Static Example

state officials (and their clients) choose state power $g \in [0, 1]$, collusive group, moves first

producers choose effort $a \in [0, 1]$, representative individual, move second

institutions described by exclusiveness parameter $\chi \in [0, 1]$, fixed in short run, but subject to evolutionary pressures

taxes depend on state power (tax collectors, armies, police, judges, infrastructure)

taxes depend on institutions

- in democracy many checks and balances (Western nations)
- in autocracy few (North Korea)

tax rate: $\tau \equiv \min \{1, \chi g\}$

Preferences and Equilibrium

producers $c(a)$ cost of effort receive utility

$$u^P = (1 - \tau)a - c(a) + \xi^P g$$

ξ^P measures usefulness of state power in providing public goods

why don't state officials take all the taxes for themselves? Why swords rather than jewelry?

- our answer: they need the swords to collect the taxes to pay for their jewelry – the external use of state power largely incidental
- benchmark assumption: perfect collusion

state officials residual claimants

$$u^O = \tau a - g + \xi^O g; \text{ can be negative for simplicity, } \xi^O < 1$$

action profile (g, a) an *equilibrium* = Stackelberg equilibrium

Institutions, State Power and Welfare

a technical assumption on functional form: properness

Theorem: *In a proper economy there is a unique equilibrium level of state power $g(\chi)$, and it is single peaked in χ ; the state power maximizing level of exclusivity $\chi^g \geq \chi^W$ the welfare maximizing level and if the value of public goods $\xi^P + \xi^O$ is not too great then the inequality is strict.*

state power maximization leads to greater exclusiveness than welfare maximization

Theorem: *Compared to welfare maximization, state power maximization implies higher taxes, lower utility for producers, higher utility for state officials and of course lower welfare.*

higher extractiveness in the sense of Acemoglu and Robinson

Competition Between Societies

list of societies $j = 1, \dots, M$ characterized by institutions and choices

χ_j, g_j, a_j

societies compete over an integral number L units of land; constant returns to scale in land

L_{jt} land controlled by society j at time t where $\sum_{j=1}^M L_{jt} = L$

society active if it has a positive amount of land

a hegemony at j if $L_j = L$

Markovian Dynamics

state variable $L_t = (L_{1t}, L_{2t}, \dots, L_{Mt})$ [note use of word “state”]

transition probabilities determined by conflict resolution function

at most one unit of land changes each period: $|L_{jt+1} - L_{jt}| \leq 1$

loss of a unit of land by a society is called *disruption*

disruption is not the same as conquest and conflict is not the same as war

- Caesar conquered Gaul in the sense it became part of Rome
- U.S. disrupted Iraq in the sense it fell into anarchy
- Ukraine became disrupted not because of invasion but because of competing financial deals offered by Russia and the EU

Conflict Resolution

chance of disruption depends on state power, land holdings, internal stability, the strength of outside forces g_0 and the ease of overcoming overwhelming odds ϵ

internal stability described by an indicator variable $e_j = 1$ if beliefs are in equilibrium, 0 otherwise

for beliefs to be in equilibrium g_j, a_j must be an equilibrium and people must believe that this is not likely to change

if beliefs are not an equilibrium then change is more likely: people will either wish to make different choices (state officials will want to modify g to improve their utility) or dissatisfaction with the status quo may lead to institutional change

probability of disruption (loss of land by j) $\pi_j(e_j, g_j, L_j, g_{-j}, L_{-j}, g_0)[\epsilon]$

Nature of the Parameters

L_{jt} endogenous, g_{jt}, e_{jt} characteristics of institutions subject to evolutionary selection

ϵ, g_0 exogenous

we think of ϵ as small and relatively constant over time and space

Resistance

conflict between opponents of “similar size” may easily lead one or the other to lose land: Alsace-Lorraine in 1871, 1918 shifting from France to Germany and back

conflict against overwhelming odds different

on December 2, 1913 when the shoemaker Karl Blank laughed at German soldiers he was beaten and paralyzed, and indeed more substantial protests of up to 3,000 people had no consequence for German control over Alsace-Lorraine

ϵ is a measure of Karl Blank's chances of success

specifically, we deal with disruption probabilities of the form $p\epsilon^r$ where r is called the *resistance*; higher resistance means less likely to be disrupted

zero resistance means appreciable chance of disruption

Learning and Unstable Societies

$e_j = 0$ then $\pi_j(e_j, g_j, L_j, g_{-j}, L_{-j}, g_0)[\epsilon]$ is positive and does not depend on ϵ

meaning: if beliefs are not in equilibrium then there is no resistance

internal instability: people will change their actions or institutions relatively quickly if incentive constraints are not satisfied or not believed to be satisfied

- in equilibrium there is nothing to be learned so little change
- out of equilibrium the opposite

this is a strong force towards equilibrium

Consequences of Disruption

change takes place only on one unit of land each period – what happens to the people who live on that land?

if change takes place it has an element of randomness

- may join an active society
- or may adopt new institutions and/or actions by “joining” an inactive society

formally: a unit of land that is disrupted is gained by a society chosen randomly according to the function $\lambda(k|j, L_t) > 0$ for $k \neq j$ and $\lambda(j|j, L_t) = 0$

note lack of dependence on ϵ

Resistance of Stable Societies

$$r_j(g_j, L_j, g_{-j}, L_{-j}, g_0)$$

- symmetry: function is independent of j (names of the societies do not matter)
- increasing in own strength g_j, L_j and decreasing in opponent strength g_{-j}, L_{-j} and when resistance is non-zero strictly increasing/decreasing
- an appreciable chance of losing land to a superior opponent:
 - lowest resistance (weakest) active society has zero resistance
- better to face divided opponents than unified

Strength of Outside Forces

what forces are “outside” of L ?

protected by asymmetric geographical barriers – they can get at you, but you can't get at them

depends on geography and technology

- English channel not a barrier given English and Roman technology in Julius Caesar's time
- post 1500 period naval technology and standing navies favored strongly the short coastline of England over the long coastline of continental Europe

Strength of Insiders and Outsiders

resistance of hegemony to outsiders $r_j(g_j, L, g_{-j}, 0, g_0)$;

outsiders are disruptive: resistance is decreasing in g_0

assume existence of a strictly increasing safety threshold $g^*(g_0)$: for bigger g_j there is resistance; for smaller g_j no resistance

strong outsiders: Battle of Yorktown 1781

8,000 French and 11,000 U.S. soldiers with the support of a French naval fleet defeat British forces

low state power: June 14, 1846

thirty three people took over the Mexican garrison of Sonoma and declared the California Republic; it was annexed by the U.S. 26 days later; there were roughly 500 U.S. soldiers in the general vicinity of California

Stationary Distribution

What is the greatest state power generated by an equilibrium?

$$g_{\max} \equiv \max_{j|e_j=1} g_j$$

Theorem: *the Markov process has a unique stationary distribution $\mu(\epsilon)$ and it places positive weight on all states. If $g_{\max} < g^*(g_0)$ then every state has an appreciable probability. If $g_{\max} > g^*(g_0)$ then for small ϵ most weight is on hegemonic states j with $g_j = g_{\max}$.*

meaning: with strong outsiders there is no tendency towards hegemony or high levels of state power, with weak outsiders we are likely to see a hegemony of the strongest **equilibrium**

Some Facts About Hegemony

- China: 2,234 years from 221 BCE – hegemony 72% of time, five interregna
- Egypt: 1,617 years from 2686 BCE - hegemony 87% of time, two interregna
- Persia: 1,201 years from 550 BCE - hegemony 84% of time, two interregna
- England: 947 years from 1066 CE - hegemony 100% of time
- Roman Empire: 422 years from 27 BCE - hegemony 100% of time
- Eastern Roman Empire: 429 years from 395 CE – 100%
- Caliphate: 444 years from 814 CE – 100%
- Ottoman Empire: 304 years from 1517 CE – 100%

Remark: in 0 CE 90% of world population in Eurasia/North Africa

Exceptions

- India
- continental Europe post Roman Empire

evolutionary theory: more outside influence, less hegemony

- Europe: Scandinavia 5%, England 8%
- India: Central Asia 5%
- China: Mongolia less than 0.5%

Transitions Between Hegemonies

Theory: *time between hegemonies is short and regions should differ in the duration of hegemony but not much in the time between hegemonies*

average time to hegemony from end of previous hegemony

- China (220 CE to present): 153 years
- Egypt (2160 BCE to 1069 BCE): 102 years
- Persia (550 BCE to 651 CE): 145 years
- Western Europe (295 CE to present): 366 years
- India (320 CE to present): 209 years

Failed Revolutions

Theory: *a hegemony will lose and regain land many times before it falls, and many of these losses will last longer than the fall itself*

true in China during the period during which we have good data during the century prior to the fall of the Ching hegemony in 1911

many failed attempts at revolution, most notably

- Boxer rebellion in 1899
- Dungan revolt in 1862 – lasted 15 years and involved loss of control in a number of provinces

in each case hegemony was restored

the successful revolution in 1911 took less than a year

Warring States and the Arrival to Hegemony

Theory: *following the fall of a hegemony there will be a warring states period with no tendency to reach any particular type of hegemony, weak or strong*

short lived hegemonies

- Alexander – weak institutions
- Napoleon – strong outside forces
- Hitler – strong outside forces
- Soviet Union – weak institutions and strong outside forces

long lived hegemonies where zealots initiated a hegemony

- various Mongol invaders of China – adopted Chinese institutions

the theory says following the warring states period anything can happen: and it does

Zealots and Instability

What is the greatest state power generated by any actions?

$$g_{\text{zealot}} \equiv \max_j g_j;$$

j that achieves the max called *zealots*

assume $g_{\text{zealot}} > g_{\text{max}}$

- zealots by definition do not satisfy incentive constraints
- the “ethos of the warrior/revolutionary”
- Atila the Hun, Ghengis Khan, Alexander the Great, Lenin/Stalin, Sun Yat Sen, Muslim brotherhood and so forth
- could be deviant preferences

essential point is that while they are strong, zealots are not stable – they do not form societies that last

Nature of the Fall

Theory: *the fall will be brutally fast, land will be lost but not regained, and the fall will be driven by powerful zealots*

Ching hegemony established in 1644 CE (and institutions that lasted since 605 CE) swept permanently away in 1911 in well less than a year, and less time even than the fall of the very short lived hegemonies established by Napoleon or Hitler

Revolts and invasions against strong hegemonies are generally either repressed and or unchecked

groups that overcame strong hegemonies (where we have data)

- Sun Yat Sen's revolutionaries; Mongolian groups that overcame other Chinese dynasties; Huns led by Attila

All have been willing to sacrifice material comfort for the cause (institutional change or conquest). This idealism rarely lasted even a generation.

Conclusion

The theory says that if we start from the observation that institutions tend to evolve through conflict between societies, rather than, say, through peaceful competition for resources, then other things should also be true:

- persistent hegemony and extractiveness in circumstances where outside forces are weak
- time to hegemony largely independent of circumstances
- fall of hegemonies due to “perfect storm” of zealots following many failed revolts