

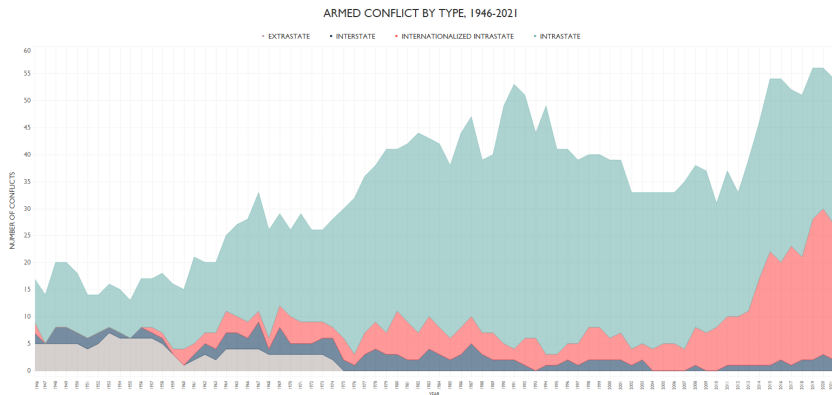
Part III B: Collective Decision Making (Conflict)

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Introduction

Why should economists care about conflict? (I)



Introduction

Why should economists care about conflict? (II)

- To state upfront that the main focus will lie on *civil* conflict.
- *Direct loss of human life*: Narrowly defined battle-related deaths from 1946 to 2019 amount to about 11 million fatalities (Lacina and Gleditsch, 2005; updated with current numbers from the UCDP, 2021). One has to add to these numbers the human lives lost in one-sided conflict, where armed troops turn their weapons against defenseless civilians. Anderton and Brauer (2021) estimate 100 million mass atrocity-related deaths since 1900.
- *Indirect effect of wars on human life*: Works through diseases after the end of conflicts. Ghobarah, Huth and Russett (2003, APSR) find that the indirect fatalities are at least as large as direct casualties.

Introduction

Why should economists care about conflict? (III)

- *Large economic costs.* According to Mueller and Tobias (2016), an average drop in GDP of 18 percent after a civil war, and only a very slow economic recovery.
 - Abundant micro-evidence: E.g. Abadie and Gardeazabal (2003, AER) find that terrorism from 1955 to 1995 in the Basque country led to a 10% GDP gap with respect to synthetic control group.
- Also large-scale destruction of *human capital* (Shemyakina, 2011, JDE) and of (*inter-group*) *social capital* (Rohner, Thoenig and Zilibotti, 2013, JOEG; Bauer et al., 2016, JEP)

Introduction

Why should economists care about conflict? (IV)

- *Various war traps*: Rohner and Thoenig, 2021, "The Elusive Peace Dividend of Development Policy: From War Traps to Macro Complementarities", *Annual Review of Economics*
- 68 percent of all civil conflict outbreaks in the second half of the 20th century took place in countries experiencing multiple wars.
- Several types of war traps that hold countries persistently back, both economically and politically.
 - Trust
 - Poverty
 - Education

War as Bargaining Failure

Overview

- Goal of this approach is to explain [why conflict takes place](#)
 - this contrasts with the rent-seeking strand of the conflict literature that focuses on intensity, duration and winning probabilities.
- Key authors are for example James Fearon and Robert Powell.
 - Jackson and Morelli (2007) also belongs to this strand of the literature.
- Conflict is costly and one would expect bargaining over contentious issues being able to avoid war. [This literature focuses on reasons for bargaining failure.](#)
- Below is summarized the extremely simple workhorse model of Fearon (1995, IO).

War as Bargaining Failure

Toy model 1/3

When will there exist bargains both sides prefer to war?

- Consider two states A and B that have preferences over a set of issues represented by the interval $X = [0, 1]$.
 - To fix ideas: A prefers outcomes close to 1, B close to 0 (e.g. dividing the territory of a border region or sharing a natural resource discovery).
- Potential outcomes are labelled $x \in X$.
- Utility functions are $u_A(x)$ resp. $u_B(1 - x)$, which are continuous, increasing and weakly concave \rightarrow risk neutral or risk averse.
- For simplicity set: $u_i(0) = 0$, $u_i(1) = 1$, where $i = A, B$.
- In the case of war, state A prevails with probability $p \in [0, 1]$ and winner grabs everything.
 - resp. B prevails with probability $1 - p \in [0, 1]$

War as Bargaining Failure

Toy model 2/3

- War is costly: costs are $c_A > 0$, $c_B > 0$.
 - War is a costly lottery!

- A's expected utility from war becomes

$$\begin{aligned} p \cdot u_A(1) + (1 - p) \cdot u_A(0) - c_A \\ \rightarrow p - c_A \end{aligned}$$

- Similarly, B's expected utility is

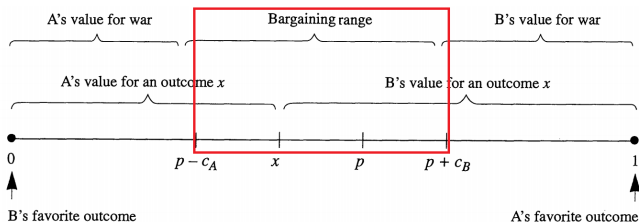
$$\begin{aligned} (1 - p) \cdot u_B(1) + p \cdot u_B(0) - c_B \\ \rightarrow 1 - p - c_B \end{aligned}$$

- As war is costly, under the assumptions made above there always exists a set of negotiated settlements that both sides prefer to fighting.
- There exists a subset of X such that for each outcome x in this set

$$u_A(x) > p - c_A \quad \text{and} \quad u_B(1 - x) > 1 - p - c_B$$

War as Bargaining Failure

Toy model 3/3



- Risk-neutral case where $u_A(x) = x$ and $u_B(1 - x) = 1 - x$
- Both states will strictly prefer any peaceful agreement in the interval $(p - c_a, p + c_b)$ to fighting

War as Bargaining Failure

Main reasons for bargaining failure 1/4

The assumptions of the toy model can be relaxed in the following way:

- 1 **PRIVATE INFORMATION:** A and B have different estimates of p . They cannot transmit their private information, as such messages may not be credible (given that p affects their bargaining power). Or transmitting proofs of military strength may reduce winning chances (secrecy is useful in fighting).
- 2 **RISK-LOVING PLAYERS:** This could explain why they prefer a costly lottery to a settlement with certainty.

War as Bargaining Failure

Main reasons for bargaining failure 2/4

- **ISSUE INDIVISIBILITIES:** If not all outcomes x are technically feasible due to indivisibilities, bargaining can fail.
 - Examples: Oil fields and natural resources.
- **PSYCHOLOGICAL GAINS FROM WAR:** Bargaining can fail when war does not entail net costs, as psychological gains outweigh the destruction and armament costs, i.e. when $c_A < 0$, $c_B < 0$.

War as Bargaining Failure

Main reasons for bargaining failure 3/4

- **COMMITMENT PROBLEMS:** incentives to renege on peace deals include:
 - Preemptive war and offensive advantages (FIRST STRIKE ADVANTAGE): $p_f > p > p_s$, p_f =winning probability first striker, p_s =winning probability second striker. Lack of credible commitment not to make surprise attack.
 - PREVENTIVE WAR: Say A's winning probabilities increase over time in a dynamic setting (i.e. $p_2 > p_1$) and A cannot credibly commit to not exploiting this advantage later.
 - STRATEGIC TERRITORY: Objects over which states bargain can themselves be sources of military power and there may be lack of credible commitment not to exploit this later.
- **POLITICAL BIAS:** Conflict leads to net costs $c_A > 0$, $c_B > 0$, but the people who decide on war are not the same who bear these costs (Jackson and Morelli, 2007)

War as Bargaining Failure

Main reasons for bargaining failure 4/4

- Powell (2006, *International Organization*) argues that commitment problems, together with informational problems, are the main source of bargaining failure.
- Other sources like issue indivisibilities or risk-acceptance can be reduced to commitment problems
- War being a costly lottery, all players would be better off agreeing to an equivalent cost-less lottery to avoid fighting if commitment is possible.

Political Bias and War

Overview

We will now look in detail at a paper that studies a particular source of bargaining failure: **POLITICAL BIAS**.

- Jackson, Matthew, and Massimo Morelli, 2007, "POLITICAL BIAS AND WAR", *American Economic Review* 97: 1353-1373.
- **Motivation:** Understanding the interaction between the domestic political structure (political bias) and economic incentives to determine when war occurs.
 - **POLITICAL BIAS:** benefits from war / share of costs for pivotal agent.
- **Main findings:** With unbiased countries there are acceptable transfers that can avoid war, while with a strong enough political bias war cannot be avoided by any transfer payments.

Political Bias and War

The baseline model

- Simultaneous game
- Two countries i, j
- Strategy sets: $\{\text{war, no war}\}$
 - If at least one country chooses war then war ensues.
- $w_j \rightarrow$ total wealth of j
 - resp. $w_i \rightarrow$ total wealth of i
- Technology of war $\rightarrow p_j(w_j, w_i)[= p_{ji}]$ prob. that j wins war.
 - resp. p_{ij} prob. that i wins

Political Bias and War

The baseline model

- Country i prevails with prob. $p_{ij} = 1 - p_{ji}$.
- Costs of war for $j \rightarrow C * w_j$ [independent of success]
 - War is a costly lottery!
- Benefit of war for $j \rightarrow G * w_i$ upon winning.
- j 's wealth after losing war against $i \rightarrow w_j(1 - C - G)$.
- j 's wealth after winning war against $i \rightarrow w_j(1 - C) + Gw_i$.
- Assumption: $C + G \leq 1$ (ensures positive wealth levels).

Political Bias and War

The baseline model

- a_j : fraction of w_j controlled by pivotal agent in country j 's decisions.
- a'_j : fraction of spoils of war for pivotal agent.
- In the absence of any transfers the pivotal agent of a country j wants to go to war iff:

$$(1 - C)a_j w_j - (1 - p_{ji})a_j Gw_j + p_{ji}a'_j Gw_i > a_j w_j$$

- **POLITICAL BIAS** of country j : $B_j = a'_j/a_j$

Political Bias and War

The baseline model

- **POLITICAL BIAS** of country j : $B_j = a'_j/a_j$

*The ratio of share of benefits from war compared to share of costs for pivotal agent is a critical determinant of a country's decisions. We call this ratio **POLITICAL BIAS**.*

If it is close to one, then the country's critical decision maker's relative benefits/costs are similar to the country at large. If this ratio is greater than one, then we say that the country leader has a positive bias.

An unbiased leader is representative of the interests of the country, in the sense that she or he sees the same relative benefits and costs from a war as the country does as a whole.

Political bias in democracy vs authoritarian regime. [Discuss].

Political Bias and War

The baseline model

- We can re-write the condition as:

$$(1 - C)a_j w_j - (1 - p_{ji})a_j G w_j + p_{ji}a'_j G w_i > a_j w_j$$

$$-C w_j - (1 - p_{ji})G w_j + p_{ji}B_j G w_i > 0$$

$$p_{ji}B_j w_i > \left(\frac{C}{G} + (1 - p_{ji})\right)w_j$$

- Biased leader with larger potential gains when $B_j > 1$.

Incentives for war:

- Increase in B_j and G , decrease in C .
- Depend only on ratio C/G and not on absolute values.
- Depend only on B_j and not on absolute values of a_j and a'_j .
- Effects of wealth are ambiguous (affect prize and winning probabilities) and depend on technology of war.

Political Bias and War

The baseline model - Different war technologies

- Example 1: *Proportional probability of winning*: $p_{ji} = w_j / (w_i + w_j)$
- This implies:

$$p_{ji} B_j w_i > \left(\frac{C}{G} + (1 - p_{ji}) \right) w_j$$

$$\frac{(B_j - 1) G w_i}{w_i + w_j} > C$$

- *Remark*: Under a proportional probability of winning, a politically unbiased country never wishes to go to war.
If $B_j > 1$, then the tendency for j to want to go to war is increasing in w_i and decreasing in w_j .

Political Bias and War

The baseline model - Different war technologies

- Example 2: *Fixed prob. of winning* (extremely insensitive): $p_{ji} = 1/2$
- This implies:

$$p_{ji} B_j w_i > \left(\frac{C}{G} + (1 - p_{ji}) \right) w_j$$

$$B_j \frac{w_i}{w_j} > 1 + \frac{2C}{G}$$

- *Remark*: Here an unbiased country could want to go to war, but only if its wealth is low compared to the other country.

Political Bias and War

The baseline model

- Example 3: *Higher wealth wins* (extremely sensitive):

$$p_{ji} B_j w_i > \left(\frac{C}{G} + (1 - p_{ji}) \right) w_j$$

$$p_{ji} = \begin{cases} 1, & w_j > w_i \\ 0.5, & w_j = w_i \\ 0, & w_j < w_i \end{cases}$$

- *Remark:* In this case country j would want to go to war iff $w_j > w_i$ and $B_j G w_i > C w_j$.

Political Bias and War

Transfers to avoid war: The commitment case

- **NEW SCENARIO:** situation where in the absence of any transfers one country would like to go to war but the other would not, and characterize when it is that transfers avoid a war
- We start with the case where countries **can commit to peace** conditional on the transfer
 - e.g. Commitment could come from international organizations (e.g. the U.N.) if they have threats; or alternatively from longer-term reputation effects.
- **Assumption:** when transfers are made from country i to country j , we assume that the decision maker in country j gets a'_j of the transfer, and the decision maker in country i loses a_i of the transfer.
 - i.e.: decision makers' biases towards transfers are the same as towards gains and losses from war.

Political Bias and War

Transfers to avoid war: The commitment case

- Our aim is to identify when it is that transfers *will avoid a war*. That is, we focus on a situation where:
 - ① in the absence of transfers j wants to go to war with i ,
 - ② i prefers to pay $t_{ij} > 0$ to j rather than going to war, and
 - ③ j would prefer to have peace with transfer t_{ij} rather than going to war.
- Please notice that when we say that transfers avoid a war, we are imposing the constraint that a war would have occurred in the absence of any transfers
- Imagine that j wishes to go to war but i does not. Therefore:
 - $p_{ji}B_j w_i > (\frac{C}{G} + (1 - p_{ji}))w_j \rightarrow$
 $p_{ji} > \frac{(1+\frac{C}{G})}{1+B_j w_{ij}}$ holds
 - $1 - p_{ji} > \frac{(1+\frac{C}{G})}{1+B_i w_{ji}}$ does not

N.B.: $w_{ji} = \frac{w_j}{w_i}$ and $w_{ij} = \frac{w_i}{w_j}$

Political Bias and War

Transfers to avoid war: The commitment case

The condition that needs to be satisfied for country j to no longer wish to go to war against i if offered $t_{ij} > 0$ is

$$(1 - C - G)a_j w_j + p_{ji}G(a_j w_j + a'_j w_i) \leq a_j w_j + a'_j t_{ij}.$$

This simplifies to*

$$p_{ji}G(w_j + B_j w_i) \leq (C + G)w_j + B_j t_{ij} \quad (1)$$

Similarly, the condition for i to be willing to make a transfer $t_{ij} > 0$ to avoid a war is

$$(1 - p_{ji})G(w_i + B_i w_j) \leq (C + G)w_i - t_{ij} \quad (2)$$

* Remember $B_j = a'_j/a_j$

Political Bias and War

Transfers to avoid war: The commitment case

- Let $t_i^P(B_i)$ be the maximum transfer that i is willing to make in order to avoid the war.
 - the transfer that makes (2) holds as equality
 - i.e. the transfer that i is willing to make in order to avoid the war
- then from (2)

$$t_i^P(B_i) = (C + G)w_i - (1 - p_{ji})G(w_i + B_i w_j) \quad (3)$$

- A transfer can be made so that country j no longer wishes to go to war if (N.B. subs (3) in (1))

$$p_{ji}G(w_j + B_j w_i) \leq (C + G)w_j + B_j t_{ij} \quad (4)$$

$$\begin{aligned} p_{ji}G(w_j + B_j w_i) &\leq (C + G)w_j + B_j(C + G)w_i \\ &\quad - B_j(1 - p_{ji})G(w_i + B_i w_j) \end{aligned} \quad (5)$$

Political Bias and War

Transfers to avoid war: The commitment case

- When we combine $p_{ji} > \frac{(1+\frac{C}{G})}{1+B_j w_{ij}}$ (i.e. the condition from slide 24 for j wanting to go to war in the absence of transfers) and (5) we obtain the following characterization of when transfers avoid a war:

$$p_{ji}(1 + B_j w_{ij}) - 1 > \frac{C}{G} > \frac{(1 - p_{ji})(B_i B_j - 1)}{(1 + B_j w_{ij})} \quad (6)$$

- LHS of (6) corresponds to country j wanting to go to war in the absence of transfers (comes from slide 24)
- RHS of (6) corresponds to the willingness of i to make a transfer to avoid the war (comes from eq. (5))

Political Bias and War

Transfers to avoid war: The commitment case

- Remember:

$$p_{ji}(1 + B_j w_{ij}) - 1 > \frac{C}{G} > \frac{(1 - p_{ji})(B_i B_j - 1)}{(1 + B_j w_{ij})}$$

PROPOSITION 1

Consider a case where j wishes to go to war (in the absence of any transfers) while i does not. Holding all else equal, the range of relative costs to gains $\frac{C}{G}$ where a transfer can be made that will avoid a war increases (in the sense of set inclusion) when

- B_i decreases,
- p_{ji} increases, and
- w_i/w_j increases (holding p_{ji} fixed).

Political Bias and War

Transfers to avoid war: The commitment case

UNBIASED PEACE WITH COMMITMENT

Two unbiased countries ($B_i = B_j = 1$) will never go to war if they can make transfers to each other and the receiver of a transfer can commit not to go to war after receiving the transfer.

- Note that the right hand side of the last equation becomes 0 when $B_i = B_j = 1$, so one country is always willing to buy the other off. So either war is avoided because neither wanted it in the first place, or because one country is willing to pay the other off.

Political Bias and War

The no-commitment case

- Let us now consider situations where a country cannot commit to avoid a war if it receives transfers
- Commitment is related to a number of factors. For example,
 - the presence or lack of international organizations
 - the patience of the challenger
 - the likelihood of meeting other countries in the future
- In the no commitment case, to avoid a war requires that after the transfer has been made a war is no longer in the aggressor's interest.

Political Bias and War

The no-commitment case

- Transfers do three things:
 - ① They make the target poorer and less appealing,
 - ② They make the challenger richer and having more to lose,
 - ③ They increase the probability that the challenger will win.
- Clearly, there are **countervailing effects**!
- If the probability is not affected too much by a transfer, then it is possible for transfers to avoid a war.

Political Bias and War

The no-commitment case

It is important to notice that in the no commitment case:

- The situations where war is avoided due to transfers in the case of no commitment are a strict subset of those when there is commitment.
- In both cases, the transfers that the potential target country is willing to make are the same.

The only differences are from the challenger's perspective:

- In the **commitment case**, a potential aggressor compares the value of no war (their wealth plus any transfers) to what *they would gain from a war in the absence of any transfers*.
- In the **no commitment case** a potential aggressor compares the value of no war (again, their wealth plus any transfers) to what *they would gain from a war after transfers have been made*.

Political Bias and War

Evidence

- Democracies rarely go to war with one another. Why?
Two unbiased countries (democracies) never go to war because they can always find some transfer that makes it irrational to go to war.
- Large statistical literature on "Democratic Peace", e.g. Maoz and Russett, 1993, American Political Science Review.
- In the U.S. during the four conscription-era wars of the 20th century, having a draft-age son reduces a legislator's support for pro-conscription bills by 10-17 percent relative to having a draft-age daughter (McGuirk, Hilger and Miller, 2023, "No Kin In The Game", *Journal of Political Economy*)

War as Rent-seeking

Introduction

- This approach takes conflict as given, and focuses on how many resources are devoted to "appropriative activities" in equilibrium.
- It can be used to explain **intensity or duration of conflict**.
- Some classic authors are Jack Hirshleifer, Herschel Grossman, Stergios Skaperdas, Kai Konrad.

War as Rent-seeking

Workhorse model 1/6

- Two risk-neutral players, i and j , fight to appropriate a prize R .
- Each faces a time constraint: $f + l = 1$, where f =fighting, l =labor.
- Payoff functions:

$$\pi_i = p_i(f_i^*, f_j^*)R + w_i(1 - f_i^*) \quad (7)$$

$$\pi_j = (1 - p_i(f_i^*, f_j^*))R + w_j(1 - f_j^*) \quad (8)$$

where

- $*$ =equilibrium level
 - p_i =probability of i winning (or alternatively, i 's share won)
 - w =wage.
- Contest success function: $p_i = \frac{\rho_i f_i^*}{\rho_i f_i^* + \rho_j f_j^*}$

where ρ =fighting technology.

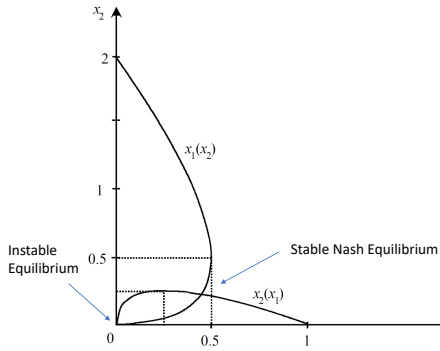
War as Rent-seeking

Workhorse model 2/6

- We can compute the first order conditions for i and j (i.e. setting the first derivative of a given player's π with respect to her f equal to 0).
- This gives two equations (reaction functions) and two unknowns (the fighting efforts).
- The intersection of the reaction functions (the best reply to the best reply) yields the Nash Equilibrium.
- Shown graphically on next page.
 - Adapted from Konrad (2007, Strategy in Contests: An Introduction). Players i and j , with fighting efforts labelled x .

War as Rent-seeking

Workhorse model 3/6



War as Rent-seeking

Workhorse model 4/6

- The First Order Conditions (FOC):

$$\frac{\partial \pi_i}{\partial f_i} = R \frac{\rho_i(\rho_i f_i + \rho_j f_j) - \rho_i(\rho_i f_i)}{(\rho_i f_i + \rho_j f_j)^2} - w_i = 0 \quad (9)$$

$$\frac{\partial \pi_i}{\partial f_i} = R \frac{\rho_i \rho_j f_j}{(\rho_i f_i + \rho_j f_j)^2} - w_i = 0 \quad (10)$$

$$\frac{\partial \pi_j}{\partial f_j} = R \frac{\rho_i \rho_j f_i}{(\rho_i f_i + \rho_j f_j)^2} - w_j = 0 \quad (11)$$

- This yields:

$$f_j = f_i \frac{w_i}{w_j} \quad (12)$$

- Replacing this f_j back in the above FOC yields the equilibrium fighting efforts.

War as Rent-seeking

Workhorse model 5/6

- The **Nash equilibrium** appropriation levels become

$$f_i^* = \frac{\rho_i \rho_j w_j R}{(\rho_j w_i + \rho_i w_j)^2} \quad (13)$$

$$f_j^* = \frac{\rho_i \rho_j w_i R}{(\rho_j w_i + \rho_i w_j)^2} \quad (14)$$

- The winning probability of i becomes

$$p_i = \frac{\rho_i f_i^*}{\rho_i f_i^* + \rho_j f_j^*} = \frac{\rho_i w_j}{\rho_i w_j + \rho_j w_i} \quad (15)$$

War as Rent-seeking

Workhorse model 6/6

- Introducing the equilibrium fighting efforts of (13) and (14) and winning probability of (15) into the payoff functions (7) and (8), we obtain:

$$\pi_i = R \frac{\rho_i^2 w_j^2}{(\rho_j w_i + \rho_i w_j)^2} + w_i \quad (16)$$

$$\pi_j = R \frac{\rho_j^2 w_i^2}{(\rho_j w_i + \rho_i w_j)^2} + w_j \quad (17)$$

- Waste of war:

$$Waste = R \frac{2\rho_i \rho_j w_i w_j}{(\rho_j w_i + \rho_i w_j)^2} \quad (18)$$

War as Rent-seeking

Implications

- More appropriation takes place when the prize is larger (high R) and when the opportunity costs of fighting are small (low w).
- When $w_i = w_j$, both players select same fighting efforts $f_i^* = f_j^*$, and success is exclusively determined by technology, $p_i = \frac{\rho_i}{\rho_i + \rho_j}$.

HIRSHLEIFER'S "PARADOX OF POWER" (1991, EP)

Put $\rho_i = \rho_j$ and $w_i < w_j$. Then, $f_i^* > f_j^*$ and $p_i = \frac{w_j}{w_j + w_i} > 0.5$. The "poorer" player fights harder and thus has better chances of winning

- Examples: Bolchewiki in Russia 1917, Fidel Castro and rebels in Cuba 1959.
- Extensions include endogenous cake size, budget constraints (Bevia and Corchon, 2010, GEB), other functional forms of contest success functions (cf. Skaperdas, 1996, ET) etc.

Ethnic Polarization and Conflict

Overview 1/4

- Joan Esteban and Debraj Ray have since 1999 ("Conflict and Distribution", *Journal of Economic Theory* 87: 379-415) studied the link between [polarization and conflict](#) in a series of influential articles.
- Ethnic polarization measures derived from a micro-founded conflict model.

Ethnic Polarization and Conflict

Overview 2/4

$$Polarization = 1 - \sum_{i=1}^N \left(\frac{1/2 - \pi_i}{1/2} \right)^2 \pi_i$$

where π_i is the proportion of people who belong to the ethnic (religious) group i , and N is the number of groups.

- The original purpose of this index was to capture how far the distribution of the ethnic groups is from the $(1/2, 0, 0, \dots, 0, 1/2)$ distribution (bipolar), which represents the highest level of polarization.
- **Polarization** is largest when there are only two groups of similar size (versus **Fractionalization**, which increases in the number of groups).

Ethnic Polarization and Conflict

Overview 3/4 (from Montalvo and Reynal-Querol, 2005, AER)

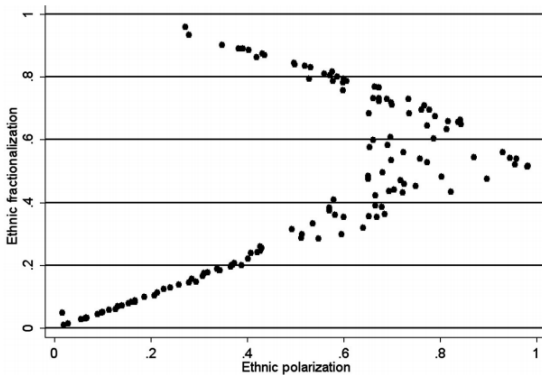


FIGURE 1. ETHNIC FRACTIONALIZATION VERSUS POLARIZATION

Source: WCE.

Ethnic Polarization and Conflict

Overview 4/4 (from Montalvo and Reynal-Querol, 2005, AER)

APPENDIX B: ETHNIC POLARIZATION AND FRACTIONALIZATION (SOURCE: WCE)

Country	ETHPOL	ETHFRAG	Country	ETHPOL	ETHFRA
Afghanistan	0.786	0.603	Ireland	0.141	0.072
Algeria	0.514	0.299	Israel	0.548	0.286
Angola	0.572	0.805	Italy	0.154	0.080
Argentina	0.579	0.408	Jamaica	0.600	0.354
Australia	0.492	0.315	Japan	0.067	0.034
Austria	0.240	0.128	Jordan	0.982	0.515
Bahamas, The	0.705	0.441	Kenya	0.381	0.890
Bahrain	0.569	0.383	Korea, Rep.	0.028	0.014
Bangladesh	0.132	0.068	Kuwait	0.980	0.513
Barbados	0.366	0.199	Lesotho	0.343	0.185
Belgium	0.871	0.544	Liberia	0.390	0.890
Benin	0.436	0.868	Luxembourg	0.596	0.298
Bolivia	0.767	0.708	Madagascar	0.017	0.050
Botswana	0.650	0.485	Malawi	0.736	0.684
Brazil	0.773	0.644	Malaysia	0.762	0.695
Burundi	0.512	0.286	Mali	0.420	0.862
Ghana	0.661	0.731	Seychelles	0.160	0.084
Greece	0.186	0.099	Sierra Leone	0.600	0.793
Grenada	0.945	0.542	Singapore	0.666	0.421
Guatemala	0.955	0.520	Solomon Islands	0.258	0.139
Guinea	0.843	0.649	Somalia	0.679	0.385
Guinea-Bissau	0.532	0.829	South Africa	0.718	0.469
Guyana	0.813	0.634	Spain	0.693	0.436
Haiti	0.207	0.104	Sri Lanka	0.749	0.452
Honduras	0.430	0.254	St. Lucia	0.958	0.540
Hong Kong, China	0.066	0.034	St. Vincent and the Grenadines	0.773	0.527
Hungary	0.308	0.167	Sudan	0.699	0.711
Iceland	0.055	0.028	Suriname	0.734	0.729
India	0.348	0.901	Swaziland	0.318	0.178
Indonesia	0.529	0.793	Sweden	0.337	0.189
Iran, Islamic Rep.	0.598	0.756	Switzerland	0.724	0.560
Iraq	0.665	0.390	Syrian Arab Republic	0.373	0.207

Ethnic Polarization and Conflict

On the Salience of Ethnic Conflict 1/2

- Let us briefly discuss the main findings of Esteban and Ray "On the Salience of Ethnic Conflict", (2008, *American Economic Review*)
- In recent decades,
class conflict has been less salient than ethnic conflict
 - what can account for this?
- Two divisions: Rich (r) versus Poor (p) and Hindu (h) versus Muslim (m)
- This leads to four groups: poor Hindus, rich Hindus, poor Muslims, rich Muslims
- *Contest over public goods* → groups want to get control over a larger share of the budget to spend it for **public goods** in which they are interested
 - For example: primary versus higher education, Hindu versus Muslim festival

Ethnic Polarization and Conflict

On the Salience of Ethnic Conflict 2/2

- *Pure public goods* → population sizes of different groups do not determine the set of feasible per capita allocations
 - i.e. population sizes of different groups do not matter
- Assumption that no conflict is possible without an alliance.
Two possibilities:
 - **Class Alliance** → conflict over class budget,
 - or **Ethnic Alliance** → conflict over ethnic budget.
- **Main result:** For most parameter values the conditions of conflict are systematically biased against class conflict and in favor of ethnic conflict.
- In their model it is the **COMPLEMENTARITY BETWEEN LARGER FINANCIAL RESOURCES (RICH) AND LOWER OPPORTUNITY COST OF TIME (POOR) THAT MAKES ETHNIC ALLIANCES MORE SUCCESSFUL THAN CLASS ALLIANCES.**

Ethnic Polarization and Conflict

Empirical Evidence

- Ethnic polarization associated with conflict. See e.g. Montalvo and Reynal-Querol, 2005, *American Economic Review*; Esteban, Mayoral, Ray, 2012, *American Economic Review*.
- Causal link? Difficult to establish (reverse causality?) → Challenging area for future research
- Main problem: persistence in polarization levels (i.e hard to include country/region FEs → hard to control for unobserved factors)
- One contribution by Chiovelli and Amodio (2018, Journal of the European Economic Association) finds that increases in ethnic polarization fuel conflict.

General Equilibrium Model of Conflict

Overview

- **Dal Bo and Dal Bo, 2011, "Workers, Warriors, and Criminals: Social Conflict in General Equilibrium", Journal of European Economic Association 9: 646-677.**
- Incorporate labor-intensive appropriative activities in canonical models of trade.
- This yields predictions on the effects of price shocks in capital- or labor-intensive sectors on the incentives for social conflict and on how conflict affects the economic structure
- Example: Dube and Vargas (2013, ReStud) find that a *drop* in coffee prices increases conflict, while a *rise* in oil prices also increases conflict in Colombia.

General Equilibrium Model of Conflict

The model setting I

- 2x2 international economics model
- Two productive sectors, labeled 1 and 2
- Two inputs, capital K and labor L
- Factors can move freely across industries
- Industry 1 is more capital intensive than industry 2
- Respective rental prices are r and w
- Factor endowments \bar{K} and \bar{L}
- Prices are internationally determined, $p_1 \equiv p$ for industry 1, $p_2 = 1$ for industry 2 (numeraire)

General Equilibrium Model of Conflict

The model setting II

- There is also an appropriation sector that uses only labor, L_A .
- Appropriation is given by increasing, continuous and strictly concave function $A(L_A)$, with $A(0) \geq 0$ and $A(\bar{L}) \leq 1$.
- The amount appropriated equals

$$A(L_A)(pq_1 + q_2) = A(L_A) [r\bar{K} + w(\bar{L} - L_A)]$$

- Here we focus on perfect competition, but the results also go through with imperfect competition.
- a_{ij} is the amount of input j used to produce one unit of output i at minimum cost.

General Equilibrium Model of Conflict

Equilibrium I

- Given the technology, relative price p and factor endowments \bar{K} and \bar{L} , the equilibrium determines the rental prices of factors (r and w), the output production levels (q_1 and q_2) and the use of factors in each sector (K_1, K_2, L_1, L_2).
- Here we focus on interior equilibrium with positive production of both sectors (no specialization).
- Zero profit condition:

$$ra_{1K} + wa_{1L} = p \quad (19)$$

$$ra_{2K} + wa_{2L} = 1 \quad (20)$$

General Equilibrium Model of Conflict

Equilibrium II

- Market for factors must clear

$$q_1 a_{1K} + q_2 a_{2K} = \bar{K} \quad (21)$$

$$q_1 a_{1L} + q_2 a_{2L} = \bar{L} - L_A \quad (22)$$

- No arbitrage condition (i.e. same return in appropriation and production)

$$\frac{A(L_A)}{L_A} [r\bar{K} + w(\bar{L} - L_A)] = [1 - A(L_A)] w \quad (23)$$

General Equilibrium Model of Conflict

Equilibrium III

- **Proposition 1** proves existence of equilibrium with positive levels of appropriation under mild conditions.
- **Proposition 2:** *The existence of the appropriation sector makes the owners of capital and labor worse off.*
- Indeed, the gross rental prices are unchanged, but the net rental prices are $[1 - A(L_A)] r < r$, resp. $[1 - A(L_A)] w < w$.
- Hence, even warriors end up worse than if they could commit not to leave productive activities.

General Equilibrium Model of Conflict

Effect of appropriation sector

Proposition 3: *The existence of the appropriation sector increases the production of the capital intensive good and reduces the production of the labor intensive good.*

- We can derive the output levels of the two sectors (reformulating eq. (4) in terms of q_2 and plug this q_2 into eq. (3), allows to obtain q_1 below, and analogous for q_2):

$$q_1 = \frac{a_{2L}\bar{K} - a_{2K}(\bar{L} - L_A)}{a_{1K}a_{2L} - a_{1L}a_{2K}}$$

$$q_2 = \frac{a_{1K}(\bar{L} - L_A) - a_{1L}\bar{K}}{a_{1K}a_{2L} - a_{1L}a_{2K}}$$

- Hence, increases in L_A must increase q_1 and reduce q_2 when $a_{2K}/a_{2L} < a_{1K}/a_{1L}$.
- This is an application of Rybczynski's Theorem (1955).
- Presence of conflict enlarges the capital intensive sector.

General Equilibrium Model of Conflict

Price changes I

Lemma 1: (*Stolper Samuelson*) *An increase in the price of the capital intensive output results in an increase in the rental price of capital and a decrease in the rental price of labor ($dr/dp > 0$ and $dw/dp < 0$).*

- We can derive the factor prices (reformulating eq. (2) in terms of w and plugging this w into eq. (1) gives expression of r below (and analogous for w):

$$r = \frac{pa_{2L} - a_{1L}}{a_{1K}a_{2L} - a_{1L}a_{2K}}$$

$$w = \frac{a_{1K} - pa_{2K}}{a_{1K}a_{2L} - a_{1L}a_{2K}}$$

- This implies $dr/dp = \frac{a_{2L}}{a_{1K}a_{2L} - a_{1L}a_{2K}} > 0$, $dw/dp = \frac{-a_{2K}}{a_{1K}a_{2L} - a_{1L}a_{2K}} < 0$.

General Equilibrium Model of Conflict

Price changes II

Proposition 4: *An increase in the price of the capital intensive output results in an increase in conflict ($dL_A/dp > 0$).*

- We start from eq. (5), express it in terms of L_A , which yields:

$$A(L_A) = \frac{L_A}{(r/w)\bar{K} + \bar{L}} \quad (24)$$

- Now we take the total derivative on both sides and rearrange:

$$\frac{dL_A}{dp} = - \left[A' - \frac{1}{(r/w)\bar{K} + \bar{L}} \right]^{-1} \left[\frac{\bar{K}L_A}{((r/w)\bar{K} + \bar{L})^2} \frac{d(r/w)}{dp} \right] > 0$$

- The denominator is negative (as shown in the paper). Hence dL_A/dp has the sign of $d(r/w)/dp$, which is positive (by Lemma 1).

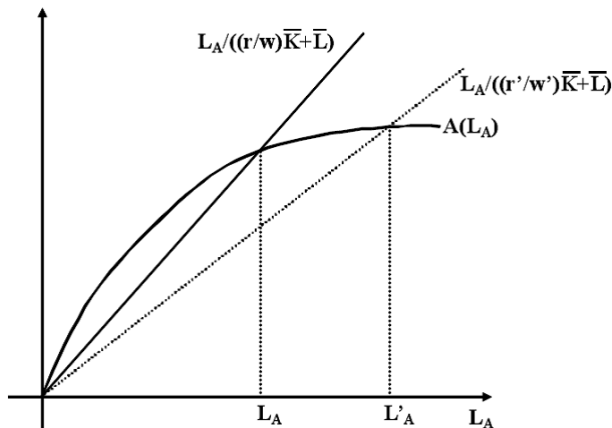
General Equilibrium Model of Conflict

Intuition I

- An increase in the price of the capital intensive good expands the capital intensive sector while the labor intensive sector contracts.
- The latter sector releases more labor per unit of capital than the former sector can absorb at the initial factor prices.
- This availability of labor lowers wages and with them the opportunity cost of the appropriation activity compared with the size of disputable wealth.
- The consequence is more conflict.

General Equilibrium Model of Conflict

Intuition II (from eq. (6))



General Equilibrium Model of Conflict

Technical Progress

Proposition 5: *Neutral technical progress in the capital intensive sector results in an increase in conflict.*

- Consider a neutral technical innovation that makes the capital intensive sector $1 + \theta$ times more productive ($\theta > 0$).
- This implies that the zero profit condition in that sector can now be written as: $ra_{1K} + wa_{1L} = (1 + \theta)p$.
- Therefore, technological progress in the capital intensive sector has the same effect on r and w as an increase of the price of the capital intensive good.

General Equilibrium Model of Conflict

Policy implications

- Giving a subsidy to productive labor reduces the level of conflict.
- Thus, some departure from laissez faire will be beneficial.
- The intuition is straightforward: Subsidizing productive labor increases the opportunity costs of engaging in appropriation, thus reducing the latter.
- A subsidy to productive labor results in a shift of labor away from appropriation activities and towards the productive sectors of the economy.
- This follows the logic of the "second best" (i.e. distortionary policies can be optimal in the presence of an initial distortion).

Theories of Trust and Conflict

Overview

- In political science there has been a literature on the so-called "security dilemma" or "spiralling model of war" where mutual distrust drives arms races and conflict
 - Herz (1950, World Politics), Jervis (1978, World Politics), Posen (1993, Survival), Snyder (1984, World Politics).
- This has been formalised with the help of global games by Baliga, Sandeep, and Tomas Sjostrom, 2004, "Arms Races and Negotiations", *Review of Economic Studies* 71: 351-369.
- A more recent literature links trust to war, using dynamic models of belief updating. Cf. slides below.

Theories of Trust and Conflict

Quote of Jervis describing "security dilemma"

"(...) anarchy encourages behavior that leaves all concerned worse off than they could be, even in the extreme case in which all states would like to freeze the status quo. This is true of the men in Rousseau's "Stag Hunt". If they cooperate to trap the stag, they will all eat well. But if one person defects to chase a rabbit –which he likes less than stag– none of the others will get anything. Thus, all actors have the same preference order, and there is a solution that gives each his first choice: (1) cooperate and trap the stag (the international analogue being cooperation and disarmament); (2) chase a rabbit while others remain at their posts (maintain a high level of arms while others are disarmed); (3) all chase rabbits (arms competition and high risk of war); and (4) stay at the original position while another chases a rabbit (being disarmed while others are armed). Unless each person thinks that the others will cooperate, he himself will not." (Jervis, 1978: 167-8).

Theories of Trust and Conflict

Stag-hunt game

		Group B	
		C	D
Group A	C	c, c	$h - l, h$
	D	$h, h - l$	$h - \alpha l, h - \alpha l$

where $c > h$, $\alpha < 1$.

- Multiple equilibria: (C, C) and (D, D) !
- This is a coordination game / common-interest-game. With distrust players may end up in the bad equilibrium (D, D) .

Theories of Trust and Conflict

Cycles of Conflict

- Summary of Acemoglu, Daron, and Alexander Wolitzky, "Cycles of Conflict: An Economic Model", 2014, *American Economic Review*:
- Their focus is on war cycles, and specifically on how conflicts that are not driven by fundamental reasons may come to an end.
- Theory of conflict snowballs in which mistaken signals can trigger conflict between two groups.
- As a bilateral conflict escalates, aggressive actions become uninformative, eventually inducing a group to experiment with cooperation.
- As long as the other group is not inherently bad, this move can bring the conflict to an end.

Theories of Trust and Conflict

War Signals: A Theory of Trade, Trust and Conflict

- Rohner, Dominic, Mathias Thoenig and Fabrizio Zilibotti (2013) "War Signals: A Theory of Trade, Trust and Conflict," *Review of Economic Studies* 80: 1114-1147.
- Builds a rational choice theory of trust, trade and war where a vicious circle is at the root of recurrent conflicts
 - War today erodes inter-ethnic trust
 - Distrust reduces trade opportunities and the opportunity cost of future war falls
 - This leads to recurrent war
- Distrust may be "unwarranted" ...without being irrational
- Culprit: imperfect information / learning trap (related to information cascades)
- Bad luck (a series of bad draws) may result in a permanent war trap (which is an absorbing state)

Theories of Trust and Conflict

War Signals: A Theory of Trade, Trust and Conflict

- A rational theory of persistent (inefficient) wars
- Business relations are key to preserve stable peace
- Peace-keeping forces may secure peace but fail to restore trade and economic cooperation (consistent with evidence, see e.g. Bosnia-Herzegovina)
- Policies aimed at restoring trade and trust can be promising
 - Contact hypothesis (Nation Building: Big Lessons from Successes and Failures, Rohner and Zhuravskaya (eds), 2023, CEPR)