

# FACTIONAL CONFLICT AND TERRITORIAL RENTS

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# MOTIVATION

Relationship between factionalization, local economic conditions, the exercise of market power, and territorial conflict

## Settings

- ▶ Afghan warlords
- ▶ Urban drug gangs
- ▶ Mexican DTOs
- ▶ State formation?

Political economy of conflict

## MOTIVATION, TAKE 2

Over 500 people were murdered in Chicago in 2012

“Most of Chicago’s violent crime comes from gangs trying to maintain control of drug-selling territories”–Head of DEA for 5-state region including Illinois

“If you want to expand your sales, you have to expand your street corners. You know, you have to physically take street corners, which is a violent act.”–John Lippert

# OUTLINE

THE MODEL

EQUILIBRIUM INTUITION

NUMBER OF FACTIONS

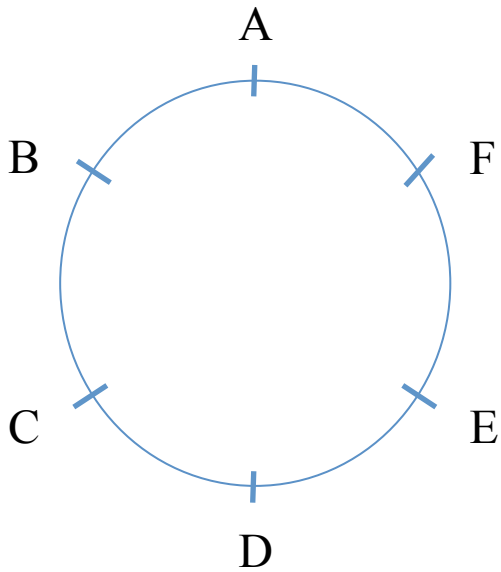
GLOBAL COMPARATIVE STATICS

LOCAL COMPARATIVE STATICS

- Population Density

- Shock to Transportation Costs

CONCLUSIONS



# TIMELINE

1. Each territory is controlled by some faction.
2. Nature chooses one territory to become *vulnerable* according to uniform distribution.
3. Any faction that controls vulnerable territory or territory contiguous with it may fight. Fighting (via all-pay auction) determines control of vulnerable territory.
4. In each territory  $i$ , the faction in control chooses local price for the good  $p_i \in [0, 1]$ .
5. Each population member (mass  $N$ ) decides whether and from whom to buy the good, given the prices and distances.

# PAYOFFS

If population member purchases for price  $p$  from a territory at distance  $x$ , payoff is

$$1 - p - tx$$

If faction makes revenues  $r$  and expends effort in conflict  $a$ , payoff is

$$r - a$$

# OBSERVED VIOLENCE

Amount invested in fighting, conditional on two factions investing positive amount

$$v = \begin{cases} \sum_{i \in \mathcal{F}} a_i & \text{if } |\{i \in \mathcal{F} : a_i > 0\}| \geq 2 \\ 0 & \text{else,} \end{cases}$$



# PREVIEW OF RESULTS

Increased factionalization:

- ▶ More frequent conflict (scare-off, opportunities)
- ▶ Less intense violence (stakes)
- ▶ Less variance and non-monotone expected level of violence

Global changes to market power ( $t$ ) or market size ( $N$ ) induce positive correlation between rents and violence

Local changes

- ▶ At vulnerable territory induce **negative** correlation between rents and violence
- ▶ At other territories create subtle spillovers with implications for diff-in-diffs

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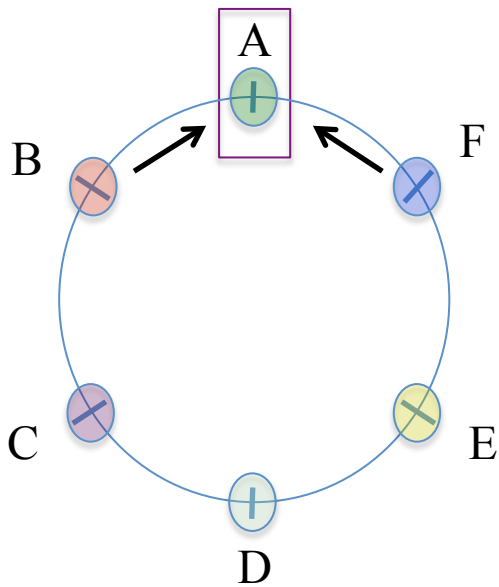
# INCREMENTAL RETURN TO WINNING

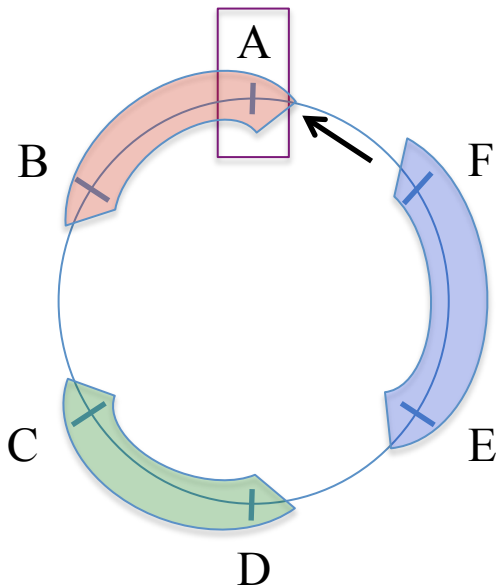
*Incremental return to winning*,  $IR_i$ , is faction  $i$ 's expected revenues after winning the vulnerable territory minus her expected revenues after losing the vulnerable territory

Revenues after winning follow from economic equilibrium

Expected revenues after losing depend on distribution over factional configurations, given loss

- Distribution depends on strategies in the conflict game





## EXPECTED LEVEL OF VIOLENCE

Violence is realized amount invested, conditional on at least two factions being active

In equilibrium, expected violence is

$$\frac{IR_2}{IR_1} \times IR_2$$

Decreasing in  $IR_1$  because of *scare-off*

Increasing in  $IR_2$  because of *stakes* and *anti-scare-off*

If some factor ( $\theta$ ) increases both, expected violence only decreasing if

$$\frac{\partial IR_2(\theta)/\partial \theta}{\partial IR_1(\theta)/\partial \theta} < \frac{IR_2(\theta)}{2 IR_1(\theta)} < \frac{1}{2}$$

# KEY ECONOMIC INTUITION

Charge higher prices in territories that face less competition

- ▶ A faction that controls three territories will charge different prices in the interior and border
- ▶ Higher local competitor prices, higher your price

Holding fixed your territory, your profits are increasing in the concentration of ownership by competitors

Profits increasing in number of territories controlled

For each configuration we can calculate each faction's profits

# SUMMARY: LOCAL RENTS

Configuration	Highest	2nd	3rd
1, 1, 1, 1, 1, 1	$u^{1,1,1,1,1,1} = \frac{Nt}{36}$		
2, 1, 1, 1, 1	$u^{2,1,1,1,1} = \frac{145Nt}{2166}$	$u^{2,1,1,1,1} = \frac{40Nt}{1083}$	$u^{2,1,1,1,1} = \frac{100Nt}{3249}$
2, 2, 2	$u^{2,2,2} = \frac{Nt}{9}$		
3, 2, 1	$u^{3,2,1} = \frac{447,343Nt}{2,643,878}$	$u^{3,2,1} = \frac{298,831Nt}{2,643,876}$	$u^{3,2,1} = \frac{5041Nt}{73,441}$
3, 3	$u^{3,3} = \frac{37Nt}{144}$		
4, 2	$u^{4,2} = \frac{109Nt}{324}$	$u^{4,2} = \frac{16Nt}{81}$	



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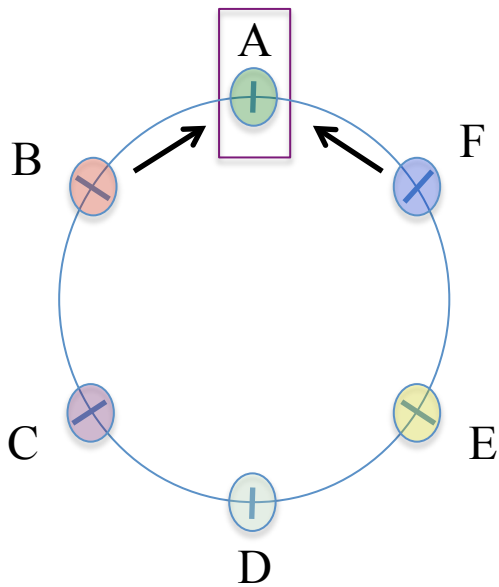
GLOBAL COMPARATIVE STATICS

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CONCLUSIONS



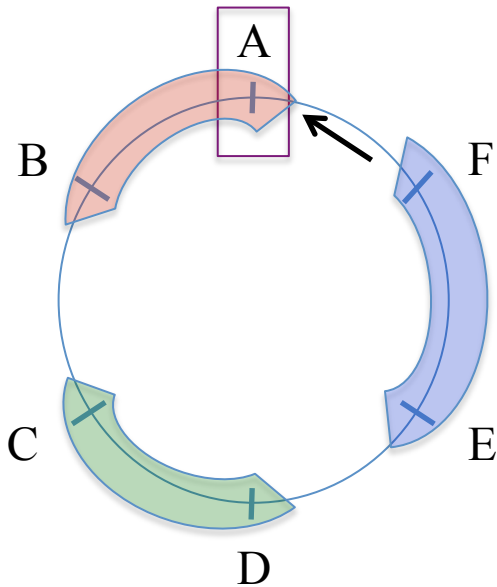
# EQUILIBRIUM

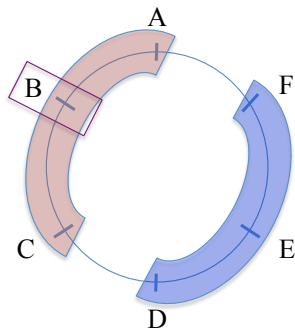
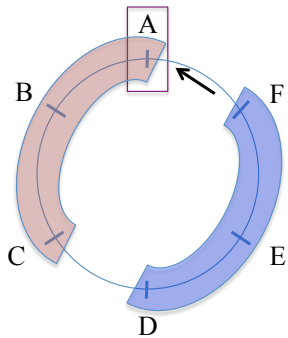
Attackers have bigger incremental return than defender because of increasing returns to scale

Defender cedes territory

- ▶ Highly factionalized environment not stable

In equilibrium, both attackers play uniform distribution on  $\left[0, \text{IR}_{\text{att}}^{1,1,1,1,1,1}\right]$





# FREQUENCY OF CONFLICT

2 factors

1. Frequency of all but one faction scared off
2. Percentage of safe territory

6 factions always induces conflict

Consolidation decreases scare-off, but increases safe territory

On net, frequency increasing in factionalization

# INTENSITY OF VIOLENCE

Conditional on a conflict, how intense is the fighting expected to be?

$$\mathbb{E}[v|v > 0]$$

Entirely determined by  $IR_2$

Consolidation increases the stakes

More factionalization implies less intense violence

## 2 EFFECTS ON EXPECTED VIOLENCE

Consolidation increases intensity but decreases frequency of violence

- Stronger incentives, but less opportunity

Conditional on a border region being vulnerable, factionalization decreases expected violence

Including the effect of safe territories, non-monotone effect on expected violence

$$\mathbb{E}[v|2, 2, 2] > \mathbb{E}[v|1, 1, 1, 1, 1, 1] > \mathbb{E}[v|3, 3]$$



# EXPECTED VIOLENCE

Configuration	$IR_1$	$IR_2$	$\frac{IR_2^2}{IR_1}$
1, 1, 1, 1, 1, 1	$\frac{65t}{2166} \approx 0.030t$	$\frac{65t}{2166} \approx 0.030t$	$\approx 0.0300t$
2, 2, 2	$\frac{51,193}{881,292} \approx 0.058t$	$\frac{28,072t}{660,969} \approx 0.043t$	$\approx 0.0311t$
3, 3 (border)	$\frac{103t}{1296} \approx 0.079t$	$\frac{77t}{1296} \approx 0.059t$	$\approx 0.0444t$
3, 3 (interior)	N/A	N/A	0
3, 3 (average)	N/A	N/A	$\approx 0.0296t$

# SUMMING UP FACTIONALIZATION

More frequent, but less intense conflict

Non-monotone effect on overall expected conflict

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# GLOBAL COMPARATIVE STATICS

In all cases, incremental returns are linearly increasing in  $N$  and  $t$

Expected level and variance of violence increasing in global market size and market power

Positive correlation between rents and conflict

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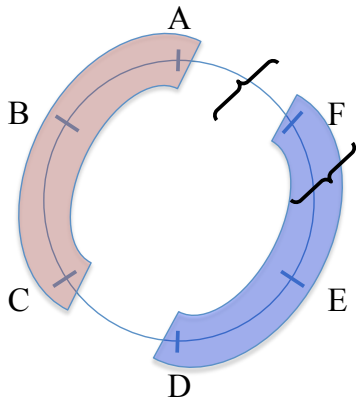
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CONCLUSIONS

# POPULATION SHOCK AT VULNERABLE TERRITORY



## 2 EFFECTS

**Direct effect.** Fix prices, demand is higher at  $F$

- ▶  $F$  more valuable

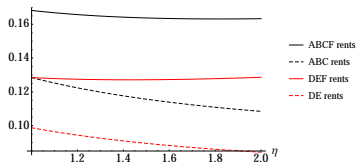
**Indirect effect.** Marginal cost (foregone demand) of price increase at  $A$  and  $E$  goes up, so prices go down, which spills over to all territories

- ▶ All territories less valuable

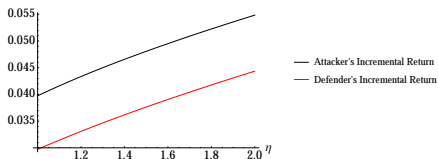


# POPULATION SHOCK AND VIOLENCE

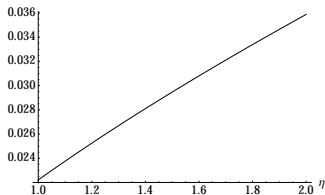
Rents against market size



Incremental returns against population density



Expected violence at F against market size at F



# POPULATION SHOCK AT VULNERABLE TERRITORY'S NEIGHBOR

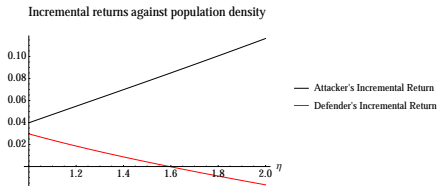
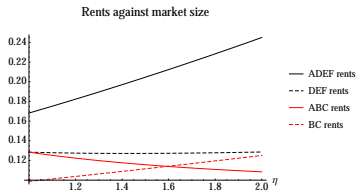
Suppose initial configuration is  $ABC, DEF$  and territory  $A$  is vulnerable

When one faction controls  $A$ ,  $E$ , and  $F$ , indirect effect of population at  $F$  no longer important

If attacker wins direct effect dominates

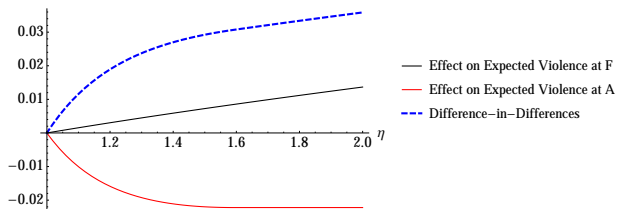
- ▶  $F$  more valuable

# POPULATION SHOCKS AND VIOLENCE AT NEIGHBOR

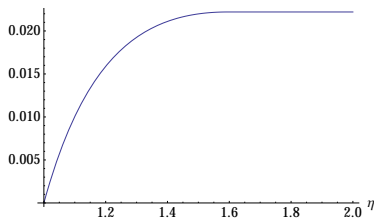


# DIFF-IN-DIFFS BIASED

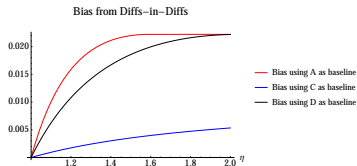
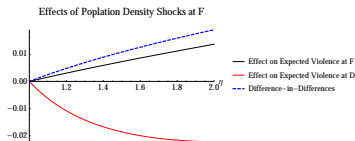
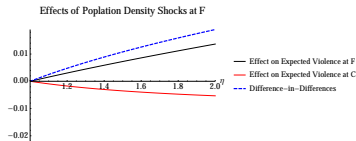
Effects of Market Size Shocks at F



Bias from Diffs-in-Diffs



# CONTROLLING WITH MORE DISTANT TERRITORIES



# SUMMING UP LOCAL POPULATION DENSITY SHOCK

Rents and violence negatively correlated from local population shock

- ▶ This is the opposite of standard empirical intuitions

Violence at  $A, C, D$  decreasing in local population density at  $F$

Difference-in-differences yields overestimates of true effect

Bias is reduced (but not eliminated) by using more distant territories as control

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## 2 EFFECTS OF TRANSPORTATION COST SHOCK

**Direct effect.** Fix prices, demand is lower at  $F$

- ▶  $F$  less valuable

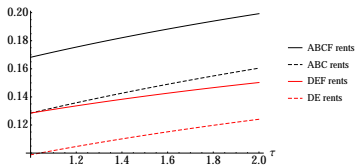
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- ▶ All territories more valuable

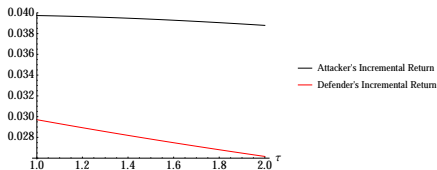


# TRANSPORTATION COST SHOCK AND VIOLENCE

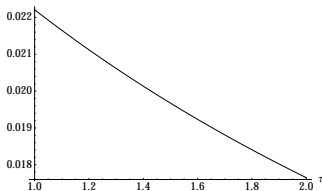
Rents against transportation costs



Incremental returns against transportation costs



Expected violence at F against transportation costs at F



# TRANSPORTATION COST SHOCK AT VULNERABLE TERRITORY'S NEIGHBOR

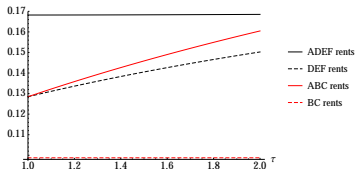
When one faction controls  $A$ ,  $E$ , and  $F$ , territory  $F$  insulated from competition

Changes to transportation costs at  $F$  have little effect

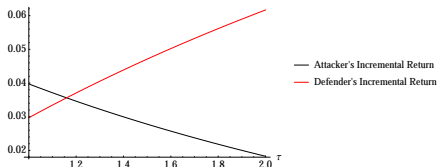
Incremental returns driven by case where defender wins

# POPULATION SHOCK AND VIOLENCE AT NEIGHBOR

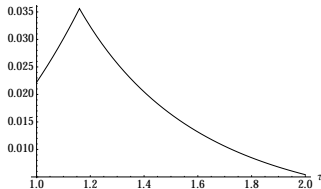
Rents against transportation costs



Incremental returns against transportation costs

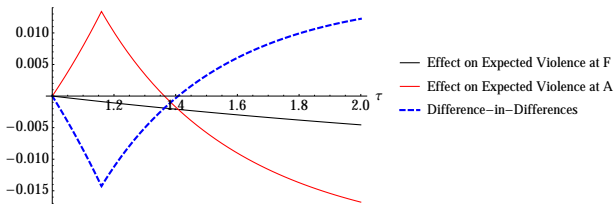


Expected violence at A against transportation costs at F

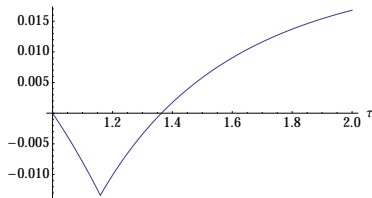


# DIFF-IN-DIFFS BIAS OF UNKNOWN SIGN

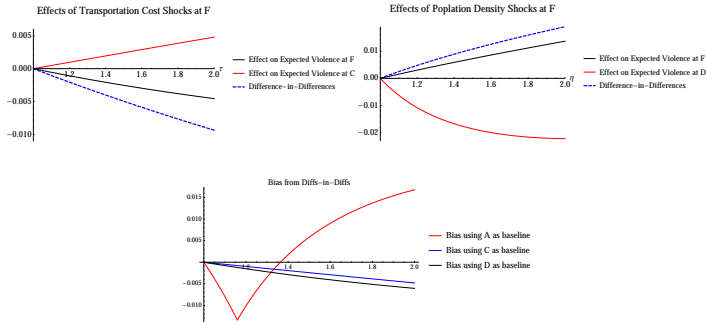
Effects of Transportation Cost Shocks at F



Bias from Diffs-in-Diffs



# CONTROLLING WITH MORE DISTANT TERRITORIES



# SUMMING UP LOCAL TRANSPORTATION COSTS

Rents and violence negatively correlated from local transportation cost shock

- ▶ This is the opposite of standard empirical intuitions

Violence at  $A$  is non-monotone in local transportation costs at  $F$ , while violence at  $C$  and  $D$  increasing

Sign of bias from diff-in-diffs depends on magnitude of shock if using  $A$  as control

Using more distant territories gives known sign to bias, but guarantees overestimate of the magnitude and may exacerbate bias

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# OPENING CONCLUSIONS

Effect of economic shocks depends on local vs. global

- ▶ Empirical literature typically uses local, yet looks for correlations between violence and rents closer to global

Local economic shocks have spillovers that lead diff-in-diffs to produce biased estimates

- ▶ Market size: overestimates, bias reduced by using more distant neighbors
- ▶ Market power: sign of bias unknowable using nearest neighbor, overestimate using more distant neighbor

Highlights a trade-off between comparability and spill-overs

Both of these results highlight a complementarity between micro-empirics and theory



# CONCLUDING CONCLUSIONS

Factionalization leads to more frequent, less intense violence.

- ▶ Less variance, non-monotone effect on expected violence

Importance of a political economy approach to conflict that takes seriously endogenous interaction between economic and conflict behavior