

# Lectures on Economic Inequality

Warwick, Summer 2018, Slides 5

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- Inequality and Divergence I. Personal Inequalities, Slides 1 and 2
- Inequality and Divergence II. Functional Inequalities, Slides 3
- Inequality and Conflict I. Polarization and Fractionalization, Slides 4
- [Inequality and Conflict II. Some Empirical Findings](#), Slides 5
- Inequality and Conflict III. Towards a Theory of Class Conflict

## Slides 5. Inequality and Conflict: Some Empirical Findings

- We begin by taking the prediction of the last lecture to the data:
- [Approximation Theorem](#) .  $R$  “approximately” solves

$$\frac{Rc'(R)}{\pi + \mu} = \lambda P + (1 - \lambda)F,$$

where

- $\lambda \equiv \pi / (\pi + \mu)$  is relative [publicness](#) of the prize.
- $P$  is squared [polarization](#):  $\sum_i \sum_j n_i^2 n_j d_{ij}$
- $F$  is [fractionalization](#):  $\sum_i n_i (1 - n_i)$ .

## Empirical Investigation

(Esteban, Mayoral and Ray *AER* 2012, *Science* 2012)

- 138 countries over 1960–2008 (pooled cross-section).
- **Prio25**: 25+ battle deaths in the year. [**Baseline**]
- **Priocw**: Prio25 + total exceeding 1000 battle-related deaths.
- **Prio1000**: 1,000+ battle-related deaths in the year.
- **Prioint**: weighted combination of above.
- **Isc**: Continuous index, Banks (2008), weighted average of 8 different manifestations of conflict.

## Groups

- **Fearon** database: “culturally distinct” groups in 160 countries.
  - based on ethnolinguistic criteria.
- **Ethnologue**: information on linguistic groups.
  - 6,912 living languages + group sizes.

## Preferences and Distances

- We use **linguistic distances** on language trees.
- E.g., all Indo-European languages in common subtree.
- Spanish and Basque diverge at the first branch; Spanish and Catalan share first 7 nodes. Max: 15 steps of branching.
- **Similarity**  $s_{ij} = \frac{\text{common branches}}{\text{maximal branches down that subtree}}$ .
- **Distance**  $\kappa_{ij} = 1 - s_{ij}^\delta$ , for some  $\delta \in (0, 1]$ .
- Baseline  $\delta = 0.05$  as in Desmet et al (2009).

## Additional Variables and Controls

- Among the controls:
  - Population
  - GDP per capita
  - Dependence on oil
  - Mountainous terrain
  - Democracy
  - Governance, civil rights
- Also:
  - Indices of publicness and privateness of the prize
  - Estimates of group concern from *World Values Survey*

- Want to estimate

$$\rho c'(\rho)_{it} = X_{1it}\beta_1 + X_{2it}\beta_2 + \varepsilon_{it}$$

- $X_{1it}$  distributional indices.
- $X_{2it}$  controls (including lagged conflict)

- With binary outcomes, latent variable model:

$$P(\text{Prio}x_{it} = 1|Z_{it}) = P(\rho c'(\rho) > W^*|Z_{it}) = H(Z_{it}\beta - W^*)$$

- where  $Z_{it} = (X_{1i}, X_{2it})$
- Baseline: uses max likelihood logit (results identical for probit).
- $p$ -values use robust standard errors adjusted for clustering.

- Baseline with Prio25, Fearon groupings

[ $\alpha$ ,  $\lambda$ ]

Var	[1]	[2]	[3]	[4]	[5]	[6]
$P$	*** 6.07 (0.002)	*** 6.90 (0.000)	*** 6.96 (0.001)	*** 7.38 (0.001)	*** 7.39 (0.001)	*** 6.50 (0.004)
$F$	*** 1.86 (0.000)	** 1.13 (0.029)	** 1.09 (0.042)	** 1.30 (0.012)	** 1.30 (0.012)	** 1.25 (0.020)
Pop	** 0.19 (0.014)	** 0.23 (0.012)	** 0.22 (0.012)	0.13 (0.141)	0.13 (0.141)	0.14 (0.131)
Gdppc	-	*** -0.40 (0.001)	*** -0.41 (0.002)	*** -0.47 (0.001)	*** -0.47 (0.001)	** -0.38 (0.011)
Oil/diam	-	-	0.06 (0.777)	0.04 (0.858)	0.04 (0.870)	-0.10 (0.643)
Mount	-	-	-	0.01 (0.134)	0.01 (0.136)	0.01 (0.145)
Ncont	-	-	-	** 0.84 (0.019)	** 0.85 (0.018)	*** 0.90 (0.011)
Democ	-	-	-	-	-0.02 (0.944)	0.02 (0.944)
Excons	-	-	-	-	-	-0.13 (0.741)
Autocr	-	-	-	-	-	0.14 (0.609)
Rights	-	-	-	-	-	0.17 (0.614)
Civlib	-	-	-	-	-	0.16 (0.666)
Lag	*** 2.91 (0.000)	*** 2.81 (0.000)	*** 2.80 (0.000)	*** 2.73 (0.000)	*** 2.73 (0.000)	*** 2.79 (0.000)

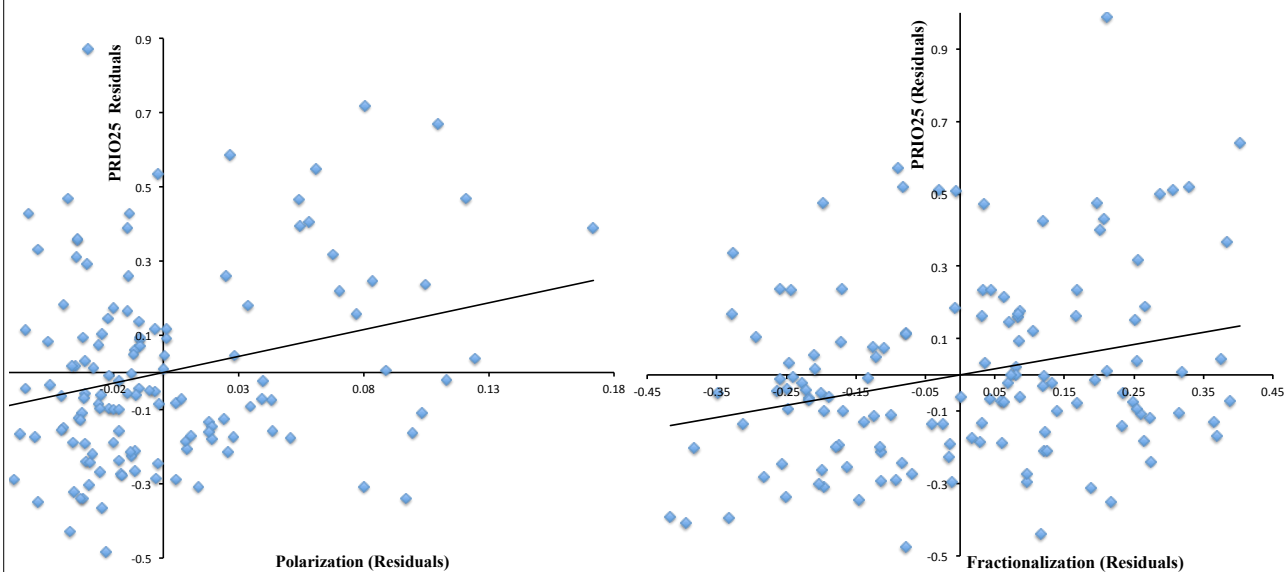
**Part A:** countries in 45-55 fractionalization decile, ranked by polarization.

**Part B:** countries in 45-55 polarization decile, ranked by fractionalization.

Part A	Intensity	Years
Dom Rep	1	1
Morocco	1	15
USA	0	0
Serbia-Mont	2	2
Spain	1	5
Macedonia	1	1
Chile	1	1
Panama	1	1
Nepal	2	14
Canada	0	0
Myanmar	2	117
Kyrgyzstan	0	0
Sri Lanka	2	26
Estonia	0	0
Guatemala	1	30

Part B	Intensity	Years
Germany	0	0
Armenia	0	0
Austria	0	0
Taiwan	0	0
Algeria	2	22
Zimbabwe	2	9
Belgium	0	0
USA	0	0
Morocco	1	15
Serbia-Mont	2	2
Latvia	0	0
Trin-Tob	1	1
Guinea-Bissau	1	13
Sierra Leone	2	10
Mozambique	2	27

■ Residual scatters.



■  $P(20 \rightarrow 80)$ , Prio25 13%  $\rightarrow$  29%.

■  $F(20 \rightarrow 80)$ , Prio25 12%  $\rightarrow$  25%.

## Robustness Checks

- Alternative definitions of conflict
- Alternative definition of groups: *Ethnologue*
- Binary versus language-based distances
- Conflict onset
- Region and time effects
- Other ways of estimating the baseline model

- Different definitions of conflict, Fearon groupings

Variable	Prio25	Priocw	Prio1000	PrioInt	Isc
<i>P</i>	*** 7.39 (0.001)	*** 6.76 (0.007)	*** 10.47 (0.001)	*** 6.50 (0.000)	*** 25.90 (0.003)
<i>F</i>	** 1.30 (0.012)	** 1.39 (0.034)	* 1.11 (0.086)	*** 1.30 (0.006)	2.27 (0.187)
Gdp	*** - 0.47 (0.001)	* - 0.35 (0.066)	*** - 0.63 (0.000)	*** - 0.40 (0.002)	*** - 1.70 (0.001)
Pop	0.13 (0.141)	* 0.19 (0.056)	0.13 (0.215)	0.10 (0.166)	*** 1.11 (0.000)
Oil/diam	0.04 (0.870)	0.06 (0.825)	- 0.03 (0.927)	- 0.04 (0.816)	- 0.57 (0.463)
Mount	0.01 (0.136)	** 0.01 (0.034)	0.01 (0.323)	0.00 (0.282)	** 0.04 (0.022)
Ncont	** 0.85 (0.018)	0.62 (0.128)	* 0.78 (0.052)	* 0.55 (0.069)	*** 4.38 (0.004)
Democ	- 0.02 (0.944)	- 0.09 (0.790)	- 0.41 (0.230)	- 0.03 (0.909)	0.06 (0.944)
Lag	*** 2.73 (0.000)	*** 3.74 (0.000)	*** 2.78 (0.000)	*** 2.00 (0.000)	*** 0.50 (0.000)

- $P(20 \rightarrow 80)$ , Prio25 13%–29%, Priocw 7%–17%, Prio1000 3%–10%.

- $F(20 \rightarrow 80)$ , Prio25 12%–25%, Priocw 7%–16%, Prio1000 3%–6%.

■ Different definitions of conflict, *Ethnologue* groupings

Variable	Prio25	Priocw	Prio1000	Prioint	Isc
<i>P</i>	*** 8.26 (0.001)	*** 8.17 (0.005)	** 10.10 (0.016)	*** 7.28 (0.001)	*** 27.04 (0.008)
<i>F</i>	0.64 (0.130)	0.75 (0.167)	0.51 (0.341)	0.52 (0.185)	- 0.58 (0.685)
Gdp	*** - 0.51 (0.000)	** - 0.39 (0.022)	*** - 0.63 (0.000)	*** - 0.45 (0.000)	*** - 2.03 (0.000)
Pop	* 0.15 (0.100)	** 0.24 (0.020)	0.15 (0.198)	0.12 (0.118)	*** 1.20 (0.000)
Oil/diam	0.15 (0.472)	0.21 (0.484)	0.10 (0.758)	0.08 (0.660)	- 0.06 (0.943)
Mount	* 0.01 (0.058)	** 0.01 (0.015)	0.01 (0.247)	* 0.01 (0.099)	** 0.04 (0.013)
Ncont	** 0.72 (0.034)	0.49 (0.210)	0.50 (0.194)	0.44 (0.136)	*** 4.12 (0.006)
Democ	0.03 (0.906)	0.00 (0.993)	- 0.32 (0.350)	0.03 (0.898)	0.02 (0.979)
Lag	*** 2.73 (0.000)	*** 3.75 (0.000)	*** 2.83 (0.000)	*** 2.01 (0.000)	*** 0.50 (0.000)

■ Binary variables don't work well with *Ethnologue*.

■ Can compute pseudolikelihoods for  $\delta$  as in Hansen (1996).

■ Onset vs incidence, Fearon and *Ethnologue* groupings

Variable	Onset2	Onset5	Onset8	Onset2	Onset5	Onset8
<i>P</i>	*** 7.85 (0.000)	*** 7.41 (0.000)	*** 7.26 (0.000)	*** 8.83 (0.000)	*** 8.84 (0.000)	*** 8.71 (0.000)
<i>F</i>	* 0.94 (0.050)	0.72 (0.139)	0.62 (0.204)	0.39 (0.336)	0.20 (0.602)	0.15 (0.702)
Gdp	*** - 0.60 (0.000)	*** - 0.65 (0.000)	*** - 0.68 (0.000)	*** - 0.64 (0.000)	*** - 0.70 (0.000)	*** - 0.73 (0.000)
Pop	0.01 (0.863)	0.03 (0.711)	0.03 (0.748)	0.06 (0.493)	0.05 (0.588)	0.05 (0.619)
Oil/diam	** 0.54 (0.016)	** 0.46 (0.022)	** 0.47 (0.025)	*** 0.64 (0.004)	*** 0.56 (0.005)	*** 0.57 (0.007)
Mount	0.00 (0.527)	0.00 (0.619)	0.00 (0.620)	0.00 (0.295)	0.00 (0.410)	0.00 (0.424)
Ncont	*** 0.74 (0.005)	** 0.66 (0.010)	0.42 (0.104)	** 0.66 (0.012)	** 0.63 (0.017)	0.40 (0.120)
Democ	- 0.06 (0.816)	0.06 (0.808)	0.08 (0.766)	- 0.02 (0.936)	0.09 (0.716)	0.10 (0.704)
Lag	0.32 (0.164)	- 0.08 (0.740)	- 0.08 (0.751)	0.29 (0.214)	- 0.13 (0.618)	- 0.13 (0.622)
	Fearon	Fearon	Fearon	Eth	Eth	Eth

■ Region and time effects, Fearon groupings

Variable	reg.dum.	no Afr	no Asia	no L.Am.	trend	interac.
<i>P</i>	*** 6.64 (0.002)	** 5.36 (0.034)	*** 7.24 (0.001)	*** 9.56 (0.001)	*** 7.39 (0.001)	*** 7.19 (0.001)
<i>F</i>	*** 2.03 (0.001)	*** 2.74 (0.001)	** 1.28 (0.030)	*** 1.49 (0.009)	** 1.33 (0.012)	*** 1.76 (0.001)
Gdp	*** - 0.72 (0.000)	*** - 0.69 (0.000)	** - 0.39 (0.024)	*** - 0.45 (0.006)	*** - 0.49 (0.001)	*** - 0.60 (0.000)
Pop	0.05 (0.635)	0.09 (0.388)	0.06 (0.596)	* 0.17 (0.087)	0.14 (0.125)	0.06 (0.543)
Oil/diam	0.12 (0.562)	0.14 (0.630)	0.10 (0.656)	0.10 (0.687)	0.05 (0.824)	0.15 (0.476)
Mount	0.00 (0.331)	- 0.00 (0.512)	0.01 (0.114)	** 0.01 (0.038)	0.01 (0.109)	0.01 (0.212)
Ncont	** 0.87 (0.018)	* 0.75 (0.064)	** 0.83 (0.039)	0.62 (0.134)	** 0.82 (0.025)	** 0.77 (0.040)
Democ	0.08 (0.761)	- 0.03 (0.932)	- 0.23 (0.389)	0.10 (0.716)	0.08 (0.750)	0.13 (0.621)
Lag	*** 2.68 (0.000)	*** 2.83 (0.000)	*** 2.69 (0.000)	*** 2.92 (0.000)	*** 2.79 (0.000)	*** 2.74 (0.000)

■ Other estimation methods, Fearon groupings.

Variable	Logit	OLog(CS)	Logit(Y)	RELog	OLS	RC
<i>P</i>	*** 7.39 (0.001)	*** 11.84 (0.003)	** 4.68 (0.015)	*** 7.13 (0.000)	*** 0.86 (0.004)	*** 0.95 (0.001)
<i>F</i>	** 1.30 (0.012)	*** 2.92 (0.001)	*** 1.32 (0.003)	*** 1.27 (0.005)	** 0.13 (0.025)	*** 0.16 (0.008)
Gdp	*** - 0.47 (0.001)	*** - 0.77 (0.001)	** - 0.29 (0.036)	*** - 0.46 (0.000)	*** - 0.05 (0.000)	*** - 0.06 (0.000)
Pop	0.13 (0.141)	0.03 (0.858)	0.14 (0.123)	** 0.14 (0.090)	** 0.02 (0.020)	** 0.02 (0.032)
Oil/diam	0.04 (0.870)	** 0.94 (0.028)	0.29 (0.280)	0.04 (0.850)	0.00 (0.847)	0.01 (0.682)
Mount	0.01 (0.136)	0.01 (0.102)	0.00 (0.510)	0.01 (0.185)	0.00 (0.101)	0.00 (0.179)
Ncont	** 0.85 (0.018)	*** 1.51 (0.007)	* 0.62 (0.052)	*** 0.83 (0.002)	** 0.09 (0.019)	*** 0.10 (0.006)
Democ	- 0.02 (0.944)	- 0.48 (0.212)	- 0.09 (0.690)	- 0.02 (0.941)	0.01 (0.788)	0.01 (0.585)
Lag	*** 2.73 (0.000)	-	*** 4.69 (0.000)	*** 2.69 (0.000)	*** 0.54 (0.000)	*** 0.45 (0.000)



## Inter-Country Variations in Publicness and Cohesion

$$\text{conflict per-capita} \simeq \alpha [\lambda P + (1 - \lambda)F],$$

- Relax assumption that  $\lambda$  and  $\alpha$  same across countries.
- **Privateness**: natural resources; use per-capita oil reserves (*oilresv*).
- **Publicness**: control while in power (*pub*), average of
  - Autocracy (Polity IV)
  - Absence of political rights (Freedom House)
  - Absence of civil liberties (Freedom House)
- $\Lambda \equiv (\text{PUB} * \text{gdp}) / (\text{PUB} * \text{gdp} + \text{OILRESV})$ .

### ■ Country-specific public good shares and group cohesion

Variable	Prio25	PrioInt	Isc	Prio25	PrioInt	Isc
<i>P</i>	- 3.31 (0.424)	- 1.93 (0.538)	- 9.21 (0.561)	- 3.01 (0.478)	- 1.65 (0.630)	- 13.04 (0.584)
<i>F</i>	0.73 (0.209)	0.75 (0.157)	- 2.27 (0.249)	1.48 (0.131)	1.51 (0.108)	** - 6.65 (0.047)
<i>PA</i>	*** 17.38 (0.001)	*** 13.53 (0.001)	*** 60.23 (0.005)			
<i>F(1 - Λ)</i>	*** 2.53 (0.003)	*** 1.92 (0.003)	*** 11.87 (0.000)			
<i>PΛA</i>				** 23.25 (0.021)	** 19.16 (0.019)	* 72.22 (0.083)
<i>F(1 - Λ)A</i>				** 4.02 (0.013)	*** 2.92 (0.003)	*** 26.03 (0.000)
Gdp	*** - 0.62 (0.000)	*** - 0.50 (0.000)	*** - 2.36 (0.000)	*** - 0.65 (0.000)	*** - 0.53 (0.003)	*** - 3.68 (0.000)
Pop	0.10 (0.267)	0.09 (0.243)	*** 0.99 (0.000)	0.08 (0.622)	0.09 (0.448)	0.33 (0.565)
Lag	*** 2.62 (0.000)	*** 1.93 (0.000)	*** 0.47 (0.000)	*** 2.40 (0.000)	*** 1.79 (0.000)	*** 0.42 (0.000)

## Summary So Far

- Exclusionary conflict as important as distributive conflict, maybe more.
- Often made salient by the use of ethnicity or religion.
- Do societies with “ethnic divisions” experience more conflict?
- We developed a theory of conflict that generates an empirical test.
- The notions of polarization and fractionalization are central to this theory
- Convex combination of the two distributional variables predicts conflict.
- Theory appears to find strong support in the data.
- **Other predictions:** interaction effects on shocks that affect rents and opportunity costs.

## But What About *Economic Inequality*?

- Lichbach survey (1989):
  - 43 papers
  - some “best forgotten”
  - Evidence completely mixed.
- “[F]airly typical finding of a weak, barely significant relationship between inequality and political violence . . . rarely is there a robust relationship between the two variables.” Midlarsky (1988)

## Economic Inequality and Conflict

Variable	Prio25	Prio25	Prio1000	Prio1000	PrioInt	PrioInt
Gini	** - 0.01 (0.042)	** - 0.01 (0.014)	0.01 (0.131)	** - 0.01 (0.054)	** - 0.02 (0.026)	*** - 0.02 (0.004)
Gdp	0.05 (0.488)	-	- 0.03 (0.533)	-	0.02 (0.871)	-
Gdpgr	-	*** - 0.00 (0.001)	-	*** - 0.00 (0.001)	-	*** - 0.01 (0.000)
Pop	0.05 (0.709)	- 0.08 (0.472)	0.14 (0.140)	0.10 (0.214)	0.18 (0.300)	0.02 (0.871)
Oil/diam	*** 0.00 (0.037)	*** 0.00 (0.018)	0.00 (0.112)	0.00 (0.124)	** 0.00 (0.022)	** 0.00 (0.010)
Democ	0.07 (0.301)	* 0.11 (0.093)	- 0.02 (0.668)	- 0.06 (0.283)	0.05 (0.614)	0.06 (0.525)

## The Ambiguity of Inequality

### ■ The Grabbing and Opportunity Cost Effects Dube-Vargas 2013, Mitra-Ray 2014

- An increase in rival income increases violence directed against rival group.
- An increase in own income reduces violence directed against rival group.

### ■ Motive Versus Means Esteban-Ray 2008, 2011, Huber-Mayoral 2014

- The class marker is a two-edged sword:
  - it breeds resentment, but harder for the poor to revolt
  - ethnic division  $\Rightarrow$  perverse synergy of money and labor (2002 Gujarat)
  - Next slide for some evidence on this.

Variable	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Gini	3.234 (2.951)						
BGI		-0.301 (5.118)	0.505 (5.097)	-0.471 (5.402)	-0.022 (0.374)	0.060 (0.433)	0.203 (0.285)
WGI		**13.752 (6.422)	*11.764 (6.012)	**13.549 (6.317)	**0.833 (0.415)	**0.822 (0.397)	*0.559 (0.303)
Overlap		-8.010 (7.220)	*-9.133 (5.417)	-9.191 (7.008)	0.395 (0.400)	0.468 (0.446)	-0.022 (0.444)
GDP, lag	-0.281 (0.254)	-0.339 (0.274)	*-0.504 (0.265)	*-0.453 (0.254)	-0.121 (0.207)	-0.363 (0.229)	0.033 (0.025)
Pop, lag	***0.400 (0.132)	**0.319 (0.142)	**0.374 (0.152)	**0.365 (0.147)	*-0.835 (0.499)	-0.541 (0.451)	***0.034 (0.017)
P	1.517 (1.002)	**2.091 (0.992)	**2.317 (0.952)	**2.337 (0.993)			
F	***2.676 (1.219)	***9.932 (3.789)	***9.108 (3.412)	***10.360 (3.694)			
Non-cont	1.098 (0.671)	*1.705 (0.758)	**1.753 (0.683)	**1.701 (0.740)			
Mount	0.011 (0.009)	0.011 (0.009)					
xPol, lag	0.031 (0.041)	0.030 (0.044)		0.032 (0.056)	-0.020 (0.016)	-0.009 (0.019)	0.006 (0.007)
xPol Sq				-0.001 (0.017)			
Anoc, lag			***1.096 (0.420)				
Dem, lag			**1.005 (0.449)				
Nat. Res.	-0.294 (0.337)	-0.224 (0.374)					
PRIO25, lag	***4.655 (0.624)	***4.465 (0.601)	***4.549 (0.591)	***4.545 (0.606)		**0.334 (0.143)	***0.682 (0.085)
	Reg E.	Reg E.	Reg E.	Reg E.	FE	FE	FE

## The Ambiguity of Inequality: An Illustration

## An Illustration: Hindu-Muslim Violence Mitra and Ray (2014)

- Recurrent episodes of violence
  - Partition era of the 1940s, and earlier
  - Continuing through the second half of the twentieth century.
- Indian history, and the relative size of Hindu population, suggest:
  - Religion is a highly salient cleavage
  - Hindu groups generally dominant in propagating conflict
- Does economics (or income comparisons) have anything to do with this?

## Some Ethnographic Literature

- Thakore (1993) on Bombay riots [[land](#)]
- Das (2000) on Calcutta riots [[land](#)]
- Rajgopal (1987), Khan (1992) on Bhiwandi and Meerut riots [[textiles](#)]
- Engineer (1994), Khan (1991) on Jabbalpur, Kanpur, Moradabad [[bidis, brassware](#)]
- Upadhyaya (1992) on Varanasi riots [[sari dealers](#)]
- Wilkinson (2004) on Varanasi [[wholesale silk](#)]
- Field et al (2009) on Ahmedabad [[housing](#)]

■ **Example:** Engineer (1987) on **Meerut riots**:

“If [religious zeal] is coupled with economic prosperity, as has happened in Meerut, it has a multiplying effect on the Hindu psyche. The ferocity with which business establishments have been destroyed in Meerut bears testimony to this observation. Entire rows of shops belonging to Muslims . . . were reduced to ashes.”

■ And yet . . .

■ Wilkinson (2004):

“Despite the disparate impact of riots on Hindus and Muslims, however, little hard evidence suggests that Hindu merchants and financial interests are fomenting anti-Muslim riots for economic gain. . . .”

■ Horowitz (2001, p. 211):

“The role that commercial competition is said to play is said to be a covert, behind-the-scenes role, which makes proof or disproof very difficult.”

## Data

■ **Conflict data.** Varshney-Wilkinson (TOI 1950-1995)

■ our extension (TOI 1996-2000).

■ **Income data.** National Sample Survey Organization (NSSO) consumer expenditure data.

■ Rounds 38 (1983), 43 (1987-8) and 50 (1993-94).

■ **Controls.** Various sources, in particular Reports of the Election Commission of India.

■ Three-period panel at the regional level; 55 regions.

## Empirical Specification

- **Baseline:** We use the Poisson specification:

$$E[\text{Count}_{i,t} | \mathbf{X}_{it}, r_i] = r_i \exp(\mathbf{X}'_{it} \beta + \tau_t)$$

- where  $\mathbf{X}$  includes
  - expenditures (as income proxies) both for Hindu and Muslim.
  - time-varying controls.
- $r_i$  are regional dummies;  $\tau_t$  are time dummies.
- **Other Specifications:**
  - Negative binomial to allow for mean count  $\neq$  variance.
  - Plain vanilla OLS (on log count).

- Recall Proposition 4:
  - An increase in rival income increases violence directed against rival group.
  - An increase in own income reduces violence directed against rival group.
- Suggests a possible interpretation of the data.





■ Casualties, 5-Year Average Starting Just After

	[Poiss]	[Poiss]	[NegBin]	[NegBin]	[OLS]	[OLS]
H Exp	***-7.87 (0.005)	***-6.82 (0.003)	** -2.79 (0.093)	-3.31 (0.131)	** -9.15 (0.033)	* -8.46 (0.085)
M Exp	***5.10 (0.000)	***4.67 (0.001)	**2.64 (0.040)	**3.87 (0.023)	***6.89 (0.006)	***9.52 (0.009)
Pop	4.28 (0.468)	3.91 (0.496)	0.62 (0.149)	0.74 (0.132)	-3.87 (0.614)	-1.23 (0.877)
RelPol	*5.55 (0.054)	*5.57 (0.056)	0.72 (0.763)	1.09 (0.715)	6.00 (0.470)	6.86 (0.408)
Gini H		-5.426 (0.317)		4.121 (0.521)		-14.473 (0.342)
Gini M		3.399 (0.497)		-5.952 (0.362)		-11.073 (0.451)
Lit, Urb	Y	Y	Y	Y	Y	Y

■ Muslim exp ↑ 1% ⇒ Cas ↑ 3–5%.

Hindu exp ↑ 1% ⇒ Cas ↓ -7– -3%.

Variations: Other measures of conflict

■ Killed and Riot Outbreaks, 5-Year Average Starting Just After

	[Poiss]		[NegBin]		[OLS]	
	Kill	Riot	Kill	Riot	Kill	Riot
H exp	-0.07 (0.976)	-2.12 (0.393)	-2.25 (0.293)	*-5.37 (0.069)	-4.27 (0.339)	** -6.30 (0.019)
M exp	0.85 (0.636)	*2.49 (0.067)	**3.69 (0.030)	**4.16 (0.016)	**6.42 (0.043)	***6.42 (0.006)
Pop	*-6.03 (0.071)	0.26 (0.900)	0.83 (0.170)	0.30 (0.823)	-3.31 (0.549)	-0.03 (0.995)
RelPol	1.31 (0.659)	0.26 (0.875)	0.10 (0.970)	*4.58 (0.085)	4.17 (0.556)	2.73 (0.603)
GiniH	-2.63 (0.686)	-2.69 (0.617)	6.32 (0.389)	4.56 (0.484)	-8.77 (0.445)	-8.99 (0.366)
GiniM	4.58 (0.505)	-1.11 (0.790)	-11.24 (0.121)	-9.14 (0.153)	-15.06 (0.235)	-11.93 (0.199)
Lit, Urban	Y	Y	Y	Y	Y	Y

**Variations:** The use of Hindu-Muslim expenditure *ratios*.

	[Poiss]			[NegBin]			[OLS]		
	Cas	Kill	Riot	Cas	Kill	Riot	Cas	Kill	Riot
M/H	<b>***4.78</b>	0.80	<b>*2.44</b>	<b>**3.88</b>	<b>**3.55</b>	<b>**4.29</b>	<b>***9.36</b>	<b>*6.19</b>	<b>***6.34</b>
	(0.000)	(0.640)	(0.089)	(0.011)	(0.014)	(0.010)	(0.010)	(0.051)	(0.006)
Pop	4.76	-5.68	0.49	0.75	0.84	0.32	-1.19	-3.32	-0.00
	(0.417)	(0.101)	(0.804)	(0.105)	(0.162)	(0.821)	(0.880)	(0.548)	(1.000)
Pce	-3.36	0.09	-0.19	0.69	1.40	-1.41	0.51	1.59	-0.25
	(0.208)	(0.971)	(0.915)	(0.671)	(0.540)	(0.471)	(0.918)	(0.703)	(0.933)
RelPol	<b>*5.36</b>	1.21	0.30	1.15	0.14	<b>*4.56</b>	6.87	4.26	2.74
	(0.061)	(0.681)	(0.856)	(0.658)	(0.961)	(0.060)	(0.405)	(0.546)	(0.600)
GiniH	-4.53	-1.90	-2.21	4.20	6.33	4.73	-14.08	-8.26	-8.80
	(0.413)	(0.774)	(0.681)	(0.499)	(0.413)	(0.485)	(0.352)	(0.471)	(0.372)
GiniM	4.05	4.77	-0.90	-6.15	-11.17	-9.08	-10.80	-14.89	-11.69
	(0.421)	(0.482)	(0.832)	(0.310)	(0.127)	(0.136)	(0.468)	(0.244)	(0.213)
Lit, Urb	Y	Y	Y	Y	Y	Y	Y	Y	Y

**Variations:** The use of different lags.

	[1] Cas-2	[2] Cas-1	[3] Cas	[4] Cas+1	[5] Cas+2	[6] Cas+3
H exp	0.98	0.10	-0.11	<b>***-6.83</b>	<b>***-11.11</b>	<b>***-10.23</b>
	(0.687)	(0.968)	(0.959)	(0.003)	(0.000)	(0.001)
M exp	-0.15	-0.68	<b>*2.36</b>	<b>***4.67</b>	<b>***6.40</b>	<b>***8.32</b>
	(0.915)	(0.624)	(0.085)	(0.001)	(0.000)	(0.000)
Pop	5.18	7.36	<b>**7.84</b>	3.90	5.47	4.48
	(0.187)	(0.117)	(0.018)	(0.507)	(0.385)	(0.410)
RelPol	-2.35	-0.87	<b>**5.99</b>	<b>**5.63</b>	<b>**5.70</b>	<b>***6.40</b>
	(0.440)	(0.786)	(0.038)	(0.038)	(0.038)	(0.008)
BJP	Y	Y	Y	Y	Y	Y
Lit, Urb	Y	Y	Y	Y	Y	Y
Ginis	Y	Y	Y	Y	Y	Y

## Concerns: Endogeneity

- **Reverse causation?** Anecdotal evidence on who suffers:
  - [Wilkinson 2004] 1985–1987: Muslims were 12% of the population, but suffered
  - 60% of the 443 deaths
  - 45% of the 2667 injuries
  - 73% of the estimated property damage
- **Omitted Variables?**
  - Gulf funding of conflict (via remittances)
  - Income recovery from past conflict

## Concerns: Endogeneity

- Instrument: **Occupational Groupings**
  - 18 broad occupational categories from the NSS.

(1) Agricultural Production and Plantations, (2) Livestock Production, (3) Fishing, (4) Mining and Quarrying (Coal; Crude Petrol and Natural Gas; Metal Ore; Other), (5) Manufacture of Food Products and Inedible Oils, (6) Manufacture of Beverages, Tobacco and Tobacco products, (7) Manufacture of Textiles (Cotton; Wool, Silk, Artificial; Jute, Veg. Fibre; Textile Products), (8) Manufacture of Wood and Wooden Products, (9) Manufacture of Paper, Paper Products, Publishing, Printing and Allied Industries, (10) Manufacture of Leather, and of Leather and Fur Products, (11) Manufacture of Rubber, Plastic, Petroleum, Coal ; Chemicals and Chemical Products, (12) Manufacture of Non-Metallic Mineral Products, (13) Basic Metal and Alloy Industries, (14) Manufacture of Metal Products and Parts, except Machinery and Transport Equipments, (15) Manufacture of Machinery, Machine Tools and Parts except Electrical Machinery, (16) Manufacture of Electrical Machinery, Appliances, Apparatus and Supplies and Parts, (17) Manufacture of Transport Equipments and Parts and (18) Other Manufacturing Industries.

## Concerns: Endogeneity

- Instrument: [Occupational Groupings](#)
- 18 broad occupational categories from the NSS.

## Concerns: Endogeneity

- Instrument: [Occupational Groupings](#)
- 18 broad occupational categories from the NSS.
- Construct average returns for Hindus and Muslims in each.
- Use NSS [national](#) expenditure averages to do this.
- Use [regional](#) employment to get H- and M-indices by region.

## IV regressions with H- and M-indices

	First Stage			Second Stage		
	Cas	Kill	Riot	Cas	Kill	Riot
M/H ind	***0.78 (0.001)	***0.78 (0.001)	***0.76 (0.002)			
M/H				***26.83 (0.004)	***24.97 (0.006)	***16.59 (0.010)
Pce	*-0.59 (0.079)	*-0.60 (0.082)	*-0.54 (0.089)	13.99 (0.131)	14.79 (0.115)	7.21 (0.188)
Pop	-0.16 (0.453)	-0.17 (0.445)	-0.22 (0.311)	3.81 (0.651)	1.71 (0.818)	3.40 (0.528)
RelPol	** -0.47 (0.046)	** -0.48 (0.042)	* -0.41 (0.087)	12.24 (0.174)	10.78 (0.195)	5.40 (0.348)
GiniH	***-1.29 (0.002)	***-1.28 (0.003)	***-1.37 (0.001)	1.82 (0.921)	8.22 (0.593)	1.10 (0.928)
GiniM	***2.77 (0.000)	***2.79 (0.000)	***2.77 (0.000)	** -67.18 (0.031)	** -72.74 (0.015)	** -44.73 (0.033)
BJP	Y	Y	Y	Y	Y	Y
Lit, Urb	Y	Y	Y	Y	Y	Y

## Concerns: A General Malaise?

- A counter-view:
  - Rise in Muslim income just a proxy for overall Hindu stagnation.
  - Could imply an increase in social unrest quite generally
  - Therefore not interpretable as **directed** violence.
- Test by using GOI dataset on Crime in India
  - Has data on “all riots”.
  - (Doesn't publish data on religious violence!)

## A General Malaise? Placebo using all conflict:

	[1] Poisson	[2] Poisson	[3] Neg. Bin.	[4] Neg. Bin.	[5] OLS	[6] OLS
HExp	<b>***0.75</b> (0.007)		-0.53 (0.448)		0.37 (0.467)	
MExp	-0.19 (0.301)		-0.12 (0.607)		-0.12 (0.617)	
M/H		-0.23 (0.202)		-0.09 (0.702)		-0.12 (0.642)
Pce		<b>*0.52</b> (0.072)		-0.68 (0.243)		0.39 (0.287)
Pop	0.06 (0.910)	0.06 (0.912)	0.50 (0.221)	0.52 (0.149)	0.73 (0.314)	0.70 (0.336)
RelPol	<b>*-0.64</b> (0.051)	<b>*-0.62</b> (0.056)	0.20 (0.721)	0.17 (0.744)	0.12 (0.839)	0.14 (0.815)
GiniH	<b>** -1.63</b> (0.046)	<b>*-1.56</b> (0.058)	0.85 (0.594)	0.84 (0.562)	0.19 (0.902)	0.14 (0.928)
GiniM	-0.74 (0.307)	-0.76 (0.293)	0.35 (0.717)	0.36 (0.671)	0.61 (0.441)	0.55 (0.495)
Lit, Urb	Y	Y	Y	Y	Y	Y

## A Question of Interpretation

- Our interpretation is based on theory / ethnographic studies.
- Positive effect of MExp, negative effect of HExp:
- Hindus are “net aggressors” in Indian religious violence.
- A counterargument:
  - Rising Muslim incomes make it easier to fund conflict.
  - Effect outweighs the opportunity cost of direct participation.
  - Ergo, the net aggressors are Muslims, not Hindus.

## Three Remarks On Funding

1. HExp enters negatively.

- So any funding effect is obliterated and reversed for Hindu groups.
- Possible, but unlikely.

2. Gulf funding.

- Taken out by the time fixed effect + instrument.

3. “Internal funding” by local groups:

- We turn to this next.

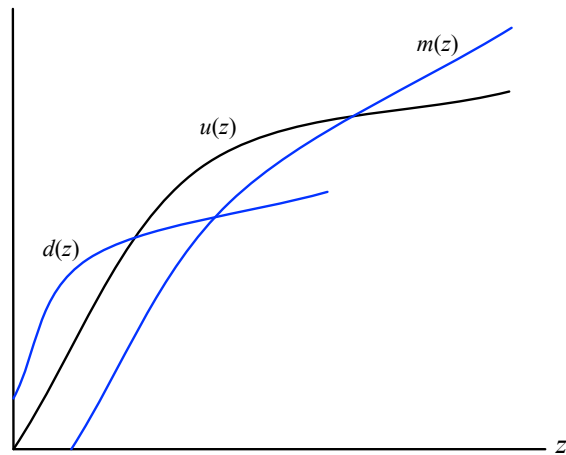
### ■ Internal Funding: Theory

■ **Proposition 5.** An increase in group incomes that causes both the funding requirement  $f$  and aggressor income  $z$  to rise in equal proportion, must reduce attacks perpetrated by members of that group.

- (Formal argument uses constant-elasticity utility.)
- Counterargument to Proposition. Either:
  - Paid attackers not from the same religious group, or
  - Funding pays for non-human inputs into violence.

## Examining the Counterargument

■ **Proposition 6.** Assume that the funding requirement is fixed. Then as aggressor income climbs: participation  $\rightarrow$  peace  $\rightarrow$  funding.



■ **Implication:** the positive coefficient on M-Exp should be heightened for relatively rich regions.

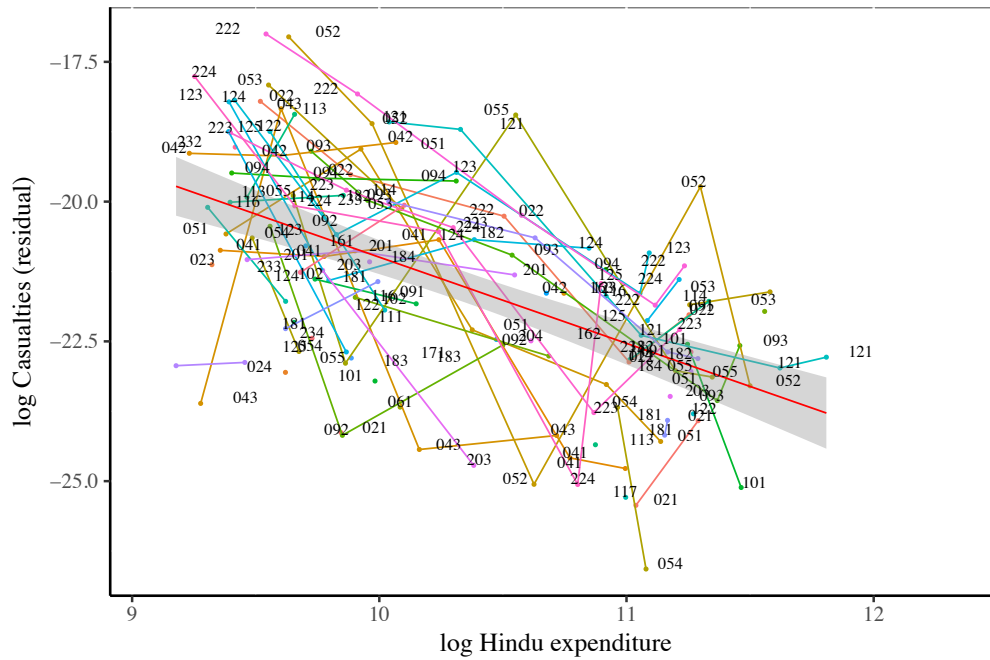
	OLS			Poisson		
	[1] All	[2] Non-Low	[3] Non-High	[4] All	[5] Non-Low	[6] Non-High
HExp	*-8.46 (0.085)	** -10.06 (0.037)	*-10.21 (0.061)	***-6.82 (0.003)	** -5.13 (0.019)	***-7.18 (0.003)
MExp	***9.52 (0.009)	***10.55 (0.004)	**9.15 (0.021)	***4.67 (0.001)	**3.31 (0.015)	***4.80 (0.001)
Pop	-1.23 (0.877)	-3.47 (0.630)	-2.25 (0.784)	3.91 (0.496)	-4.33 (0.118)	3.62 (0.538)
RelPol	6.68 (0.408)	5.60 (0.588)	5.79 (0.505)	*5.57 (0.056)	1.83 (0.366)	*5.43 (0.071)
GiniH	-14.47 (0.342)	-16.79 (0.328)	-13.97 (0.388)	-5.43 (0.317)	2.01 (0.719)	-5.66 (0.295)
GiniM	-11.07 (0.451)	-17.32 (0.250)	-9.56 (0.549)	3.40 (0.497)	5.47 (0.222)	3.95 (0.429)
Lit, Urb	Y	Y	Y	Y	Y	Y





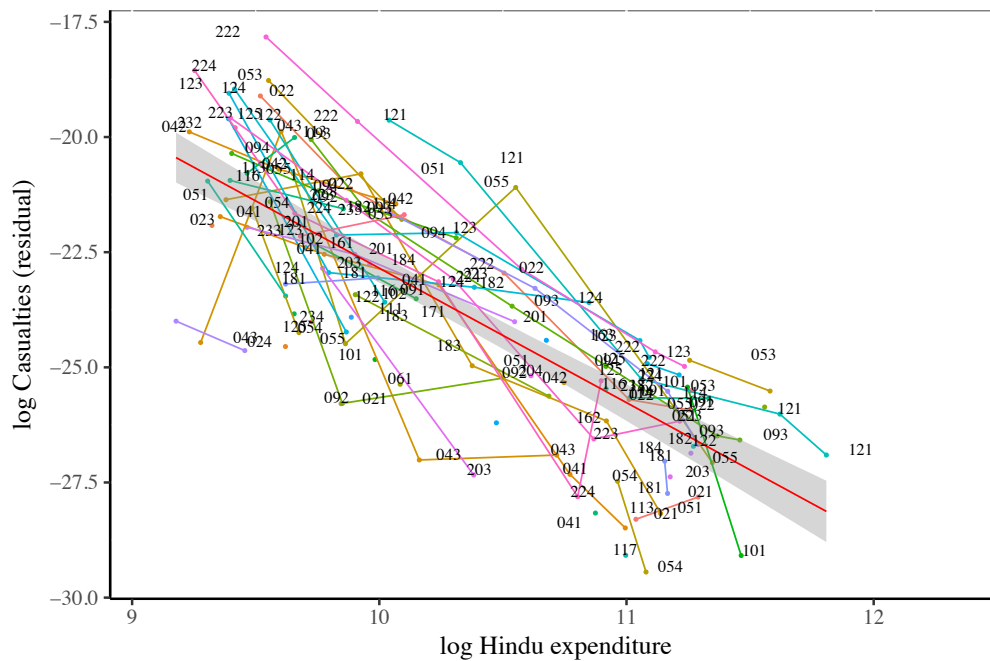
## Extension to Post-Gujarat, With Data till 2010

Hindu expenditure; all regions



## Extension to Post-Gujarat, With Data till 2010

Hindu expenditure; Ahmedabad excluded



## Summary

- We take the theory developed in the previous lecture to the data.
  - Fractionalization insignificant on its own
  - Significantly related to conflict when polarization is also entered into the regression, as predicted by the theory
  - Interaction with measures of publicness and privateness also support the theory that polarization works through public goods, and fractionalization through private goods.
- We also study the ambiguity of economic inequality
  - Empirical illustration with Hindu-Muslim violence.