

Lectures on Economic Inequality

Warwick, Summer 2016, Supplement 1 to Slides 4

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- Overview: Convergence and Divergence
- Inequality and Divergence: Economic Factors
- Inequality and Divergence: Psychological Factors
- [Inequality, Polarization and Conflict, Supplement 1](#)

Inequality and Conflict

- Three reasons why economic inequality not directly linked:
 - The poor have motive but not means, the rich have means but not motive.
 - Synergy of “finance and bodies” makes ethnic conflict more salient.
 - Institutions have watched out for classes, but not for groups.

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 - The poor have motive but not means, the rich have means but not motive.
 - Synergy of “finance and bodies” makes ethnic conflict more salient.
 - Institutions have watched out for classes, but not for groups.
- These considerations often make ethnicity and religion salient.
 - It isn't economic inequality as a whole, but unevenness **across groups**.
 - That unevenness may be disequalizing or even equalizing.

Uneven Growth and Conflict: 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.

Uneven Growth and Conflict: Hindu-Muslim Violence

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- Recurrent episodes of violence
 - Partition era of the 1940s, and earlier
 - Continuing through the second half of the twentieth century.
- ~ 1,200 riots, 7,000 deaths, 30,000 injuries over 1950–2000.
 - Numbers may look small relative to Indian population
 - Don't capture displacement, segregation and widespread fear.

Some Ethnographic Literature

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

■ Examples:

- 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.”

- Das (2000) on Calcutta riots:

“[I]t appears that that ‘promoters’ played a crucial role in inflaming the riot whose victims . . . were slum-dwellers. Their obvious aim was to clear the *bus-tees* [or slums] for construction projects. . . The expectation was that once such people could be forced to abandon their establishments the realtors would have ‘an easy way to rake in the fast buck’ . . . What actually took place in 1992 was a land-grabbing riot under a communal garb.”

■ 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. . . The fact that economically motivated violence against Muslims occurs *after a riot breaks out* does not necessarily prove that this is why the violence broke out in the first place.”

- Horowitz (2001, p. 211):

“It is difficult to know how seriously to take commercial competition as a force in targeting choices. In some north Indian cities serious competition has subsisted without any violent episodes. 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.”

Our Approach

- Religious violence can be used to inflict harm on economic rivals:
 - direct looting or exclusion: property, jobs, businesses.
 - Or a failure of aspirations via economic growth for a salient rival group.
 - What we do cannot identify the precise channel.

Our Approach

- Religious violence can be used to inflict harm on economic rivals:
 - direct looting or exclusion: property, jobs, businesses.
 - Or a failure of aspirations via economic growth for a salient rival group.
 - What we do cannot identify the precise channel.
- What we can do is examine the economic basis of violence:
 - Whether economic improvements can be conflictual
 - The identity of the aggressor group.

- Two groups. Each has potential victims and aggressors.
- As aggressors, individuals decide whether to engage in violence.
- As victims, individuals buy security against such attacks.

- Attack probability α , success probability p
- Potential victim with income y takes α as given
- Chooses “defense” d by maximizing

$$(1 - \alpha)[y - c(d)] + \alpha \{ p(d)[(1 - \mu)y - c(d)] + [1 - p(d)][(1 - \beta)y - c(d)] \}$$

no attack

successful attack

unsuccessful attack

- μ, β : share of income lost in attack, $\mu > \beta \geq 0$.
- $\alpha \rightarrow p$: protection function

■ Aggressor with y' facing victim with y , takes p as given.

■ Cost of conflict ty' , potential gain λy .

■ Attack if

$$p\lambda y > ty'$$

gain **loss**

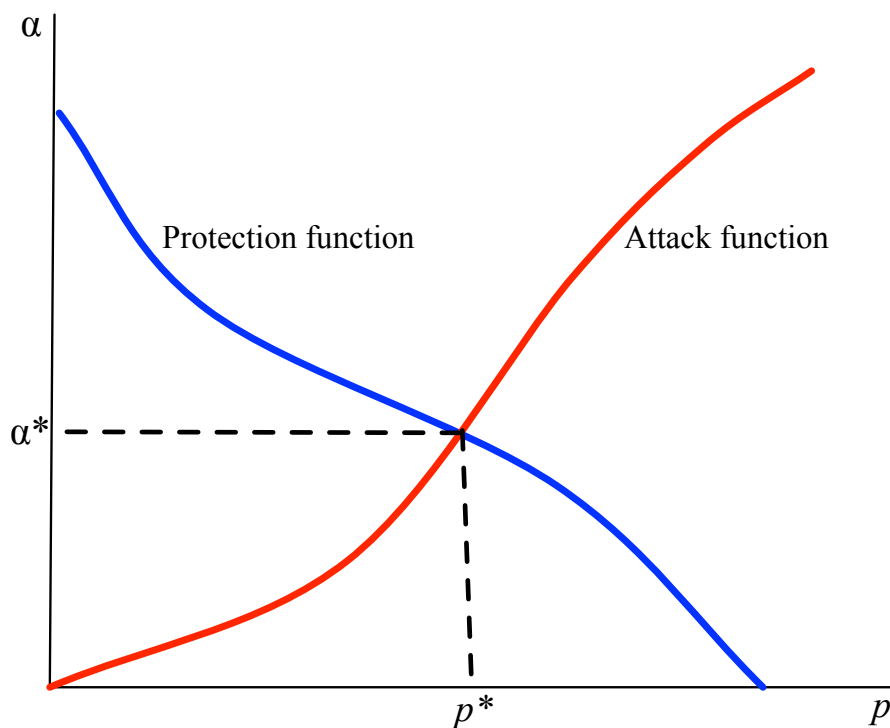
■ So probability of attack α is

$$\alpha = \pi F(\lambda py/t)$$

■ π probability of cross-match; F cdf of aggressor incomes.

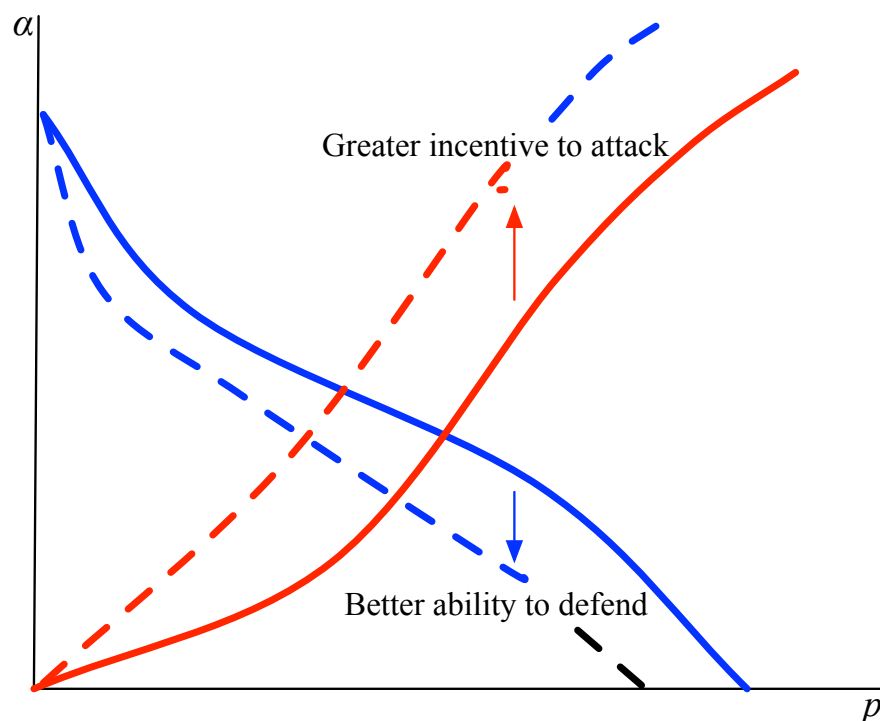
■ $p \rightarrow \alpha$: **attack function**

■ Combine protection and attack functions for equilibrium.



Individual Incomes and Conflict

- Change income of potential victim: net effect ambiguous.

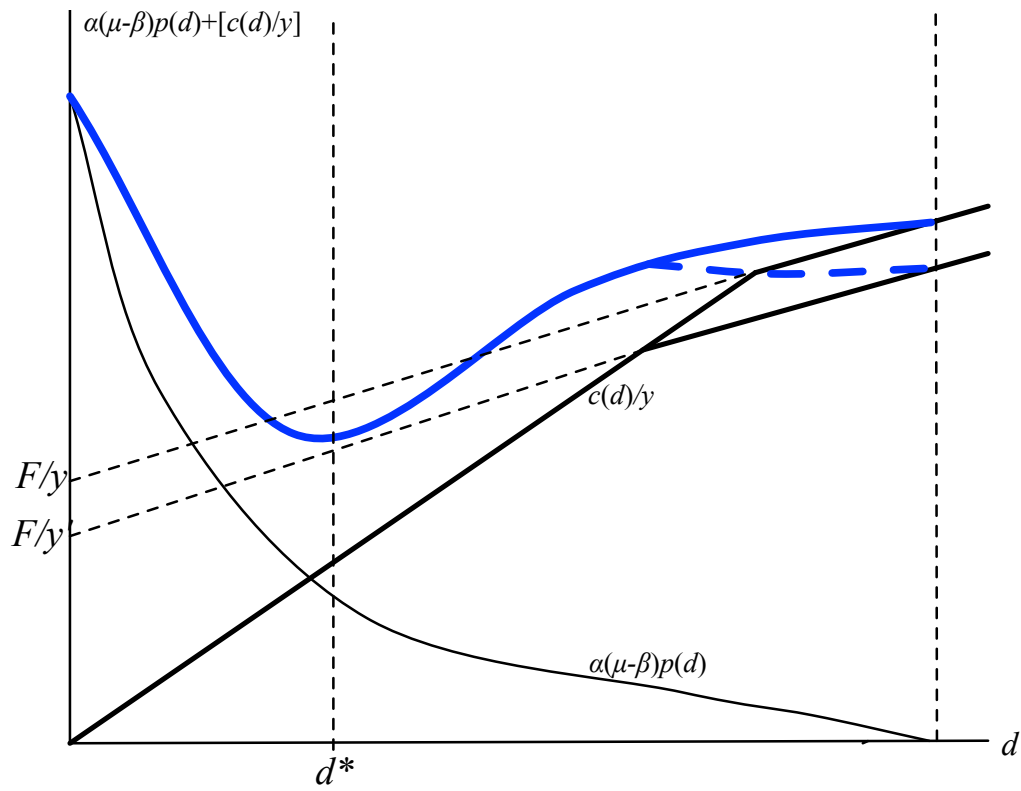


Group Incomes and Conflict

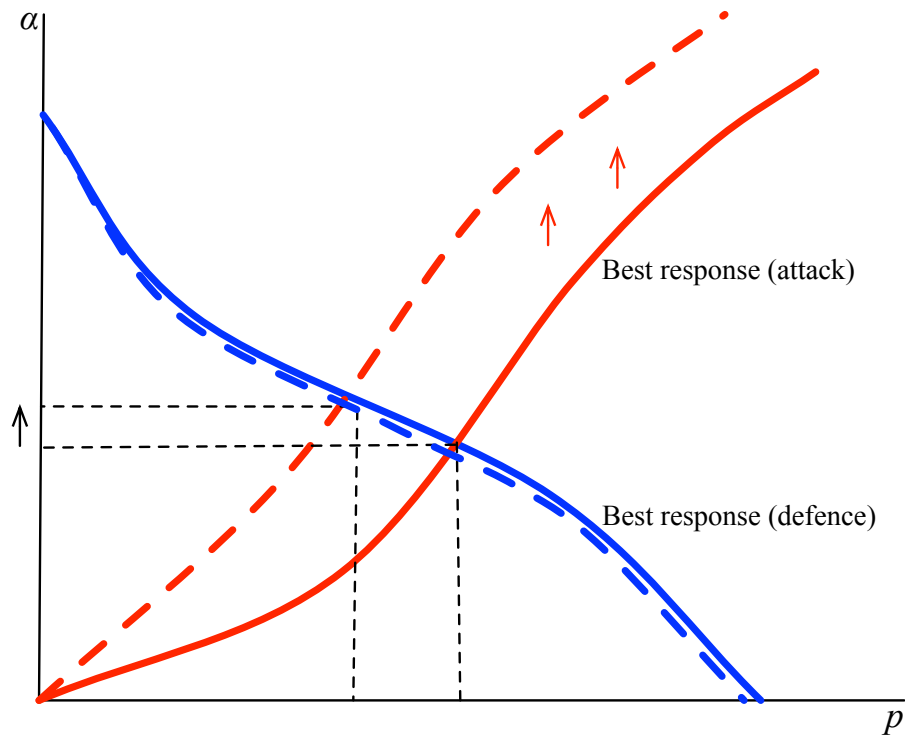
- Two components of protection: **human** and **physical**.
- **Human protection** comes from own-group members.
- Unit cost proportional to group income.
- **Physical protection**: high walls, barricades, firearms.
- Large fixed costs.
- Overall cost:

$$c(d) = \min\{wd, F^* + w^*d\}$$
- where $w > w^* \geq 0$.
- w, w^* are proportional to average group incomes.

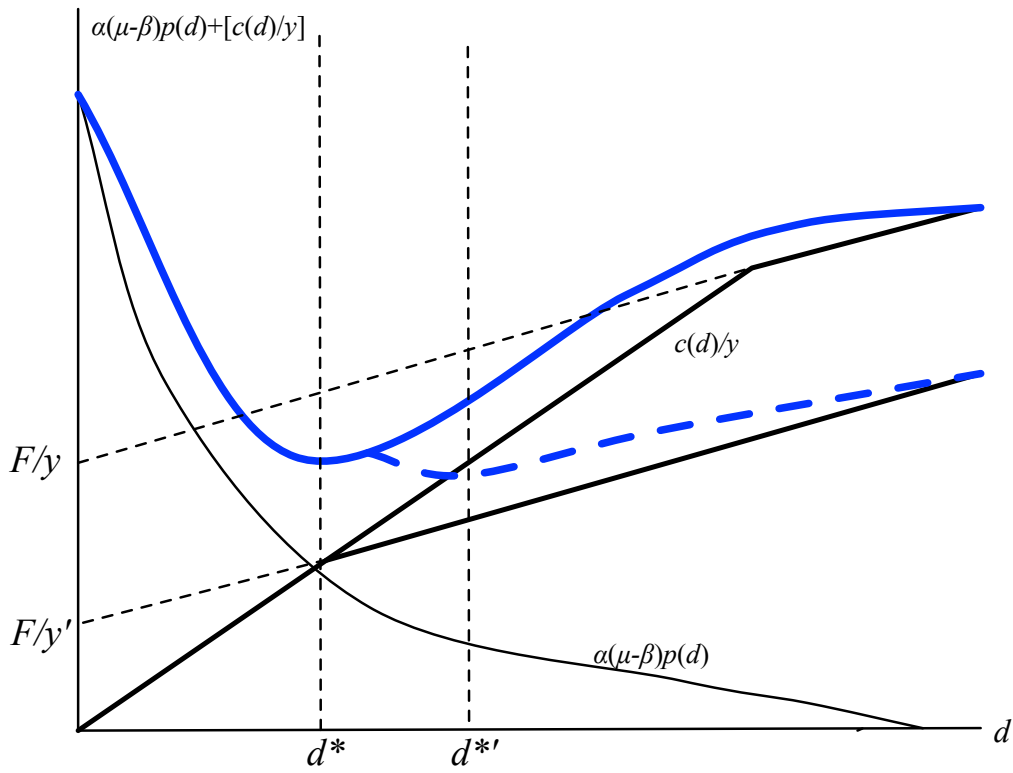
■ Low-income adjustment in d when group incomes change:



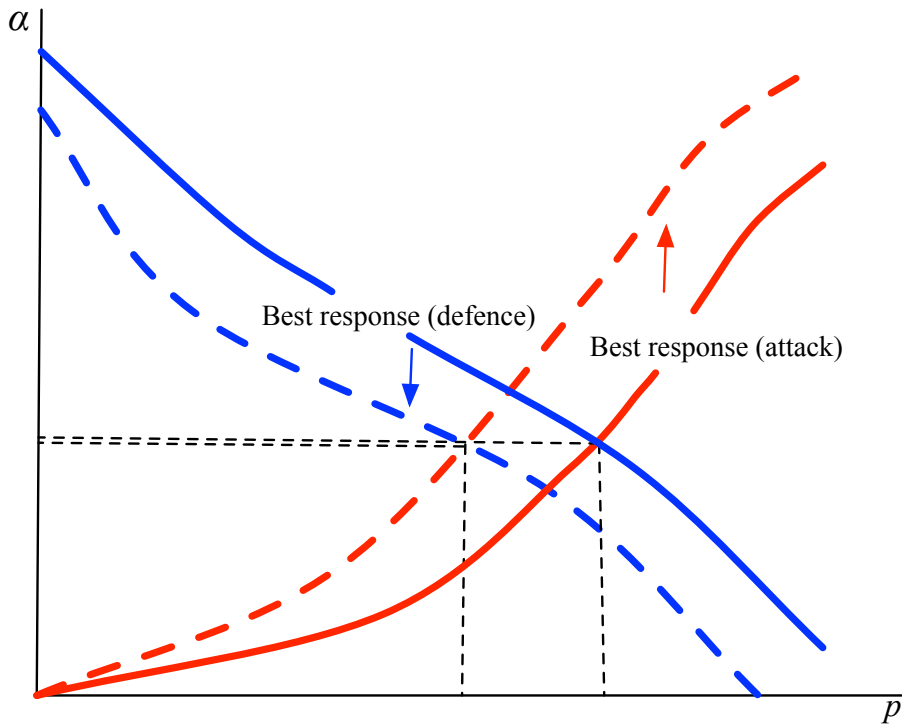
■ Low incomes: attack probability goes up with group income



■ High-income adjustment in d when group incomes change:



■ High incomes: attack probability responds ambiguously



- **Proposition 1.** Under a proportional increase in group income:
 - Attacks instigated **by** group members unambiguously decline.
 - Attacks perpetrated **on** group members increase, provided that group incomes are lower than a certain threshold. (Otherwise ambiguous.)

- **Interpreting the Data.** Suppose we see:
 - A group's income is **positively** related to subsequent conflict.
 - The other group's income is **negatively** related.
 - Then, the second group is, "in the net", the **economic aggressor**.
 - And the first group is, "in the net", the **economic victim**.
 - **Note 1:** Not a test of the theory.
 - **Note 2:** Not a measure of overall aggression.
- **India:** eternal finger-pointing when religious violence erupts.
 - Most trails lost in chicken-and-egg of revenge and retribution.
 - Our theory provides a methodology for tracing these trails.

■ Proposition

- Assume human technologies for attack and defense.
 - Under a proportional increase in group income:
 - Attacks instigated **by** group members unambiguously decline.
 - Attacks perpetrated **on** group members increase.
-

- Extensions to non-human technologies discussed in paper.

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.

■ Some summary statistics on riots:

State	Conflict								
	1984-88			1989-93			1994-98		
	Cas	Kill	Out	Cas	Kill	Out	Cas	Kill	Out
Andhra Pradesh	320	48	14	226	165	11	141	8	2
Bihar	62	18	4	647	485	29	187	42	6
Gujarat	1932	329	97	1928	557	75	639	2	3
Haryana	0	0	0	6	4	2	0	0	0
Karnataka	300	38	19	430	82	32	235	39	7
Kerala	17	0	2	42	5	3	0	0	0
Madhya Pradesh	139	17	8	794	174	12	22	2	1
Maharashtra	1250	333	57	2545	808	29	238	9	11
Orissa	0	0	0	62	16	6	0	0	0
Punjab	13	1	1	0	0	0	0	0	0
Rajasthan	14	0	4	302	75	15	66	6	3
Tamil Nadu	21	1	1	125	12	5	67	33	5
Uttar Pradesh	963	231	38	1055	547	48	217	50	22
West Bengal	71	19	7	148	59	12	0	0	0

■ Some summary statistics on expenditure ratios:

State	Exp.								
	1983			1987-8			1993-4		
	H/M	Min	Max	H/M	Min	Max	H/M	Min	Max
Andhra Pradesh	0.99	0.96	1.09	0.99	0.92	1.17	0.99	0.84	1.16
Bihar	0.98	0.88	1.12	1.07	1.02	1.12	1.03	0.93	1.16
Gujarat	1.02	0.89	1.19	0.98	0.78	1.14	1.06	0.88	1.13
Haryana	1.2	1.07	1.53	0.96	0.85	1.05	1.60	1.39	1.93
Karnataka	0.98	0.84	1.19	1.00	0.83	1.07	1.01	0.69	1.15
Kerala	1.10	1.07	1.19	1.15	1.15	1.16	1.01	0.92	1.16
Madhya Pradesh	0.92	0.78	1.38	0.86	0.71	1.04	0.88	0.62	1.16
Maharashtra	1.04	0.97	1.25	1.04	0.74	1.29	1.12	0.87	1.42
Orissa	0.69	0.36	1.04	0.85	0.58	0.93	0.96	0.73	1.13
Punjab	0.86	0.75	1.15	1.21	1.19	1.22	1.18	1.08	1.34
Rajasthan	0.97	0.43	1.18	1.02	0.46	1.19	1.22	1.06	1.35
Tamil Nadu	1.06	0.82	1.44	0.88	0.80	0.94	0.98	0.85	1.05
Uttar Pradesh	1.12	1.01	1.23	1.11	0.95	1.54	1.08	0.93	1.31
West Bengal	1.18	1.05	1.26	1.21	1.05	1.31	1.25	1.07	1.38

Empirical Specification

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

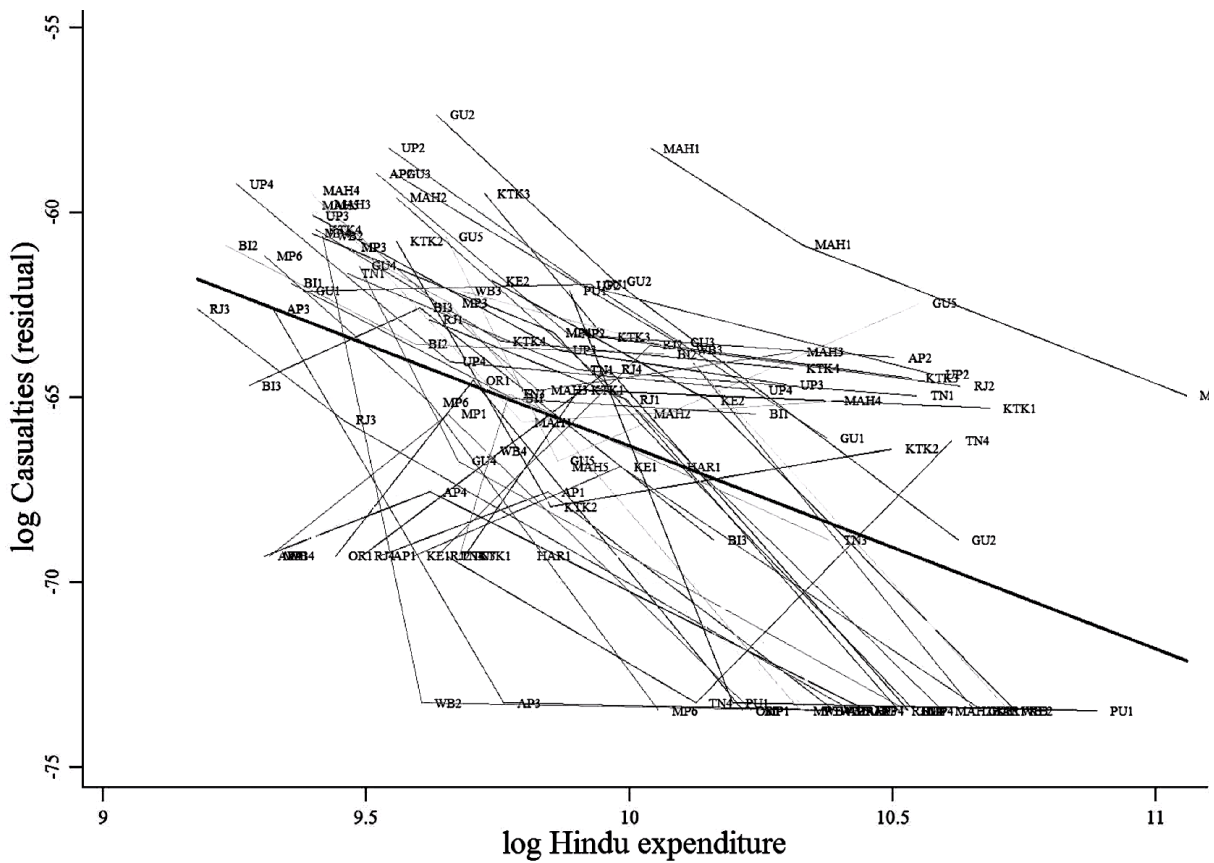
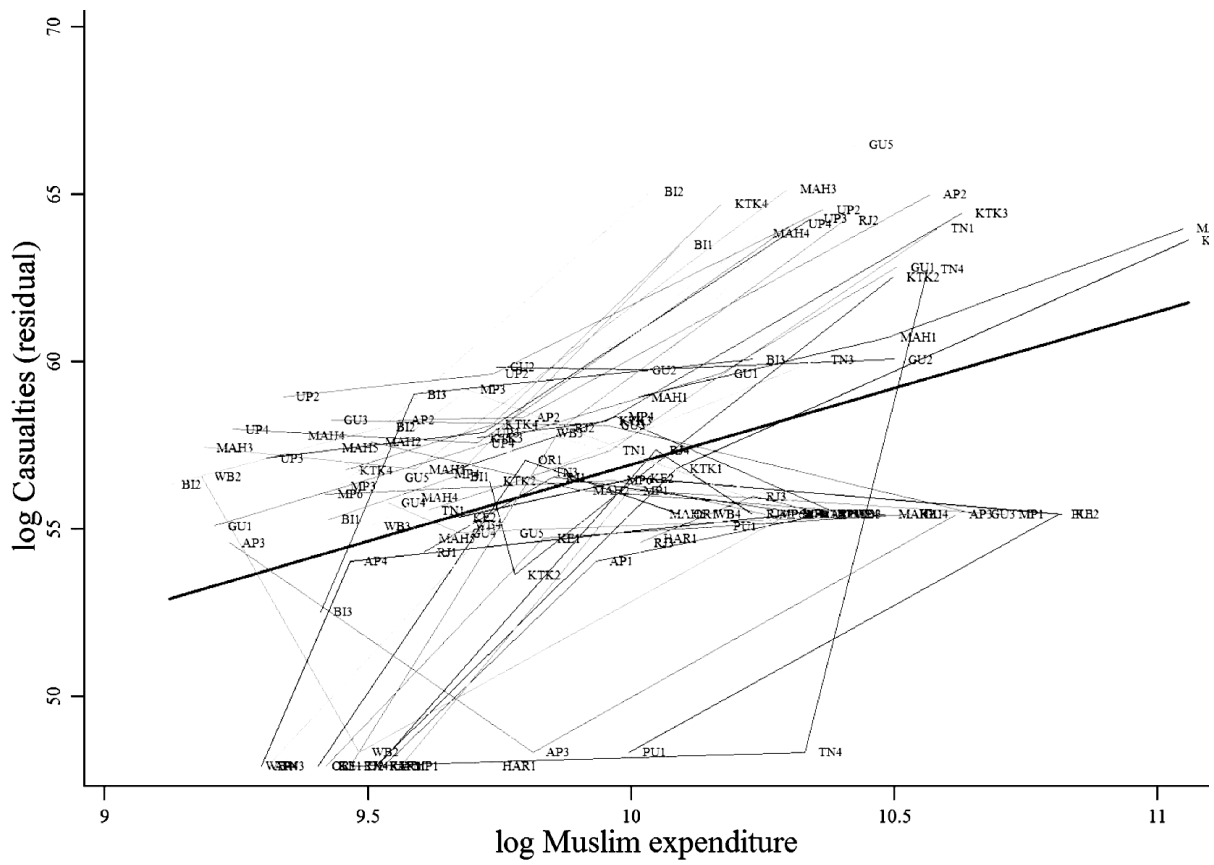
$$E[\text{Count}_{i,t} | \mathbf{X}_{it}, r_i] = r_i \exp(\mathbf{X}'_{it}\beta + \tau_t)$$

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

■ 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

- Mus exp \uparrow 1% \Rightarrow Cas \uparrow 3–5%. Opp for Hindu exp.

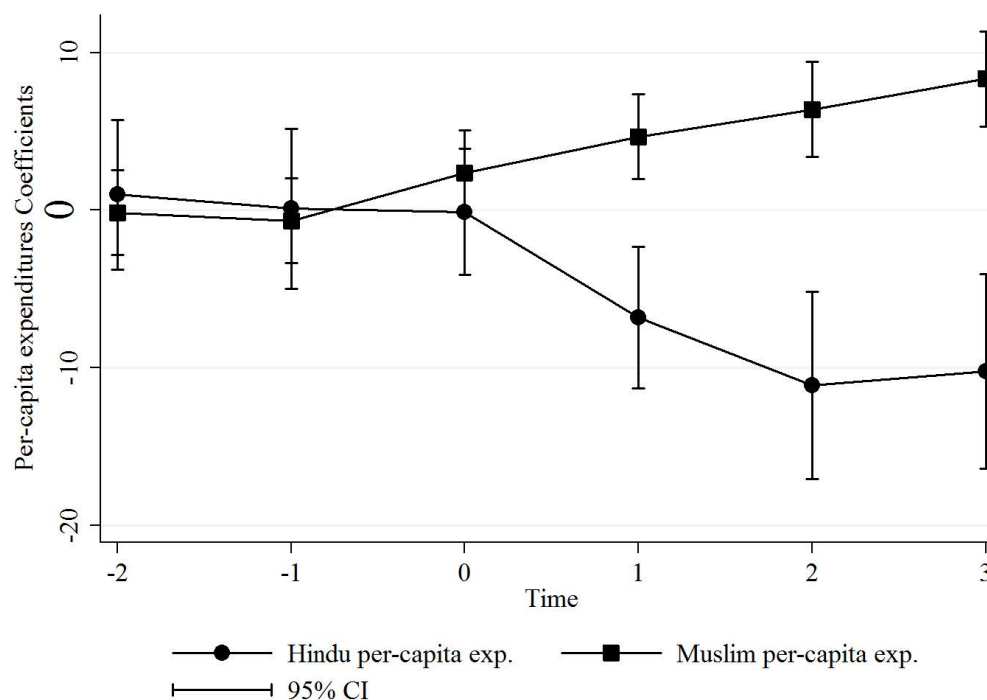


	[1] Cas-2	[2] Cas-1	[3] Cas	[4] Cas+1	[5] Cas+2	[6] Cas+3
H exp	0.98 (0.687)	0.10 (0.968)	-0.11 (0.959)	***-6.83 (0.003)	***-11.11 (0.000)	***-10.23 (0.001)
M exp	-0.15 (0.915)	-0.68 (0.624)	*2.36 (0.085)	***4.67 (0.001)	***6.40 (0.000)	***8.32 (0.000)
Pop	5.18 (0.187)	7.36 (0.117)	**7.84 (0.018)	3.90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

■ See paper for other variations, e.g:

■ lagged conflict as regressor, political controls, urban only.

■ Hindu-Muslim coefficients for different lags, with 95% CI



Endogeneity

- **Reverse causation?** Anecdotal evidence on who suffers:
 - 1985–1987 526 Hindu-Muslim incidents in 10 states.
 - Muslims were 12% of the population, but suffered
 - 60% of the 443 deaths
 - 45% of the 2667 injuries
 - 73% of the estimated property damage
 - from Wilkinson (2004), who quotes the 9th and 10th *Annual Reports of the Minorities Commission* (1988 and 1989).
-

- [Previous regression on different lags in line with this]

- **Omitted Variables?** Possible concerns:

- Gulf funding of conflict:

Correlated via remittances with Muslim expenditure.

- Income recovery from past conflict

Combined with periodic upsurges of violence.

- 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.

■ **Discussion:** Category breadth and the exclusion restriction.

(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.

■ 18 sectors to partition the entire labor force of India.

■ 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

More on Endogeneity

- In case the argument for lagged conflict not affecting broad occupational structure was unconvincing ...
- Linear system GMM for dynamic panels
- Arellano-Bover (1995), Blundell-Bond (1998).
- Use lagged expenditures as instruments for current expenditures
- after first-differencing (to eliminate unobserved fixed effects)
- include our H- and M-indices as additional instruments
- Develop a two-step system GMM estimator
- Designed to yield consistent estimates in small- T large- N panels.

■ GMM with lagged expenditure and H-M-indices

	[1] Casualties	[2] Casualties	[3] Casualties	[4] Casualties	[5] Killed	[6] Outbreak
HExp	***-14.09 (0.008)		-2.11 (0.726)		-4.71 (0.234)	0.63 (0.423)
MExp	**10.26 (0.035)		**11.43 (0.013)		***9.49 (0.000)	**1.36 (0.029)
M/H		*8.59 (0.085)		**11.52 (0.035)		
Pce		***-2.38 (0.003)		**9.52 (0.010)		
Pop	**2.42 (0.038)	**2.29 (0.013)	***4.49 (0.000)	***4.68 (0.000)	***4.06 (0.000)	***0.84 (0.000)
RelPol	7.73 (0.270)	*9.70 (0.054)	2.84 (0.586)	0.07 (0.989)	0.81 (0.836)	0.15 (0.825)
LagCas			-0.12 (0.369)	-0.11 (0.416)		
LagKill					-0.09 (0.460)	
LagOut						***0.31
Controls	Y	Y	Y	Y	Y	Y

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
 - (not just in targeted Hindu-Muslim conflict)
 - Concomitant rise in Hindu-Muslim conflict is just a byproduct of this overall uptick in social unease
 - 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!)

- Effect of group incomes on **all** riots:

	[1] Poisson	[2] Poisson	[3] Neg. Bin.	[4] Neg. Bin.	[5] OLS	[6] OLS
HExp	***0.75 (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		*0.52 (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	*-0.64 (0.051)	*-0.62 (0.056)	0.20 (0.721)	0.17 (0.744)	0.12 (0.839)	0.14 (0.815)
GiniH	** -1.63 (0.046)	*-1.56 (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 the theory.
 - Positive effect of MExp, negative effect of HExp:
 - Hindus are “net aggressors” in Indian religious violence.
 - Interpretation in line with many case studies.
 - 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.

 - Funding of conflict reasonable (on both sides).
 - But does it explain what we observe?
1. Recall: HExp enters negatively.
 - So if funding is responsible, the corresponding effect is obliterated and reversed for Hindu groups.
 - Possible, but in light of the fact that Muslims are by far the larger losers in outbreaks of violence, unlikely.
 2. Gulf funding.
 - Taken out by the time fixed effect + instrument.
 3. “Internal funding” by local groups:
 - Examine this in two ways.

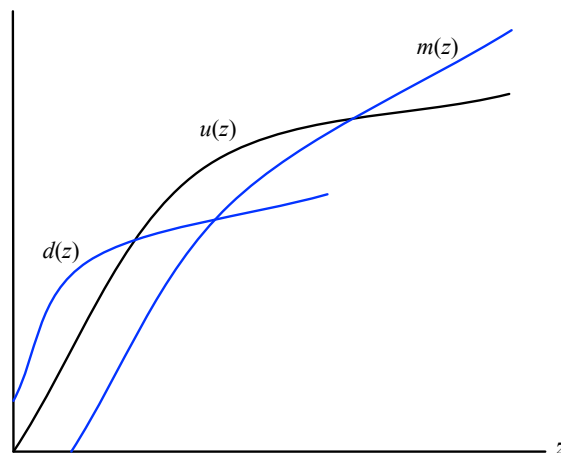
■ Internal Funding: Theory

■ **Proposition.** 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.

■ Dealing with the counterargument:

- **Proposition.** Suppose that f is unchanging with z .
- Then, as z goes up: 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

A Tentative Conclusion

- On the whole, the evidence suggests that Hindu groups respond to rival economic gains by fomenting religious violence.
- Reiterate: such a conclusion must rest on empirics+theory and cannot be derived from the empirics alone.
- At the same time, the theory does not arise from a vacuum. (Many case studies.)
- No reason to argue that a particular religious group is intrinsically more predisposed to violence.
- Yet particular histories condition subsequent events.
- In another culture, with a different history and a different demography, the outcomes may well have been very different.