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Development economics Lecture 7: Group differences and discrimination

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Where are we on our path?

Lectures

- 1. Introduction
- 2. Traditional growth models
- 3. Modern (endogenous) growth models
- 4. Taking stock on growth models and poverty traps
- 5. Games in economic development
- 6. Measuring poverty and inequality
- 7. Group differences and discrimination
- 8. Culture, institutions, and the role of history
- 9. Health and nutrition
- 10. Education
- 11. The role of foreign aid
- 12. Credit markets and microcredit
- 13. Risk and insurance
- 14. Behavioral development economics

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 Warning: A sensitive topic of witch killing and of genocide will be discussed.

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Discrimination definition and theories

Gender gaps and gender discrimination

Discrimination as self-fulfilling prophecies

Discrimination and productivity

Ethnic hatered and genocide

Contact hypothesis and reducing ethnic tensions

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Etimology of discrimination?

Discrimination derives from Latin, where the verb *discrimire* means "to separate, to distinguish, to make a distinction".

Source: wikipedia

- Why discrimination matters for development?
 - Causes inequalities and unequal opportunities for specific groups
 - Violates human rights
 - Results in inefficient allocation of resources
 - Can have adverse effects on productivity
 - Extreme forms lead to violence against specific groups and conflict

What is discrimination?

- "Differential treatment of individuals based on non-economic factors (such as race or sex), while *controlling for all productive characteristics.*" (me, paraphrasing others)
- Introduced to economics by Becker (1957): The Economics of Discrimination
- Think of a following model:

$$ln(w_i) = \alpha + \beta' x_i + m_i + \varepsilon_i$$

w_i... individual wage of individual *i x_i*... set of *all* productive characteristics
 m_i... indicator for minority

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What is discrimination?

$$ln(w_i) = \alpha + \beta' x_i + m_i + \varepsilon_i$$

- Is effect of β the same across groups?
 - What if some equipment only designed for tall people and women are on average shorter?
- What if *m* also determines productivity?
 - Customer discrimination.
- Is a difference in x driven by naturally occurring group differences (genes)?
 - What about pre-market discrimination?
 - Rational belief of minorities not taking up education if returns to education low?
 - Stereotype threat (Steele and Aronson 1995)?
- Can we measure all x?

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Taste based discrimination: simple model

- Becker (1957) argues that discrimination comes out of utility function, through a distaste parameter d_{min}. Minority workers either:
 - Produce more than majority ones to gain same wage, or
 - are compensated less.
- Assume the following firm's utility from hiring minority and majority workers (note, not profit function!):

$$U = pF(N_{maj} + N_{min}) - w_{maj}N_{maj} - w_{min}N_{min} - d_{min}N_{min}$$

Optimal number of workers (assuming unique productivity level across groups, implied by our definition of F(.)):

►
$$p \frac{\partial F(N_{maj})}{\partial N_{maj}} = w_{maj}$$

► $p \frac{\partial F(N_{min})}{\partial N_{min}} - d_{min} = w_{min}$

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Taste based discrimination



Quantity of labor demanded

Taste based discrimination: market predictions

- Above examples assume that d_{min} equal across employers.
- If some employers discriminate and some do not, and there is sufficient amount of non-discriminating employers to employ all minority workers, discrimination masked: all minority workers work for non-discriminating employers (segregation)
 - Note: d_{min} can also be a random variable with some distribution over the population.
- Basic micro intuition: In competitive markets with free entry (recall producer theory, think of profit and cost functions), workers must earn marginal product. Thus discriminating firms must cover the distaste themselves and are competed out.
 - ► Hjort (2014) and Hedegaard and Tyran (2017) show that people are indeed *willing to pay* for discrimination.

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Is this taste based discrimination?

- 1. People lock their car doors when driving through poor neighborhoods.
- 2. Males in their late 20s preferred by firms to same age female applicants.
- 3. Blacks checked more throughly at airports than whites.
- ► Implicit assumptions:
 - 1. poor more likely to commit crime
 - 2. women more likely to take parental leaves
 - 3. higher crime rates among blacks

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Statistical discrimination: it's information

Phelps (1972) and Arrow (1973): firms may have limited information about productivity of individuals and have to infer it from group averages (easily observable characteristics such as race and sex).

Statistical discrimination: simple model

- Employer observes noisy signal of applicant's productivity: $\widehat{\pi^i}$
- ► Employer has prior belief about average productivity of individuals from two groups: π_{min} and π_{maj}; π_{min} < π_{maj}
- Assume: $\pi_{maj}^i \sim N(\overline{\pi_{maj}}, \sigma_{\pi}^2)$ and $\pi_{min}^i \sim N(\overline{\pi_{min}}, \sigma_{\pi}^2)$
- ► Employer assumes the following about applicant's productivity: π_{maj}ⁱ = π_{maj} + ε_i + μ_i

•
$$\varepsilon_i = \pi^i_{maj} - \overline{\pi_{maj}}$$

• μ_i is noise around true π_{maj}^i (with variance σ_{μ}^2)

► The employer then uses all info available to extract information from the two signals: x and m̄x, x = {min, maj}

•
$$E[\pi|maj, \hat{\pi}] = \overline{\pi_x}(1-\gamma) + \widehat{\pi_x}\gamma$$
 where $\gamma = \underbrace{\sigma_{\pi}^2/(\sigma_{\pi}^2 + \sigma_{\mu}^2)}_{=1 \text{ if } \sigma_{\mu}^2 = 0}$

From $\overline{\pi_{min}} < \overline{\pi_{maj}}$ it immediately follows that in expectations, productivity of *maj* applicant is above *min* applicant.

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Statistical discrimination: simple model

- ► Few notes on the model:
 - Note that we work with a simple model where noise around the σ_{π}^2 is the same across groups.
 - ► Aigner and Cain (1977) and Cornell and Welsh (1996) assume $\sigma_{\pi_{min}}^2 > \sigma_{\pi_{maj}}^2 \rightarrow$ less informativeness in signals from minority (more weight on group average)
 - On average, the employers are getting it "right" as long as $\overline{\pi_{\min}}$ is true (otherwise *prejudice*).
 - ► Caution: Bohren, Haggag, Imas, and Pope (2019 NBER)
 - ► This belief is rational and does not require any *d_{min}* distaste parameter.
 - Statistical discrimination not competed away in equilibrium
 - ▶ Pay is equal across groups for the same *expected* productivity.
 - Statistical discrimination is efficient

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Statistical discrimination: take-aways

- So is statistical discrimination OK?
- Illegal in most countries.
- Individuals should not be punished for lower average quality of their group. Why? Can lead to self-fulfilling expectations / vicious cycles. Fryer, Goree, Holt (2005):



► Notes:

- In experiment, green disadvantaged by more costly education investment in rounds 1-5. No disadvantage later.
- Employers get aggregate information on avg. group investment

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Statistical discrimination: case for racial profiling?

- Back to case of racial profiling. Is this OK? There are more criminals in some groups, so should we check them more?
 - Efficient at the margin.
 - But as long as Type I errors exist (locking up an innocent), there will be a higher share of such cases among on-average-more-criminal groups

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Gender gaps

- Women often the largest share of the poor (especially single-headed households)
 - ► Reasons?



Ratio of women to men of working age in the poorest households in sub-Saharan Africa, selected countries, 2004-2009

Source: UNDP (2012)

Missing women (Sen, 1992, 2003)

- ► Amartya Sen: "there are 100 million missing women around the world, (44 million in China, 37 million in India)"
- Biological ratio established around 1.05 boys:girls ratio (Europe, US)
- Reasons?
 - Higher female mortality, higher infant mortality among girls (1992).
 - Neglected health and nutrition during childhood (1992)
 - Selective abortion of female foetuses (2003)
 - Statistics:
 - China: 86 girls to 100 boys (similar in South Korea, northern India)
 - Kerala, India: exception with 1:04 ratio good education (90% literacy), women participate in productive activities

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"Lifeboat" model

- ► Two household members with same "production function"
- Splitting resources unequally produces higher future output
- ► In line with statistical motives ("rational")



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Miguel (2005): Poverty and witch killing

- Does gender-specific targeting respond to economic incentives?
 - $\blacktriangleright\,$ Contributes to literature on poverty and conflict $\rightarrow\,$
- Setting: Witch killing. Prevalent throughout history (Oster 2004), now still practiced in many parts of the world.
- ▶ Mesaki (1994, p. 59):

"I ran away [...] after being suspected of being a witch. [...] There were many deaths in the family [...] then rumour began to spread in the village that I was the one who killed them [...] [M]y own children started to hate me, [...] some of them started taunting me as a witch. I tried to explain but they did not give me the chance to vindicate myself. I knew what would befall me in view of what had happened to others previously, for they were brutally killed. Thus, when [...] one of the grandchildren whispered to me that they were about to kill me, I left the same evening."

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Miguel (2005): Poverty and witch killing

- ► This paper: rural Tanzania; population relies on agriculture
- ► Identification problems: what problem with an OLS model:

$$MURDER_{i} = \alpha + \beta_{1}INCOME_{i} + \mathbf{X}\beta + \varepsilon_{i}$$

Examines variation in rainfall across time and place. Why improvement in identification? Exogenous!



- Large regional variation in weather in Africa remember this in lecture on insurance (index insurance)
- Rainfall shock (drought or flood) proxy for famine. Why not use famine indicators? Famine incidence depends on institutional strength; this possibly correlated with murders.

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Miguel (2005): Witch murder statistics

	Mean
Panel A: Demographic characteristics	
Female	0.96
Age	57.6
Had relatives in the village	0.98
Lived in a household with others	0.87
Sukuma ethnic group	0.96
Panel B: Socio-economic characteristics	
Ownership of household goods (e.g. radio, bicycle):	
"Below average"	0.69
"Average"	0.31
"Above average"	0
Ownership of livestock:	
"Below average"	0.55
"Average"	0.38
"Above average"	0.08
Ownership of land:	
"Below average"	0.32
"Average"	0.57
"Above average"	0.11
Panel C: Timing of witch murders	
Pre-harvest/harvest season (February-July)	0.74
February	0.02
March	0.07
April	0.21
May	0.12
June	0.12
July	0.19
Post-harvest season (August–January)	0.26
August	0.07

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Miguel (2005): Extreme rainfall and witch murder

Explanatory variable	Dependent variable: witch murders								
	OLS	OLS	OLS	OLS	OLS				
	(1)	(2)	(3)	(4)	(5)				
Extreme rainfall (drought or flood)	0.085**	0.076**	0.098	0.085**	0.056				
	(0.042)	(0.037)	(0.059)	(0.042)	(0.038)				
Extreme rainfall, previous year			-0.000						
			(0.042)						
Extreme rainfall,			-0.032						
current year and previous year			(0.080)						
Human disease epidemic				-0.006					
				(0.036)					
Village fixed effects (67 villages)	Yes	No	Yes	Yes	Yes				
Socio-economic controls, and geographic division fixed effects	No	Yes	No	No	No				
Year fixed effects (11 years)	No	No	No	No	Yes				
<i>R</i> ²	0.15	0.05	0.16	0.15	0.19				
Root MSE	0.32	0.32	0.31	0.32	0.31				
Mean of dependent variable	0.09	0.09	0.09	0.09	0.09				
Number of observations	736	736	736	736	736				

Extreme rainfall and witch murders

Notes: Huber robust standard errors in parentheses. Significantly different from zero at 90% (*), 95% (**), 99% (***) confidence. Observations are weighted by the number of households per village. Regression disturbance terms are clustered at the village level. Socio-economic controls include Average years of education, Proportion Sukuma ethnic group, Proportion households grow cash crops. Households per village/1000. Proportion practice traditional religions, and

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Miguel (2005): Channels and policy

- Extreme rainfall is associated with 0.085 more witch murders per village-year.
- ► Why? Distinguishing two channels:
 - Socio-cultural theory of "scapegoating"
 - Economic model: response to incentives (lifeboat model)
- Against scapegoating: murders do not respond to another shock, disease epidemics; disease epidemics uncorrelated with income loss (in the area).
- ► Policy:
 - Insurance against shocks to smooth consumption
 - ► Increase attractivity of elderly women: Introduction of old age pensions South Africa → drop in witch killing (suggestive, not causal; Singer 2000)

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Discrimination as self-fulfilling prophecies

- Stereotyped groups may start conforming to stereotypes by adjusting their behavior
- This may have direct productivity effects (in obtaining education, performing at work...)
- Evidence?

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Discrimination as self-fulfilling prophecies

- Stereotype threat: stereotyped-based expectations affect individual performance in the domain of the stereotype
- Stone et al. (1999): Students asked to perform a task described as testing "natural athletic ability," and the exactly same test, only described as testing "sports intelligence". Who performed better: Blacks or whites?
 - Whites did worse than blacks in "athletic ability test"
 - Blacks did worse than whites in "sports intelligence test"
 - Change in self-confidence a culprit

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Hoff and Pandey (2006): Discrimination, Social Identity, and Durable Inequalities

Experiment in which Indian students invited to solve 15 mazes



- ► Students either of low or high caste invited in groups of 6
- Random assignment to mixed (H/L) or to homogenous sessions
- In some groups following information revealed at the beginning:
 - Name, village, father's name, paternal grandfather's name, caste

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Hoff and Pandey (2006): Results





Source: Hoff and Pandey (2006)

Caste-revealed single caste: introduced to rule out that Caste revealed effect driven by intimidation of low-caste by high-caste, rather than social identity.

- CR-SC lowers high-caste performance. Authors' take:
 - "[CR-SC] changed the extent to which subjects anticipated being rewarded because of their social status rather than their effort, while the presence [low-caste] in condition C led [high-caste] to try to excel in order to distinguish themselves from [low-caste]."

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Hoff and Pandey (2006): Implications

- Lack of confidence in negatively stereotyped groups. Implications:
 - Possibly resulting in group specific inequalities in human capital accumulation
 - Psychological effect beyond institutional unequal opportunities!!!
- Other effects of discrimination on productivity?

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Roses and discrimination?



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- Ethnic heterogeneity in Sub-Saharan Africa very high. Adverse effects on public goods (e.g., Alesina et al. 1999)
- Tribal competition matters in Kenya (Ndegwa 1997; Oyugi 1997; Barkan 2004)
- But direct effects on firm productivity? \rightarrow Hjort (2013)
- Sample of 924 flower-packaging workers in a Kenyan factory (equal share of Kikuyu and Luo)
- Production function (three worker units):
 - Supplier: brings flowers arriving from the greenhouses to her worktable and throws out poor-quality flowers; sorts flowers by length/types into piles; piles placed on the worktable of one of two processors
 - 2x Processor: remove leaves; cut flowers to the right size; create bunches

Hjort (2014 QJE)

- ▶ Productivity can be measured → Outcome: daily processor output from 2007 and 2008
- Incentives: Processors paid a piece rate based on own output (2w / rose); Suppliers paid a piece rate based on total team output (w / rose)

Indentification:

- Rotation process generates quasi-random variation in team composition.
- When a worker takes leave, another worker returning from leave joins the two remaining workers.
- Three types of teams:
 - 1. Ethnically homogeneous
 - 2. One of processors shares supplier's ethnicity, one not (Horizontal discrimination)
 - 3. Both processors different ethnicity from supplier (Vertical discrimination)

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Hjort (2014 QJE)

► Two natural experiments:

- 1. Contentious presidential election results in early 2008 \rightarrow violent ethnic conflict between Kikuyu and Luo; Production at the plant continued.
- 2. Six weeks after conflict began, plant implements **team pay**: processors paid for their combined output.

Research questions:

- 1. Productivity effects of ethnic diversity?
- 2. Do economic costs of ethnic diversity vary with the degree of conflict between groups?
- 3. Does discriminative behavior change with a change in incentives?

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Hjort (2014 QJE)

► Theory:

 Suppliers: different weight to coethnics' and non-coethnics' utility (Becker 1974)

Predictions:

- 1. Suppliers in mixed teams misallocate flowers:
 - Vertically: undersupplying non-coethnic downstream workers
 - Horizontally: shifting flowers from non-coethnic to coethnic downstream workers
- 2. **Conflict:** adversely affects utility weight (distaste parameter)
- 3. **Team pay:** reduction in horizontal misallocation in teams with processors of different ethnicity

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Hjort (2014 QJE): Results



FIGURE III Output by Team Ethnicity Configuration



Hjort (2014 QJE): Results

 Vertically mixed (VM) teams 8% less productive; horizontally mixed (HM) teams 5% less productive than homogeneous teams (first period)

Horizontal discrimination:

- Non-coethnic processor output in HM team 18% lower (relative to homogenous)
- ► Coethnic processor output in HM team 7% higher (relative to homogenous) → favored workers benefit from discrimination against nonfavored workers.
- Kikuyu and Luo workers are of similar productivity on average, horizontal misallocation has little effect on total output

► Vertical discrimination / willing to pay to discriminate:

 Suppliers accept lower own pay to lower the pay of non-coethnic co-workers
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Hjort (2014 QJE): Conflict and team pay results



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Hjort (2014 QJE): Conflict and team pay results

Output by Team Ethnicity Configuration Before and After Conflict, and Under Team Pay

(1) Preconflic Log (processor output) 8.148*** (0.023)	(2) Log (team output) 8.840***	(3) Conflict/te Log (processor output)	(4) am pay Log (team
Log (processor output) 8.148*** (0.023)	Log (team output) 8 840***	Log (processor output)	Log (team
8.148*** (0.023)	8 840***		output)
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	-0.046*** (0.001)	()	-0.092***
0.070*** (0.002) -0.181***		0.087*** (0.004) -0.317***	
(0.002) -0.084*** (0.002)	-0.084*** (0.001)	(0.005) -0.163*** (0.004)	-0.161*** (0.004)
-0.009 (0.013)	-0.010 (0.012) -0.044***		
0.017*** (0.004) -0.131***	(0.004)		
(0.005) -0.074*** (0.005)	-0.073*** (0.004)		
		-0.007 (0.013)	-0.010 (0.013) 0.044***
		-0.127*** (0.005)	(0.004)
		(0.005) -0.003 (0.005)	-0.003 (0.004)
224,730 Yes Yes Two-way (processor	112,365 Yes Yes One-way (team)	204,148 Yes Yes Two-way (processor	10,2074 Yes Yes One-way (team)
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Hjort (2014 QJE): Conflict and team pay results

- Conflict: Output gap between homogeneous and diverse teams nearly doubled.
 - ► Increase in supplier non-coethnic distaste
 - Economic costs of ethnic diversity varies with political environment
 - Long term: no reversion in the output gap in ethnically mixed teams (9 months post-conflict); social preferences are affected by conflict (Bauer et al. 2016 JEP)
- Team pay: increase in output in horizontally mixed team (30% output gap between coethnic and non-coethnic processors eliminated)

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Hjort (2014 QJE): Final remarks

► Segregation? Why not segregate Kikuyu and Luo?

- Supervisors realized tension (introduction of team pay)
- Perhaps try contact hypothesis?
- ▶ But see that type of contact matters! We'll discuss this later.

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Extreme cases of discrimination

- Discriminatory preferences malleable. Can politics *consciously* affect it?
- Since 1945 as many as 22 million noncombatants have been killed in nearly 50 genocides and politicides (Harff 2003).
- Joseph Goebbels (Hitler's propaganda minister): radio as "'the most important instrument of mass influence that exists anywhere" (Welch 1993).
- Research question: Does propaganda that explicitly encourages violence against a certain group induce violence against that group?

Yanagizawa-Drott (2014 QJE): Propaganda and Conflict: Evidence from the Rwandan Genocide

 Role of mass media in the spread of violence by estimating the effects of propaganda disseminated via radio during the 1994 Rwandan genocide

Setting and history:

- ► Ethnic groups: Hutu majority, Tutsi minority (1991: 14%)
- Tutsi ruling elite pre-colonial; Hutu-dominated post-colonial
- ▶ 1990: Tutsi-led rebel army invaded northern Rwanda from Uganda: demands to an end to the ethnically unbalanced policies practiced in Rwanda.
- Hutu president Habyarimana signed peace agreement in Arusha, Tanzania, in August 1993
- Habyarimana's jet shot down (April 1994)
- Hutu extremists initiated a coup, overtook government
- Mass killing of Tutsis ensued (until July 1994): at least 500,000 Tutsis killed (and moderate Hutus)

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Yanagizawa-Drott (2014 QJE): Media

- ► Radio Television Libre des Mille Collines (RTLM):
 - Most extreme messages; voice of Hutu Power party
 - Language used in broadcasts was dehumanizing, as Tutsis would often be referred to as *inyenzi* (cockroaches)
 - Message:
 - Government officials encouraged the killing of Tutsis.
 - Looting of Tutsi assets allowed.
 - Killing is an act of self-defence and an obligation.
 - ► Failure to obey was punished.
- Alternative media:
 - Radio Rwanda no reporting on war and genocide (will serve as a placebo)
 - Newspaper readership very limited. Radio main source of information.

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Yanagizawa-Drott (2014 QJE): Channels

- How does propaganda propagate violence?
- Direct effects
 - ► Persuasive communication (DellaVigna and Gentzkow 2010; bayesian updating): convincing listeners that participation in the attacks on Tutsis was desired (preferences for killing ↑ / fear of retribution from government for killing ↓). Notes:
 - Hutu's long-term neighbors of Tutsis!
 - Dehumanizing messages possibly affecting preferences.

Spillover effects

- **Social interactions** (Durlauf 2004):
 - interdependencies in individual constraints
 - psychological factors / conformity
 - interdependencies in information transmission
- ► Counter-effects: substitution in violence (free riding)
- $\blacktriangleright \ \rightarrow \ {\sf Direction} \ {\sf of} \ {\sf effect} \ {\sf ex-ante} \ {\sf unclear}$

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Yanagizawa-Drott (2014 QJE): Data (coverage)

► Data on radio coverage

- Village-level
- Information on RTLM transmitters from Rwanda Bureau of Information and Broadcasting (ORINFOR): two transmitters
 - ► Kigali (capital)
 - Mount Muhe (one of highest mountains)
- ► Use radio propagation software → high spatial resolution dataset on radio coverage → calculate the area with reception / village using ArcGIS (exploit topography; Rwanda very hilly!)
 - Measurement error: most likely random. Using predicted coverage: attenuation bias, effects biased downwards

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Yanagizawa-Drott (2014 QJE): Radio coverage



Figure A.2. Predicted Radio Coverage, 4 communes example

This left picture shows the height of ground, where brighter marks higher altitude. The right picture shows the empirical radio coverage, where grey marks radio coverage. The signal comes from the Mount Muhe transmitter located 30 km to the west (outside the figure). The figures show that within each commune (boundaries in thick white lines), villages (boundaries in thin white lines) to the east of hilltops have low radio coverage due the hilltops in the line-of-sight to the transmitter. In this example, the variation comes from the east-west relationship to the hilltops. In other communes it will, of course, function in other directions. In Table 2 we also show that the slope of the village is uncorrelated with radio coverage. Source: SRTM 90m topography data, author's calculations of radio coverage in ArcGIS.

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Yanagizawa-Drott (2014 QJE): Radio coverage



RTLM Radio Coverage

The figure shows the radio coverage in villages (share of village area with sufficient radio reception) based on the Longley-Rice propagation model. Source: Author's calculations in AreGIS using the Longley-Rice propagation model.

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Yanagizawa-Drott (2014 QJE): Data (violence)

- Violence participation proxy: number of persons prosecuted for violent crimes committed during the genocide in each village
 - From National Service of Gacaca Jurisdictions, court set up in 2001 to process crimes committed during the genocide
- Data on:
 - Militia violence
 - Individual violence
- Measurement error: standard or not?

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Yanagizawa-Drott (2014 QJE): Violence



Genocide Violence in Villages

The categories represent the total number of prosecuted persons in the village (sum of militia and individual violence). White areas are missing data, either because of geography, such as parks and natural reserves, or villages that lack data in the sample.

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Yanagizawa-Drott (2014 QJE): Estimation

- Why OLS violence_i = $\alpha + \beta \times coverage_i + \epsilon_i$ poor?
- Placement of transmitters non-random (strategic placement to ensure large audience; especially that of Hutu
- ► Identification: *local* variation in radio reception
 - Exploit local variation in radio coverage due to hills lying in the line of sight between radio transmitters and villages
 - ► Signal propagation follows the laws of physics! → Exogenous source of variation
- Specification: $log(h_{vci}) = \beta_v r_{ci} + X'_{ci} \pi + \gamma_c + \varepsilon_{ci}$
 - $v \dots$ violence type, $i \dots$ village, $c \dots$ commune
 - ► *h_{vci}* . . . violence
 - ► *r_{ci}* . . . RTLM coverage
 - Commune fixed effects to control for broad regional differences!

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Yanagizawa-Drott (2014 QJE): Exogeneity check

Local radio coverage unrelated to other predictors of violence

TABLE II

	Exogeneity Check												
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10) Radio	(11) Radio	(12) Radio	
	Population	Population	Distance	Distance	Distance					in near	in nearby	in village	
	in 1991, log	density in 1991, log	to major town, log	road, log	border, log	North sloping	East sloping	South sloping	West sloping	villages (<10 km)	villages (10–20 km)	Radio Rwanda	
Radio coverage in village	-0.049	0.196	0.092	-0.238	0.082	0.113	-0.008	0.020	-0.125	0.029	-0.009	0.061	
	(0.071)	(0.145)	(0.086)	(0.154)	(0.189)	(0.087)	(0.099)	(0.089)	(0.109)	(0.018)	(0.020)	(0.047)	
Observations	1065	1065	1065	1065	1065	1065	1065	1065	1065	1065	1065	1065	
R-squared	0.460	0.426	0.908	0.705	0.921	0.150	0.138	0.145	0.162	0.957	0.952	0.697	
Propagation controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Commune FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	

Notes. Radio coverage is the share of the village area that has RTLM reception. The radio propagation controls are: latitude, longitude, and second-order polynomials in village mean altitude, village altitude variance, and distance to the nearest RTLM transmitter. Standard errors in parentheses, adjusted for spatial correlation (Conley 1999). Significance levels at '10K, **55, ***15.

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Yanagizawa-Drott (2014 QJE): Results

Full radio coverage ↑ violence by 62-69% (0.484-0.526 log points; percentages: e^β − 1), compared to no coverage areas.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
		Total vio	lence		Militia vic	lence	Individual violence			
Radio coverage in village	0.507**	0.526**	0.484**	0.582^{**}	0.559***	0.544***	0.450^{*}	0.465^{*}	0.418*	
	(0.226)	(0.242)	(0.235)	(0.239)	(0.216)	(0.206)	(0.233)	(0.252)	(0.246)	
Population in 1991, log			0.590***			0.589***			0.624^{***}	
			(0.131)			(0.171)			(0.150)	
Population density in 1991, log			-0.014			0.004			-0.015	
			(0.070)			(0.101)			(0.069)	
Distance to major town, log			0.068			-0.233			0.113	
			(0.150)			(0.149)			(0.152)	
Distance to major road, log			-0.196^{**}			-0.245^{***}			-0.193^{**}	
			(0.076)			(0.090)			(0.075)	
Distance to the border, log			0.171^{*}			0.030			0.186^{*}	
			(0.103)			(0.126)			(0.103)	
East sloping, dummy			0.017			0.098			0.014	
			(0.070)			(0.092)			(0.084)	
North sloping, dummy			0.065			0.041			0.079	
			(0.068)			(0.092)			(0.068)	
South sloping, dummy			-0.013			-0.028			-0.012	
			(0.074)			(0.101)			(0.077)	
Observations	1065	1065	1065	1065	1065	1065	1065	1065	1065	
R-squared	0.63	0.64	0.66	0.52	0.53	0.55	0.62	0.63	0.65	
Commune FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Propagation controls	N	Y	Y	N	Y	Y	N	Y	Y	

TABLE III Main Effects

Notes. Militä violenes is the number of presecuted person under category 1 crimes, which are prosecutions against organizers, leaders, army, and militä, Individual violenes is terme category 2 prosecutions for homicides, attempted homicides and services vious violence. Tell violence is the sum of both categories. Radio coverage in village is the share of the village area that has RTLM reception. The radio progragation controls are latitude, longitude, and second-order polynomisia in village mean altitude, village is attempted with the avera that has RTLM reception. The radio progragation controls are latitude, longitude, and second-order polynomisia in village mean altitude, village istitude variance, distance to the nearest RTLM transmitter. Sandard errors in parenthese, adjusted for spatial correctation (Conley 1999). Significance levels at 10% - 75%, **15%.

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Yanagizawa-Drott (2014 QJE): Spillovers

- Specification: $log(h_{vci}) = \lambda_{vd}\bar{r}_{dci} + \bar{X}_{dci}\phi_d + \gamma_c + \varepsilon_{ci}$
 - ▶ *r*_{dci}... population-weighted average in radio coverage in *other villages* within distance *d*
- Results:
 - ▶ "Positive" spillover effects of broadcasting on in militia violence
 - No spillover effects on individual violence \rightarrow
 - Support for information channel; needs some organization (recall Durlauf 2004)
 - Alternative: stronger complementarities in the production of militia violence (violence begets violence)

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Yanagizawa-Drott (2014 QJE): Spillovers

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
			Share of militia violence									
	1	Militia violence Individual violence Total viol					Total viole	nce	Militia/total v			
Radio coverage in nearby	2.18***	2.04^{***}	1.76**	0.468	0.348	0.682	0.688	0.553	0.790	0.194***	0.184***	0.103
villages, within 10 km	(0.797)	(0.771)	(0.760)	(0.570)	(0.572)	(0.588)	(0.613)	(0.62)	(0.608)	(0.060)	(0.059)	(0.063)
Radio coverage in nearby	-0.341	-0.277	-0.163	-0.223	-0.167	-0.303	-0.264	-0.202	-0.298	-0.016	-0.012	0.021
villages, within 10-20 km	(0.739)	(0.763)	(0.821)	(0.675)	(0.721)	(0.751)	(0.629)	(0.68)	(0.712)	(0.091)	(0.089)	(0.092)
Radio coverage in village		0.505**	0.198		0.437^{*}	0.801		0.492^{**}	0.750		0.036	-0.052
		(0.199)	(0.443)		(0.249)	(0.551)		(0.240)	(0.552)		(0.027)	(0.051)
Radio in village * Radio in			0.841			-0.999			-0.708			0.240*
nearby villages, within 10 km			(1.029)			(0.971)			(0.979)			(0.123)
Observations	1065	1065	1065	1065	1065	1065	1065	1065	1965	1045	1045	1045
R-squared	0.56	0.56	0.56	0.65	0.65	0.65	0.66	0.66	0.66	0.260	0.261	0.263
Commune FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Propagation controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Propagation controls, nearby villages	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Additional controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

TABLE V Spatial Spillover Effects

Notes. Radio coverage in village is the share of the village area with RTLM radio reception. Radio coverage in nearby villages is the population-weighted share of the village nearea with RTLM radio coverage, within a given distance from the village centroid. For nearby villages, the propagation control is the within 10 km population weighted average of the standard propagation variables. Additional controls are the logs of population, population density, distance to nearest major town, distance to nearest major road, distance to the border and slope dumnics. Standard errors in parenthesis, adjusted for spatial correlation (Conley 1999). Significance levels at 10%, **5%, **1%.

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Yanagizawa-Drott (2014 QJE): Final remarks

- Heterogeneity: effects concentrated among less educated (illiteracy rates): propaganda stronger among less educated
 - Word of caution: education in some cases used for indoctrination (Cantoni et al. 2014)
- Placebo test: not just any radio (same analysis for Radio Rwanda produces no effects), it's the contents!
- ► Policy:
 - The United Nations Force Commander for the peacekeeping intervention, Romeo Dallaire, urged the international community to jam RTLM signals, but his call went unheeded (Dallaire 2007).
 - Do not repeat this in future!
 - Pay attention to all types of mass media (social?) and language used!
- Or doing good: Blouin and Mukand (2019 JPE): Erasing Ethnicity? Propaganda, Nation Building, and Identity in Rwanda

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Discrimination definition and theories

Gender gaps and gender discrimination

Discrimination as self-fulfilling prophecies

Discrimination and productivity

Ethnic hatered and genocide

Contact hypothesis and reducing ethnic tensions

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Contact hypothesis

Contact hypothesis

- ► How to reduce discrimination?
- ► Allport (1954): Contact hypothesis in social psychology
- Necessary conditions: Interpersonal contact across group lines can reduce prejudice if:
 - 1. it is cooperative,
 - 2. places participants on equal footing,
 - 3. is endorsed by communal authorities, and
 - 4. is characterized by a common goal
- Contact reduces prejudice by highlighting commonalities (Burns et al. 2015), forging friendships (Finseraas and Kotsadam 2017), lowering intergroup anxiety, and inducing empathy (Carrell et al. 2015).
 - Cooperative vs. non-cooperative contact: Lowe (AER forthcoming): Types of Contact: A Field Experiment on Collaborative and Adversarial Caste Integration

Discrimination Gender Stereotype threat Productivity Genocide

Mousa (2020 Science): Building social cohesion between Christians and Muslims through soccer in post-ISIS Iraq

- Generalizability: Limitations of existing studies: contact effects generalization using self-reported attitudes measured immediately after the intervention.
- Conflict setting different? Ethnic violence ↑ group identity, ethnic prejudice, and fear of being close to the outgroup
- Setting: Northern Iraq; Christians and Muslims both like football
 - ► Civic associations (e.g. amateur sports clubs) → building social capital

Contact hypothesis

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Contact hypothesis

Mousa (2020 Science)

- This paper: random assignment of Muslim players to 45 Christian-majority football teams (*cooperative contact, common goal*). Christians minority in Iraq! No ISIS in sample!
 - ► Practically? Captains told local Christian community cooperating with US university → soccer league for displaced; Aims to study their experiences. Community-building one of the leagues' aims. (*endorsement by authorities*)
 - Matching of added players based on baseline skills (equal footing)
- 91.8% of contacted participants were retained until the end of the study (good for attrition but also suggestive of results)

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Mousa (2020 Science): Outcomes

► On-the-field: Behavior toward team-/ league-mates

- Best newcomer award voting (from different team)
- Willingness to register for a mixed team next season
- Regular training with Muslim 6 months later
- Off-the-field: Behavior towards Muslims outside the intervention (generalizability!)
 - ► Taking up invite (also for family members!) to a dancing and dinner party → meeting other Muslims, not just footballers
 - Using a voucher for a restaurant visit in a Muslim neighborhood
 - Donation of \$1 to Christian or neutral NGO (neutral helping both Muslims and Christians)

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Mousa (2020 Science)



Fig. 1. Behavioral results. The intervention consistently improved on-the-field behavioral outcomes, with no detectable effects on off-the-field outcomes. The left panel shows covariate-adjusted mean outcomes for treated and control players, with covariates held at median or modal values. The right panel shows the difference between treated and control players, with 95% confidence intervals.

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Mousa (2020 Science): Take-aways

- Cohesion concentrated within narrowly defined groups of footballers
- ► No generalizability of contact towards Muslims in general
 - ► Some improved social cohesion towards Muslims in general among successful teams → contact must be extremely positive
- At least no increased violence against mixed teams from homogenous team (examining red and yellow cards)!
- Can localized cohesion spill-over towards broader population over time? Go out and test this!

Discrimination Gender Stereotype threat Productivity Genocide Contact hypothesis

Taking stock

- 1. Unequal treatment not necessarily discrimination; this matters for policy.
- 2. Economic theory preference or beliefs based
- 3. Many groups disadvantaged: women, social class, ethnic groups...
- 4. Discrimination reduces economic potential (beyond other dimensions): both through discriminative action and through affecting individual behavior (and investment)
- 5. Discrimination is malleable:
 - 5.1 Bad (propaganda) and good (contact hypothesis) news
 - 5.2 Responds to economic incentives (witches vs. team pay)
- 6. Establishing cooperative contact may be one way, although needs to be designed carefully
- ▶ Where next? Culture, institutions, and the role of history