

Community Ties and Police Use of Force

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Should cities strive to employ a diverse police force?

- Demographic diversity has long been recognized as an important consideration when staffing police departments.
- Prior research has mainly focused on city-level outcomes such as crime rates and arrest rates due to lack of detailed police data.
 - ▶ Find little evidence that diversity lowers crime (Lott 2000; McCrary 2007; Garner, Harvey, & Johnson, 2019)
- Lack of research on specific pathways through which demographic diversity may affect policing outcomes
 - ▶ Racially integrated teams induce greater trust among citizens (Weitzer 2000)
 - ▶ More female officers led to increased reports of violent crime and domestic violence against women (Miller & Segal 2018)
- Leverage data to answer question through different lens: police behavior.

Research Question

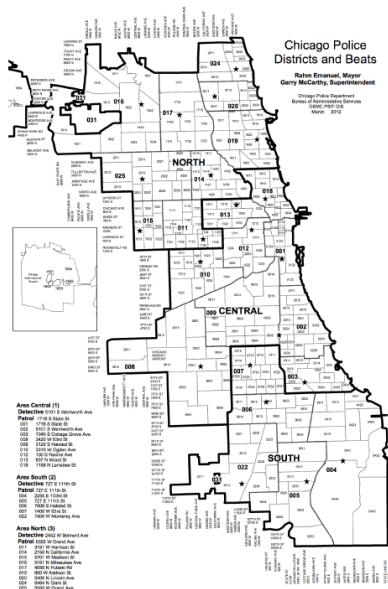
- Does an officer's tie to the community in his or her assigned patrol district affect the officer's use of force?
- Construct officer-specific measure of community tie by comparing the racial distribution of the officer's patrol district to the racial distribution of the officer's home neighborhood (proxy for preferences).
 - ▶ Identifying assumption: officers are assigned to patrol district independently of home address. Use this as randomly assigned level of "community tie".
 - ▶ Districts that look similar to officer's home beat → strong tie
 - ▶ Districts that look very different from officer's home beat → weak tie
- Find that officers with weak community ties are 6% more likely to use force and use 14% more force, relative to those with strong ties.

Process of being a CPD Officer

- ➊ Every few years, CPD offers written exam for entry-level officers.
- ➋ Those who pass the exam are put on a wait list according to a randomly assigned lottery number.
- ➌ When number is called, applicants go through screening process (e.g., physical, drug, psychological). Those who pass enter Police Academy and become Probationary Police Officers.
- ➍ Upon graduation from Police Academy six months later, PPO work in the field for 12 months.
- ➎ Then, new officers are assigned to a district for permanent assignment.
 - ▶ A small number who achieved distinctions in the Academy get to choose initial district assignment.
 - ▶ Upon assignment, District Commander assigns officers to watches and beats.
 - ▶ An officer may transfer to another district pursuant to a bidding process, which is based on seniority.

Empirical Strategy

- Chicago divided into 25 districts, which are subdivided into beats
- We have officer's home address so can identify their "home beat"
- Exogeneity Test: Is district assignment independent of home beat?
- Compare racial breakdown of officer's home beat to officer's patrol district to create community-tie measure
- Idea: Strength of community tie randomly assigned across officers



Data Summary

- Officer Personnel Data: birth year, race, sex, rank, tenure, patrol district assignment, use of force, arrests
 - ▶ Freedom of Information Act requests through Invisible Institute
 - ▶ 16,116 CPD officers between 2007-2015 (1,341,774 observations)
- Officer Home Address
 - ▶ InfoUSA, proprietary database of US consumers with residential information
 - ▶ Able to match about 77% of CPD officers
- District-level Data
 - ▶ Chicago Data Portal: total crime rate, violent crime rate, property crime rate
 - ▶ 2000 and 2010 Census: median household income, population by race
- Analysis Sample: 56,812 observations on 8,202 D1 Police Officers with home address in every year

Testing Key Identifying Assumption

Is district assignment independent of officer's home location?

Two tests:

- 1 Are new officers randomly assigned to districts?
- 2 For all officers, do officer traits matter in predicting district assignment?

Are new officers randomly assigned to districts?

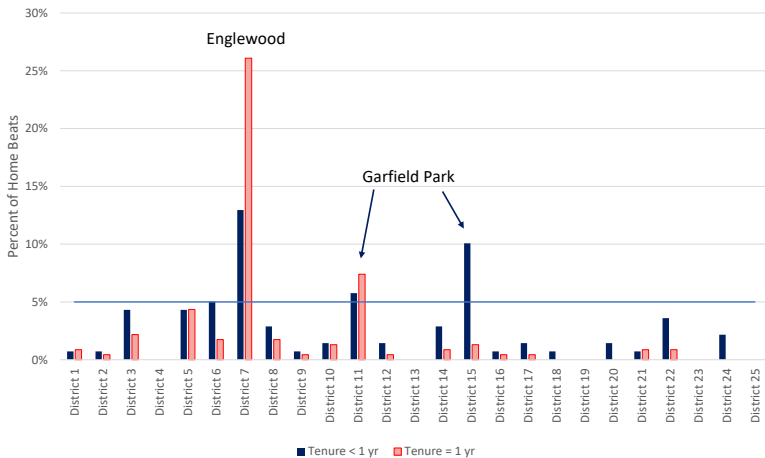
- 1 Separately for each district D and two tenure levels (< 1 yr and 1 yr):

$$D_{it} = \beta_0 + \theta^B + \beta_1 \text{SameArea}_{it} + X\delta + \tau_t + \varepsilon_{it}$$

- ▶ $D_{it} = 1$ if officer i lives in district D in year t
 - ▶ θ^B = home beat fixed effects
 - ▶ $\text{SameArea}_{it} = 1$ if officer lives and works in same area (e.g., north, central, south)
 - ▶ X = vector of officer characteristics: race, sex, age, tenure
 - ▶ τ_t = year fixed effects
- 2 Adjust p-values on θ^B for multiple testing using Benjamini-Hochberg procedure
 - 3 Graph share of adjusted p-values that are < 0.05 (i.e., share of home beats with adj p-value < 0.05)

Home beat not strongly predictive of district assignment

Share of Home Beats with adjusted p-value < 0.05



Do officer traits predict district assignment?

- 1 Separately for each district D :

$$D_{it} = \beta_0 + \beta_1 \text{DiffArea}_{it} + \beta_2 \text{SameDist}_{it} + \tau_t + \beta_3 \text{tenure}_{it} + \varepsilon_{it} \quad (1)$$

$$D_{it} = \beta_0 + \beta_1 \text{DiffArea}_{it} + \beta_2 \text{SameDist}_{it} + \tau_t + \beta_3 \text{tenure}_{it} + X\delta + \varepsilon_{it} \quad (2)$$

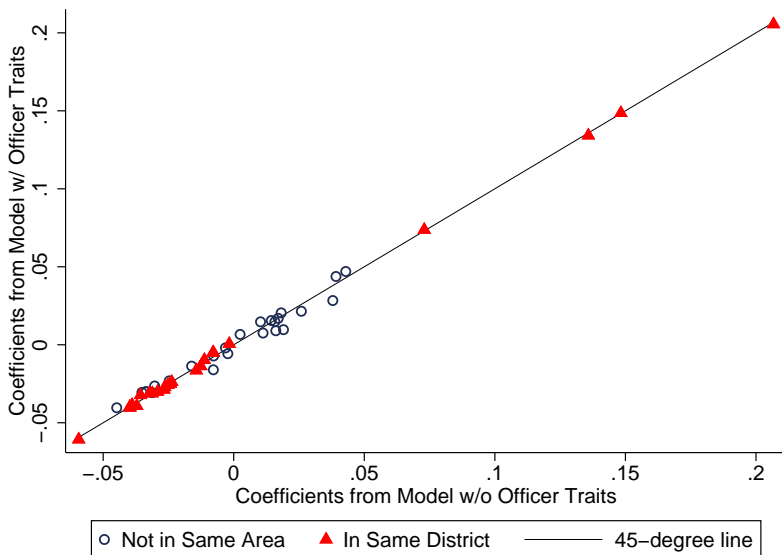
- ▶ $D_{it} = 1$ if officer i lives in district D in year t
- ▶ τ_t = year fixed effects
- ▶ X = vector of officer characteristics: race, sex, age

Officer work/home location classifications:

- ▶ $\text{DiffArea}_{it} = 1$ if officer lives and works in different areas (e.g., north, central, south)
- ▶ $\text{SameArea}_{it} = 1$ if officer lives and works in same area (reference group)
- ▶ $\text{SameDist}_{it} = 1$ if officer lives and works in same district

- 2 Plot $\hat{\beta}_1$ and $\hat{\beta}_2$ from (1) and (2) \Rightarrow shouldn't be different if randomly assigned to districts

Officer traits do not predict district assignment



Measuring Officer's Community Tie

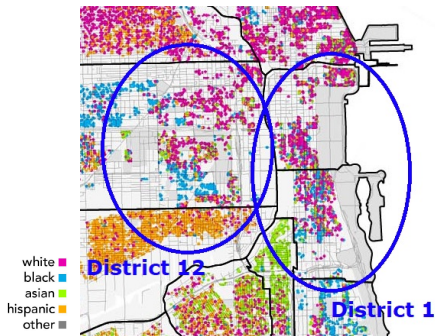
- Use 2000 and 2010 Census to obtain population counts of each CPD district in terms of blacks, Hispanics, whites, and other. Impute counts between 2000-2010.
- Calculate Euclidean demographic distance (EDD) between officer's assigned patrol district and officer's home beat:

$$||share_{home} - share_{work}||/\sqrt{2}$$

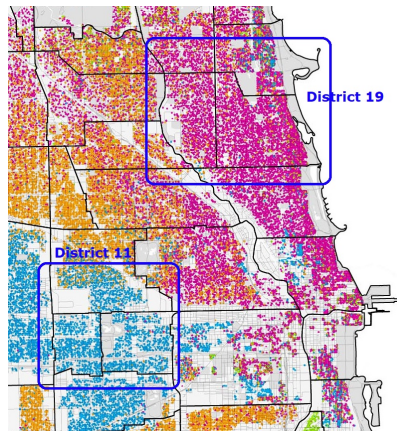
- Ranges between 0 and 1, with higher values indicating greater “distance” or great racial dissimilarity.
- We use it to measure level of community tie as a function of demographic similarity.
 - ▶ Davis et al (2019) use EDD to measure “social frictions associated with racial and ethnic demographics”.

EDD Examples

(a) EDD value of 0.3



(b) EDD value of 0.8



Source: Bill Rankin of Radical Cartography, <http://www.radicalcartography.net/index.html?chicagodots>

EDD Summary Statistics

	All Officers	White Officers	Black Officers	Hispanic Officers
Panel A: Mean Racial Share in Home District				
White	0.4888	0.6805	0.1437	0.4896
Black	0.2566	0.0716	0.7231	0.0844
Hispanic	0.2031	0.1895	0.1030	0.3720
Panel B: Mean Racial Share in Work District				
White	0.2606	0.3103	0.1504	0.2631
Black	0.4529	0.3639	0.6992	0.3820
Hispanic	0.2220	0.2537	0.0999	0.2940
Panel C: Euclidean Demographic Distance between Work and Home				
Mean	0.4068	0.4543	0.2985	0.4444
Standard Deviation	0.2709	0.2637	0.2676	0.2509
Median	0.3720	0.4372	0.2436	0.4199

Regression Model

$$y_{ijt} = \beta_0 + \beta_1 \text{MedTie}_{ijt} + \beta_2 \text{WeakTie}_{ijt} + \tau_t + \alpha_j + X\delta + \varepsilon_{ijt}$$

y_{ijt} = total number of TRR filings by officer i in district j in year t

TRR filings required if subject alleges injury from officer's use of force, officer strikes subject or uses weapon

Community Tie Measures:

- $\text{StrongTie}_{ijt} = 1$ if EDD is (0, 0.3] (reference group)
- $\text{MedTie}_{ijt} = 1$ if EDD is (0.3, 0.6]
- $\text{WeakTie}_{ijt} = 1$ if EDD is (0.6, 1]

Regression Model

$$y_{ijt} = \beta_0 + \beta_1 \text{MedTie}_{ijt} + \beta_2 \text{WeakTie}_{ijt} + \tau_t + \alpha_j + X\delta + \varepsilon_{ijt}$$

X is a vector of controls for:

- officer characteristics: sex, race/ethnicity, birth year, tenure, number of months assigned to district
- time-varying work district characteristics: leave-out mean arrests and use of force, total crime rate, violent crime rate, property crime rate, median HH income, racial population shares
- time-varying home district characteristics: racial population shares

τ_t = year fixed effects, α_j = work district fixed effects, SE clustered at officer-level

Impact of Community Ties on Use of Forces

Dependent Variable:	Any Force (1)	TRR Filings (2)
Medium Community Tie	0.00154 (0.00616)	0.0110 (0.0148)
Weak Community Tie	0.0155** (0.00700)	0.0599*** (0.0186)
Reference Group Mean	0.2604	0.4257
Observations	56,792	56,792
Controls for:		
Year FE	Yes	Yes
District FE	Yes	Yes
Officer characteristics	Yes	Yes
Time-varying district characteristics	Yes	Yes

Appendix Slides

EDD Histogram by Officer Race

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