

Does inequality increase crime? The effect of income inequality on crime rates in California counties

Wenbin Chen Matthew Keen

December 15th, 2014

Does inequality motivate criminal behavior?

- Economic theory of crime:
 - Individuals respond to deterrents (police, sentencing, etc.)
 - Individuals react to opportunities
 - Individuals make rational decisions based on costs and benefits
 - Inequality provides higher potential payoffs for crimes like burglary and robbery
 - Inequality may indicate reduced social mobility, suggesting lower opportunity costs for committing crimes
 - Likely to see effect in property crimes and robbery
- Strain theory:
 - Alienation from society motivates criminal behavior
 - Awareness of inequality or lack of social mobility could be a stressor
 - Possible to see effect in any categories of crime

Previous work:

- Mixed results in previous work on income inequality and crime
- Previous work (Kelly 2000) using cross-sectional data for U.S. counties shows that income inequality increases violent crime
 - Notably found no effect from income inequality on property crime
- A more recent article (Brush 2007) using U.S. county data
 - Using cross-sectional analysis income inequality increases most categories of crime
 - The effect disappears when they used a fixed-effect model

Model:

- We estimated the effect of income inequality using panel data for California Counties covering 2005 to 2012
- To control for other factors effecting crime we included other demographic and income related variables.
- We calculated a Gini coefficient for each County-Year as our measure of income inequality.

$$\ln(\text{CrimeRate}_{it}) = \beta_0 + \mathbf{Y}_t\delta + \beta_1 \ln(\text{Gini}_{it}) + \ln(\mathbf{X}_{it})\beta_2 + a_i + u_{it}$$

Crime data: Reported crimes per 100 000 county residents

- Crime report numbers from California Criminal Justice Statistics Center
- County population figures are estimates from the census bureau (2010 actual count)

Table : Crime Rates

Variable	Obs	Mean	Std. Dev.	Min	Max
Violent Crime	264	447.4	175.4	188.0	917.2
Homicide	264	4.6	3.0	0	13.2
Rape	264	26.5	10.4	10.5	75.0
Robbery	264	126	95.2	24.0	525.8
Assault	264	289.9	113.1	110.8	674.9
Property Crime	264	2998.6	871.0	1468.5	5563.6
Burglary	264	717.5	241.7	319.3	1420.1
Theft	264	1827.0	514.6	825.2	3542.5
Auto Theft	264	454.0	251.6	96.1	1358.3
Arson	264	27.2	20.4	0.7	175.7

County data:

- Data aggregated from American Community Survey via IPUMS (except density)
- Gini coefficient estimated using individual adult incomes.

Table : Other variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Gini	264	.57	.03	.51	.67
Dropout	264	10.1%	4.7%	2.9%	24.9%
College	264	20.8%	9.2%	7.4%	44.6%
Density	264	1118.0	2913.7	36.9	17571.6
Male	264	49.3%	.2%	41.2%	61.9%
Youth	264	13.3%	2.4%	7.5%	23.7%
Male.Youth	264	6.9%	1.3%	4.0%	11.9%
Poverty300	264	47.41%	12.5%	21.6%	74.6%
Mean.Income	264	20920	10660.6	20920	76750
Unemployment	264	9.3%	3.4%	3.5%	18.3%

Table : Pooled OLS - Violent Crime

VARIABLES	Violent Crime	Homicide	Rape	Robbery	Assault
Gini	-2.597*** (0.544)	-4.140*** (1.064)	-2.219*** (0.524)	-2.629*** (0.713)	-2.535*** (0.592)
College	-0.0468 (0.141)	-0.894*** (0.276)	0.307** (0.136)	0.0567 (0.185)	-0.24 (0.154)
Dropout	0.215* (0.112)	-0.05 (0.220)	-0.200* (0.108)	0.341** (0.147)	0.184 (0.122)
Density	0.132*** (0.0223)	0.384*** (0.0436)	-0.0816*** (0.0215)	0.386*** (0.0292)	0.0403* (0.0242)
Male	-0.489 (0.574)	1.079 (1.123)	-0.0813 (0.552)	-0.745 (0.752)	-0.844 (0.624)
Youth	-0.16 (0.410)	0.625 (0.802)	1.198*** (0.395)	0.451 (0.537)	-0.608 (0.446)
Male_Youth	-0.328 (0.395)	-0.703 (0.772)	-1.000*** (0.380)	-0.699 (0.517)	0.139 (0.429)
Poverty300	1.334*** (0.260)	1.537*** (0.509)	1.237*** (0.251)	0.873** (0.341)	1.354*** (0.283)
Mean_Income	0.526* (0.310)	0.84 (0.607)	0.500* (0.299)	0.0219 (0.406)	0.819** (0.337)
Unemployment	0.0849 (0.128)	0.138 (0.249)	0.132 (0.123)	0.427** (0.167)	-0.0138 (0.139)
Year 2006 to 2012	- to ***	- to *	- to ***	- to ***	- to **
Constant	7.615 (4.755)	-0.911 (9.295)	1.197 (4.573)	10.71* (6.225)	6.803 (5.167)
Observations	264	264	264	264	264
R-squared	0.535	0.514	0.489	0.704	0.467

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table : Pooled OLS - Property Crime

VARIABLES	Property Crime	Burglary	Theft	Auto Theft	Arson
Gini	-1.224*** (0.422)	-0.271 (0.487)	-1.804*** (0.419)	-0.699 (0.777)	-1.631 (1.066)
College	0.0169 (0.109)	-0.104 (0.126)	0.0364 (0.109)	-0.0575 (0.202)	0.109 (0.277)
Dropout	0.0484 (0.0871)	-0.118 (0.101)	0.0781 (0.0865)	0.111 (0.161)	-0.125 (0.220)
Density	0.0807*** (0.0173)	0.0258 (0.0199)	0.0609*** (0.0172)	0.265*** (0.0319)	0.0838* (0.0437)
Male	0.452 (0.445)	-0.737 (0.513)	1.316*** (0.442)	-0.615 (0.820)	3.882*** (1.125)
Youth	0.610* (0.318)	0.313 (0.367)	0.853*** (0.316)	0.121 (0.586)	1.912** (0.804)
Male_Youth	-0.606** (0.306)	-0.496 (0.353)	-0.698** (0.304)	-0.441 (0.564)	-1.06 (0.774)
Poverty300	0.410** (0.202)	0.291 (0.233)	0.644*** (0.200)	-0.0379 (0.372)	0.812 (0.510)
Mean_Income	0.131 (0.240)	-0.285 (0.277)	0.657*** (0.239)	-0.883** (0.443)	0.289 (0.608)
Unemployment	0.444*** (0.0989)	0.531*** (0.114)	0.366*** (0.0982)	0.701*** (0.182)	0.452* (0.250)
Year 2006 to 2012	- to ***	- to ***	- to ***	- to ***	- to ***
Constant	6.426* (3.684)	11.96*** (4.250)	-1.826 (3.659)	18.49*** (6.788)	-15.54* (9.312)
Observations	264	264	264	264	264
R-squared	0.488	0.524	0.432	0.574	0.327

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table : Fixed Effect - Violent Crime

VARIABLES	Violent Crime	Homicide	Rape	Robbery	Assault
Gini	0.409 (0.424)	-1.764 (1.255)	-0.0109 (0.505)	-0.265 (0.433)	0.547 (0.536)
College	-0.0375 (0.174)	0.526 (0.515)	-0.185 (0.207)	0.0621 (0.178)	-0.00773 (0.220)
Dropout	-0.0635 (0.112)	-0.598* (0.332)	0.121 (0.134)	0.103 (0.115)	-0.128 (0.142)
Density	-2.721*** (0.636)	-0.324 (1.883)	-1.916** (0.757)	-3.079*** (0.650)	-2.750*** (0.804)
Male	-0.0214 (0.411)	4.113*** (1.218)	0.345 (0.490)	0.0931 (0.420)	-0.0147 (0.520)
Youth	-0.28 (0.249)	-0.0756 (0.739)	0.521* (0.297)	-0.00254 (0.255)	-0.449 (0.315)
Male_Youth	-0.0499 (0.201)	-0.0234 (0.595)	-0.565** (0.239)	0.0448 (0.205)	0.0205 (0.254)
Poverty300	-0.232 (0.209)	-0.00888 (0.620)	-0.364 (0.249)	-0.515** (0.214)	-0.0922 (0.265)
Mean_Income	-0.439* (0.235)	-1.182* (0.696)	0.445 (0.280)	-0.451* (0.240)	-0.620** (0.297)
Unemployment	-0.0697 (0.0680)	-0.566*** (0.202)	0.13 (0.0810)	-0.0556 (0.0696)	-0.0866 (0.0860)
Year 2006 to 2012	- to ***	- to *	-	***	- to *
Constant	26.83*** (5.259)	7.838 (15.58)	9.461 (6.262)	29.29*** (5.377)	27.79*** (6.648)
Observations	264	264	264	264	264
R-squared	0.362	0.187	0.345	0.39	0.282
Number of CountyID	33	33	33	33	33

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table : Fixed Effect - Property Crime

VARIABLES	Property Crime	Burglary	Theft	Auto Theft	Arson
Gini	-0.127 (0.246)	0.0467 (0.364)	-0.209 (0.279)	0.0508 (0.494)	0.172 (1.158)
College	-0.114 (0.101)	-0.0936 (0.149)	-0.198* (0.115)	0.21 (0.203)	1.200** (0.475)
Dropout	0.137** (0.0650)	0.0449 (0.0963)	0.189** (0.0739)	-0.00329 (0.131)	0.586* (0.306)
Density	-1.286*** (0.368)	-2.211*** (0.546)	-0.785* (0.419)	-1.360* (0.742)	-2.469 (1.737)
Male	-0.0294 (0.238)	0.0803 (0.353)	0.1 (0.271)	-0.0937 (0.480)	-1.012 (1.124)
Youth	-0.12 (0.145)	0.0682 (0.214)	-0.13 (0.164)	-0.532* (0.291)	-0.136 (0.681)
Male_Youth	0.0282 (0.116)	-0.169 (0.172)	0.0739 (0.132)	0.236 (0.234)	-0.0286 (0.549)
Poverty300	-0.603*** (0.121)	-0.429** (0.180)	-0.616*** (0.138)	-0.748*** (0.244)	-0.219 (0.572)
Mean_Income	-0.238* (0.136)	-0.772*** (0.202)	0.0889 (0.155)	-0.4 (0.274)	-0.309 (0.642)
Unemployment	-0.045 (0.0394)	-0.0834 (0.0584)	0.0254 (0.0449)	-0.272*** (0.0794)	-0.566*** (0.186)
Year 2006 to 2012	- to **	- to ***	- to ***	- to ***	-
Constant	21.27*** (3.049)	29.03*** (4.518)	14.23*** (3.468)	22.14*** (6.136)	21.63 (14.37)
Observations	264	264	264	264	264
R-squared	0.663	0.272	0.547	0.758	0.391
Number of CountyID	33	33	33	33	33

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Conclusion:

- The result in Pooled OLS model: income inequality will decrease violent crime
- The result in Fixed-effect model: striking different from pooled OLS
 - Changed sign for density and poverty
 - Gini coefficient became insignificant
 - Many fewer control variables are significant

Further Research:

- Including a lagged dependent variable to control for endogeneity problem
- Including instrumental variables to deal with endogeneity issue
- Increasing the variance of explanatory variables
 - A larger proportion of US counties
 - A longer range of years

Thank You!