MIS Quarterly

SPECIAL ISSUE: ICT AND SOCIAL CHALLENGES

THE INTERNET AND RACIAL HATE CRIME: OFFLINE SPILLOVERS FROM ONLINE ACCESS

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Appendix A

Descriptive Information on Broadband Providers

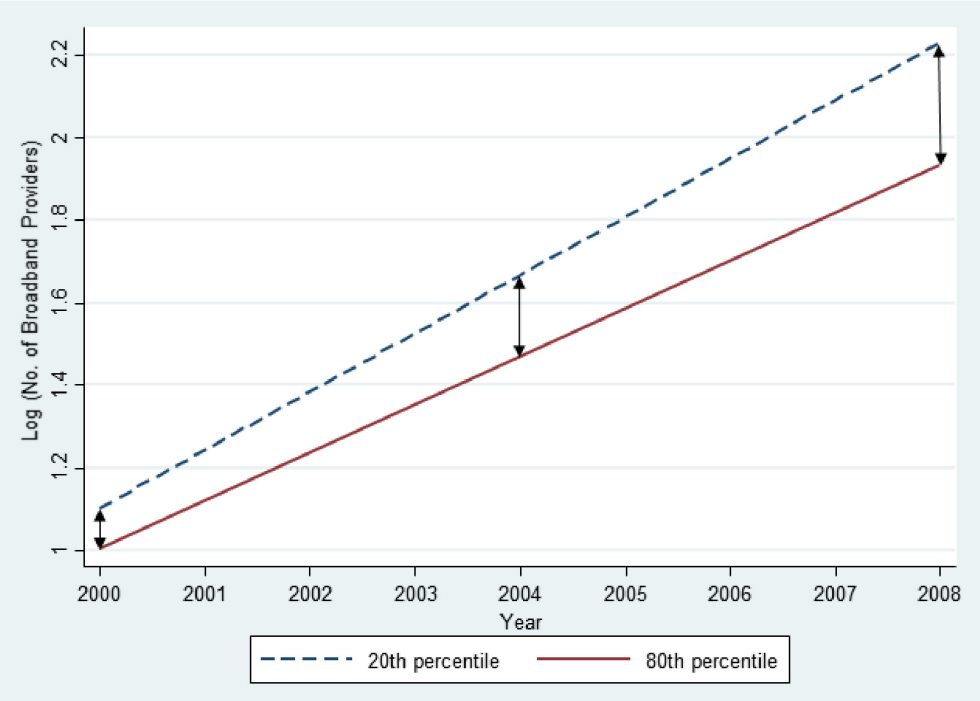
Table A1. Correlations between Broadband Providers with Household Internet Access Measures

Locations	CPS Home Internet Usage	FCC High Speed Line Subscribers
Alabama	0.9997	0.9820
Alaska	0.9798	0.9727
Arizona	0.9887	0.9267
Arkansas	0.9957	0.9913
California	0.9438	0.8372
Colorado	0.9888	0.9714
Connecticut	0.8942	0.8340
Delaware	0.9452	0.9082
District of Columbia	0.9677	0.9163
Florida	0.9603	0.9392
Georgia	0.9672	0.9536
Idaho	0.9951	0.9837
Illinois	0.9514	0.9224
Indiana	0.9802	0.9643
Iowa	0.9958	0.9753
Kansas	0.9864	0.9912
Kentucky	0.9943	0.9869

Table A1. Correlations between Broadband Providers with Household Internet Access Measures (Continued)

Locations	CPS Home Internet Usage	FCC High Speed Line Subscribers
Louisiana	0.9848	0.9698
Maine	0.9969	0.9718
Maryland	0.9864	0.9331
Massachusetts	0.7761	0.9043
Michigan	0.9625	0.9516
Minnesota	0.9994	0.9813
Mississippi	0.9829	0.9855
Missouri	0.9684	0.9792
Montana	0.9913	0.9899
Nebraska	0.9899	0.9944
Nevada	1.0000	0.9737
New Hampshire	0.9843	0.9472
New Jersey	0.9999	0.9165
New Mexico	0.9959	0.9856
New York	0.9483	0.9041
North Carolina	0.9938	0.9819
North Dakota	0.9894	0.9317
Ohio	0.9840	0.9625
Oklahoma	0.9857	0.9798
Oregon	0.9759	0.9839
Pennsylvania	0.9772	0.9408
Rhode Island	0.9495	0.9318
South Carolina	0.9779	0.9890
South Dakota	0.9998	0.9807
Tennessee	0.9760	0.9538
Texas	0.9760	0.9648
Utah	1.0000	0.9705
Vermont	0.9977	0.9679
Virginia	0.9994	0.9832
Washington	0.9729	0.9592
West Virginia	0.9821	0.9420
Wisconsin	1.0000	0.9926
Wyoming	0.9997	0.9888
All	0.4151	0.4908

Notes: Both the data on CPS household Internet use and FCC High Speed Line subscribers are only available at the state level. The broadband provider data is aggregated to the state level before running the correlation analyses.



Note: Counties with slope values covering the lower 20th percentile of the sample—relatively flatter terrains (dotted line)—experienced a greater growth rate in broadband providers compared to counties that hold slope values over the 80th percentile—relatively steeper terrains (solid line).

Figure A1. Increasing Growth Rates of Broadband Providers over the Years (Split by 20th and 80th Percentile of the Slope Values)

Appendix B

Supplementary Analyses

Table B1. Year by Year OLS Regressions for Racial Hate Crimes

	Year 2001 (1)	Year 2002 (2)	Year 2003 (3)	Year 2004 (4)	Year 2005 (5)	Year 2006 (6)	Year 2007 (7)	Year 2008 (8)
DV: Log (Number of Racial Hate Crimes)								
Log (Number of BB Providers)	1.092***	0.663***	0.363***	0.442***	0.182**	0.403***	0.180**	0.120
	(0.19)	(0.11)	(0.10)	(0.10)	(0.09)	(0.08)	(0.09)	(0.08)
Log (Population Density)	-0.003	-0.032	0.014	0.023	0.016	-0.007	0.009	0.022
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Log (Mean Age)	0.337	-0.008	0.427	0.582	0.623*	0.082	0.241	-0.311
	(0.35)	(0.36)	(0.39)	(0.41)	(0.38)	(0.37)	(0.38)	(0.35)
Log (Number of International Migrants)	0.035*	0.005	0.005	0.033**	0.091***	0.028	0.074***	0.042**
	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)
Proportion of African Americans	-0.005	-0.115	-0.239*	-0.110	-0.266*	0.179	-0.167	-0.028
	(0.16)	(0.13)	(0.14)	(0.15)	(0.14)	(0.17)	(0.16)	(0.16)
Log (Number of People in Poverty)	0.157***	0.147***	0.216***	0.138***	0.088**	0.102***	0.100**	0.097**
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Employment Percentage	4.196***	2.325*	4.931***	1.905	0.084	-0.049	-2.171	-0.474
	(1.54)	(1.32)	(1.23)	(1.23)	(1.34)	(1.39)	(1.41)	(1.38)
Log (Number of Police Employees)	0.111***	0.134***	0.085**	0.097***	0.108***	0.139***	0.124***	0.154***
	(0.04)	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Log (Number of Crimes)	0.028**	0.030**	0.038***	0.025	0.044***	0.048***	0.040***	0.064***
	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Observations	1025	1025	1025	1025	1025	1025	1025	1025
F-statistics	50.356	39.988	38.722	37.488	39.706	40.098	37.415	42.147
R-squared	0.4192	0.4027	0.3785	0.3706	0.3827	0.3909	0.3675	0.3857

Notes: All models are OLS regressions. Robust clustered standard errors are reported in parentheses. All regressors are lagged by one period to avoid simultaneity biases. *Significant at 10%; **Significant at 5%; ***Significant at 1%.

Table B2. Correlation Matrix for Slope and other Regressors

	1	2	3	4	5	6	7	8	9	10
1. Log (Slope)	1.0000									
2. Log (Number of BB Providers)	-0.1652	1.0000								
3. Log (Population Density)	-0.0496	0.3808	1.0000							
4. Log (Mean Age)	0.1743	-0.0748	-0.2950	1.0000						
5. Log (Number of International Migrants)	-0.1924	0.4836	0.5384	-0.3481	1.0000					
6. Proportion of African American	-0.3325	0.1295	0.1678	-0.2155	0.1954	1.0000				
7. Log (Number of People in Poverty)	-0.0606	0.4504	0.5986	-0.3179	0.7638	0.2414	1.0000			
8. Employment Percentage	-0.0333	-0.0079	0.1163	-0.1786	0.1589	-0.1908	-0.0176	1.0000		
9. Log (Number of Employees in Police Force)	-0.1961	0.4186	0.7801	-0.2863	0.7001	0.2265	0.8009	0.0721	1.0000	
10. Log (Number of Crimes)	0.0695	0.2217	0.3913	-0.3914	0.4224	0.1258	0.5323	-0.0208	0.4059	1.0000

Table B3. Cross Sectional IV Regressions for Various Hate Crime Types

	Year 2001	Year 2002	Year 2003	Year 2004	Year 2005	Year 2006	Year 2007	Year 2008
Second Stage Coefficient Estimates for Log (Number of BB Providers)								
Racial Hate Crimes	2.322	2.620***	1.582***	1.254***	1.224**	1.022***	1.573***	1.180***
	(1.86)	(0.74)	(0.43)	(0.39)	(0.53)	(0.27)	(0.55)	(0.40)
Ethnicity Hate Crimes	2.117*	0.849**	0.760***	0.485**	0.594**	0.291**	0.441*	0.326*
	(1.21)	(0.37)	(0.23)	(0.20)	(0.27)	(0.14)	(0.26)	(0.19)

Note: Each row of hate crime type is a separate regression of Equation (1) that involves the specific hate crime type of interest. Figures reported are coefficient estimates for the number of broadband providers, and its standard deviation. Coefficients of racial hate crime from Table 2 are replicated for comparison purposes. Robust clustered standard errors are reported in parentheses. *Significant at 10%; **Significant at 5%; ***Significant at 1%.

Table B4. Test of Exclusion Restriction Assumption

DV: Racial Hate Crime	Log Specification		Non-Log Specification	
	(1)	(2)	(3)	(4)
Slope * Year 2001	0.027	0.013	0.019	-0.009
	(0.02)	(0.02)	(0.01)	(0.02)
Slope * Year 2002	-0.006	-0.014	0.010	0.005
	(0.02)	(0.02)	(0.01)	(0.01)
Slope * Year 2003	0.016	0.013	0.014	0.011
	(0.02)	(0.02)	(0.01)	(0.01)
Slope * Year 2004	0.014	0.013	0.008	0.004
	(0.02)	(0.02)	(0.01)	(0.01)
Slope * Year 2005	0.013	0.019	0.011	0.006
	(0.01)	(0.02)	(0.01)	(0.01)
Slope * Year 2006	-0.012	-0.019	-0.008	-0.016
	(0.01)	(0.02)	(0.01)	(0.01)
Slope * Year 2007	-0.019	-0.002	-0.010	-0.003
	(0.01)	(0.01)	(0.01)	(0.01)
Log (Population Density)	0.061	0.060	0.146	0.148
	(0.06)	(0.05)	(0.21)	(0.20)
Log (Mean Age)	1.452*	2.596**	5.210	13.981
	(0.84)	(1.15)	(6.63)	(9.77)
Log (Number of International Migrants)	-0.001	0.007	-0.117*	-0.034
	(0.01)	(0.01)	(0.07)	(0.06)
Proportion of African Americans	-1.015	-0.447	1.491	4.828
	(2.19)	(1.91)	(31.46)	(28.36)
Log (Number of People in Poverty)	0.128*	0.237***	1.069*	1.565***
	(0.07)	(0.07)	(0.60)	(0.50)
Employment Percentage	0.069	-0.467	-3.426	-9.223
	(0.79)	(0.80)	(7.87)	(8.32)
Log (Number of Employees in Police Force)	0.046	0.031	0.018	0.057
	(0.04)	(0.04)	(0.28)	(0.23)
Log (Number of Crimes)	-0.003	-0.009	0.017	0.003
	(0.01)	(0.01)	(0.07)	(0.06)
Year Fixed Effects	✓	✓	✓	✓
County Fixed Effects	✓	✓	✓	✓
Industry Size Controls	✓	✓	✓	
Observations	7542	8200	7542	8200
F-statistics	1.919	2.245	1.928	2.392

Notes. All regressions are OLS regressions with year and county level fixed effects. Models 1 and 2 use log transformed racial hate crimes and slope in the regressions, while Models 3 and 4 use non-logged racial hate crimes and slope. Models 1 and 3 include the annual payroll for common industries in urbanized locations as covariates, while Models 2 and 4 rely on the basic set of covariates. Robust standard errors are reported in parentheses. *Significant at 10%; **Significant at 5%; ***Significant at 1%.

Table B5. Moderating Effects of Poverty and Employment

	Poverty		Employment	
	Below Median (1)	Above Median (2)	Below Median (3)	Above Median (4)
Second Stage DV: Log (Number of Racial Hate Crimes)				
BB Providers Measure	0.496***	0.955***	1.410***	1.027***
	(0.17)	(0.24)	(0.18)	(0.30)
Log (Population Density)	-0.036***	-0.021	-0.042**	-0.045**
	(0.01)	(0.02)	(0.02)	(0.02)
Log (Mean Age)	0.015	-0.064	-0.025	0.951***
	(0.16)	(0.22)	(0.21)	(0.23)
Log (Number of International Migrants)	0.004	0.006	-0.015	-0.002
	(0.01)	(0.02)	(0.01)	(0.02)
Proportion of African Americans	-0.145***	-0.270**	-0.457***	0.254*
	(0.05)	(0.11)	(0.07)	(0.13)
Log (Number of People in Poverty)	0.048***	0.224***	0.105***	0.112***
	(0.01)	(0.04)	(0.02)	(0.03)
Employment Percentage	-0.712	-0.610	-5.501***	7.851***
	(0.44)	(1.40)	(0.88)	(2.26)
Log (Number of Employees in Police Force)	0.058***	0.165***	0.120***	0.121***
	(0.01)	(0.02)	(0.02)	(0.02)
Log (Number of Crimes)	0.013**	0.065***	0.012	0.068***
	(0.01)	(0.01)	(0.01)	(0.01)
Year Fixed Effects	✓	✓	✓	✓
County Fixed Effects	✓	✓	✓	✓
Observations	4100	4100	4100	4100
Hansen J Statistics	2.468	14.456	5.240	10.926
P-value of Hansen J Statistics	0.872	0.025	0.513	0.091
Root MSE	0.3839	0.7769	0.6387	0.6649

Notes: All models are panel IV regressions. Models 1 and 2 are split by the median poverty rate. Models 3 and 4 are split by the median employment rate. Robust standard errors are reported in parentheses. *Significant at 10%; **Significant at 5%; ***Significant at 1%.

Table B6. First Difference Regression Specification

	(1)	(2)	(3)	(4)
First Stage DV: Log (Change in BB Providers)				
Log (Slope)	-0.026***	-0.024***	-0.008***	-0.007***
	(0.00)	(0.00)	(0.00)	(0.00)
Second Stage DV: Log (Change in Racial Hate Crimes)				
Change in BB Providers	0.204*	0.219*	0.649*	0.682*
	(0.11)	(0.11)	(0.37)	(0.40)
Baseline controls added	✓	✓	✓	✓
Interaction terms added		✓	✓	✓
Household income and college attainment added			✓	✓
Population size added			✓	
Additional racial proportions added				✓
Observations	8200	8200	8200	8200
First stage F-statistics	46.546	44.623	30.807	29.78
Stock Yogo Critical Value	8.96	8.96	8.96	8.96
Root MSE	0.540	0.539	0.536	0.537

Notes: Baseline covariates used in the first-difference models are the same as those in the Model 3 of Table 3; that is, demographic controls include population density, mean age, number of international migrants, and proportion of American Africans; socioeconomic controls include number of people in poverty and employment percentage; crime-related controls include number of police employees and number of crimes at the county level. Emulating the approach in Kolko (2012), population density is further interacted with the change in broadband providers and added as covariates to the specifications. In all models, road density is added as a covariate as per Kolko (2012). Following Kolko (2012), median household income and percentage of college attainment are added in the specifications of Models 3 and 4, along their interactions with change in broadband providers. County population size is entered as a covariate with its interaction with change in broadband providers in Model 3, while the additional racial proportion breakdowns (i.e., White proportion and Asian proportion) are entered in Model 4. Robust clustered standard errors are shown in parentheses. *Significant at 10%; **Significant at 5%; ***Significant at 1%.

Table B7. Fixed Effects Regression with "Pre"- and "Post"-Intervention Data

	Years 1992-1998		Years 1992-1995	
DV: Log (Number of Racial Hate Crimes)	**(1)**	**(2)**	**(3)**	**(4)**
Log (Number of BB Providers)	0.128***	0.011***	0.138***	0.027***
	(0.02)	(0.00)	(0.02)	(0.01)
County Fixed Effects		✓		✓
Observations	2892	2892	2892	2892
F-statistics	48.135	12.194	55.38	24.923

Notes: Each regression consists of two observations from each county. The first observation holds the average values of the dependent and independent variables in pre-broadband period, and the second holds these values for the post-broadband period. In Models 1 and 2, we define the pre-broadband period as the years 1992 to 1998, which is the standard assumed in Kolko (2012). Using a stricter definition of pre-broadband period of 1992 to 1995 (Forman et al. 2012), we reestimate the same specification in Models 3 and 4.

Table B8. Falsification with Regressions under Different Periods

	One-period Lagged Outcomes (1)	Pre-broadband Outcomes (2)
Second Stage DV: Log (Racial Hate Crimes in Different Periods)		
Log (Number of BB Providers)	0.509	0.121
	(0.32)	(0.19)
Demographic Controls	✓	✓
Socioeconomic Controls	✓	✓
Crime-related Controls	✓	✓
Year Fixed Effects	✓	✓
County Fixed Effects	✓	✓
Observations	8200	6937
First stage F-statistics	10.702	33.267
Stock Yogo Critical Values	11.29	11.12
Root MSE	0.4155	0.4499

Notes: The dependent variable for Models 1 is the log count of the racial hate crimes one period before that of the regressors; that is, the log number of racial hate crimes in 1999 to 2007 is regressed on the log number of broadband providers and covariates in 2000 to 2008. The dependent variable in Model 2 is the log count of racial hate crimes in the pre-broadband period from 1992 to 1998 and the independent variable of interest is the log count of broadband providers from 2000 to 2006. All regressions include county and year dummies. Robust clustered standard errors, clustered on county, are in parentheses. Covariates used in these models are the same as those in Table 3; that is, demographic controls include population density, number of international migrations and proportion of American Africans; socioeconomic controls include number of people in poverty; crime-related controls include number of police employees and number of crimes at the county level. First stage coefficients are not shown here as they are qualitatively similar to those regressions in Table 3. *Significant at 10%; **Significant at 5%; ***Significant at 1%.

Table B9. Panel IV Regressions, Additional Covariates and Alternate Specifications

	Log Specification			Non-Log Specification		
	(1)	(2)	(3)	(4)	(5)	(6)
Second Stage DV: Racial Hate Crime						
BB Providers Measure	0.385*	0.336*	0.344	0.289**	0.241*	0.279*
	(0.22)	(0.20)	(0.22)	(0.14)	(0.14)	(0.16)
Log (Population Density)	0.061	0.056	0.053	0.238	0.124	0.188
	(0.04)	(0.04)	(0.04)	(0.24)	(0.24)	(0.25)
Log (Population Size)	0.241		0.145	-2.319		-3.026
	(0.30)		(0.31)	(2.10)		(2.14)
Log (Mean Age)	3.227***	3.089***	3.256***	13.592*	15.585*	12.759
	(0.94)	(0.99)	(0.96)	(7.73)	(8.72)	(8.27)
Log (Number of International Migrants)	0.007	0.008	0.007	-0.028	-0.030	-0.024
	(0.01)	(0.01)	(0.01)	(0.05)	(0.05)	(0.05)
Proportion of African Americans	-0.107	-1.820	-1.529	-1.061	24.934	22.836
	(1.78)	(3.67)	(3.59)	(27.68)	(19.38)	(18.80)
Proportion of Whites		-0.882	-0.646		29.422	28.525
		(3.59)	(3.55)		(29.77)	(29.74)
Proportion of Asians		6.658	6.422		71.667	77.925
		(5.30)	(5.50)		(49.11)	(49.39)
Log (Number of People in Poverty)	0.048	0.064	0.050	0.628	0.460	0.617
	(0.09)	(0.10)	(0.09)	(0.50)	(0.54)	(0.50)
Log (Median Household Income)	-0.244	-0.276	-0.300	-2.779*	-3.645***	-2.991*
	(0.22)	(0.20)	(0.22)	(1.53)	(1.40)	(1.54)
Employment Percentage	-0.688	-0.662	-0.686	-8.399	-8.599	-8.383
	(0.73)	(0.73)	(0.73)	(5.27)	(5.31)	(5.28)
Log (Number of Employees in Police Force)	0.021	0.025	0.021	0.101	0.034	0.110
	(0.04)	(0.04)	(0.04)	(0.36)	(0.36)	(0.36)
Log (Number of Crimes)	-0.013	-0.012	-0.012	-0.017	-0.019	-0.018
	(0.01)	(0.01)	(0.01)	(0.06)	(0.07)	(0.06)
Year Fixed Effects	✓	✓	✓	✓	✓	✓
County Fixed Effects	✓	✓	✓	✓	✓	✓
Observations	8200	8200	8200	8200	8200	8200
First stage F-statistics	20.799	23.928	20.502	39.324	39.082	33.098
Stock Yogo Critical Value	11.29	11.29	11.29	11.29	11.29	11.29
Hansen J Statistics	7.148	7.675	7.818	5.933	5.761	5.798
P-value of Hansen J Statistics	0.307	0.263	0.252	0.431	0.450	0.446
Root MSE	0.4198	0.4186	0.4187	2.775	2.771	2.773

Notes: All regressions are 2SLS IV regressions with year and county level fixed effects. Models 1–3 use log transformed racial hate crimes and broadband providers in the regressions, while Models 4–6 use non-logged racial hate crimes and broadband providers. Robust clustered standard errors are reported in parentheses. *Significant at 10%; **Significant at 5%; ***Significant at 1%.

Table B10. Cross Sectional IV Regression Estimates with Non-Time Varying Covariates

	Year 2001	Year 2002	Year 2003	Year 2004	Year 2005	Year 2006	Year 2007	Year 2008
Coefficients of BB Providers after Adding								
College Education Attainment	2.318*	2.432***	1.579***	1.212***	1.173**	0.976***	1.485***	1.008**
	(1.40)	(0.63)	(0.43)	(0.42)	(0.56)	(0.28)	(0.55)	(0.40)
Entropy	1.201	2.752***	1.546***	1.245***	1.190**	1.034***	1.632***	1.180***
	(2.42)	(0.91)	(0.48)	(0.41)	(0.57)	(0.29)	(0.60)	(0.41)
Racially Charged Search	0.900	2.425***	1.162**	0.895*	0.812	0.739**	1.144**	0.801*
	(2.19)	(0.91)	(0.47)	(0.49)	(0.60)	(0.30)	(0.55)	(0.45)
Road Density	0.602	3.169**	1.549***	0.978*	0.844	0.775**	1.140*	0.845**
	(8.00)	(1.49)	(0.60)	(0.51)	(0.69)	(0.32)	(0.63)	(0.42)

Notes: All coefficients reported here are for the log number of broadband providers. Each cell represents a unique regression coefficient for a specific year with an additional covariate added to the existing list of baseline covariates in Table 2. Robust clustered standard errors are reported in parentheses. *Significant at 10%; **Significant at 5%; ***Significant at 1%.

Table B11. Robustness Check with Outlier Removal

	Log Specification	Non-Log Specification
Second Stage DV: Racial Hate Crime	**(1)**	**(2)**
BB Providers Measure	0.846***	0.385**
	(0.31)	(0.16)
Demographic controls	✓	✓
Socioeconomic controls	✓	✓
Crime-related controls	✓	✓
Year Fixed Effects	✓	✓
County Fixed Effects	✓	✓
Observations	6150	6150
First stage F-statistics	16.827	48.244
Stock Yogo Critical Values	10.83	10.83
Hansen J Statistics	0.361	4.222
P-value of Hansen J Statistics	0.986	0.377
Root MSE	0.4205	2.546

Notes: All regressions are 2SLS IV regressions with year and county level fixed effects. Model 1 uses log transformed racial hate crimes and broadband providers in the regressions, while Models 2 uses non-logged racial hate crimes and broadband providers. Regression is based on observations from 2003 to 2008. Robust clustered standard errors are shown in parentheses. *Significant at 10%; **Significant at 5%; ***Significant at 1%.

Table B12. Reclassification Check and Effects on Alternative Crimes

Second Stage DV: Log (Number of Various Crimes)	Aggravated Assault (1)	Burglary (2)	Murder (3)	Robbery (4)	Simple Assault (5)
Log (Number of BB Providers)	0.250	-0.175	0.299	0.123	0.096
	(0.25)	(0.28)	(0.26)	(0.27)	(0.24)
Demographic Controls	✓	✓	✓	✓	✓
Socioeconomic Controls	✓	✓	✓	✓	✓
Crime-related Controls	✓	✓	✓	✓	✓
Year Fixed Effects	✓	✓	✓	✓	✓
County Fixed Effects	✓	✓	✓	✓	✓
Observations	8200	8200	8200	8200	8200
First stage F-statistics	25.687	25.687	25.687	25.687	25.687
Stock Yogo Critical Values	11.29	11.29	11.29	11.29	11.29
Hansen J Statistics	17.721	9.898	30.670	10.565	8.514
P-value of Hansen J Statistics	0.007	0.129	0.000	0.103	0.203
Root MSE	0.4215	0.4506	0.4616	0.4749	0.3689

Notes: The dependent variable for each column is the log count of the crimes stated at the top of each column. All regressions include county and year dummies. Robust clustered standard errors, clustered on county, are in parentheses. Regressors in the second stage are lagged by one period to avoid simultaneity biases. Covariates used in these models are the same as those in Table 3; that is, demographic controls include population density, mean age, number of international migrants, and proportion of American Africans; socioeconomic controls include number of people in poverty and employment percentage; crime-related controls include number of police employees and number of crimes at the county level. First stage coefficients are not shown here as they are similar to those regressions in Table 3. *Significant at 10%; **Significant at 5%; ***Significant at 1%.

Table B13. Impact on Lone Wolf and non-Lone Wolf Hate Crimes, Split by Racism Levels

	Single Perpetrator				Multiple Perpetrators			
	Low Entropy (1)	High Entropy (2)	Low Racially Charged Search (3)	High Racially Charged Search (4)	Low Entropy (5)	High Entropy (6)	Low Racially Charged Search (7)	High Racially Charged Search (8)
Second Stage DV: Log (Number of Racial hate crimes)								
Log (Number of BB Providers)	0.027	0.498***	-0.063	0.227**	0.078	0.004	-0.131	0.010
	(0.13)	(0.19)	(0.44)	(0.11)	(0.10)	(0.07)	(0.22)	(0.06)
Log (Population Density)	-0.018	0.015	-0.001	-0.011	0.020*	0.019	0.006	0.021
	(0.08)	(0.02)	(0.01)	(0.02)	(0.01)	(0.04)	(0.01)	(0.02)
Log (Mean Age)	1.992***	0.599	0.635	2.722***	0.272	-0.298	-0.453	-0.013
	(0.62)	(0.80)	(0.64)	(0.77)	(0.42)	(0.39)	(0.43)	(0.47)
Log (Number of International Migrants)	-0.001	-0.007	-0.002	-0.003	0.008	-0.003	-0.003	0.006
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)
Proportion of African Americans	1.161	1.256	1.171	1.207	-0.338	0.747	0.039	0.581
	(0.81)	(1.13)	(0.85)	(1.07)	(0.70)	(0.47)	(0.56)	(0.60)
Log (Number of People in Poverty)	0.054	-0.122	0.138	-0.090	0.021	0.063*	0.094	0.073**
	(0.07)	(0.09)	(0.18)	(0.07)	(0.05)	(0.04)	(0.09)	(0.04)
Employment Percentage	-1.397***	-0.809	0.128	-1.000*	0.481	0.313	0.862	0.291
	(0.53)	(0.68)	(1.21)	(0.52)	(0.42)	(0.32)	(0.72)	(0.28)
Log (Number of Employees in Police Force)	0.004	-0.016	-0.008	-0.001	-0.033**	0.046***	-0.001	0.007
	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)	(0.01)
Log (Number of Crimes)	0.006	0.000	0.002	0.008	0.002	-0.003	0.002	-0.008
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Observations	4144	4056	3952	4024	4144	4056	3952	4024
First Stage F-statistics	19.412	11.522	2.242	28.105	19.412	11.522	2.242	28.105
Stock Yogo Critical Value	11.29	11.29	11.29	11.29	11.29	11.29	11.29	11.29
Hansen J Statistics	1.271	3.848	8.049	4.009	4.547	8.931	8.164	6.554
P-value of Hansen J Statistics	0.973	0.697	0.235	0.675	0.603	0.177	0.226	0.364
Root MSE	0.2247	0.2461	0.2368	0.2266	0.1370	0.1413	0.150	0.1304

Notes: All models are 2SLS IV regressions. Models 1 to 4 examining the impact of broadband providers on the incidence of lone wolf racial hate crimes while Models 5 to 8 examine the impact of broadband providers on the incidence of racial hate crimes perpetrated by multiple individuals. Covariates used are similar to those in Table 3 in the main paper. *Significant at 10%; **Significant at 5%; ***Significant at 1%.

Table B14. Hate Groups and Hate Crimes

	County-Level			State-Level
	(1)	(2)	(3)	(4)
Second Stage DV: Log(Number of Racial Hate Crimes)				
Number of Hate Groups	-0.051	-0.047	-0.045	0.021
	(0.03)	(0.03)	(0.03)	(0.10)
Log (Population Density)	0.065	0.064	0.064	-8.508**
	(0.05)	(0.05)	(0.06)	(4.01)
Log (Mean Age)	0.595	2.520**	2.925**	25.796**
	(0.61)	(1.15)	(1.29)	(10.35)
Log (Number of International Migrants)	-0.009	0.007	0.008	-0.071***
	(0.01)	(0.01)	(0.01)	(0.03)
Proportion of African Americans	-1.665	-1.202	-1.429	-70.402***
	(1.89)	(1.90)	(2.20)	(17.41)
Log (Number of People in Poverty)	0.151**	0.269***	0.253***	1.125
	(0.07)	(0.08)	(0.08)	(0.82)
Employment Percentage	-0.512	-0.630	-0.622	9.108
	(0.64)	(0.78)	(0.86)	(5.50)
Log (Number of Employees in Police Force)	0.015	0.029	0.059	1.117
	(0.04)	(0.04)	(0.04)	(1.00)
Log (Number of Crimes)	-0.007	-0.008	-0.002	-0.438
	(0.01)	(0.01)	(0.01)	(0.65)
County Fixed Effects	✓	✓	✓	✓
Year Fixed Effects		✓	✓	✓
Industry Size Controls			✓	
Observations	7818	7818	7181	189
R-squared	0.005	0.008	0.009	0.222

Notes: All regressions are 2SLS IV regressions with year and location fixed effects. Models 1-3 is conducted at the county level using county level fixed effects, while Model 4 is conducted at the state level using state fixed effects. Robust clustered standard errors are shown in parentheses. *Significant at 10%; **Significant at 5%; ***Significant at 1%.

Appendix C

Description of the NCVS Dataset

The National Crime Victimization Survey (NCVS) is the largest ongoing survey of a nationally representative sample of residents conducted biannually to understand the characteristics of criminal victimization and incidence of non-reported crimes. We used the NCVS dataset to perform two checks: (1) whether crime reporting trends varies systematically pre- and post- broadband introduction periods and (2) the number of perpetrators involved in hate crimes from 2004 to 2008.

For the first check, we combine data from the NCVS and FCC to build a panel dataset that includes an indicator for whether or not the crime is reported, the number of broadband providers, and various demographic and crime-related covariates from 1985 to 2004. We converted the number of broadband providers to the MSA level in order to match the two data sets. In assessing whether broadband availability is systematically correlated with unobserved factors that shift crime reporting behaviors, we use logit models to predict the impact of broadband providers on the likelihood of crime reporting. If broadband availability is indeed correlated with such factors, the logit models will reveal a significant coefficient for the broadband providers. Since the FCC data is available from 1999 onward, we impute missing values for the number of providers using conservative approaches guided by existing literature on broadband growth. First, following Forman et al. (2012) and Gillett et al. (2006), who note that the growth of commercial Internet usage did not begin until 1995, we label the number of broadband providers to be zero for years 1995 and earlier, and then impute values for 1996–1998. Second, under a stricter model, the number of broadband providers is inputted as zero in 1990 and earlier, as the first commercial ISP only emerged in 1990. We then impute values for 1991–1998. Using this data, we run a set of logit models in which the indicator for whether or not the crime is reported is the dependent variable. The main independent variable is number of broadband providers. We include a full set of demographic and crime related factors, and use MSA and year-quarter dummies in these specifications. Table 5 shows the results of the regression analysis.

In 2004, the NCVS began surveying respondents on whether the experienced crime is driven by bias motivations (i.e., racial, sexual orientation, religious, ethnicity, and disability aspects of the respondent). The latest public NCVS dataset with this information does not yet contain fine-grained location data. Based on this dataset, we tabulate the proportion of hate crimes that are committed by one perpetrator and more than one perpetrator. Across all years, the proportion of hate crimes that is committed by one perpetrator is above 64 percent points, with the highest proportion recorded at 75 percent points.

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