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Zuzana Fromm¹

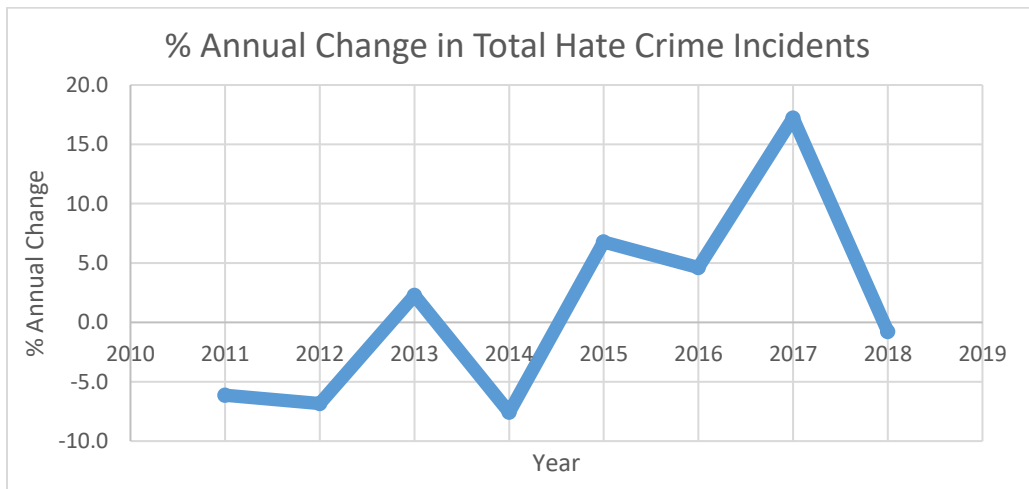
ABSTRACT

The purpose of this study was to test the impact of macroeconomic and demographic variables on hate crime activity in the US States between 2010 and 2017. The macroeconomic variables included personal income, unemployment rate, and poverty rate. The demographic variables were age, education and proportion of the population that is black. Rational choice theory was used to explain the relationships between the explanatory variables and hate crime rates in the US States. The study consisted of 49 States (excluding Hawaii) and District of Columbia. The total sample size consisted of 400 observations. Three models were employed and regression analysis was used to estimate the strength of each model's fit and the significance of all independent variables. The fixed effects model was the best fit of all three models, it explained 81.7% of the variance in hate crime rates. The general model for Democratic States explained 61.3% of the variance in hate crime rates and had the largest number of significant explanatory variables. The general model for Republic States had the worst fit of all three models, explaining 27.2% of the variance in hate crime rates.

INTRODUCTION

Research on macroeconomic variables and their impact on hate crime activity is limited. Understanding the impact of income, unemployment, and poverty levels, on hate crime activity may aid the design of policies intended to reduce such criminal activity. In the current study, panel data for US States from 2010 to 2017 was used to evaluate the impact of socioeconomic variables on hate crime activity. Although the study allows an examination of relationships between economic and demographic variables at the State level and hate crime occurrence, the model cannot be generalized to a specific individual. The current study uses rational choice theory in an attempt to fill gaps in understanding the best fit model as well as the strength of relationships between socioeconomic variables and hate crime activity across a longer period of time than existing research.

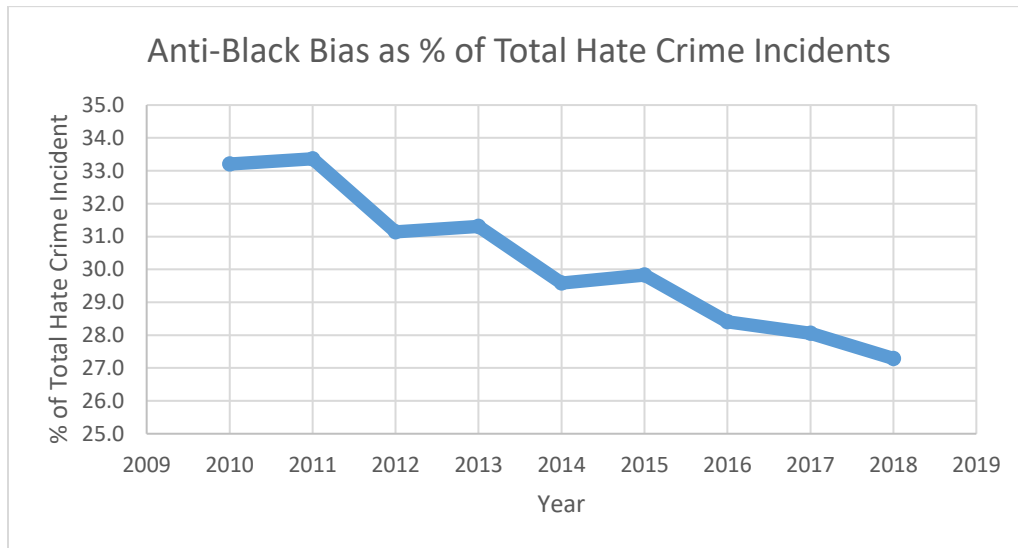
Figure 1



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Figure 1 above shows the annual percentage change in total hate crime incidents in the US. With respect to the time frame of this study, 2010 – 2017, there is an upward trend in hate crime rates. Figure 2 below shows that Anti-Black bias as a motive for hate crime has been declining over the period of this study. It is worth while noting that Anti-Black bias as a motive for crime accounts for 27% to approximately 33% percent of total hate crime incidents. Anti-Black bias accounts for the largest portion of all hate crime incidents.

Figure 2



THEORETICAL BACKGROUND

The little research that is available is based on two different theoretical approaches. One approach is based on Becker’s (1968) “altruistic” behavior definition, or the opposite “envious” behavior, where an individual is motivated to commit a hate crime by the desire to make the other person worse off. For example, a criminal will reduce his or her own consumption of all goods and services or spend more resources (such as income) in order to reduce a victim’s consumption of all goods and services or increase a victim’s spending on resources (such as income) even more than a criminal.

The second approach, rational choice theory, is often used to explain situational crime where a criminal weighs the potential benefits and costs of committing a crime. A criminal prefers crimes that have the lowest perceived cost, those crimes that are least likely to be detected thereby reducing the likelihood of incarceration, and the highest potential reward. In the context of hate crime a reward is based on the criminal’s perception of how much they can make their victim worse off, or how much a criminal can reduce the victim’s consumption of all goods and services. A criminal that behaves rationally will increase his or her criminal activity when their perception of costs (detection, sentencing, incarceration) decrease and/or their perception of rewards increase.

Sociological or psychological theories explain the source of criminals’ preferences, but both Becker’s and rational choice theory explain how criminals’ preferences affect their choices (McCarthy and Chaudhary,

2014)². The current study attempts to apply rational choice theory to explain the impact of economic and demographic variables on hate crime.

In the current study, consumption of hate crime activity is treated similarly to the consumption of any good or service. An increase in hate crime activity (consumption of hate crime), without a change to the cost of hate crime activity (stricter sentencing and incarceration), will increase a criminal's utility or well being as measured by the rewards discussed above. This is similar to a consumer who will be happier to consume more restaurant meals without spending more of their income on those meals. The price of a good in economic theory is relative, it is based on the cost of the good or service in question relative to the price of other goods and services. For example, a consumer will consume more restaurant meals if the price of those meals has decreased relative to the price of eating at home. Finally, the decision to participate in a particular activity, such as going to a restaurant, carries an additional cost over and above the price of the meal itself. For example, the cost of spending a few hours in a restaurant is what else a person could have been doing with their time, such as studying for an exam. Another example frequently used, the opportunity cost of going to school includes not only the cost of tuition and books but also the income one could have been earning had they been working.

In the context of hate crime, a criminal's opportunity cost of time (as measured by foregone income) plus the perceived cost of committing a hate crime (detection, sentencing, incarceration) is the ultimate price of hate crime activity (or hate crime consumption). Hence, a decrease in the opportunity cost of time (decrease in income) or a decrease in perceived costs (harsher sentencing) is negatively related to hate crime activity. Just like a decrease in the price of restaurant meals will increase the quantity of restaurant meals consumed, a decrease in the price of committing a hate crime will increase the quantity of hate crime committed. With respect to the positive relationship between opportunity cost of time and income, it is expected that individuals with an income level below a poverty line and those that are unemployed will be more likely to commit hate crime activity, as compared to those living with an income above the poverty line and/or are employed.

It is hypothesized that differences in regional price parity indices between States will have a positive relationship with hate crime rates. As mentioned above, price of goods in economics is measured in relative terms. Thus, an increase in a regional price parity index makes the price of hate crime relatively less expensive and one should observe an increase in hate crime consumption. No research has been found on this relationship.

Other factors that change the opportunity cost of time are age, education and search time for potential victims. The opportunity cost of time is not constant over time because a person's income changes over their lifetime. A younger person will have less education, less skills, less experience, and less training than their older counterpart. As a result a younger person will have a lower income, and lower opportunity cost of time, than an older person. Since opportunity cost of time, or income, is positively related to age, a younger person is expected to consume more hate crime activity, than their older counterpart. Similarly, income and education level is positively related, a person's income increases with higher education levels as compared to someone with less education. Thus, opportunity cost of time (as measured by income) rises with education level and is expected to have a negative impact on hate crime

² McCarthy, Bill and Ali R. Chaudhary. Rational Choice Theory and Crime. Published as Chapter in Brunisma, D and D. Wisburd (Eds) 2014. Encyclopedia of Crime and Criminal Justice. Springer.

activity. Further, a search for potential victims takes time and that time carries a cost, foregone income. In the case of racial hate crime activity, a location with a high proportion of black population will have lower search time cost for potential victims, than a location with a low proportion of black population. It is expected that proportion of black population is positively related to hate crime activity because of lower opportunity cost of search time for potential victims, as compared to the cost of search time in a location with a lower proportion of black population.

Finally, individual tastes and preferences towards crime and punishment are influenced by his or her surroundings. A person's surrounding may be shaped by ones home life, school life, or the ideology (attitudes) of their parents or governments in a particular location. In an attempt to capture the influence of ideology at a macro level voting behavior, Democratic or Republican, is considered. For example, Bill de Blasio the elected mayor of New York in 2013, a Democratic State, campaigned on a promise to end stop-and-frisk.³ In California, a Democratic State, voters approved sentencing changes from felony to misdemeanor for non-violent crimes.⁴ Also, in California a law was passed in 2017 that "reduced penalties for knowingly exposing a sexual partner to HIV from felony to a misdemeanor".⁵ In Washington, a Democratic State, a similar bill was proposed in 2019.⁶ All States that legalized the recreational use of Cannabis were Democratic, except Alaska.⁷ These few examples are used to make a generalization about Democratic States, in that they tend to be more lenient towards crime than their Republican counterparts. Ideology fits into rational crime theory through its impact on a criminal's perceived cost (detection, sentencing, incarceration) of crime activity. Namely, a criminal in a Democratic State faces different costs of crime than a criminal in a Republican State.

LITERATURE REVIEW

Research on the relationship between economic variables and hate crime is mixed. Medoff (1999) used the rational choice model to define how certain economic factors influence hate crime rates in a cross-section analysis of US States in 1995. Lower wage rate, higher unemployment rate and Democratic ideology (more liberal) had a positive and significant influence on hate crime rates. Whereas Gale, Heath, and Ressler (2002) used Becker's "envious" behavior as a motivator to participate in hate crime activity. They found a positive significant relationship between income levels and hate crime rates in their panel study of US States in 1992 and 1995. In their study the authors suggested that higher income States may have a greater unequal income distribution between the poor and the affluent which would increase hate crime activity amongst the relatively less wealthy. Gale, Heath and Ressler (2002) did not provide a threshold beyond which a State is considered a higher income State.

Medoff (1999), Gale, Heath and Ressler (2002) both found positive relationships between unemployment and hate crime rates. Similar results were found by Ryan and Leeson (2011) in their study on hate groups and hate crime for the US States between 2002 and 2008. Further, Anderson,

³ Cullen, James. Ending New York's Stop-and-and Frisk Did Not Increase Crime. Brennan Centre for Justice, April 11, 2016.

⁴ Smith, Dan. Voters approve sentencing changes in Prop. 47. The Sacramento Bee. November 4, 2014.

⁵ La Corte, Rachel, From felony to misdemeanor: Bill would ease penalty in Washington for exposing a partner to HIV. The Associated Press: The Seattle Times, February 22, 2020.

⁶ La Corte, Rachel (2020)

⁷ DISA Global Solutions. Map of Marijuana Legality by State, January 2020.

Crost, and Rees (2018) in their difference in difference analysis on economic downturns and racial animus showed that States with the highest increases in racist internet search “n-word” and hate crimes against blacks were States with higher than average increases in unemployment rates and GDP between 2009 and 2012.

Although most research supports a positive relationship between unemployment and hate crime activity, there is some research that suggests that unemployment does not have an impact, or that it may even have a negative impact, on hate crime rates. Krueger and Pischke (1997), in their pooled data for the West and East German regions from 1991 to 1992, found that the unemployment rate had no impact on racially motivated serious (murder and arson) crime against foreigners. What was interesting in this study was that once Krueger and Pischke (1997) separated the population of the East from the West, and ran separate regressions, the unemployment rate was significant but negatively related to hate crime rate.

With respect to age, Medoff (1999) found a positive and significant relationship between the proportion of the population that was 15-19 years old and hate crime rates. Consistent with rational choice theory, individuals with lower value of time results in a higher incidence of hate crime. The authors did not include the proportion of population 20-24 years old to test whether there is a significant difference between these two cohorts.

Individual predisposition to liberalism in terms of attitudes towards crime and punishment has an impact on individual tastes for hate crime activity across States. Medoff (1999) in his study showed a positive and significant relationship between a liberal ideology (from 0 = extremely conservative to 100 = extremely liberal) and hate crime activity. According to Medoff (1999) ideology shapes ones attitudes and acceptable behavior, liberal views are associated with more leniency towards hate crime, thus a positive relationship with hate crime activity. The authors also suggest that liberal States have a lower search cost for identifying potential victims thereby producing higher rates of hate crime, than less Liberal States.

Medoff (1997) found a positive significant relationship between education (25 years and older with at least high school diploma) and hate crime activity. Contrary to rational choice theory, an educated population may have a positive impact on hate crime because it is associated with tolerant attitudes. Alden and Parker’s (2004) findings are also inconsistent with rational choice theory for those with high school and college education. In their research on gay and lesbian hate crime victimization, those with high school education had a lower impact on hate crime, than those with college education.

The research results on the relationship between poverty levels and hate crime were also mixed. Gale, Heath, and Ressler (2002) found a positive, but insignificant, relationship between poverty rates and hate crime rates. Whereas, Alden and Parker (2004) in their research on gay and lesbian hate crime victimization found a negative and significant relationship between poverty and hate crime rates. Further, Ryan and Leeson (2011) in their study found a negative but insignificant relationship between poverty and hate crime rates.

Finally, Ryan and Leeson (2011) in their study of hate groups and hate crime found a significant negative relationship between proportions of black population in a State and hate crime. The significance was present when fixed effects for State heterogeneity were excluded. The authors did not specify a directional relationship in their hypothesis, for proportion of black population and hate crime. The

uncertainty was explained by indicating that hate crime against black minority is determined by the dominance of their presence but potential black victims in large numbers may be insulated from hate crime.

HATE CRIME MODEL⁸

Table 1 provides definition of the variables used in the study. In order to estimate the determinants of hate crime occurrence, the following regression equation was used:

$$\text{Hate Crime Rate}_{it} = \beta_0 + \beta_1 \text{Log Personal Income}_{it} + \beta_2 \text{Unemployment Rate}_{it} + \beta_3 \text{Poverty Rate}_{it} + \beta_4 \text{Pop 15-19}_{it} + \beta_5 \text{Pop 20-24}_{it} + \beta_6 \text{Education}_{it} + \beta_7 \text{Pop Black}_{it} + \beta_8 \text{RPP}_{it} + \epsilon_t$$

Table 1

Definition of Variables	
Variable	Definition
Hate Crime Rate _{it}	State <i>i</i> incidents in which one or more offense types are motivated by the same bias per 100,000 population in time <i>t</i>
Log Personal Income _{it}	State <i>i</i> log of real personal income per capita income in 2012 dollars in time <i>t</i>
Unemployment Rate _{it}	State <i>i</i> unemployment rate for population 16 years and older in time <i>t</i>
Poverty Rate _{it}	State <i>i</i> percentage of population below poverty income line in time <i>t</i>
Pop 15-19 _{it}	State <i>i</i> percentage of population ages 15-19 in time <i>t</i>
Pop 20-24 _{it}	State <i>i</i> percentage of population age 20-24 in time <i>t</i>
Education _{it}	State <i>i</i> percentage of population age 25 or older with at least a high school diploma in time <i>t</i>
Pop Black _{it}	State <i>i</i> percentage of black population in time <i>t</i>
RPP _{it}	State <i>i</i> Regional Price Parity, US = 100, in time <i>t</i>
<i>i</i>	49 US States plus the District of Columbia, referred to as States (Hawaii did not participate in the UCR program)
<i>t</i>	Years 2010 - 2017

Based on current research and rational choice theory, it is hypothesised that personal income, population 20-24, and education will have a negative relationship with hate crime rates. Unemployment rate, poverty rate, population 15-19, and regional price parities will all have a positive relationship with hate crime rates.

DATA

Federal Bureau of Investigation's (FBI) Uniform Crime Reporting (UCR) Program was used to collect data on the number of incidents per bias motivation on reported hate crimes between 2010 and 2017. FBI defines hate crime as a committed criminal offense motivated, in whole or in part, by an offender's perceived bias or biases against race, religion, disability, sexual orientation, ethnicity, gender, or gender identity.

There are two methods that law enforcement enters data, the Summary Reporting System (SRS) and National Incident-Based Reporting (NIBRS). Participation in UCR program is mandatory for federal law enforcement agencies, but is voluntary for local, State and tribal law enforcement agencies. Hate crime

⁸ Please refer to Appendix for SPSS output.

data of all States plus the District of Columbia, with the exception of Hawaii which did not participate in the program, was used in the study.

With respect to the time period of analysis, 2010-2012, SRS collected data on 11 hate crime offenses (those against a race, religion, sexual orientation, ethnicity/national origin, or disability and those committed against persons, property, or society) whereas NIBRS' additional data collected on hate crime offenses appears under the Other category of UCR's hate crime statistics.

From 2013 SRS collected data on 13 committed hate crime offenses due to a reclassification of offender's bias against a race, gender, gender identity, religion, disability, sexual orientation, or ethnicity, including those that were committed against persons, property, or society. The new data allows the collection hate crimes committed by and against juveniles, including up to five motivation biases (as compared to one) per offense type, as well as those crimes motivated by gender and gender identity bias.

Finally, in 2015 an additional bias motivation against anti-Arab was included and in 2016 a revision of the definition of rape was applied. Given these numerous changes in the collection of committed hate crime offenses in the current study, the data collected by various law enforcement agencies may show inconsistencies and inaccurate depiction of the overall hate crime activity taking place. Further, law enforcement agencies who do not voluntarily provide statistics will underestimate the overall hate crime activity.

Midyear population estimates as collected by the United States Census Bureau were used in the study. The State population estimates included data for the number of State population that is black, the number of State population that is 15-19 years old and 20-24 years old, the percentage of State population that is 25 years and older with a high school diploma or higher, and percentage of State population that is below the poverty income line.

Personal income as collected by The Department of Commerce, Bureau of Economic Analysis in the Regional Economic Accounts, was included in the study. State real personal income in chained 2012 dollars divided by State midyear population was used to calculate State real personal income per capita.

U.S. Bureau of Labor Statistics collects data on unemployment rates. The State unemployment rate included the State total number of persons 16 years and older who were unemployed as a percentage of the State civilian labour force. Regional price parities as collected by Bureau of Economic Analysis were used in the study. The State regional price parity indices for each State as indexed to US where US = 100 were included.

IDEOLOGY SPECIFICATION IN THE HATE CRIME MODEL

The results of Presidential voting elections, in terms of majority voting Republican or Democratic in each State, were used to capture ideology. Data was based on information collected by Electoral Ventures LLC that operates 270towin.com. Since the data of the study is from 2010 to 2017, ideology was assigned as follows. The 2008 election results were used to assign ideology in years 2010-2011. The 2012 election results were used to assign ideology in years 2012-2015. The 2016 election results were used to assign ideology in years 2016-2017. Some States, Florida, Indiana, Iowa, Michigan, North Carolina, Ohio,

Pennsylvania, and Wisconsin, all had two years where their voting changed from predominantly Democratic to predominantly Republican, or vice versa. These States did not have 8 years of constant ideology. Florida, Iowa, Michigan, Ohio, Pennsylvania and Wisconsin changed their predominantly Democratic ideology to Republican in the 2016 presidential election. Indiana and North Carolina changed their predominantly Democratic ideology to Republican in the 2012 election. Table 2 below shows how each State was coded based on the aforementioned ideology.

Table 2

Ideology	State	Year							
		2010	2011	2012	2013	2014	2015	2016	2017
Democratic	Florida	[Blue bar]							
Republican	Florida	[Red bar]							
Democratic	Indiana	[Blue bar]							
Republican	Indiana	[Red bar]							
Democratic	Iowa	[Blue bar]							
Republican	Iowa	[Red bar]							
Democratic	Michigan	[Blue bar]							
Republican	Michigan	[Red bar]							
Democratic	North Carolina	[Blue bar]							
Republican	North Carolina	[Red bar]							
Democratic	Ohio	[Blue bar]							
Republican	Ohio	[Red bar]							
Democratic	Pennsylvania	[Blue bar]							
Republican	Pennsylvania	[Red bar]							
Democratic	Wisconsin	[Blue bar]							
Republican	Wisconsin	[Red bar]							
Split	Democratic States	8	8	6	6	6	6		
Split	Republican States			2	2	2	2	8	8
Democratic	California, Colorado, Connecticut, Delaware, District of Columbia, Illinois, Maine, Maryland, Massachusetts, Minnesota, Nevada, New Hampshire, New Jersey, New Mexico, New York, Oregon, Rhode Island, Vermont, Virginia, Washington	20	20	20	20	20	20	20	20
Democratic	Total Number of States	28	28	26	26	26	26	20	20
Republican	Alabama, Alaska, Arizona, Arkansas, Georgia, Idaho, Kansas, Kentucky, Louisiana, Mississippi, Missouri, Montana, Nebraska, North Dakota, Oklahoma, South Carolina, South Dakota, Tennessee, Texas, Utah, West Virginia, and Wyoming	22	22	22	22	22	22	22	22
Republican	Total Number of States	22	22	24	24	24	24	30	30

Prior to analysis a homogeneity test of hate crime rates between the two ideologies was conducted. Levene's Test for equality of variance, $F(1,398) = 10.299$, $p = 0.001$ and Independent t-test for equality

of means, $t(290,509) = 4.031$, $p = 0.000$, were both significant at the 1% level. The States with different ideologies are in fact two independent samples, with different variances and means.⁹

As a result of the homogeneity test, in order to estimate the determinants of hate crime rates using panel data across States and time, three models were adopted. In the first model, a regression was conducted based on fixed effects. In order to test the determinants of hate crime using a fixed effects model the following equation of hate crime occurrence was adopted:

$$\text{Hate Crime Rate}_{it} = \beta_0 + \beta_1 \text{Log Personal Income}_{it} + \beta_2 \text{Unemployment Rate}_{it} + \beta_3 \text{Poverty Rate}_{it} + \beta_4 \text{Pop 15-19}_{it} + \beta_5 \text{Pop 20-24}_{it} + \beta_6 \text{Education}_{it} + \beta_7 \text{Pop Black}_{it} + \beta_8 \text{RPP}_{it} + F_i + \varepsilon_t$$

The new term F_i captures individual State fixed effect. In the current study, States with Democratic views may be more liberal and this has an impact on those States' hate crime rates. F_i will control for the ideology of each State.

In the other two models, the original regression equation was used but it separated the sample groups based on ideology. One sample contained States for those years in which they had Democratic ideology (N = 200) and the other sample contained States for those years in which they had Republican ideology (N = 200). The following regression equation was adopted:

$$\text{Hate Crime Rate}_{it} = \beta_0 + \beta_1 \text{Log Personal Income}_{it} + \beta_2 \text{Unemployment Rate}_{it} + \beta_3 \text{Poverty Rate}_{it} + \beta_4 \text{Pop 15-19}_{it} + \beta_5 \text{Pop 20-24}_{it} + \beta_6 \text{Education}_{it} + \beta_7 \text{Pop Black}_{it} + \beta_8 \text{RPP}_{it} + \varepsilon_t$$

Table 3 shows the descriptive statistics for three different model specifications. All States (50) in the study, and all States that primarily voted Democratic as compared to all States that primarily voted Republican during election years 2008, 2012 and 2016.

Table 3

Descriptive Statistics						
	All States		Democratic		Republican	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
Hate Crime Rate	2.2167	2.36477	2.6844	2.94325	1.7490	1.45255
Log Personal Income	4.6617	0.05202	4.6721	0.05045	4.6513	0.05161
Unemployment Rate	6.4218	2.16877	6.8325	2.24222	6.0110	2.01596
Poverty Rate	13.6023	3.42667	12.5810	3.09109	14.6235	3.44847
Pop 15-19	6.6963	0.39343	6.6458	0.40203	6.7468	0.37895
Pop 20-24	7.1221	0.57541	6.9839	0.58086	7.2603	0.53671
Education	88.2808	3.11501	88.7970	2.68975	87.7645	3.41831
Pop Black	11.3996	10.82259	11.0515	10.50150	11.7476	11.14991
RPP	97.1105	8.03172	102.3585	7.47872	91.8625	4.24856
Observations (N)	400		200		200	

⁹ District of Columbia (DC) was found to have z scores above the +/- 3 range. Using a mean average for those variables shown to have high z-scores did not improve the quality of the data. Removing all 8 observations for DC created other abnormalities within the data.

RESULTS

Table 4 shows the regression estimation results from three models specified in the study. The Fixed Effects model had a significant $R^2 = .817$ where $F(57,342) = 26.808$, $p < 0.01$. 81.7% of the variance in hate crime rates per 100,000 State population was explained by the independent variables. The second model included only those States whose residents voted primarily Democratic. The model has a significant but lower R^2 than the Fixed Effects model, $R^2 = .613$ with $F(8, 191) = 37.854$, $p < .01$. For the Democratic States, 61.3% of the variance in hate crime rates per 100,000 of State population was explained by the independent variables. The third model included only those States whose residents voted primarily Republican. The R^2 was the lowest of all three models, $R^2 = .272$ with $F(8, 191) = 8.927$, $p < .01$. For the Republican States, only 27.2% of the variance in hate crime rates per 100,000 of State population was explained by the independent variables.

The Fixed Effects model, which took account of the heterogeneity across 50 States in the study over 7 years, had the best fit amongst the three models. The second model was a better fit for the Democratic States as compared to the Republican States.

Table 4

Estimation Results on Determinants of Hate Crime per 100,000 (2010-2017)¹						
	All States Fixed Effects		Democratic States		Republican States	
	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error
Constant	-92.792*	35.500 (0.009)	-160.561*	20.543 (0.000)	37.568*	13.804 (0.007)
Log Personal Income (-)	16.144*	6.125 (0.009)	23.126*	4.647 (0.000)	-6.748**	2.697 (0.013)
Unemployment Rate (+)	0.203**	0.088 (0.022)	0.473*	0.091 (0.000)	0.009	0.068 (0.901)
Poverty Rate (+)	-0.084***	0.047 (0.076)	0.357*	0.082 (0.000)	0.036	0.051 (0.485)
Pop 15-19 (+)	-0.077	0.497 (0.876)	-2.015*	0.483 (0.000)	-0.585***	0.299 (0.052)
Pop 20-24 (-)	-0.189	0.312 (0.545)	0.843**	0.329 (0.011)	0.736*	0.201 (0.000)
Education (-)	0.065	0.135 (0.629)	0.492*	0.080 (0.000)	0.033	0.055 (0.551)
Pop Black (+)	-1.372*	0.201 (0.000)	-0.016	0.018 (0.400)	-0.068*	0.011 (0.000)
RPP (+)	0.142	0.097 (0.146)	0.112*	0.026 (0.000)	-0.092*	0.025 (0.000)
R^2	.817*		.613*		.272*	
F statistic	F(57,342) = 26.809 (0.000)		F(8,191) = 37.854 (0.000)		F(8,191) = 8.927 (0.000)	
Observations	400		200		200	

¹p-value ()

*Significant at 1 percent

**Significant at 5 percent

***Significant at 10 percent

FIXED EFFECTS MODEL RESULTS

Table 4 shows the estimated unstandardized coefficients for the independent variables. The direction and power of the estimates differ between the three models used in the study. The Fixed Effects model, although highest explanatory power, had the least number (3) of significant coefficients of all three models. Log Personal Income, Unemployment Rate and Pop Black coefficients were all significant at the 5% level.

Personal Income was found to be positively related to hate crime rate, contrary to what was hypothesized. The results showed that a one percent increase in personal income will increase hate crime rate by .16 per 100, 000 of State population. Based on rational choice theory, it was expected that an increase in personal income would have a negative impact on hate crime rates since the opportunity cost of committing the offense increases with higher income. The result may be reflecting the fact that higher income States, as compared to lower income States, have a bigger income distribution gap between low and high income. A relatively larger income distribution gap in States with higher income, as compared to States with lower income, may account for the positive relationship between personal income and hate crime rates.

Unemployment Rate was found to be positively related to hate crime rate, as hypothesized. This result is consistent with other studies. Unemployed persons have a lower opportunity cost of committing a hate crime and thus a higher incidence of hate crime, than those that are employed.

In the Fixed Effects model, Pop Black, the proportion of state population that is black, was found to be negatively related to hate crime rate, opposite of what was expected. The results show that a one percent increase in state population that is black will increase hate crime rate per 100,000 of State population by 1.372. It was hypothesized that an increase in the proportion of the population that is black, the lower the search cost for those committing hate crime offenses because their targets are available in large numbers. Instead, the results may be showing that a threshold may exist, in terms of the proportion of the population that is black, beyond which the number of blacks is so large that they are not targeted. There is simply too many of them to be a targeted minority in hate crime.

The estimated coefficients for Poverty Rate, Pop 15-19, and Education have opposite signs compared to what was hypothesized, and they are all insignificant at the 5% level. An interpretation of the signs of the coefficients still warrants an explanation. Those who are poor, young, and less educated are expected to have lower income, and based on rational choice theory would have a lower opportunity cost of committing a hate crime. The negative coefficients for Poverty and Pop 15-19, although insignificant, may reflect that people below the poverty line and 15-19 year olds are less likely to participate in hate crime activity and more likely to participate in a different type of crime, such as property crime or theft. These types of crimes were not captured in this study.

The proportion of the population that is 25 years and older with at least a high school education was expected to have a negative impact on hate crime rates, but it was shown to have an insignificant positive impact. The estimated positive coefficient may reflect that educated individuals may have a liberal view that is lenient towards crime. Increased leniency, in terms of smaller punishment for crimes

as compared to conservative views, lowers the cost of committing any crime. In that case a positive relationship between education and hate crime would be consistent with rational choice theory.

Finally, in the Fixed Effects model, the coefficients for Pop 20-24 and RPP were all found to have signs as hypothesized, negative and positive respectively, but both were found to be insignificant. The study was not able to show that younger individuals, Pop 15-19, as compared to older individuals, Pop 20-24, have a different impact on hate crime based on their expected level of income. Also, the Fixed Effect model was unable to show that regional price parity between a State and US price averages has a significant positive impact on hate crime rates. Regional price parity reflects ones affordability, which in the Fixed Effect model had the correct positive sign but was not found to have a significant impact on hate crime.

DEMOCRATIC STATES MODEL RESULTS:

Table 4 shows the results for the estimated regression for Democratic States. The Democratic States model had the second best fit and the largest number of significant coefficients among the three models. All coefficients for the explanatory variables were significant at the 1% level, except the Pop 20-24 coefficient that was significant at the 5% level and Pop Black coefficient that was insignificant.

Log Personal Income was found to be positively related to hate crime rate, again opposite of what was hypothesized. The results show that a one percent increase in personal income will increase personal hate crime rate by .23 per 100, 000 of State population. As in the Fixed Effects model, the result may reflect that higher Democratic income States, as compared to lower Democratic income States, have a larger income distribution gap that may account for the positive relationship between personal income and hate crime rates. This is consistent with rational choice theory, as are the positive relationships between Unemployment Rate, Poverty Rate, and RPP, and hate crime rates. As expected an increase in unemployment rate and the percentage of population living in poverty, and a decrease in affordability (as measured by increase in RPP) will increase hate crime rates. Within the Democratic State sample, socioeconomic variables had significant impact on hate crime that was consistent with rational choice theory.

In the Democratic State model, Pop Black, the proportion of state population that is black, was found to be negatively related to hate crime rate, opposite of what was expected but the estimated coefficient was insignificant. As with the Fixed Effects model, the results may show that the proportion of the black population in Democratic States is large enough that it has passed some threshold where blacks are not likely to be targeted as a minority group.

The estimated coefficients for Pop 15-19, Pop 20-24 and Education were all significant but they all had opposite signs of what was expected. The study was not able to show that younger individuals, Pop 15-19, as compared to older individuals, Pop 20-24, have a positive impact on hate crime because of lower income as is consistent with rational choice theory. Again, it may be the case that younger individuals have a higher incidence of crime, as compared to their older counterparts, but it is in a different type of crime which is not captured in this model.

Finally, the study showed that the proportion of the State population that is 20-24 years old and those who are 25 years old with at least a high school education have a positive impact on hate crime. This result, as in the Fixed Effects model, may reflect a more ingrained liberal ideology due to age and

education that tends to be more lenient towards crime. These results are consistent with rational choice theory, if the cost of crime is lower in Democratic States as compared to Republican States, such as being charged with a misdemeanor vs felony, then one would expect to see a stronger impact from Pop 20-24 and Education on hate crime rates in Democratic States than in Republican States. This in fact is what the results in Table 4 show, the coefficients for the Pop 20-24 and Education are stronger and more significant in the Democratic States model than those found in the Republican States model.

REPUBLICAN STATES MODEL RESULTS

Table 4 shows the results from the estimated regression of the Republican States model. The Republican States model had the worst fit of all three models, with (4) significant coefficients for the explanatory variables. The coefficients for Log Personal Income, Pop 20-24, Pop Black, and RPP were all significant at the 1% level, except Log Personal Income which was significant at the 5% level.

The coefficients for Personal Income and RPP were both found to be negative which was different from the results for the Fixed Effects and Democratic States models. In this case, as was hypothesized, a one percent increase in personal income leads to a .067 decrease in hate crime rate per 100,000 of State population. This result is consistent with rational choice theory in that higher income increases the opportunity cost of time and leads to a decrease in hate crime.

The estimated coefficient for RPP in the Republican States model was not only different from the other two models but the result is also inconsistent with rational choice theory. It was expected that an increase in regional price parity would increase hate crime because RPP is treated as a proxy for affordability. Republican States model predicts that a decrease in affordability (increase in RPP) will reduce hate crime. Table 3, Descriptive Statistics, shows that the mean and standard deviation of RPP for Republican States is 91.863 and 4.249, which is lower than that found for the Democratic States, 102.359 and 7.479 respectively, and Fixed Effects model, 97.111 and 8.032 respectively. The negative coefficient for RPP in the Republican States model may be measuring the impact of something different than affordability.

The estimated coefficient for Pop 20-24 was found to be positive, contrary to expectations but similar to what was found in the Democratic States model. The estimated coefficient for Pop Black was found to be negative, also contrary to expectations but similar to the Fixed Effects model.

CONCLUSION

The hate crime model is a very good fit for All States with Fixed Effects and the Democratic States, where the independent variables in the latter has the strongest individual explanatory power. Economic variables, such as personal income and unemployment rates, are strong predictors of hate crime rates. Whereas, ideology may be a strong influential factor on demographic variables that impact hate crime rates.

When using panel data for empirical models of hate crime, the role of ideology needs to be measured and incorporated. The impact of relative income distribution gaps found in each State may be a superior measure for the impact of income on hate crime. Future research should also consider measuring

thresholds for the proportion of the population that is black beyond which such demographic variable has no impact on hate crime.

With respect to the relationship between income and age, a 30-34 age cohort may better reflect the increase in income over one's lifetime, as compared to a 20-24 age cohort used in the study. A stronger positive relationship between age and income may be reflected by a stronger relationship between income and hate crime activity.

A policy design with the objective to reduce hate crime activity via traditional means requires further thought. Traditional means of reducing "crime" refers to measures that increase the cost of committing a "crime" through an increase in the use of detection methods (CPTED)¹⁰, stricter sentencing, or longer incarceration. Based on the current study, a criminal's opportunity cost of time, as measured by foregone income or perhaps perceived income distribution gaps, and differences regional price parities also impact the decision to commit a crime. Hence, these economic variables need to be taken into account when designing hate crime reduction policies.

Further, in the current study it was apparent that one's ideology may have influence on certain demographic factors that are also linked to one's opportunity cost of time. With respect to rational choice theory, age and education is positively related to income and one would expect these explanatory variables to have a negative impact on hate crime. The current study found some evidence that these variables are in fact positively related to hate crime which suggest that a different factor other than income, such as ideology, may have an impact on a criminal's decision to commit a hate crime. A criminal's perception of his or her environment that tends to be lenient towards crime and punishment will reduce the perceived costs that the criminal associates with committing a crime. A policy designed to change those perceptions may, in theory, change hate crime activity.

Finally, perception of rewards from hate crime activity is different from property crime. With respect to hate crime, rewards are based on how much a criminal can make their victim worse off by reducing the victim's consumption of all goods. With respect to property crime, rewards are based on how much a criminal can increase his or her own consumption of goods. As a result the use of traditional policy design to reduce hate crime may be less effective when it does not differentiate between a criminal's perceptions of rewards from hate crime as compared to a criminal's perception of rewards from property crime.

¹⁰ CPTED refers to crime prevention through environmental design.

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