Did the 2011 Police Budget Cuts Have a Significant Impact on Violent Crime Rates in New Jersey Urban Centers?

David Summerton

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Executive Summary. In 2010, New Jersey faced a significant budget crisis. To lessen the deficit faced by the state, Governor Chris Christie outlined a plan for widespread budget cuts including law and public safety. This analysis considers the changes to police forces made in New Jersey's "Urban Fifteen" cities as classified by the New Jersey State Police. Four of the fifteen cities – Camden, Newark, Paterson, and Trenton – had substantial cuts made to their police force in 2011 (more than 15% of officers were laid off from the previous year). Determining whether these substantial budget cuts caused a significant increase in crime is the goal of this study. Evidence from this analysis suggests that reductions in police force size of 15 percent or more resulted in an increase of more than 100 crimes per 100,000 people from 2010 to 2011**.** With that in mind, cities should be observed on a case-by-case basis. Urban centers should be monitored closely for unwanted changes in crime rates. This will allow city governments to make adjustments in policing strategy or resources.

Introduction

In 2010, Governor Chris Christie revealed his plan to fix New Jersey's economy – one that faced a budget deficit of more than ten billion dollars. Because he opposed new taxes, spending cuts were necessary to close the budget gap (Halbfinger, 2010). Governor Christie called for reductions in every state government department and outlined the size of the reductions in each department. Among the many cuts, the Department of Law and Public Safety faced a seven percent reduction (Star-Ledger, 2010). Due to the Governor's proposal of reductions, local police departments no longer had the state aid needed to fund their operations. Because New Jersey's major urban police departments relied more heavily on state aid than smaller suburban departments, they felt the brunt of the budget cut impact (Kalet, 2013). The impact of the budget reductions was most evident through the change in the total number of employed police officers in the state.

Concerns mounted that the large reductions in police force size would result in a spike in crime rates. Layoffs in major New Jersey urban centers had professionals in the field worried about the potential consequences in the years to follow (Schoen, 2013). While New Jersey cities faced potentially dire consequences from the cuts, the cuts also present an opportunity to clearly isolate the effect of police expenditures on crime. Simple comparisons of police spending and crime are highly misleading as higher crime may cause cities to hire more police. If, however, changes in police spending are clearly unrelated to crime levels, we may draw reliable inferences about the effect of police on crime. Toward that end, this paper uses the Christie budget cuts to quantify the impact of the police budget cuts on violent crime. The analysis will compare crime rates in New Jersey cities in that received major cuts to those that did not. Analysis on this data will ideally result in conclusive evidence for whether or not major reductions in police force size resulted in notable increases in violent crime rates.

Background

The study of the causes and effects of crime is complicated due to its ever-changing nature. The motivations exhibited by criminals are difficult to summarize at an aggregate level due to the varying circumstances that surround each crime. In one of the most widely cited criminological studies, Cohen and Felson (1979) present their routine activities approach which suggests a convergence of circumstances lead to criminal activity. Instead of analyzing characteristics that are typically associated with crime (economic status, family disorganization, race, etc.) the authors focus on the combination of motivated offenders, suitable targets, and the absence of oversight. That is, if a perpetrator is able to encounter a victim without any simultaneous presence of guardianship or bystanders then a crime event is more likely to occur.

Though their study focuses on informal guardians (city residents), logic suggests that this theory extends to the presence of police. An increase in oversight by police officers, theoretically, would deter potential criminals and therefore cause a reduction in crime. If there were a police officer on every city block, crime rates would fall. Despite these common sense implications, some criminologists question Cohen and Felson (1979).

Much of the skepticism is rooted in empirical assessments of the police-crime link. A review of previous police-crime relationship articles in Sherman (2002) reveals the weaknesses in the empirical tests of this police-crime link. Most of the studies analyzing the impact of drastically lowering the amount of police (mostly in the form of police strikes) showed spikes in crime in the study areas – however, none of these studies included a control group for comparison. Without a comparison group, it is difficult to prove whether the increase in crime was exclusively due to lack of police.

Marvell and Moody's (1996) review of previous literature yielded little evidence that an increase in police causes a decrease in crime. However, they argue that the failure to find a negative effect of police on crime is the result of specification errors, in particular a failure to control for endogeneity. The problem of endogeneity arises when it is difficult to determine which factor causes the other – whether police have an effect on crime rates or whether crime rates have an effect on the amount of police. In their analysis, they find 24 fewer crimes for each additional officer in a city department. Vollaard (2005) finds similar results in a police-crime study in the Netherlands, every one percent increase in police per capita resulted in a 0.5 percent decline in crime and nuisance.

Levitt's (2004) review of the plausible factors behind the drop in crime in the 1990's found that an increase in police force did, in fact, negatively influence crime rates. An approximate 14% increase in number of police officers per capita

resulted in crime reductions between 5% and 6%. Eck and Maguire (2000), however, contend that inconsistencies in the relationship between crime and police in the 1990's are present. Both San Diego and New York City saw large drops in crime rates (more than 40%) during the early-to-mid 1990's yet their police per capita rose at different levels (1% in San Diego and 18% in New York City). Similar inconsistencies existed with Dallas and Seattle where police per capita either slightly rose or even decreased (3% increase and 6% decrease, respectively) while crime rates greatly lowered (39% decrease in Dallas and 18% decrease in Seattle).

With lack of concrete evidence dealing with the relationship between decreases in police force and crime, this analysis intends to contribute additional information to the topic. The majority of studies examining the effect of an increase in police have not had significant results. Those studies that did find strong evidence reported that increasing police does lower crime. Following this logic, findings should also be conclusive for the opposite relationship – lowering the amount of law enforcement resources should follow with an increase in crime. This analysis seeks to investigate the line of thinking mentioned above. If substantial rises in crime are found to result from slashing state funding for law enforcement, then this analysis may influence future decisions made in regard to police budget cuts.

Policy Options

When a state budget problem occurs, departments of law enforcement have three options: no cuts to the police budget, cuts to the police budget and no changes in operations, and cuts to the police budget and law enforcement agencies adjust policing strategies. Obviously, no reduction in budget cuts would not present a new problem in controlling crime but larger cuts to other government-funded operations would be necessary. Reducing the police force, however, presents the problem of crime control. Policing in a similar fashion post-cut may yield problematic results as evidence suggests that targeting crime hot spots result in better use of resources (Braga, 2001; Chettiar, 2015). Alternatively, if large cuts happen in Trenton, for example, then surrounding jurisdictions in Mercer County could re-locate some officers to Trenton to assist in creating a larger police presence.

Findings

Data

The New Jersey state budget cuts in 2010 reduced the size of the police force in many New Jersey cities. The focus of this study, though, is on New Jersey's "Urban Fifteen" (UF). The UF includes urban communities in New Jersey with more than 50,000 inhabitants. According to the New Jersey State Police (NJSP), the UF make up approximately 19% of the population in New Jersey and historically 33% of the annual reported crime. According to the NJSP website, the cities included in the UF are those deemed by the New Jersey Department of Community Affairs, Division of State and Regional Planning and the Bureau of Statewide Planning as densely populated with extensive development. The panel data on these cities to be used in this analysis consist of several variables for the years 2006 to 2014. The data ranging in years prior and post-cuts help to determine possible patterns that may exist before and after the budget crisis. Violent crime and number of employed police officer data were collected from the NJSP website (Uniform Crime Reports data were used for police officer counts for 2014 due to lack of data from NJSP). In addition, population data for each of the cities came from the NJSP (excluding 2014, which used Uniform Crime Reports population data).

Control variables comprise of measures of economic strength and variability such as unemployment rate, median household income, median owner-occupied housing value, and percent below poverty. An additional control variable representing familial dysfunction, percentage of single-parent households, was included. Variables controlling for race (in the form of percentage of African-American inhabitants) and population density (persons per square mile) were also included. These data come from estimates from the American Community Survey as well as the 2010 U.S. Census

Methodology

To determine the impact of the 2010 New Jersey budget cuts on violent crime we compare cities that did, and did not, have major layoffs in 2011. The cities that saw major lay-offs in their police force were Newark, Camden, Paterson, and Trenton. Those jurisdictions in the UF that did not see major cuts included Jersey City and Elizabeth, among others. A breakdown of which cities did and did not see major changes in their police force is

City	Police Officer Count (2010)	Police Officer Count (2011)	% Change	Major Δ
Trenton	356	238	-33.146	Yes
Paterson	497	357	-28.169	Yes
Camden	366	265	-27.596	Yes
Newark	1308	1095	-16.284	Yes
East Orange	265	237	-10.566	No
Elizabeth	341	312	-8.504	No
Irvington Township	167	153	-8.383	No
Vineland	153	142	-7.190	No
Bayonne	195	182	-6.667	No
Union	158	153	-3.165	No
Jersey City	831	806	-3.008	No
Passaic	163	159	-2.454	No
Woodbridge Township	195	192	-1.538	No
Toms River Township	150	150	0.000	No
Clifton	141	144	2.128	No

Table 1: Categorizing Urban Fifteen Cities by Major Police Budget Cuts (2010-2011)

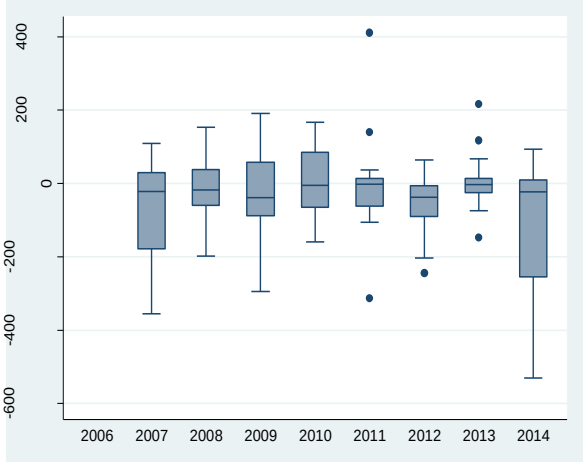

Figure 1: Change in Violent Crime Rates by Year

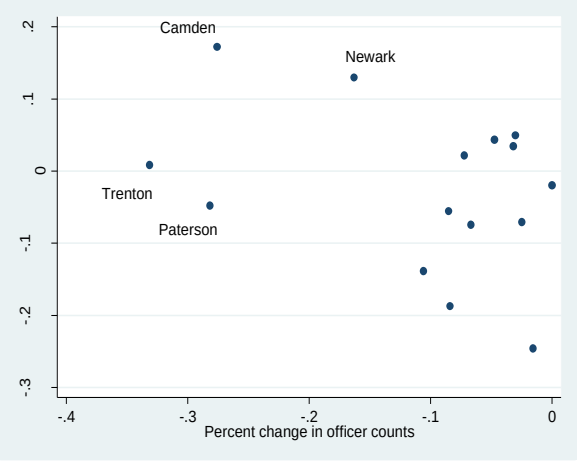

Figure 2. Change in Police Force Size and Crime

shown in Table 1. Cities with a percentage decrease in police force from 2010 to 2011 greater than 15% were classified as having major layoffs. Since the major budget cuts occurred during the transition from 2010 to 2011, a focus of the analysis is to determine to impact of the drop in police on crime during this time – something that can be analyzed using regression models and other statistical measures.

The changes in size of police forces occurred during the later stages of 2010 and the data reflect this disparity with pronounced differences in employed officers from 2010 to 2011. The problem of endogeneity is not of concern because changes to the police force were not a response to crime rate changes. Instead, an exogenous factor of budget cuts created a quasi-experimental scenario in which some cities received the "treatment" of a slash to the budget while others were not as affected and therefore serve as the makeshift "controls". Since random assignment was not used in determining which departments had to layoff a

	Model 1	Model 2	Model 3	Model 4
Police Officers per Capita	4.474***	3.201***	0.629	1.478**
	(10.25)	(7.10)	(1.27)	(3.37)
Unemployment Rate		45.55***	12.87***	25.25***
		(5.65)	(1.64)	(4.25)
Percent Single-Parent Household			34.54	62.29**
			(1.52)	(3.15)
Percentage of African-Americans			3.256	-5.950**
			(1.62)	(-3.03)
Percent Below Poverty			20.33	23.70**
			(1.56)	(2.24)
Median Household Income				0.00889*
				(1.68)
Persons Per Square Mile				-0.0122***
				(-5.17)
Constant	-489.3***	-666.8***	-566.2***	-1480.4***
	(-3.62)	(-5.34)	(-4.19)	(-3.43)
adj. R^2	0.439	0.572	0.737	0.862

Table 2: Determinants of Violent Crime Rates, NJ Urban Fifteen Cities

significant portion of their force, this analysis does not reflect a true experimental design.

Results

An initial look at the relationship between police force presence and violent crime suggests that results vary for those cities that endured vast amounts of layoffs. If crime rates were inversely related to police force size, then 2011 and the years following would have generally elevated overall amounts of violent crime. However, this is not the case, as seen in Figure 1. Labeled points indicate cities that are outliers from the overall city crime rate trends. In 2011, Camden and Newark show noticeably high changes in violent crime rate while Trenton and Paterson are captured within the boxplot. If large reductions to the police force size had a direct significant impact on crime rates, then Trenton and Paterson should also be seen as outliers – or at the very least, show evidence of a positive trend (where the upper-tail of the boxplot would extend well beyond zero). However, the boxplot (and outliers) suggests that cities were impacted differently by the police budget cuts in 2011.

A closer look at the relationship between violent crime and change in police force from 2010 to 2011 is observable in Figure 2 below. Camden and Newark saw noticeably higher changes in violent crime rates when compared to all other cities. Trenton and Paterson, however, saw very different results. Trenton had little change in violent crime (less than 1%) despite facing the largest proportion of layoffs of any city. Meanwhile Paterson had a *decrease* in violent crime from 2010 to 2011 while having the second largest proportion of cuts. This preliminary finding suggests that there is not a clear pattern between reductions in police and the violent crime response.

Regressing the control variables with police per capita (measured in number of police per 100,000 persons) against violent crime rates yielded somewhat predictable results. These results appear in Table 2. However, the results in Table 2 are unreliable because of potential endogeneity between police and crime. While hiring more police may reduce crime, politicians may also react to higher crime rates by hiring more police. The estimates in the first column of Table 2 suggest that for every unit increase in police per capita, violent crime rates go up by roughly 4.5 crimes per 100,000 persons. Including a series of controls generally cuts the size of this effect. From column 4 of Table 2, we see that every unit increase in police per capita, violent crime rates go up by roughly 1.5 crimes per 100,000 persons. However, this direct relationship between police and crime is likely the result of the endogenous relation noted

	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Δ Unemployment Rate	3.734	4.269	3.911	4.153	4.519	4.449
	(1.10)	(1.29)	(1.15)	(-1.13)	(-1.24)	(-1.19)
Δ Median Household Income	-0.00348	-0.00344	-0.00382	-0.00479*	-0.00476*	-0.00514*
	(-1.28)	(-1.30)	(-1.39)	(-1.73)	(-1.73)	(-1.81)
% Single-Parent Households	0.574	14.84*		-0.149	14.80*	
	-0.09	-1.83		(-0.02)	-1.72	
% Below Poverty	-0.0766	-6.593		0.287	-6.628	
	(-0.02)	(-1.46)		(-0.06)	(-1.38)	
Δ in Police Force	-101.7*	-100.5*	-110.4**	-132.1**	-130.3**	-136.0**
	(-1.86)	(-1.89)	(-1.98)	(-2.23)	(-2.24)	(-2.21)
% African-American		-1.540**			-1.583**	
		(-2.55)			(-2.48)	
Constant	-35.11	-75.33**	-27.83**	-71.59	-109.7*	-72.65
	(-1.05)	(-2.08)	(-2.53)	(-1.29)	(-2.06)	(-1.96)
Random (RE) or Fixed (FE) Effects for City	RE	RE	FE	RE	RE	FE
Time Fixed Effects	No	No	No	Yes	Yes	Yes
Overall R2	0.0992	0.1563	0.0986	0.1872	0.247	0.1867

Table 3: Random- and Fixed-Effects Regression Results for Changes in Violent Crime Rates. * = p

above as we see in columns 2 through 4 of Table 2. Adding control variables to the model changed the significance and beta estimates of police per capita. From column 4, we see that the strongest influences on crime rates are percentage of single-parent households, unemployment rate, and percent below poverty.

To correct for endogeneity and produce reliable estimates of the effect of police on crime, we create a dummy variable for cities that endured budget cuts. We construct a dummy variable that assigns a 1 for police force increases of 15% or greater in the year of the increase, a -1 for a 15% or greater decrease in police force size, and a 0 to all other changes below these thresholds. These values change in the time series as only the instances that met the requirements received the given number – that is, Trenton, for example, received a "-1" in 2011 but received a "0" in all other years. We regress changes in violent crime rates on this dummy variable and a series of other (first –differenced) control variables. The results appear in Table 3.

Since measures of single-parent households, percentage below poverty, and percentage of African-Americans are from the decennial U.S. Census, they do not change over the time series. Consequently, we cannot run regressions with city fixed-effects when these variables are included as controls. Therefore, we report random-effects regressions in columns 1 and 2 of Table 3 and fixed-effects regressions in column 3. The fixed-effects regressions simply drop the Census data controls.

The results on our variable of interest (Δ in Police Force) are consistent across the random- and fixed-effects specifications. In general, a decrease (increase) of 15% or more in the size of the police force is associated with an increase (decrease) in the violent crime rate per 100,000 of about 100 violent crimes. The budget cut dummy variable is statistically significant at the .1 level in the random-effects specifications and at the .05 level in the fixed-effects specification.

The final three columns of Table 3 incorporate time fixed effects. Adding these variables increases both the magnitude and the precision of the estimates on the variable of interest (Δ in Police Force). According to these models, a decrease (increase) of 15% or more in the size of the police force is associated with an increase (decrease) in the violent crime rate per 100,000 of about 130 violent crimes. The budget cut dummy variable is statistically significant at the .05 level in each specification.

Recommendations

Result Implications

The analysis suggests that significant police force cuts cause increases in violent crime. The results suggest that a decrease (increase) of 15% or more in the size of the police force is associated with an increase (decrease) in the violent crime rate per 100,000 of about 130 violent crimes. However, examination of specific cities following police force cuts suggests that not all cities show violent crime increases following budget cuts. Trenton and Paterson had the two highest reductions in resources yet saw little to no change in crime rates in the following year. By contrast, Camden showed significantly higher violent crime following a budget cut.

Policy Implications

Given our evidence that police budget cuts cause crime to rise, city managers charged with closing budget deficits should include the project costs of higher violent crime in their budgetary decisions. More broadly, the results suggest that more police on the street is an effective means to reduce crime.

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