Over-policing, Under-policing, or Both?

An Analysis of Police Resource Allocation

Rebecca Goldstein* Michael W. Sances† Hye Young You‡

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Abstract

A growing body of empirical and qualitative evidence indicates that local police departments are increasingly being used as sources of revenue for municipalities through the imposition and collection of fees, fines, and asset forfeitures. We examine whether revenue collection activities compromise the criminal investigation functions of local police departments by constructing a novel data set of municipal finances, crime clearance rates, and demographics. We find that municipalities which collect a relatively larger per capita amount of revenue from fees, fines, and forfeitures solve violent crimes at relatively lower rates, conditional on background crime rates, police budgets, and demographics. These findings help to explain the puzzle of why communities which appear to be under intense police surveillance ("over-policed") often also express demand for additional police resources.

*Ph.D. Student, Harvard University. Email: goldsteinr@post.harvard.edu
†Assistant Professor, University of Memphis. Email: msances@memphis.edu
‡Assistant Professor, Vanderbilt University. Email: hyeyoung.you@vanderbilt.edu

1 Introduction

Modern police departments are expected to perform two major functions: patrol functions and criminal investigation functions. Patrol officers are tasked with responding to emergency calls, taking witness statements, and completing official logs of police activity. Criminal investigators - who were almost exclusively privately employed by detective agencies until the early 20th century - are tasked with speaking with witnesses, developing leads, and managing forensic evidence in an effort to identify, arrest, and make a prosecutable case against a criminal offender (Braga et al. 2011).

The U.S. Department of Justice's March 2015 investigation of the police department in Ferguson, Missouri, which followed the widely publicized police shooting of an unarmed black teenager, shed light on a third role that police can play: a role in generating revenue for the municipality. Police can do this in three principal ways: through imposing fees, imposing fines, and through seizing assets that were used in the course of criminal activity (called *civil asset forfeiture*). The DOJ report described fees for the use of police services - for example, a $50 fee for the issuance of an arrest warrant and a further 56 cent per-mile fee for the distance police drive to deliver the warrant, along with exorbitant fines for traffic violations that were compounded by fines for failure to appear on time for traffic court. Civil asset forfeitures are not mentioned in the DOJ report, although a related type of forfeiture, bond forfeiture – whereby failure to pay a bond in a timely manner results in the transfer of the bond to the City's account (without the amount of the bond going to pay the underlying fine, and along with an arrest warrant being issued) – was found to be extremely common.[1]

There is strong evidence that the practice of using the police to generate municipal revenue through the imposition and/or collection of fees, fines, and forfeitures is not limited to Ferguson, Missouri. Data from the Census of Governments indicates that

[1] "Investigation of the Ferguson Police Department," *United States Department of Justice Civil Rights Division*, March 4, 2015.

about 80 percent of American cities derive at least some revenue from fees, fines, and asset forfeitures, with about 12 percent of cities collecting more than 5 percent of municipal revenue this way and about 6 percent of cities collecting more than 10 percent of their revenue this way in 2012 (Sances and You 2016).

Fees and fines imposed directly by the police are often in addition to fees and fines imposed by the court system and enforced by the police: a survey by National Public Radio and New York University's Brennan Center for Justice found that 48 states increased existing civil and/or criminal court fees or added fees for services that used to be free (such as fees for room and board for time spent in jail) between 2010 and 2014 (Wright and Logan 2006; Shapiro 2014). As for forfeitures, while there is no official tally of the amount collected in civil asset forfeitures by state and local police forces, the 14 states for which data is available collectively made over $250 million by seizing cash and property in 2013.[2]

It is easy to imagine that using the police as a source of municipal revenue might distort their activities from their traditional roles in patrol and criminal investigation to other, more lucrative activities, given the limited police resources. This paper uses a novel data set that combines city-level demographics with data on municipal finances and data on crime clearance rates (that is, the rate at which the police eventually charge a person or persons with reported crimes) to test whether high emphasis on revenue generation activities by police forces has any impact on their activities on crime clearance.

Establishing a causal link between reliance on collecting revenues from fees and fines and crime clearance is challenging because the allocation of police resources to revenue collection is not random and municipalities may face different types of crime - such as more prevalent gang activity - which could systematically affect the crime clearance rate. To address these concerns, we use two empirical strategies. First, we use county fixed effects to account for heterogeneity across municipalities that is constant over time. However,

[2] "Policing for Profit: The Abuse of Civil Asset Forfeiture" (2nd Edition). 2014. *Institute for Justice.*

fixed effects cannot control for time-varying factors that may affect both reliance on fines and crime clearance issues that are specific to a county. To overcome this obstacle, we employ an instrumental variables approach. Previous research has shown that when municipal governments come under financial distress, reliance on fees and fines increases (Garrett and Wagner 2009; Markowsky and Stratmann 2009). Therefore, we use an exogenous shock to municipal revenue as an instrument. Specifically, we leverage the fact that recent, very large municipal revenue increases from the boom in shale and natural gas production due to technological progress resulted in significant cross-county variation in increased revenue between 2007 and 2012 that is exogenous to factors that might affect the rate of crime clearance, conditoinal on demographic variables.

We find that, in cities where a relatively higher proportion of revenue is collected through fees, fines, and forfeitures, violent crimes are cleared at a relatively lower rate, conditional on the background crime rate, the overall police budget, and a host of relevant sociodemographic variables. Furthermore, there is no similar observable relationship between the proportion of municipal revenue from fees, fines, and forfeitures and the clearance rate of property crimes. Together, these results suggest that the use of police to collect fees, fines, and forfeited assets has a particularly negative impact on the solve rates of crimes for which the investment of investigative resources is most crucial to solving the crime in question.

This paper makes several important contributions to existing literature. First, it empirically tests whether the phenomenon identified in the DOJ's Ferguson Report – namely, that police functions can be distorted in favor of revenue collection at the expense of other police activities – is particular to Ferguson or not, and finds that it is not. Second, it suggests a mechanism by which the distortion of the police function away from investigation and towards revenue collection is related to lower levels of violent crime clearance; namely, that crimes requiring a high level of investment in investigative resources are not solved when these resources are directed elsewhere. Third, this research contributes to

an understanding of the possible externalities of municipal revenue shortfalls. Finally, it suggests a possible explanation for why communities which appear to be under intense police surveillance ("over-policed") often also express demand for additional police resources. If high-crime communities that are over-policed are receiving a large amount of police attention from officers who are in fact carrying out a revenue generation function, they are also under-policed with regard to the police's investigatory function.

2 Background and Hypothesis

2.1 Policing for profit

There is extensive academic study of police- and court-imposed fees and fines, though it usually focuses on the function of these fees and fines as, effectively, forms of regressive taxation (Harris, Evans, and Beckett 2010; Kohler-Hausmann 2014; Natapoff 2015). Studies conclude that decriminalization threatens to become a kind of regressive tax, turning the poorest populations into funding fodder for the judiciary and other government budgets.

After the release of the DOJ's investigative report on the Ferguson Police in MO, there has been an array of news reports that many municipal governments heavily rely on fee, fine and forfeiture revenue and this is a political decision that disadvantages racial minorities. Studies show that when municipal governments are under financial distress, reliance on fees and fines increase (Garrett and Wagner 2009; Markowsky and Stratmann 2009) and the share of black in a city is significantly predictive of the proportion of revenue that the city collects from fees and fines (Sances and You 2016).

Implementing this practice requires a close coordination between governing body between municipal government and local police forces as the DOJ reports vividly reports.[3]

[3]In March 2010, the city's Finance Director wrote to the Chief of Police that "unless ticket writing ramps up significantly before the end of the year, it will be hard to significantly raise collections next year... Given that we are looking at a substantial sales tax shortfall, it's not an insignificant issue." Later, in January 2013, the Police Chief reported to the City Manager that "Municipal Court gross revenue for calendar year 2012 passed the $2,000,000 mark for the first time in history, reaching $2,066,050," to which

Given the limited resources that local police offices have, focusing on revenue generating activities can have a profound effect on police resource allocation. Indeed, Kohler-Hausmann (2014) notes that that, in New York City where court-imposed fees and fines - which exceed $120 for noncriminal violation convictions and $200 for misdemeanor convictions, the rate of misdemeanor arrest is very high but the conviction rate is very low.

This suggests that city-level justice systems which are relatively more focused on the types of activities that generate significant fines may also be systems in which the justice system's relative focus is on social control of perceived disorderly populations, rather than procedural or substantive justice - exactly the kind of justice system described in the Ferguson report. A NYU Brennan Center study of legal debts in the 15 U.S. states with the largest prison populations concluded that "Overdependence on fee revenue compromises the traditional functions of courts and correctional agencies...When probation and parole officers must devote time to fee collection instead of public safety and rehabilitation, they too compromise their roles."

Perhaps unsurprisingly, police departments, too, are concerned about the negative externalities of municipal revenue shortfalls. In a revealing article in the June 2010 issue of *Police Chief Magazine*, entitled "Generating New Revenue Streams", West Covina, California Police Commander Paul LaCommare provides a list of suggestions for "alternative[s] to personnel and service reductions" in the face of severe municipal budget cuts to police departments. Included in his suggestions, alongside entrepreneurial advice such as "allowing agenccy name to be used for advertisement and branding" and "police department-run firearm safety classes" are "fine increases by 50 percent", "pay-per-call policing", "state and court fees for all convicted felons returning to the community", and "triple driving-under-the-influence fines by the court". After detailing innovative solutions in West Covina, Commander LaCommare cautions:

Some law enforcement professionals will balk at the strain of generating new revenue sources.

the City Manager responded, "Awesome! Thanks!" ("Investigation of the Ferguson Police Department," *United States Department of Justice Civil Rights Division*, March 4, 2015).

Agencies must be extremely careful during the selection process when they are choosing a type of revenue-generating program to implement. Each program must be evaluated against the strengths and weaknesses of the organization. Just as important, each revenue-generating idea must be evaluated to determine if it is within the highest standards of law enforcement. Many ideas, although legal and posssible, will not meet this standard.

In addition to its almost eerie prescience regarding the policing practices uncovered in Ferguson and elsewhere in St. Louis County, Commander LaCommare's remarks should make clear that police enforcement of fees and fines as municipal revenue sources are not to increase police budgets or hire more police officers; rather, they are implemented to stave off cuts to police staff and hours.

There are existing studies that address the issue of how police activities might be redirected as a result of financial incentives but their focus has been the potential distortionary effects of civil asset forfeiture on police activity, not the potential distortionary effects of fee and fine imposition on fee activity. Studies find that when local governments allow police agencies to keep a substantial fraction of the assets that they seize in drug arrest, local governments offset police seizures by reducing their other allocations to police. Police, in turn, respond to the real net incentives for seizures by increasing the drug arrest rate (Benson, Rasmussen, and Sollars (1995); Williams (2002); Baicker and Jacobson (2007)). However, there are no such studies to date that we are aware of that examine similar distortions in police activity due to the combined collection of fees, fines, and forfeitures, not due to forfeitures alone.[4]

[4]One exception, although focusing on the positive aspects of ticketing activities by police, is Markowsky and Stratmann (2011). They use municipal budgetary shortfalls as an instrumental variable to identify the effect of traffic citations on traffic safety and show that budgetary shortfalls lead to more frequent issuance of tickets to drivers.

2.2 Research on violent crime clearance

There is surprisingly little academic research on crime clearance rates, especially outside criminology. Wellford and Cronin (2000) analyzed homicides in four large U.S. cities in 1994 and 1995, and found that a number of factors under police control make clearing a homicide more likely; namely, assigning three or four detectives to the case (rather than just one) and interviewing witnesses at the crime scene. Many factors outside police control also influence the likelihood that a homicide will be cleared, though; namely, homicides are more likely to be cleared when they are not drug-related, when the homicide occurs in a private rather than public location, and when there is an eyewitness who observed the homicide. Technology can also affect crime clearance: Dunsmuir, Tran, and Weatherburn (2008) find that the introduction of mandatory DNA testing of prisoners in New South Wales, Australia led to increased clearance rates for most types of violent crime (though there was no difference in the ultimate conviction rate). It is worth noting that there is little agreement in the criminological literature over whether the activities of criminal investigators actually contribute to crime control. The role of criminal investigators is "essentially [to] conduct ad-hoc reactive investigations to hold offenders accountable for crimes in the hopes of generating deterrence through making arrests" (Braga et al. 2011). But, importantly for our analysis, Roberts and Roberts Jr (2015) use data from the U.S. National Incident-Based Reporting System to show that police workload negatively predicted clearance for homicides nationwide in 2007. And furthermore, Chalfin and McCrary (2013) show using a panel of police force and crime data from 242 American cities from 1960 to 2010 that the police elasticity of crime is greater for violent than for property crimes; that is, adding more police is more strongly related to lower rates of violent crime than it is to lower rates of property crime.

2.3 Hypothesis

Why might we think policing for profit is associated with lower rates of violent crime clearance? To arrive at our hypotheses, we refer to three stylized facts about criminal investigation and policing, drawn on thirty years of research by economists and criminoligists.

First, additional resources provided to criminal investigators have at least a detectably nonzero, nonnegative relationship to crime clearance rates. Although the famous RAND study (Greenwood and Petersilia 1975) showed little relationship between criminal investigatory effort and crime clearance rates, and attributed most of the variation in crime clearance to random circumstances, violent crime clearance rates vary substantially across cities, and it is difficult to imagine that some cities' detectives are systematically luckier than other cities' detectives.

Second, property crimes are much harder to solve than violent crimes. This is mostly because the victim of a nonlethal violent crime is very likely to know who the perpetrator is, or be able to identify him or her, while the victim of a property crime is very unlikely to know who the perpetrator is or to have ever seen or met him or her. This fact is evident in Figure 2, and in the fact that average clearance for property crimes is consistently about half that of violent crimes (Braga et al. 2011).

Third, on the whole, crimes are assigned significantly more investigatory resources, on average, than property crimes. Although many cities have special units for solving property crimes, because they are so difficult to solve, many departments see them as all but unsolvable in the absence of an immediately obvious suspect. Indeed, Williams and Sumrall (1982) discusses this problem and proposes reconceptualizing property crime investigation as a consumption good for victims as a justification for funding it at all.

In light of these stylized facts, we argue it is logical to hypothesize that a distortion of the police function in the form of a reallocation of officers to revenue collection instead of criminal investigation will result in lower rates of violent crime clearance, and that that

reallocation is observable in a municipality's reliance on revenue collected from fees, fines, and asset forfeitures. We further argue that the difference in the role of investigatory effort in solving violent crimes and property crimes provides a fruitful opportunity to examine the role of police resource reallocation on solve rates. Since violent crimes are assigned more investigatory resources than property crimes are (Braga et al. 2011), *marginal decreases in the investigatory resources devoted to violent crimes are likely to have a greater effect on solve rates than marginal decreases in investigatory resources devoted to property crimes.*

3 Data and Empirical Strategy

Our main aim is to examine how use of police forces to generate local revenues affects crime clearance in local areas. To measure the use of fines, we use the Census of Governments (COG), a U.S. Census Bureau program that collects revenue and expenditure data for all of the roughly 90,000 local governments every five years, in years ending in the digits two and seven. Starting in 2007, the COG began asking all cities how much of their revenue was collected via fines and fees (Sances and You 2016). As the COG survey instructs respondents, this variable includes "receipts from penalties imposed for violation of law; civil penalties (e.g., for violating court orders); court fees if levied upon conviction of a crime or violation... and forfeits of deposits held for performance guarantees or against loss or damage (such as forfeits bail and collateral)."[5]

When we clean the Census of Government data for the years 2007 and 2012, we only keep entities categorized as "municipal governments" and "township governments," excluding counties, school districts, and special districts. Since we are interested in resource allocation for law enforcement in municipal governments, we further restrict the sample

[5]Notably, this variable expressly does not include "penalties relating to tax delinquency; library fines; and sale of confiscated property." https://www.census.gov/govs/www/class_ch7_misc.html. Appendix A presents an example of a survey form asking about revenue sources.

to municipal governments that have a police force.[6] For each municipality, we calculate the per capita own-source revenues from fees and fines.[7]

To measure the crime clearance rate, we use the Uniform Crime Reporting (UCR) data. The FBI has gathered crime statistics from law enforcement agencies across the country since 1930s and the UCR program collects statistics on violent crime (murder and nonnegligent manslaughter, forcible rape, robbery, and aggravated assault) and property crime (burglary, larceny-theft, and motor vehicle theft). The UCR data include crime counts and crime clearance rates by types of crime.[8] We use the UCR data for years 2007 and 2012, and merge with local government public finance data, using a unique Census place code. This leaves 5,935 unique municipal governments. To control for other variables that are associated with crime clearance rate, we collect local government demographic data from American Community Survey and state government finance data from the Census.

Figure 1 presents the distribution of per capita own-source revenue from fees and fines for the year 2012. The dotted line indicates the mean value of per capita revenue from fines, fees, and forfeitures in 2012. There is a significant variation across cities. We present the distribution of clearance rates for violent crime (left) and property crime (right) for 2012 in Figure 2. The dotted lines denote the mean value for each clearance rate.

Identifying the causal effect of police reliance on fines and fees to generate municipal

[6]We identify municipal governments with police force by examining their public finance record on police force budgets. If their police force budget is greater than 0, we assume they have their own police force.

[7]We need to clarity all revenues from fines and fees are not coming from police activities. But late court fees and other fees are often originated from interaction with law enforcement in the first place.

[8]The data for offense known and clearances by arrest are submitted voluntarily by city, county, and state law enforcement agencies. Some agencies receive forms directly from the FBI and return them directly to the FBI. Many others receive forms from state collecting programs and return these forms to those programs. The state programs, in turn, forward the reports to the FBI. Reports are sent out and collected on a monthly basis. Once received, the FBI checks the agencies' reports for completeness and arithmetical accuracy. If an unusual fluctuation is detected in an agency's crime count, the FBI compares those counts with counts from previous reports or compares the frequencies to those of agencies similar to the agency in question. When necessary, law enforcement agencies are contacted to correct or explain the figures. "Uniform Crime Reporting Program Data [United States]: Offenses Known and Clearances by Arrest, 2007." *ICPSR 25101.*

Figure 1: Distribution of Per Capita Revenue from Fines and Fees, 2012

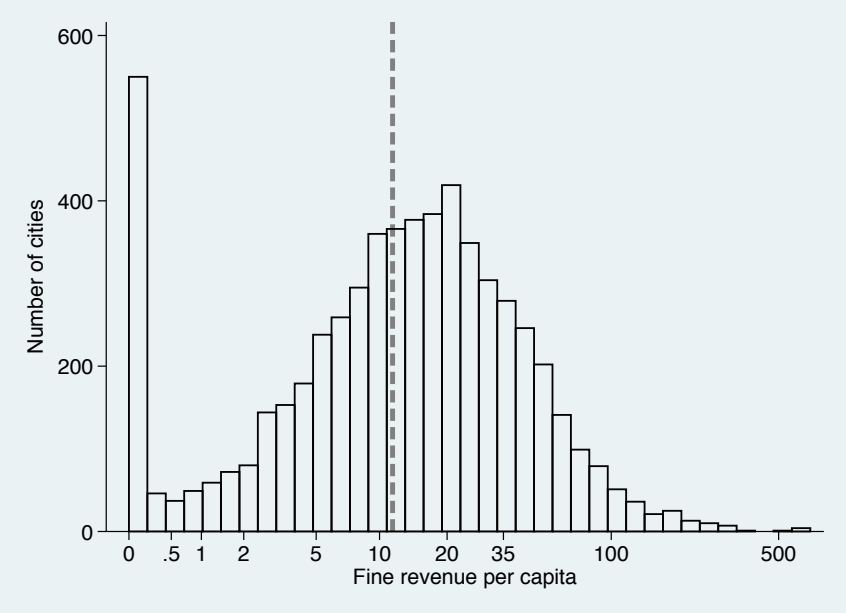
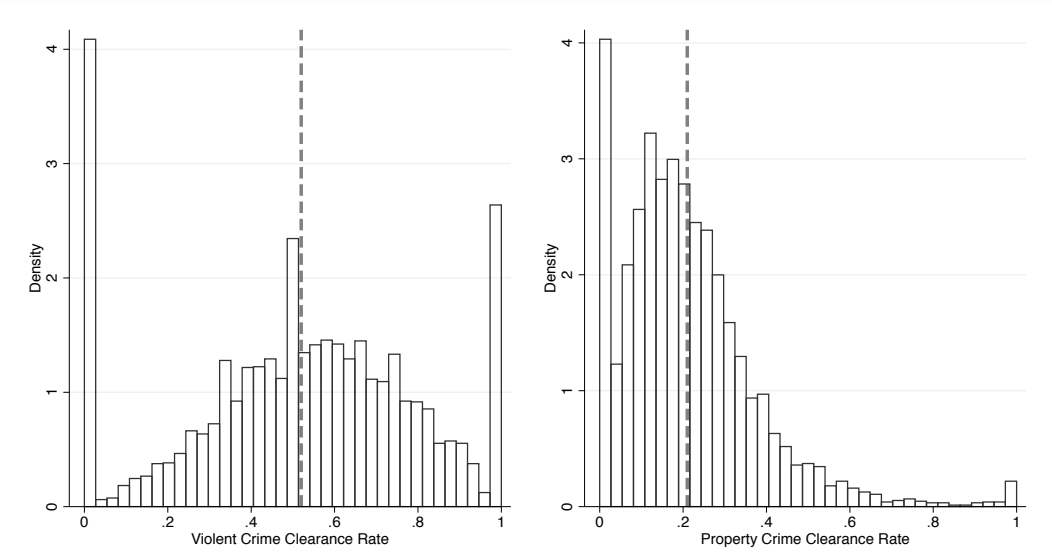


Figure 2: Distribution of Crime Clearance Rate, 2012



revenues on crime clearance rates is is challenging because collective revenues from fines and fees is non-random across municipal governments. Even if we include an array of control variables, it is possible that omitted variable bias exists. Unobservable variables, such as racial tension between local enforcement forces and residents, could affect both the practice of revenue generation from fees and fines and crime clearance rates. Reverse causality is also possible; it may be the case that when the crime clearance rate is low, people are reluctant to move into the area, thereby reducing the property values and encouraging the municipal government to rely more on fines and fees.

To address those concerns, we employ two empirical strategies. First, we use county fixed effects to account for time-invariant county-specific characteristics.[9] The main empirical specification we estimate is:

$$\mathbf{C}_{ijt} = \alpha_j + \gamma_t + \beta_1 \mathbf{Fines}_{ijt} + \beta_2 \mathbf{X}'_{ijt} + \varepsilon_{ijt} \tag{1}$$

where C_{ijt} indicates the crime clearance rate in city i in county j at time t. α_j denotes the county fixed effect, γ_t denotes the time fixed effect, $Fines_{ijt}$ indicates that a percent revenues generated from fines and fees in city i in county j at time t. X_{ijt} denotes control variables that could influence the crime clearance rate. We include local government police budget as a percent of total spending, total population, proportion of the population between the ages of 15 and 34, education level, unemployment, black resident poverty rate, degree of income inequality in the area, and median income as controls. Table 1 presents the summary statistics for these variables.

Second, we address the concern of time-varying omitted variable bias with an instrumental variable (IV) estimation strategy. Financially distressed municipal governments tend to increase their reliance on fines and fees as revenue generation sources. Therefore,

[9] A more stringent empirical strategy would be a municipality level fixed effect. However, given that the Census of Governments has collected information about revenues from fines and fees only since 2007, time span between 2007 and 2012 does not show much variation in terms of per capita fines within the municipality.

Table 1: Summary Statistics

Variable	N	Mean	SD	Min.	Max.
Panel A. Crime					
# Violent Crime	11870	150.8	1076.2	0	51831
Violent Crime Cleared Ratio[a]	10361	0.52	0.27	0	1
Murders	11870	1.8	15.0	0	500
Aggravated Assault	11870	90.2	593.1	0	31211
Forced Rape	11870	7.9	31.4	0	953
Robbery	11870	50.7	460.7	0	21787
# Property Crime	11870	1071.0	4679.3	0	149488
Property Crime Cleared Ratio[b]	10650	0.19	0.14	0	1
Burglary	11870	237.4	1023.0	0	29112
Larceny Theft	11870	723.1	3074.0	0	115935
Motor Vehicle Theft	11870	110.5	722.5	0	29231
Panel B. Public Finance					
% Intergovernmental Transfer Revenue	11870	16.3	13.1	0	97.2
% Tax Revenue	11870	47.31	21.0	0	100
% Fines and Fees Revenue	11870	1.9	3.1	0	62.6
Fines per capita ($)	11870	21.5	32.1	0	677.6
Police Budget Ratio	11870	0.19	0.08	0	1
Panel C. Demographics					
Population	11870	28220	142657	952	8302659
Population 15∼34	11870	0.27	0.06	0.0	0.81
Black	11870	0.10	0.17	0	0.99
Less than High School	11870	0.15	0.09	0	0.78
Unemployment	11870	.08	.04	0	.95

Note: Unit of observation is municipality (N = 5,935) × year (2007 and 2012). a.b. some areas with zero crime have no clearance rate data.

we use a shock to municipal revenue as an IV for revenue from fines and fees. Specifically, we leverage the fact that recent, very large municipal revenue increases from the boom in shale and natural gas production due to technological progress resulted in significant cross-county variation in increased revenue between 2007 and 2012 that is exogenous to factors that might affect the rate of crime clearance, conditoinal on demographic variables. The technological innovation that combines horizontal drilling with hydrofracturing ("fracking") has generated very large returns for oil and natural gas-holding counties in the U.S. since about 2005 (Fedaseyeu, Gilje, and Strahan 2015; Feyrer, Mansur, and Sacerdote 2015), particularly in producer states such as North Dakota and Texas. Feyrer, Mansur,

and Sacerdote (2015) argue that every million dollars of oil and gas extracted produces $66,000 in wage income and 0.78 jobs for a county. But within those fracking states, there is significant variation across counties in terms of income increase from fracking activities. Therefore, we can take an advantage of this variation.

Data on oil and natural gas production comes from Drilllinginfo, a private company that provides information on energy sector firms. The Drillinginfo data provides detailed fracking information at the county level for each month. From this, we construct a measure of per capita new production of oil and natural gas from horizontal drilling in each county for the years 2007 and 2012. We use the county-level per capita increase in new production as an instrument for revenue from fines and fees in each municipality.[10] Revenue increases from shale gas and oil production, combined with the international price of oil and gas, contributes to increased local government revenue through tax income and royalties, and therefore we expect it to be negatively associated with per capita fee and fine revenue. Because these revenues are the result of technological innovations and geology, new production of oil and gas is exogenous to the characteristics of municipal government.[11]

The empirical specification is as follows:

$$\text{(First Stage) Fines}_{ijst} = \alpha_s + \alpha_t + \gamma_1 * NewValue_{jst} + \gamma_2 * \mathbf{X'}_{ijst} + \nu_{ijst} \tag{2}$$

$$\text{(Second Stage) Clearance}_{ijst} = \alpha_s + \alpha_t + \beta_1 \mathbf{\hat{Fines}}_{ijst} + \beta_2 * \mathbf{X'}_{ijst} + \varepsilon_{ijst}$$

, where i, j, s, t denote city, county, state, and year, respectively.

[10] We use West Texas Intermediate monthly oil price and the U.S. natural gas monthly price to calculate the monetary value of new production per capita.

[11] Fracking activity is also used elsewhere in the academic literature as an instrument for income and voter preference changes (Fedaseyeu, Gilje, and Strahan 2015; Feyrer, Mansur, and Sacerdote 2015). One concern for the exclusion restriction would be that fracking activity could increase crime in a local area. But Feyrer, Mansur, and Sacerdote (2015) finds no significant increase in crime in counties affected by fracking activities, and we also control for the total number of violent crime and property crime in the model.

4 Results

First, we present OLS results with and without county fixed effects. Table 2 presents the results from estimating equation (1). Columns (1) and (3) present the results for violent crime clearance rate, with and without county fixed effects, respectively, and columns (2) and (4) present the results for property crime clearance rate, with and without county fixed effects, respectively.

Per capita revenues from fines and fees show a significant negative relationship with violent crime - murders, aggravated assault, forced rape, and robbery - clearance rate. Property crime does not show any significant relationship with per capita revenues from fines and fees that municipality collects. This may be related to the fact that more active police activities to collect fees deter potential criminal's behavior on property crimes (Di Tella and Schargrodsky 2004).

Second, we present the results from the instrumental variable analysis in Table 3.[12] The results of the instrumental variables analysis is consistent with the results from the fixed effects model: while activities focusing on collecting fines and fees are associated with a lower violent crime clearance rate, they are not associated with any change in the property crime clearance rate. Specifically, a one dollar in the per capita fee, fine, and forfeiture revenue collected by a municipality is associated with a decrease in the violent crime clearance rate of 0.3%.

One potential threat to the validity of our results is that it might be driven by large, violent cities. For example, cities such as Chicago Los Angeles have serious gang violence problems, and gang-related violent crimes are notoriously hard to solve. As a result, police resource may be more efficiently allocated to other types of activities such as collecting traffic tickets in such a crime environment. To address this issue, we drop cities with the

[12]The results from the first stage regression are reported in Table A1 in Appendix B. There is a statistically significant and negative relationship between new values from oil and gas production by fracking in the county and per capita fines and revenues collected in municipalities within that county. The F-statistics are 156 and 78, respectively, in each regression, which are much larger than the cutoff point of 10 which roughly defines a weak instrument problem (Stock, Wright, and Yogo 2002).

Table 2: Revenue from Fines and Crime Clearance Rate

	(1)	**(2)**	**(3)**	**(4)**
Variable	Violent	Property	Violent	Property
Per capita Fines Revenue	-0.000422***	0.0000691	-0.000237**	0.0000696
	(-4.43)	(1.28)	(-2.22)	(1.31)
(ln) #Violent Crime	0.00599		-0.0105**	
	(1.44)		(-2.13)	
(ln) #Property Crime		-0.00240		-0.000899
		(-0.64)		(-0.19)
Police Budget	-0.0918**	0.00879	0.0202	0.0404
	(-2.53)	(0.42)	(0.43)	(1.59)
(ln) Population	-0.0382***	-0.00444	-0.0146**	-0.000568
	(-7.17)	(-1.00)	(-2.15)	(-0.10)
Population aged 15-34	-0.00865	-0.0266	-0.0127	0.0126
	(-0.19)	(-0.89)	(-0.20)	(0.30)
Black	-0.164***	0.0124	-0.133***	-0.0200
	(-8.07)	(0.96)	(-4.13)	(-0.92)
Less than High School	-0.0125	-0.119***	-0.146***	-0.0553
	(-0.35)	(-4.85)	(-2.60)	(-1.68)
Unemployment	-0.484***	-0.247***	-0.106	-0.136**
	(-5.67)	(-5.22)	(-0.84)	(-2.23)
Gini	-0.0294	-0.00722	-0.119	-0.0361
	(-0.48)	(-0.19)	(-1.53)	(-0.79)
(ln) Median Income	-0.00663	-0.0619***	-0.0151	-0.0329**
	(-0.58)	(-6.34)	(-0.69)	(-2.54)
Constant	1.041***	0.966***	1.180***	0.538***
	(8.11)	(8.99)	(4.42)	(3.55)
Year FE	Y	Y	Y	Y
County FE	N	N	Y	Y
N	10361	10650	10361	10650
adj. R^2	0.045	0.021	0.226	0.215

Note: t statistics in parentheses. ** $p < 0.05$, *** $p < 0.01$
Standard errors are clustered at the county level.

Table 3: Revenues from Fines and Crime Clearance Rate: Instrumental Variable Analysis

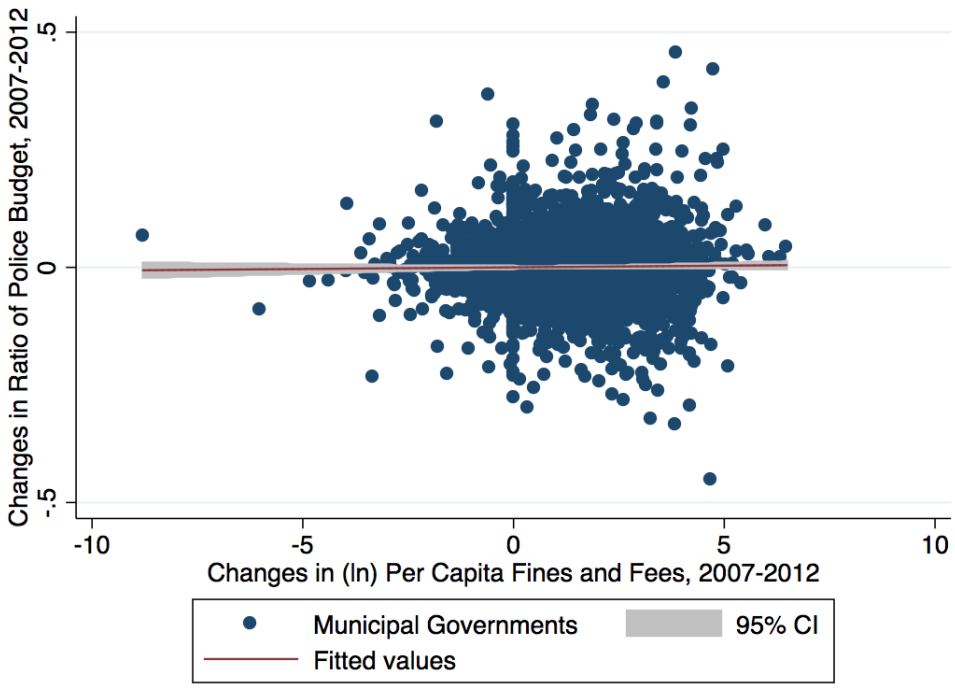
	(1) Violent Crime	(2) Property Crime
Per capita Fines and Fees	-0.00302***	0.00121
	(-5.03)	(1.36)
(ln) # Violent Crime	-0.00658	
	(-1.06)	
(ln) # Property Crime		-0.0160**
		(-2.39)
Police Budget	0.131**	-0.00604
	(2.54)	(-0.17)
Tax Share in Revenue	-0.000415**	0.000109
	(-2.27)	(1.11)
(ln) Population	-0.0226***	0.0174**
	(-3.71)	(2.14)
Population aged 15-34	0.0328	-0.0600
	(0.74)	(-1.66)
Black	-0.147***	-0.0681***
	(-3.87)	(-2.84)
Less than High School	-0.124**	-0.0992***
	(-2.33)	(-3.85)
Unemployment	-0.0940	-0.241***
	(-0.88)	(-2.97)
Gini	0.00514	-0.0817
	(0.08)	(-1.50)
(ln) Median Income	0.00855	-0.0751***
	(0.51)	(-4.90)
Constant	0.670***	0.965***
	(3.11)	(6.09)
Year FE	Y	Y
State FE	Y	Y
N	10010	10286
adj. R^2	0.174	0.144

t statistics in parentheses. ** $p < 0.05$, *** $p < 0.01$
Standard errors are clustered at the state level.

largest gang presences re-estimate the model; the results remain robust and the results of this exercise are reported in Table A2 in Appendix C.[13]

It is also conceivable that when cities increase their reliances for fines and fees, they may also increase the city's budget for police operations. Although we condition on the size of the police budget in the main empirical section, as a robustness check, we examine whether changes in revenues from fines and fees are associated with increases in police budget between 2007 and 2012. Figure 3 presents the results of this exercise; the per capita increase in fines and fees in a city between 2007 and 2012 is not systematically associated with changes in police budge over the same period. This suggests that police forces are in fact trading off between resources allocated to investigation and resources allocated to revenue collection.

Figure 3: Changes in Per Capita Fees and Fines and Changes in Police Budget, 2007-2012



[13]The list of cities excluded is Chicago, Los Angeles, Philadelphia, Miami, New York, Atlanta, Cleveland, St. Louis, Dallas, Memphis, Nashville, New Orleans, Milwaukee, Orlando, Houston, and Detroit. These cities come from the 2013 report of the FBI's National Gang Intelligence Center.

5 Conclusion

This paper has shown that a municipality's increased per capita revenue level from fees, fines, and asset forfeitures is negatively associated with the rate of violent crime clearance, conditional on the crime rate, the total police budget, and a host of relevant sociodemographic variables. County fixed effects analysis confirms that these results are not being driven by time-invariant omitted variables at the county level, and an instrumental variables analysis leveraging positive revenue shocks due to increased shale and gas production confirms that these results are not being drven by time-varying, county-specific omitted variables that might affect both reliance on fines and crime clearance rates. Specifically, we find that a one dollar in the per capita fee, fine, and forfeiture revenue collected by a municipality is associated with a decrease in the violent crime clearance rate of 0.3%.

These results contribute to the scholarly understanding of the externalities generated by municipal revenue collection. When revenue is collected through systems of fees, fines, and forfeitures, rather than through taxes, the fee collection systems themselves generate externalities that may not have been anticipated by policymakers aiming simply to cover a revenue shortfall. Markowsky and Stratmann (2011) show that one possible externality is fewer road accidents as a result of increased imposition of traffic fines (and thus, stricer enforcement of traffic rules). While that arguably constitutes a positive externality, in this paper we have documented a negative externality: the reallocation of police resources is associated with neglect of other important police functions, namely, the investigation of violent crimes. These results suggest that cities where the police are relied upon to collect revenue through fees, fines, and asset forfeitures essentially commandeer their police for revenue collection, which, perhaps unsurprisingly, compromises their ability to perform traditional functions.

These results also contribute to a broader understanding of the relationship between law enforcement and high-crime communities, and the consequences of that relationship. Almost forty years after James Q. Wilson described some police forces as contributing to

a high quality of public services in their city (the "service-oriented style"), some as aggressively enforcing misdemeanors, especially those committed by minorities (the "watchman style"), and some as aggressively enforcing all crimes (the "legalistic style") (Wilson 1978), this research has shown that a municipality's revenue needs can contribute to which "style" the police use. This is particularly important in light of the recent work by, among others, Weaver and Lerman (2010), Burch (2013), Lerman and Weaver (2014), and White (2015), which all illustrate that involuntary contact with law enforcment significantly decreases democratic participation, even for those whose voting right have not been affected. Those who have contact with the carceral state, it seems, in general, withdraw from all types of contact with the state – including contact, such as voting, which has the potential to change policy in ways that might benefit them personally.

All the cited studies of the consequences of law enforcement behavior for democratic citizenship, including Wilson's, comment extensively on the ways in which racial bias shapes these phenomena. The literature on racial bias in the imposition of fees and fines, particularly traffic fines, is vast and does not merit a summary here, although interested readers should refer to Epp, Maynard-Moody, and Haider-Markel (2014). That fines and fees that generate municipal revenue are often implemented in a dramatically racially discriminatory fashion (including, of course, in Ferguson and elsewhere in St. Louis County) may partially explain the very large negative effect of the share of a city's population that is black on the violent crime clearance rate. Furthermore, the pattern we document in this paper may contribute to the well-documented racial gap in perceptions of police legitimacy (Warren 2011, Tyler and Jackson 2014, Epp, Maynard-Moody, and Haider-Markel 2014).

Finally, this is the first political science research of which we are aware that helps to explain the seeming paradox of why many high-crime communities which have heavy police presence often also express desire for increased policing of violent crimes. The notion that high-crime communities are at once over-policed and under-policed is well-

documented in sociology (Smith 1986, Kennedy 1998, Gau and Brunson 2015), but is not generally addressed in political science research, which trands towards documenting the effects of over-policing instead (Lerman and Weaver 2014). In this paper, we suggest that one reason for this paradox may be that a heavy police presence can sometimes reflect aggressive fee and fine enforcement, not police's investigatory function, which is one explanation for this apparent contradiction.

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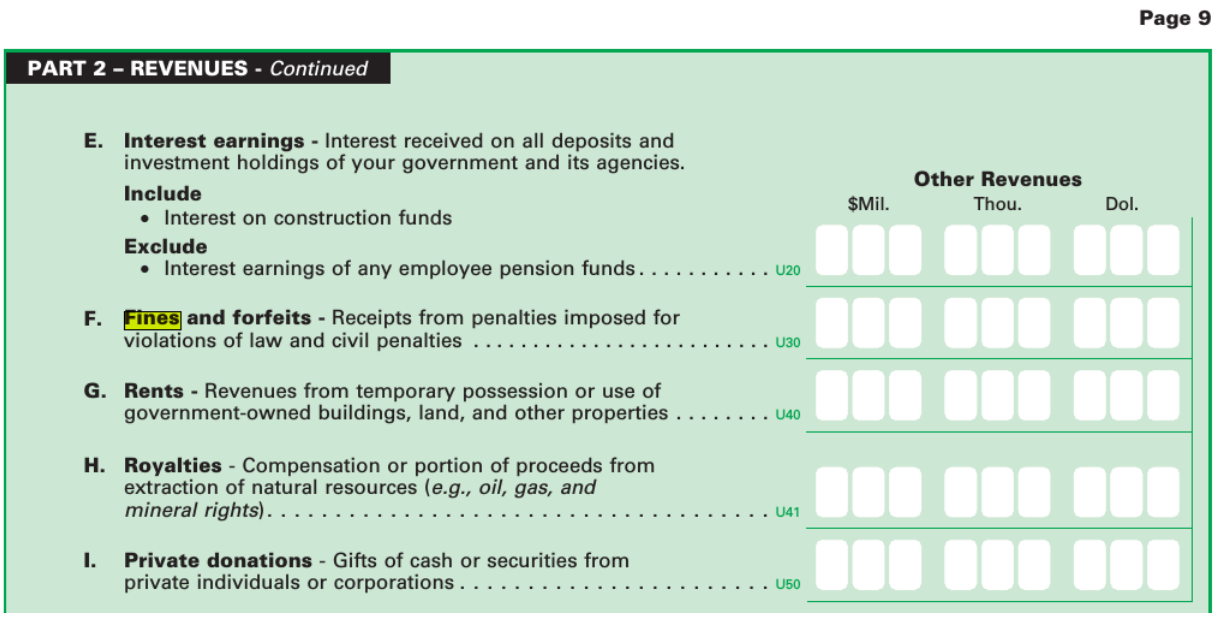
A Appendix: Census of Government Survey Forms of Revenue

Code: U30 ITEM: Fines and Forfeits

Includes: Receipts from penalties imposed for violations of law; civil penalties (e.g., for violating court orders); court fees if levied upon conviction of a crime or violation; court-ordered restitutions to crime victims where government actually collects the monies; and forfeits of deposits held for performance guarantees or against loss or damage (such as forfeited bail and collateral).

Excludes: Penalties relating to tax delinquency (report at appropriate Tax code); library fines (report at Other Charges, code A89); and sale of confiscated property (use code U99).

Here is a picture of the form that governments filled out (in 2012):



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PART 2 – REVENUES - *Continued*

Other Revenues — $Mil. Thou. Dol.

E. Interest earnings - Interest received on all deposits and investment holdings of your government and its agencies.
Include
- Interest on construction funds

Exclude
- Interest earnings of any employee pension funds U20

F. Fines and forfeits - Receipts from penalties imposed for violations of law and civil penalties U30

G. Rents - Revenues from temporary possession or use of government-owned buildings, land, and other properties U40

H. Royalties - Compensation or portion of proceeds from extraction of natural resources (*e.g., oil, gas, and mineral rights*) U41

I. Private donations - Gifts of cash or securities from private individuals or corporations U50

B Appendix: First Stage Result

Table A1: Instrument Variable Analysis: First Stage Result

	(1) Violent Crime	(2) Property Crime
DV = per capita fines and fees		
New Value per capita	-145.98***	-135.06***
	(-5.53)	(-5.58)
F-statistics	156.0	78.4
District Control	Y	Y
Year FE	Y	Y
State FE	Y	Y
N	10010	10286
adj. R^2	0.165	0.165

t statistics in parentheses. ** $p < 0.05$, *** $p < 0.01$

C Appendix: Robustness Checks

Table A2: Revenues from Fines and Crime Clearance Rate, Excluding Cities with Prevalence of Gangs

	(1) Violent	(2) Property	(3) Violent	(4) Property
Per capita Fines Revenue	-0.000414***	0.0000748	-0.000237**	0.0000705
	(-4.35)	(1.38)	(-2.22)	(1.33)
Police Budget	-0.0914**	0.00863	0.0207	0.0405
	(-2.52)	(0.42)	(0.44)	(1.59)
(ln) # Violent Crime	0.00585		-0.0109**	
	(1.40)		(-2.21)	
(ln) # Property Crime		-0.00264		-0.001000
		(-0.71)		(-0.21)
(ln) Population	-0.0376***	-0.00342	-0.0143**	0.000131
	(-6.95)	(-0.77)	(-2.08)	(0.02)
Population 15 $\sim$ 34	-0.0107	-0.0295	-0.0127	0.0106
	(-0.23)	(-0.99)	(-0.20)	(0.25)
Black	-0.165***	0.0138	-0.132***	-0.0180
	(-8.06)	(1.06)	(-4.08)	(-0.82)
Less than High School	-0.0109	-0.118***	-0.145***	-0.0545
	(-0.31)	(-4.81)	(-2.59)	(-1.65)
Unemployment	-0.486***	-0.248***	-0.109	-0.135**
	(-5.68)	(-5.24)	(-0.86)	(-2.22)
Gini	-0.0286	-0.00516	-0.122	-0.0348
	(-0.47)	(-0.14)	(-1.56)	(-0.76)
(ln) Median Income	-0.00707	-0.0626***	-0.0156	-0.0332**
	(-0.62)	(-6.36)	(-0.72)	(-2.56)
Constant	1.040***	0.965***	0.967***	0.566***
	(8.10)	(8.94)	(3.54)	(3.64)
Year FE	Y	Y	Y	Y
County FE	N	N	Y	Y
N	10331	10620	10331	10620
adj. R^2	0.043	0.020	0.225	0.215

t statistics in parentheses
** $p < 0.05$, *** $p < 0.01$