

Review

Estimating the impact of state government spending and the economy on crime rates

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Received 28 March, 2017; Accepted 15 June, 2017

The determinants of crime have been an area of numerous studies over time. In spite of this volume of work, interest in the causes of crime continues to persist. This paper investigates the determinants of variations in crime rates in the United States using cross-sectional state-level data. It explores the role of government spending and socio-economic variables and compares these determinants for the three years 1990, 2000, and 2010 to determine whether there have been changes in the impact of these variables in these years. State level data is used for the statistical analysis. The result shows that the determinants of crime varied by both the category of crime and the period of study. In addition, government spending on welfare and education were not significant in 1990, but become more significant for the 2000 and 2010 samples.

Key words: crime rate, determinants of crime, government spending.

INTRODUCTION

Crime affects American society originating from both domestic and international origins. Society is inundated by newsworthy events of criminality among media outlets. Given the advent and proliferation of modern electronic technologies, crime flourishes among virtual and online settings. As crime rates continue to persist, researchers continue to study the determinants of crime in the society. Crime is costly for all taxpayers. Expenditures within the justice system are staggering realities of enhancing public safety. Table 1 shows the amounts of monies that were expended toward abating U.S. criminality between the years 1962 and 2014. The 2016 fiscal year is no exception regarding considerable financial investment toward supporting the justice system and diminishing criminality. According to 2016 White House budget data,

gross discretionary requests total approximately \$28.7 billion whereas net discretionary requests total approximately \$24.9 billion (White House, 2015a, b). Table 1 shows the expenditures by selected U.S. government agencies toward abating U.S. criminality between 1962 and 2014.

It has been almost fifty years since the seminal paper on the determinants of crime by Becker (1968) ignited interest in the economic determinants of criminality, and redirected an understanding of the causes of crime from a purely social view to an economic view particularly among economists. In this paper, Becker argued that criminality is a personal decision based on the possibility of obtaining financial and other rewards compared to undertaking other legal work. Earlich (1973) extended

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Table 1. Expenditures toward abating U.S. criminality (1962-2014) (The Marshall Project, 2015; The Cost of Crime Fighting).

Entity	Expended amount
Federal Bureau of Investigation	\$178.3 billion
U.S. Attorneys and Marshals Service	\$162.2 billion
Bureau of Prisons	\$151.6 billion
Office of Justice Programs	\$130.1 billion

this study by introducing the role of opportunity cost of being caught as a determinant of criminal activity. In his study, he incorporated both the cost of punishment and the potential returns from criminal activity (Engelen et al., 2015). The implication of this study was that deterrence alone may not be adequate to deal with crime, but that other factors such as job opportunity and compensation were also important considerations.

Recently, economists have incorporated both sociological and economic factors in trying to understand the causes of criminal activity (Cochran & Chamlin, 2000; Detotto & Otranto, 2010; Yildiz, Ocal, & Yildirim, 2013; and Engelen, Lander, & van Essen, 2016). This is more glaring when the interest is to understand the spatial variations in the rates of crime in various localities. Many studies have used individual level data given the assumption that criminal activity is an individual decision. They argue that to understand criminal activity, individual data was necessary (Yildiz et al., 2013). The problem with this view is that it may explain the decision to commit crime from an individual point of view, but is flawed when it comes to explaining the role of environmental and economic forces on criminality. The aim of this paper is to explain the role of state government spending and economic variables on crime rates, and to compare these effects of these variables for three different years, 1990, 2000, and 2010. This is important because there has been a marked difference in the treatment of crime by the legal system over these time periods.

Our study contributes to the literature on criminality by studying the variations in the significance of governments spending and economic variables over these three years. This study uses state-level data derived from various sources including the Census Bureau and FBI crime statistics for 1990, 2000, and 2010.

The theoretical basis for this study is the social disorganization theory and social control theory of crime. The social disorganization theory posits that the physical and social environments an individual finds himself in are the main determinants of the ultimate decisions made by the individual in terms of whether to commit crime or not. Under this theory, poorly maintained environments with lack of amenities and opportunities, high unemployment rates and poverty rates, and poor school systems are more likely to experience high crime rates. Social control theory on the other hand implies that individual commit

crime in environments in which there are no social controls such as government laws, schools, churches and families. The implications of these theories are that economic factors such as unemployment rate, poverty rate, and government participation in the form of government spending on welfare, education, protection could be used to predict variations in crime rates among various regions of the United States.

LITERATURE REVIEW

The determinants of crime have been examined from a variety of perspectives including social and economic over the years. The original studies, dominated by sociologists, emphasized behavioral aspects of the causes of crime including biology (Munkner et al., 2003; Ghoreishi et al., 2015), maltreatment in childhood and criminality in adolescence and adulthood (Maughan and Moore, 2010; Yun et al., 2011; Silva et al., 2012), drug use (Skårberg et al., 2010). Various aspects of the determinants of crime have been investigated by both sociologists and economists over the years. While sociologists concentrated of behavioral aspects such as mental behavior, emotional condition, opportunity, and external controls, economists have concentrated on the effects of economic variables such as unemployment, poverty rates, economic growth, net benefit, and government spending. The results have in some cases not been conclusive.

Other perspectives involve considerations of opportunity theory and motivation theory. Opportunity theory incorporates the basic premise of economic market theory for describing and predicting interactions between criminals and victims (Cook, 1986). Motivation theory is commensurate with reasoned action theories involving notion that human motivations are influenced by social norms and personal attitudes (Gottschalk, 2010). Economic conditions and crime involve considerations of motivation versus opportunity within the contexts of business cycles (Cantor and Land, 1985). Two perspectives are associated with this notion: (1) alterations of criminal motivations via considerations of the effects of altering economic conditions regarding social controls and social strains, and (2) influences affecting the vulnerabilities and availabilities of possible

criminal targets thereby impacting the quantity of potential opportunities for criminality (Cantor and Land, 1985). Strong economic conditions may contribute toward decreases of property crime via reductions of criminal motivations (Arvanites and Defina, 2006).

Crime has been explored from a variety of societal perspectives. Waters et al. (2005) indicate that interpersonal violence costs represent approximately 3.3% of the U.S. gross domestic product. Regarding substance abusers, Mauser et al. (1994) indicate that the benefits of treatment programs outweigh their costs. Mauser et al. (1994) also indicates that diverting offenders into treatment results in less cost than incarceration.

The relationship between crime and unemployment rate has been found to be positive by many researchers (Raphael and Winter-Ebmer, 2001), however, Yildiz et al. (2013) assert that the relationship between unemployment and crime in the literature is ambiguous. The ambiguity could be explained by two views. First, unemployment increases the supply of criminals as their opportunity cost of crime increases. Secondly, unemployment reduces the supply of victims as potential victims now stay home reducing the opportunity for criminals to steal from them (Melick, 2003). In their study of the effects of social and economic variables on crime rate, Yildiz et al. (2013) used individual level data between 2002 and 2009 to determine the effects of socio-economic variables on the number of criminals, and found unemployment rate to marginally increase the number of criminals. Fallahi et al. (2012) studied the effect of unemployment on various crime rates in the USA for the period 1978 to 2004 and found that unemployment rate had a negative effect on burglary rate and a positive effect on auto crime rate in the short run while unemployment volatility had a positive long-run effect on motor vehicle theft rate only, but no effect on burglary rate in the long run. Other authors have found the unemployment rate to reduce crime rate because as unemployment increases, people stayed home reducing the opportunity for criminals to steal from them. In addition, it reduces the wealth available for criminals. Buonanno et al. (2014) examined crime rates versus economic conditions between the years 1970 and 2010. Although the crimes rates responded positively to variation among rates of unemployment, no substantial evidence was shown regarding an asymmetric response to negative and positive economic cycle variations (Buonanno et al., 2014).

Over 70% of all offenders recidivate within five years after they are released from confinement (McElreath et al., 2015). Hall et al. (2015) indicate that higher amounts of economic freedom within a state exhibit decreases of recidivism among parolees. With respect to economic freedom among labor markets, a 1% increase of freedom exhibits an approximate 0.67% decrease of recidivism (Hall et al., 2015). Within an economy, the presences of

construction jobs and low-skill manufacturing opportunities are associated with substantial decreases in the quantities of individuals whom recidivate (Schnepel, 2014).

Another determinant of crime that has been studied by economists is the gross state product. It is suggested that criminal activity increases and decreases with increases and decreases in economic activities because this affects the ability of the state to provide the social welfare of its residents (Ali and Peek, 2009). An alternative view is that gross state product positively affects crime. This is because a growing economic comes with the availability of items that are attractive to criminals and increases their opportunity to steal.

Certainly, many more perspective exist regarding the economics of crime. The reviewed literature revealed little consideration of changes in economic conditions over time. Given the absence of such discussions within the reviewed literature, this study examines the possible changes in impact of selected economic variables and government spending on crime rates over three different periods in the United States. State level data was used for this study.

METHODOLOGY

Research design

This quantitative cross-sectional study uses a multiple regression analysis to study the relationship between government spending, economic variables and crime rates in the United States for three selected years, 1990, 2000, and 2010.

Secondary data obtained from various sources was used to estimate the factors that predict crime rates. The data used in this study covered three specific periods, 1990, 2000, and 2010.

The main source of crime data was the Uniform Crime Reporting (UCR) Program publications of the FBI. The FBI compiles crime statistics from UCR data and publishes them annually in its crime in the United States series. These crimes are grouped into two major categories namely violent crime and property crime. The violent crime category includes murder, rape, robbery, and aggravated assault while property crimes category includes burglary, larceny-theft, and motor vehicle theft. Government spending and economic data were obtained from US Census reports.

Variations in the determinants of crime over these periods were explored. While efforts were made to obtain data from reliable sources, the study is faced with certain limitations including the specific reliance on the reporting of data by the source. Table 2 shows the definition of variables used in this study.

Model specification

Given the theories previously discussed, crime rate can be expressed as:

$$\text{Crime}_{it} = f(S_{it}, E_{it}, C_{it})$$

where Crime_{it} are the crime rates, S_{it} are the spending variables expressed as $S_{it} = f(\text{WELFi}, \text{PROTi}, \text{and EDUC})$. E_{it} are the economic variables expressed as $E_{it} = f(\text{GSP}, \text{UNEM}, \text{INC}, \text{POV})$,

Table 2. Definition of variables.

WELSP	Welfare spending by both state and local government spending
PROTSP	Spending by both state and local governments on protection
EDUCSP	Spending by both state and local governments on education
GSP	Gross State Product
UNEM	Unemployment rate
INC	Median income
POV	Poverty rate
POP	State population
URBAN	Percentage of the population urban areas

Table 3. Results of the effects of government spending and economic variables on crime rates.

Variable	Violent crime					
	1990		2000		2010	
POP	-54	**	39.9	-	20.2	-
URBAN	14.36	***	5.24	**	4.59	**
GSP	3.76	-	-0.25	-	-0.825	-
UNEM	42.7	-	18.8	-	-4.7	-
INC	0.0066	-	0.0143	-	0.0115	***
POV	40.9	*	49.4	***	45.28	***
WELSP	-52.7	-	-47.5	-	11	-
PROTSP	78.8	-	51.3	*	22.98	**
EDUSP	-20.4	-	-14.15	*	-5.71	**
R2	46.3	-	51.18	-	53.8	-

***Significance at 1%, **Significance at 5%, *Significance at 10%.

and Cit are the control variables expressed as $Cit = f(POP, URBAN)$. Expanding the crime function results in the regression model:

$$Crime_{it} = \alpha_i + \beta_{11}WELL_{i1} + \beta_{12}PROT_{i2} + \beta_{13}EDUC_{i3} + \delta_{11}GSP_{i1} + \delta_{12}UNEM_{i2} + \delta_{13}INC_{i3} + \delta_{14}POV_{i4} + \lambda_{11}POP_{i1} + \lambda_{12}URBAN_{i2} + \varepsilon_i$$

Welfare spending is the amount of total spending by both state and local governments within a state for the year in question. The effect of government spending on crime rate has been of interest to economist. Meloni (2014) studied the effect of government monetary transfer on crime rates in Argentina and found that while government transfers reduced property crimes and its main categories, larceny and robbery, and aggravated assault, it had no impact on murder rate. In the same study, Meloni (2014) found that total government expenditures had no significant effect on any of the crime categories. Spending on protection has received considerable attention in the literature. Shoesmith and Klein (n.d.) studied the effect of police expenditure on arrests in the United States and found a positive relationship between police expenditure and arrests however, Kolliasa et al. (2012) found that public spending on crime does not have any effect on crime rates in Greece. The effect of education spending on crime rates has not been studied extensively. Most of the researches on the effect of education deal with the amount of education on individual decision to commit crime. Fella and Gallipoli (2014) studied the effect of high school completion on crime rate in Pakistan, and found high school

graduation to be negatively related to crime. The unemployment rate has been studied extensively with missed results. While unemployment was found to reduce property crime it had no significant effect on violent crime rate (Meloni, 2014).

RESULTS

The purpose of this study was to determine the impacts of economic variables and government spending on crime rates in the United States. To perform this study, nine classifications of crime were studied including violent crime and property crime, and their sub-categories (murder, robbery, assault, rape, motor vehicle, burglary, and larceny theft). The effects of these variables were obtained and compared over three periods including the years 1990, 2000, and 2010. Tables 3 to 11 present the results of regression analysis of the effects of government spending and selected economic variables on crime rates.

Violent crime

The results show that urban population and poverty rates

Table 4. Results of the effects of government spending and economic variables on crime rates.

Variable	Murder					
	1990		2000		2010	
POP	-3.14	-	0.25	-	0.192	-
URBAN	0.296	**	0.0993	-	0.051	*
GSP	0.138	-	-0.0014	-	-0.006	-
UNEM	0.96	-	-0.568	-	-0.158	-
INC	0.00018	-	0	-	0	***
POV	1.412	***	1.538	***	0.916	***
WELSP	-1.1	-	-0.544	-	0.008	-
PROTSP	1.56	-	1.435	**	0.312	**
EDUSP	-0.381	-	-0.386	**	-0.082	**
R2	25.3	-	47.14	-	62.6	-

***Significance at 1%, **Significance at 5%, *Significance at 10%.

Table 5. Results of the effects of government spending and economic variables on crime rates.

Variable	Robbery					
	1990		2000		2010	
POP	-1	-	-0.8	-	1.3	-
URBAN	2.02	**	2.129	**	2.133	**
GSP	-0.07	-	-0.07	-	-0.2	-
UNEM	2.03	-	4.56	-	2.48	-
INC	0.007	***	0.0058	***	0.007	***
POV	21.61	***	17.89	***	19.97	***
WELSP	1.85	-	1.14	-	4.34	-
PROTSP	17.1	-	19.32	***	11.24	**
EDUSP	-4.47	-	-4.88	***	-2.82	**
R2	54.01	-	49.57	-	51.17	-

***Significance at 1%, **Significance at 5%, *Significance at 10%.

Table 6. Results of the effects of government spending and economic variables on crime rates.

Variable	Assault					
	1990		2000		2010	
POP	1.8	-	-0.06	-	-0.494	-
URBAN	-13.8	-	26.4	-	15.6	-
GSP	23.3	-	17	-	-5.8	-
UNEM	7.14	***	2.54	-	2.4	*
INC	0.00233	-	0.00689	-	0.0044	-
POV	21.9	*	28.1	**	23.37	***
WELSP	-44.1	-	-37.1	-	4.4	-
PROTSP	56.5	-	30.2	-	10.7	-
EDUSP	-14.74	-	-8.41	*	-2.66	-
R2	44.75	-	41.55	-	30.89	-

***Significance at 1%, **Significance at 5%, *Significance at 10%.

Table 7. Results of the effects of government spending and economic variables on crime rates.

Variable	Rape					
	1990		2000		2010	
POP	-0.0624	*	-0.0513	-	-0.127	***
URBAN	2.29	-	2.23	-	3.13	*
GSP	-0.91	-	-0.45	-	-1.22	-
UNEM	-0.017	-	0.02	-	0.009	-
INC	0	-	0.0003	-	0.0004	-
POV	0.0003	-	0.596	-	1.032	-
WELSP	0.551	-	-1.47	-	-2.28	**
PROTSP	2.78	-	1.208	-	0.729	-
EDUSP	-0.703	-	-0.296	-	-0.141	-
R2	7.65	-	7.39	-	16.63	-

***Significance at 1%, **Significance at 5%, *Significance at 10%.

Table 8. Results of the effects of government spending and economic variables on crime rates.

Variable	Property Crime					
	1990		2000		2010	
POP	214.2	**	173.9	**	163.1	**
URBAN	15.18	**	13.71	**	13.47	**
GSP	-4.09	***	-3.8	*	-2	-
UNEM	10.3	-	-1.6	-	17.9	-
INC	0.0218	-	0.0182	-	0.017	-
POV	111.8	***	114.5	***	103.3	***
WELSP	-52.1	-	-16.3	-	-73.4	-
PROTSP	178.7	**	88.6	*	71.2	**
EDUSP	-45.3	**	-21.5	*	-18.7	**
R2	52.1	-	49.2	-	52.65	-

***Significance at 1%, **Significance at 5%, *Significance at 10%.

Table 9. Results of the effects of government spending and economic variables on crime rates.

Variable	Motor vehicle					
	1990		2000		2010	
POP	30.7	*	30.2	*	31.9	*
URBAN	7.34	***	7.4	***	7.41	***
GSP	-0.777	**	-0.77	*	-0.873	*
UNEM	10.7	-	13	-	11.2	-
INC	0.0114	***	0.0105	***	0.0109	***
POV	35.24	***	32.43	***	33.98	***
WELSP	1.78	-	1.5	-	3.8	-
PROTSP	21.5	-	14.71	-	9.49	-
EDUSP	-5.53	-	-3.64	-	-2.34	-
R2	72.97	-	73.67	-	73.57	-

***Significance at 1%, **Significance at 5%, *Significance at 10%.

Table 10. Results of the effects of government spending and economic variables on crime rates.

Variable	Burglary					
	1990		2000		2010	
POP	68	-	114.5	***	58.8	***
URBAN	12.22	***	2.55	-	1.25	-
GSP	-1.04	-	-2.1	-	-0.895	-
UNEM	7.5	-	30.3	-	19.2	-
INC	0.0131	-	0.00976	-	-0.0014	-
POV	48.1	***	36.2	***	30.8	***
WELSP	-64.3	-	-57.3	-	-13.3	-
PROTSP	82	-	13.6	-	19.3	**
EDUSP	-19.7	-	-4.2	-	-5.02	**
R2	41.62	-	45.15	-	57.87	-

***Significance at 1%, **Significance at 5%, *Significance at 10%.

Table 11. Results of the effects of government spending and economic variables on crime rates.

Variable	Larceny theft					
	1990		2000		2010	
POP	1.92	-	-1.98	-	-0.67	-
URBAN	-18	-	142	-	90.6	*
GSP	-84	-	199	**	-3.9	-
UNEM	35.48	***	19.04	***	8.59	**
INC	-0.0025	-	-0.0102	-	0.01079	-
POV	31.1	-	-3.1	-	47.6	***
WELSP	-101.4	-	-156.2	-	-62.7	*
PROTSP	72	-	85.6	-	39	*
EDUSP	-15.4	-	-23	-	-10.38	*
R2	42.29	-	37.72	-	34.98	-

***Significance at 1%, **Significance at 5%, *Significance at 10%.

were positively significant determinants of violent crime rate in the 1990, 2000, and 2010 samples. In 1990 sample, only total population, urban population, and poverty rate were significant. In 2000 urban population, poverty rate, and government spending on education and protection were significant determinants of crime rate. By 2010, urban population, median income, poverty rate, and government spending on education and protection were significant determinants of crime rate. While the poverty rate urban population, poverty rate and median income, and government spending on protection were positively associated with crime rate, government spending on education was negatively related to crime rate.

Violent crime: Murder, robbery, assault, and rape

Tables 3, 4, 5, 6, and 7 present the results for violent

crime, murder rate, robbery rate, assault rate, and rape rate respectively for 1990, 2000, and 2010. Urbanization and poverty rates were significant determinants of murder rate in the 1990 sample while the 2000 sample shows that poverty rate and protection spending positively impacted murder rate while education spending negatively impacted murder rate. For the 2010 sample, urbanization, median income, poverty rate, and protection spending positively impacted murder rate while government spending on education negatively impacted murder rate. In the 1990 sample, urbanization, and poverty rate were positively related to robbery rate. The results showed that urbanization, median income, and poverty rate increased robbery rate during all three periods. Protection spending was positively related to robbery rate in 2000 and 2010 while government spending on education reduced the robbery rate during the same period.

Poverty rate was found to be positively associated with assault rate in 1990, 2000, and 2010. The unemployment rate increased assault rate in 1990 and 2010 while government spending on education reduced assault rate only in the 2000 sample. Rape rate was found to be negatively related to state population in both the 1990 and 2010 samples. Urbanization was positively related to rape rate in the 2010 sample. Government spending on welfare negatively impacted rape rate only in the 2010 sample.

Property crime: Motor vehicle crime, burglary rate, larceny crime

The results for property crime rates are presented in Tables 8, 9, 10, and 11. Property crime rates are compiled for motor vehicle crime rate, burglary rate, and larceny crime rate. For the years 1990, 2000, and 2010, the factors that significantly impact property crime rate were stable over the period. The results show that total population, urban population, poverty rate, government spending on protection, and spending on education were significant during these periods. Gross state product significantly reduced property crime rate in 1990 and 2000, however it was not significant in 2010. Population, urbanization, poverty, and spending for protection had positive impacts on property crime rate while spending on education reduced property crime rate in the 1990, 2000, and 2010 samples.

Motor vehicle crime

The result of the analysis of the determinants of motor vehicle crime rate is presented in Table 9. The determinants of motor vehicle crime rate were stable over the period in the study. Total population, urbanization, median income, and poverty rates were positively significant determinants of motor vehicle crime rate. Gross state product significantly reduced motor vehicle crime rate. Government spending did not have any significant impact on motor vehicle crime rate in 1990, 2000, or 2010.

Burglary rate

Table 10 presents the result of the regression analysis for burglary rate. In the 1990 sample, urbanization, and poverty rate significantly increased burglary rate. In the 2000 sample, total population and poverty rate had positive and significant impact on burglary rate. The result shows that for the 2010 sample, total population, poverty rate, and spending on protection were positively significant while government spending on education significantly reduced burglary rate in 2010. The impact of

poverty rate on burglary rate was stable over the period of study.

Larceny theft

Table 11 shows the result of the regression analysis for larceny theft rate. In the 1990 sample, only unemployment was positively significant. In the 2000 sample, unemployment rate and gross state product were positive and significant. In the 2010 sample, urbanization, unemployment rate, and poverty rate had positively significant impact on larceny rates. Both total welfare spending and education spending negatively impacted larceny theft rates, while spending on protection was positively associated with larceny crime rate. A comparison of the determinants of larceny rate was stable for the unemployment rate.

DISCUSSION

The purpose of this study was to determine the impact of the economy and government spending on crime rate in the United States. Regression analysis was performed for the years 1990, 2000, and 2010. The results were compared to see whether the determinants were stable over the period. For the economic variables, poverty rate was the most important determinant of crime rate for all categories of crime. In most cases, poverty rate had positive and significant impact. The results for unemployment, median income, and gross state product varied from crime category to crime category, and varied from one year to the other.

Government spending was found to be a significant determinant of crime rate but the effect was not consistent. Previous studies have also come up with inconclusive results. In their study, Kolliasa et al. (2012) found that public spending on crime did not reduce crime rate in Greece. The analysis showed that government spending on welfare, protection, and education were more significant in 2000 and 2010 than in 1990. In most cases, total spending on welfare was not significant.

Controlling crime in the United States continues to pose major problems for policy-makers. The various governments have undertaken policies ranging from spending on protection, education, and welfare for low income families as means of fighting crime. Views abound about the effects of these programs on the reported crime rates. While some economists argue that programs such as spending on welfare reduce the crime rate by reducing the assumed justification to commit crime (Hannon and Defronzo, 1988), others argue that they increase the crime rate by creating a sense of entitlement and reducing the incentive to seek legal employment, or have no effect on the crime rate (Worrall, 2005).

This study has some implications for how policies to combat crime should be pursued. First, policies should be designed differently for specific types of crime. Spending on welfare was found not to be a significant determinant of both violent crime and property crime in most cases. This means that fighting crime should not be used as a reason for increasing welfare spending however, since all crime rates increase with the poverty rate, designing welfare spending to alleviate poverty might impact the crime rate negatively. It is important to note that the impacts of government spending particularly on education significantly reduced the crime rate in the 2000 and 2010 samples in most cases, but had no significant effect on the crime rate in 1990 sample. This might be an indication of the need to regularly evaluate government spending on education to ensure that they achieve their objective of reducing the crime rate in the changing environments.

The result for police protection was not expected. In most of the samples, spending on protection had a positive relationship with crime rate however this was not significant in some cases. Protection spending was not significant in the 1990 sample but became significant the many of the 2000 and 2010 regressions. It is possible that this unexpected result was due to the omission of an important variable, or a problem of causal relationship between protection spending and crime rate.

A comparison of the violent crime and property crime regressions show a marked difference in the determinants of crime rates between 1990, 2000, and 2010. In the property crime regression, the variables that affect the crime rate appeared to be stable in the 1990, 2000, and 2010 samples. In the case of violent crime there was a marked change in the effects of the determinants between 1990 sample and the 2000 and 2010 samples. This might be due to improvements in government spending, particularly education spending, as more information are obtained about the crime rate.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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