

Understanding the Size of State Criminal Justice Systems:

An Empirical Study of Two Alternative Public Choice Models

J. Ramón Gil-García*

Recepción: 24 de marzo de 2003

Aceptación: 26 de mayo de 2003

* Profesor Investigador Asociado (Profip) en la División de Administración Pública del Centro de Investigación y Docencia Económicas y Profesor de la Facultad de Ciencias Políticas y Administración Pública en la Universidad Autónoma del Estado de México. Actualmente estudia su doctorado en Administración Pública en el *Rockefeller College of Public Affairs and Policy, University at Albany* y colabora en varios proyectos de investigación como *Research Project Assistant* en el *Center for Technology in Government, University at Albany*

Entendiendo el tamaño de los sistemas estatales de justicia criminal. Un estudio empírico de dos modelos de elección pública.

Resumen. El propósito de este estudio es entender los determinantes del tamaño de los sistemas de justicia estatales en los Estados Unidos, así como analizar comparativamente el desempeño de dos modelos de elección pública para explicar esta variable. Se presentan dos modelos de los determinantes del crimen con la finalidad de mostrar diferentes aproximaciones a este fenómeno social. La evidencia indica la importancia de los votantes y los grupos de interés en la definición del tamaño de los sistemas de justicia estatales. El ingreso medio, salario de los jueces, educación y nivel de pobreza son las principales variables explicativas.

Palabras clave: sistemas de justicia, análisis comparado, crimen, elección pública, estatal.

Abstract. The purpose of this study is to understand the determinants of the size of the state criminal justice systems in the United States and analyze the comparative performance of two public choice models in explaining this variable. Two models of the determinants of crime are presented, in order to show different approaches to this social phenomenon. This paper presents evidence that confirms the importance of voters and interest groups in shaping the size of the state criminal justice systems. Median income, salary of judges, education, and poverty were found to be the most important explanatory variables.

Key words: justice systems, comparative analysis, crime, public choice, state.

Introduction

Most people agree that justice system is an important element of a government in any social and economic reality. Crime is and has been one of the biggest problems that society needs to deal with. Many disciplines try to understand the social problem of crime and develop policy tools to address it. In economics, various scholars, such as, for example, Becker (1968) and Ehrlich (1970, 1973, 1975) developed interesting models of the determinants of crime and possible deterrents for it. These economic models offer ideas on the causes of crime that differ from the common wisdom.

In addition, there are two important public choice models to explain government decisions: median voter and interest groups. The purpose of this study is to analyze the comparative performance of these two public choice models in explaining the determinants of the size of the state criminal justice systems in the United States.¹

1. A study developed by Congleton and Bennet (1995) is used as a methodological referent. These authors present an interesting way to compare the relative performance of median voter model and special interest groups model in explaining state expenditures on highways.

The main determinants of crime, in the economic models, are the severity and probability of punishment. It is very difficult to understand the size of the criminal justice system without looking at some determinants of crime. The economic model of crime and some alternative views are presented in greater detail in the first section of this paper. Based on data from the United States, four multiple regression models are developed and some related ideas are briefly discussed.

In the next two sections (2 and 3) the median voter model and the interest group model are explained. Different components of these two public choice models are identified and related to specific characteristics of the problem of crime and public expenditures in the criminal justice systems. Justice systems are public goods in the economic sense of the term; they possess the two characteristics of a pure public good that many authors, such as Sexton (1995) or Mankiw (2001) have identified:² a) non-rival consumption, and b) non-excludability. It appears that one of the best solutions for dealing with public goods is for the government to provide them. It is often supposed that this arrangement reduces the *free rider*³ problem as well as the monopoly power. For this reason, criminal justice systems are provided by the government and are funded through taxes.

Section four presents an empirical study of U.S. government direct expenditures in criminal justice systems. An Ordinary Least Squares (OLS) regression analysis is performed. Reduced and extended form models of median voter demand and interest group competition are estimated using cross-sectional data from the United States. The results of this statistical analysis are discussed and some relationships among different variables and theory are emphasized. The last section presents some reflections on the empirical study, some conclusions, and some ideas for future areas of research within this topic.

1. The Determinants of Crime

Many explanations for the social problem of crime are possible. Some of them take into account socio-economic

2. Other scholars, such as Stiglitz (1989), establish these characteristics in a different way. In his opinion, the main properties of a pure public good are related to the feasibility and desirability of consumption rationalization.

3. The 'free rider' problem is perennial to the distribution of public goods. As a consequence of the characteristic of non-excludability, individuals do not have incentives to contribute to the cost of the good, and may try to benefit from the good without sharing in its cost.

and demographic information such as poverty, education, population density, and unemployment. Some economists have created an economic theory of crime that explains criminal activity based on rational individual choice. Witte (1980) establishes that there are two main schools of the economic theory of crime. The first one has relied most heavily on Becker's work (1968) and is best represented by the work of Isaac Ehrlich (1970, 1973, 1975). Block and Lind (1975a, 1975b), and Block and Heineke (1975) have developed an alternative economic approach.

In the model developed by Ehrlich (1973), the individual maximizes his expected utility, which is a function of wealth and time in consumption activity. Ehrlich's statistical results showed that a relative increase in legal wages would reduce the incentive to participate in illegal activity, assuming absolute risk aversion. In addition, an increase in either the probability of apprehension and conviction or the severity of the punishment if convicted reduces the incentive to participate in illegitimate activities. Finally, the deterrent effect of 1 percent increase in the marginal or average penalty per offense will exceed or fall short of that of a similar increase in the probability of apprehension and punishment if the offender is a risk avoider or a risk preferer, respectively.

Building on the finding about the probability of apprehension and the severity of the punishment as disincentives for crime, many other scholars have tried to get more empirical evidence using different sets of data. Witte (1980), analyzing individual data, found that certainty of punishment has a greater deterrent effect for those who would commit relatively minor offenses, and increased severity of punishment has a greater deterrent effect for those who would commit greater crimes. Cook (1977) summarizes the conclusions from one survey of aggregate work that attempts to estimate the deterrent effect of criminal justice sanctions. He establishes that there is strong evidence that an increase in the threat of punishment can reduce the amount of some crimes in some circumstances.

It is not the purpose of this work to test the economic model of crime. However, it is necessary to understand the main determinants of crime as suggested by those models. These determinants are going to be used for the expanded models in section four. A general specification of the equation suggested by the reduced economic model of crime can be the following:

$$C = C (CP, SP, OV)$$

C represents the amount of expected crime (total number of offenses), CP is the certainty of punishment, SP is the

Table 1. Determinants of violent and property crimes in the states (USA).

Variable	Violent Crime (economic model of crime)	Violent Crime (socio-demographic factors) ⁴	Property Crime (economic model of crime)	Property Crime (socio-demographic factors)
Constant	-3471.04 (-3.743)***	-29.413 (0.0)	3941.2 (2.08)**	36739 (0.257)
State Population	3.934 E-3 (28.204)***		5.58 E-3 (19.581)***	
Crime Deterrent Effect (Severity*Probability)	-143.99 (-6.784)***		48.111 (1.109)	
Percentage of People with High School		-99.052 (-0.106)		-442.086 (-0.296)
Percentage of People in Poverty		1303.78 (0.974)		1863.42 (0.866)
Population Density		26.299 (1.422)		37.132 (1.25)
R-square	0.957	0.071	0.929	0.068
F-statistic	411.998	1.073	242.7	1.015
S.E. of the Estimate	4729.76	20872.29	9664.25	33541.29

T-statistics are in parentheses under coefficient values. Those followed by * are significant at the 10 percent level, those followed by ** are significant at the 5 percent level, and those followed by *** at the 1 percent level.

severity of punishment if convicted, and OV represents other variables that can be included in the model. Four different variations of this model were developed (Violent Crime-Economic Model of Crime, Violent Crime-Socio-demographic Factors, Property Crime-Economic Model of Crime, and Property Crime-Socio-demographic Factors). Regression estimates were calculated using Ordinary Least Squares (OLS) and the results are shown in table 1.⁵

It is interesting to see that the two models that follow the prescription of the economic model of crime fit the data better. We cannot be completely sure of this, because the specification of the models or the way in which the variables were operationalized could impact the findings of our regression.

2. The Median Voter's Demand for Criminal Justice System

The median voter model holds that, under general circumstances, the demand for public sector output in a democracy is the median voter's demand (Holcombe 1989). So, in majority-rule systems, the median voter's demand represents, in some sense, the aggregated demand of the society (voters). However, some scholars have found evidence of the fragility of this model. Arrow (1951) describes plausible conditions under which majority rule will not produce a determinate equilibrium. The work of Niskanen (1971), Romer and Rosenthal (1978), and McKelvey (1976) have been considered a critique of the median voter model.

Contrary to these authors, Mueller (1976, 1989) discusses that there are several empirical studies that serve to reinforce the conclusion that, in general, empirical work on the subject is consistent with the median voter model. Holcombe (1989), referring to the plausibility of the median voter model, establishes some important ideas: a) it is not necessarily true that multiple peaked preferences will lead to indeterminacy; b) saying the model is descriptive does not necessarily imply that median voters will always get what they want; and c) the alternatives do not have to be related to each other in any manner other than being able to be placed on the continuum so that there are not multiple peaked preferences.

In the particular case under consideration, median voters' demands are the result of their preferences, their income, and the cost of the criminal justice system. As Chicoine *et al.* (1989) state, the median voter's demand for a service,

4. In the first model of crime determinants, population was included, but 'state population' affected the signs of other variables. 'State population' was dropped from the model and it was expected that population density could replace some of the information we lost by not including state population. There are stronger theoretical reasons to keep our other variables. They are mentioned in most of the literature on the determinants of crime: education, poverty, and population density (or percentage of people who live in cities). Unemployment was also dropped from this first model, because it is highly correlated with percentage of people in poverty. It seems that these two variables were measuring the same dimension of the crime's construct.

5. In section four, different measurements used to operationalize the variables are presented, as well as the sources of each piece of data.

in this case for the criminal justice system, is assumed to depend on both income levels and tax prices, and that any government spending far from the median will be forced to leave the 'office'. However, criminal justice spending seems to be a multidimensional decision. Within the criminal justice system we can find law enforcement agencies, courts, prosecutors, corrections, etc. Holcombe (1989) says that in many multidimensional issues, it is expected that median voters analyze the issue as a whole.

3. Interest Groups and the Demand for Criminal Justice System

Another important public choice model is the interest group model. It can be considered as the main competitor of the median voter explanation. Stigler (1971), Peltzman (1976), and Becker (1983) have developed different explanations about the influence of interest groups in the decision of the legislators. In all models the size of the group is very important, but the specification of the variables and their implications are different from one model to the other.

Stigler (1971) thinks of regulators as utility maximizers. They use policy outputs to maximize direct and indirect support. Direct support is represented by the number of votes that an interest group can provide to the legislator. Indirect support is the amount of money that an interest group is willing to give to the legislator for his or her political campaigns. Indirect political support is a function of the amount of money individuals can expect to receive as a result of the policy output and the cost of organizing in their pressure group. Direct political support is a function of the size of the group and the expected per capita gain for the members of the group. In Stigler's model, relatively small and concentrated groups (producers) tend to win, because the information and organization costs are smaller than in large groups.

Becker (1983) also emphasizes the importance of group size and cost of organizing. His main contribution is the explanation of the nature of policies not only as distribu-

tive mechanisms, but also as efficient outcomes. He explains that the bigger the deadweight loss, the bigger the damage for some groups, the bigger the willingness of some groups to organize against that policy decision. The principal implications of his model are: a) we should see efficient policies, because they reduce the deadweight loss, and b) transfers should be achieved at low deadweight loss.

On the other hand, Peltzman (1976) developed a model that includes some consumers as beneficiaries from the regulation. He establishes that coalitions can work better if consumers are allowed to benefit from policies. In his model, political support is a function of prices and profits. The resulting prices are going to be somewhere between the monopoly price and the competition price. The shape of the demand curve and the relative organizational capabilities of the different groups determine the equilibrium price. Thus, the markets that are going to be regulated first are the ones with prices very close to the monopoly prices or the competitive prices, because these markets represent high benefits for regulators.

In this paper, the assumption is that interest groups are rent-seeking agents. They try to influence direct expenditures of the criminal justice system, because they get some benefits (rents). Some interest groups get more benefits from large direct expenditures, and some others prefer small direct expenditures in criminal justice systems.⁶ The size of the group and the amount of the expected gain are the main components of the resulting policy outcome.

4. Why do States Have Differently Sized Criminal Justice Systems?

There might be different explanations for the relative sizes of the criminal justice systems in various states of the U.S. This paper tries to generate some empirical evidence regarding the performance of two public choice models in explaining the relative sizes of criminal justice systems of the 50 states and the District of Columbia.

The current 'supply' of criminal justice system could be seen as the percentage of total direct expenditures dedicated to it. This percentage is a good measure of the relative effort of different states to have a good criminal justice system. Four different models were developed to understand the determinants of direct expenditures on the criminal justice system. Data for direct criminal justice expenditures and salaries of judges,⁷ are taken from the *Sourcebook of Criminal Justice Statistics 2000*, supported by the Bureau of Justice Statistics of the United States Department of Justice.⁸ The *March Current Population Survey (1998)*

6. The groups that prefer small direct expenditures in criminal justice are not always thought as against the criminal justice system. They might be private groups that provide substitute goods. Thus they would like a large budget for criminal justice, but not for direct expenditures.

7. Salary of judges per thousand of habitants is used as a proxy of the per capita cost for the criminal justice system.

8. Data used for this paper vary from 1997 to 2000. The online version of this document can be found at the University at Albany (SUNY) Web page: www.albany.edu/sourcebook

Table 2. Descriptive statistics of dependent and independent variables.

Variables	Mean	Standard deviation	Maximum	Minimum
Direct expenditure in criminal justice system/total direct Expenditure of the State	6.78%	1.56%	12.23%	3.86%
Median income	\$36,266.12	\$5,403.83	\$50,992.00	\$26,657.00
Salary of judges/thousand of habitants	\$77.76	\$69.62	\$256.44	\$4.53
State population	4,063,935	5,666,186.22	33,037,000	433,000
Number of persons executed since 1977	15.52	38.21	239	0
Percentage of automated files	81.86	25.28	100	0
Number of persons executed*Percentage of automated files (Crime deterrent effect)	14.07	37.52	239	0
Percentage of people with high school	83.1	4.29	92.1	75.4
Percentage of people in poverty	11.9	3.2	20.5	7.2
Population density	119.15	182.87	898.49	.84
Average annual salary of lawyers	\$64,869.35	\$11,399.06	\$91,951	\$43,788.5
Availability of private correctional facilities	3,034.26	5,073	27,139	150

conducted by the U.S. Bureau of Census (Department of Commerce) provides the data on median income. Median state income is used as a proxy for median voter wealth. State population is obtained from the *Population Estimates Program* (Population Division of the Bureau of Census). The severity of punishments is represented by the number of persons executed by state since 1977 published in *Capital Punishment 2000*, an annual publication of the Office of Justice Programs, U.S. Department of Justice. The percentage of automated files from the *Survey of Criminal History Information Systems 1997* is used as a proxy for the certainty of punishment variable. The crime deterrent effect is calculated from the severity of punishment multiplied by certainty of punishment. Education, represented by the percentage of people with high school degrees is obtained from the *Educational Attainment in the United States (Update)* publication of the Bureau of Census. Data for percentage of people in poverty are obtained from *Poverty in the United States: 2000*, published by the Bureau of Census. Population density is calculated using total state areas from *Census 2000 Summary File 1*, also from the Bureau of Census.

Lawyers are assumed to be the principal interest group supporting high expenditures in the criminal justice system. The Average Annual Salary of Lawyers from the *Earnings by Occupation and Education 1990*, supported by the Government Information Sharing Project,⁹ is used as a proxy for the expected benefits or gains for this interest group. The availability of private correctional facilities¹⁰ represents the interest groups against direct expenditures in the criminal justice system, who would prefer transfers to private facilities/agents that provide some of the services.

Some descriptive statistics are shown in table 2. It is interesting to see the variation among the different states. Percentages of direct expenditures in various criminal jus-

tice systems range from 3.86% in North Dakota to 12.23% in the District of Columbia. Annual median income varies from \$26,657 in West Virginia to \$50,992 in Alaska. Salary of judges per thousand of habitants ranges from \$4.53 in California to \$256.44 in Kentucky. State population ranges from 433,000 in Montana to 33,037,000 in California. Number of persons executed ranges from 0 in several states to 239 in Texas. Percentage of people with a high school education has a lower range, varying only from 75.4% in Kentucky to 92.1% in Alaska. Percentage of people in poverty ranges from 7.2% in Maryland to 20.5% in New Mexico. Finally, population density varies from 0.84 in Alaska to 898.49 in New Jersey.

According to the median voter model, a positive sign is expected in median-voter wealth (median income), and a negative sign is expected in the cost of the criminal justice system (salary of the judges per thousand of habitants). For the extended models, a positive sign is expected in population, and a negative sign in the crime deterrent effect. From the different models of crime developed in an earlier section of this paper, it is assumed that the crime deterrent effect is negatively related to the number of crimes. It is also supposed that if the number of offenses increases, the percentage of direct expenditure in the criminal justice system also increases. Therefore, an increase in the deterrent affect would have a negative impact in the direct expenditures for criminal justice system.

A negative sign is expected in education and positive relations are expected for percentage of people in poverty and population density. Interest group models imply that the average annual salary of lawyers has a positive relation with

9. The Web page of this project is: govinfo.kerr.orst.edu

10. Data for private correctional facilities are also taken from the *Sourcebook of Criminal Justice Statistics 2000*.

the percentage of direct expenditures for criminal justice system. A negative sign is expected for the availability of private correctional facilities.

Ordinary least squares estimates for the different models are reported in table 3. In general the interest groups models seem to perform better, with an average R-square higher than the median voter models (0.3556 and 0.3543 respectively), but the difference is extremely small and cannot really be taken as an indication of the higher performance of the interest groups models. Columns one to three of table 3 show the different variations of the median voter model. In the first model only median income and salary of judges per thousand inhabitants were taken as explanatory variables of the model. The second column incorporates state population and crime deterrent effect to the reduced median voter model. Column three shows the results of the median voter model using socio-demographic variables to represent crime. The second model has the smallest standard error and the highest R-square of this first set.

In the first median voter model, both estimates are statistically significant at the 10 percent level, but only salary of judges is significant at a higher level. The salary of judges and state population variables are significant at the 10 per-

cent level in the second model. Contrary to expectations, crime deterrence shows a positive sign, apparently suggesting that an increase in crime is going to have a negative impact on the percentage of direct expenditures for criminal justice system. The third median voter model shows the median income, salary of judges, and poverty statistically significant at the 10 percent level. Education presents a positive relation with the expenditure in criminal justice system, again contrary to expectations, implying that an increase in education increases the expected crime and, therefore, increases the percentage of direct expenditure in the criminal justice system.

Looking at the standardized coefficients (β) in the first model, the salary of judges (cost of the criminal justice system) seems to have a greater effect on the percentage of criminal justice expenditures, beta of -0.474. Population has a higher effect in the second model (0.342). In the third model, the cost of the criminal justice system also shows a greater effect (-0.418), followed by the median voter (median income) variable, which has a beta of 0.396.

Columns four to six present the results for three different variations of the interest group model. Column four

Table 3. State government percentage of direct expenditure in the criminal justice system.

Variable	Median voter	Median voter (economic model of crime)	Median voter (socio-economic factors)	Interest groups	Interest groups (economic model of crime)	Interest groups (socio-economic factors)
Constant	5.4 (4.405)***	4.89 (3.897)***	0.135 (0.026)	4.33 (2.475)**	4.808 (2.541)**	-8.709 (-1.324)
Median income	5.59 E-5 (1.739)*	5.53 E-5 (1.688)	9.907 E-5 (0.060)*			
Salary of judges/ Thousand of habitants	-9.42 E-3 (-3.686)***	-5.56 E-3 (-1.903)*	-8.32 E-3 (-3.127)***			
state population		7.871 E-8 (2.11)**		6.451 E-8 (1.423)	5.99 E-8 (1.125)	4.506 E-8 (0.994)
Crime deterrent effect		1.631 E-3 (0.320)			-4.301 E-4 (-0.42)	
Percentage of people with high school degree			1.98 E-2 (0.361)			0.135 (2.010)*
Percentage of people in poverty			0.156 (1.788)*			0.16 (1.813)*
Population density			1.045 E-3 (0.918)			1.25 E-3 (0.308)
Average annual salary of lawyers				3.86 E-5 (1.385)	3.37 E-5 (1.120)	3.83 E-5 (1.368)
Availability of private correctional facilities				-9.931 E-6 (-0.201)	-5.388 E-6 (-0.051)	3.98 E-6 (0.076)
R-square	0.302	0.396	0.365	0.32	0.306	0.441
F-statistic	9.296	5.740	4.607	3.759	2.092	2.765
S.E. of the Estimate	1.18	1.124	1.17	1.074	1.103	1.04
Est. Value at Means	6.69	6.81	6.71	7.07	7.22	7.24

T-statistics are in parentheses under coefficient values. Those followed by * are significant at the 10 percent level, those followed by ** are significant at the 5 percent level.

shows the regression estimates for the reduced version of the interest group model. In column number five; the model integrates the crime deterrent effect. The interest group model that includes the socio-demographic specification of the crime, showed in column 6, seems to have the best performance in explaining the direct criminal justice expenditures. This model has an R-square of 0.441 and a standard error of 1.04.

In the first two interest group models none of the variables are statistically significant. This seems to indicate the uniqueness of our population. However, the variables bear the expected signs and have R-squares of 0.32 and 0.306 respectively. In the third model, education and poverty are significant at the 10 percent level. Education shows a positive sign that is the opposite of the expected one. Availability of private correctional facilities presents a positive sign that also is contrary to expectation.

The standardized coefficients help to identify relative impact of the different independent variables on the dependent variable. In the first model, population has the greatest impact, with a beta of 0.355, and the average annual salary of lawyers shows a beta of 0.297. The second model presents again the same patterns with population (0.357) and average annual salary of lawyers (0.280) in the first and second place of relative impact in the dependent variable. The third model shows an interesting pattern. Education and poverty are in the first two places with betas of 0.466 and 0.435 respectively.

Finally, to get some sense of the predictive performance of the different models, predicted mean of percentage of direct expenditures on criminal justice for each model was calculated and compared to the actual mean. Calculated means for the different models are presented in the final row of table 3. The actual mean is 6.78, and the model that combines variables from both the median voter model and

the economic model of crime seems to be the best predictor for this set of data, with a difference from the actual mean of only 0.026. In general, all three median voter models are the best predictors of the actual mean. The reduced interest group model is the best predictor within the three interest group models with a difference of 0.286 from the actual mean. This difference is more than ten times the difference of the combined model.

Conclusion

The median voter model is good for explaining variations among the various states' criminal justice spending. Criminal justice is a case involving a multidimensional issue and a complex funding mechanism. Some authors think that earmarked 'taxes' can resemble better the assumptions and/or implications of public choice models. According to the evidence presented in this paper, it seems that these models also perform well for services funded by general revenue funding or a complex combination of different financial sources.

Median income, salary of judges, education and poverty were found the most important explanatory variables. It would be an interesting task to develop other studies that narrow the nature of the criminal justice system (from multidimensional to monodimensional). Future research might study funding for only one component of the criminal justice system, such as, for example, the courts, law enforcement agencies, prosecutors, etc.

This paper supports the idea that the median voter model has been a useful theoretical instrument for understanding public sector. As Holcombe (1989) establishes, the median voter model provides the foundation for a general theory of political structure that parallels the theory of market structure, with the median voter model fulfilling a role analogous to perfect competition in the market.



Bibliography

Arrow, K. J. (1951). *Social Choice and Individual Values*. Yale University Press, New Haven.

Becker, G. S. (1968). "Crime and Punishment: An Economic Approach", *Journal of Political Economy*, 78. March/April: 169-217.

_____ (1983). "A Theory of Competition Among Pressure Groups for Political Influence", *Quarterly Journal of Economics*, 98. August: 371-400.

Block, M. K. _____ and J. M. Heineke (1975). "A Labor Theoretic Analysis of the Criminal Choice", *American Economic Review*, 65. June: 314-325.

_____ and R. C. Lind (1975a). "Crime and Punishment Reconsidered", *Journal of Legal Studies* 4. January: 241-247.

_____ and R. C. Lind (1975b). "An Economic

- Analysis of Crime Punishable by Imprisonment”, *Journal of Legal Studies*, 4. June: 479-492.
- Chicone, D.; N. Walzer and S. Deller (1989). “Representative vs Direct Democracy and Government Spending in a Median Voter Model”, *Public Finance*, 2: 225-236.
- Congleton, R. D. and R. W. Bennett (1995). “On The Political Economy of the State Highway Expenditures: Some Evidence of The Relative Performance of Alternative Public Choice Models”, *Public Choice*, 84: 1-24.
- Cook, P. J. (1977). “The Correction Carrot”, *Policy Analysis*, 1. Winter: 11-55.
- Ehrlich, I.
 _____ (1970). *Participation in Illegitimate Activities: An Economic Analysis*. Ph.D. Dissertation. Columbia University.
 _____ (1973). “Participation in Illegal Activities: A Theoretical and Empirical Investigation”, *The Journal of Political Economy*, 81: 521-565.
- _____ (1975). “The Deterrent Effect of Capital Punishment: A Question of Life and Death”, *American Economic Review*, 65 (3): 397-417.
- Holcombe, R. G. (1989). “The Median Voter Model in Public Choice Theory”, *Public Choice* 61: 115-125.
- Mankiw, N. G. (2001). *Principles of Microeconomics*. Harcourt College Publishers, Fort Worth, TX.
- McKelvey, R. D. (1976). “Intransitivities in Multidimensional Voting Models and Some Implications for Agenda Control”, *Journal of Economic Theory*, 12. June: 472-482.
- Mueller, Dennis C.
 _____ (1976). “Public Choice: A Survey”, *Journal of Economic Literature*, 14(2): 395-433.
 _____ (1989). *Public choice II*. Cambridge University Press, New York.
- Niskanen, W. A. (1971). *Bureaucracy and Representative Government*. Aldine-Atherton, Chicago and New York.
- Peltzman, S. (1976). “Toward a More General Theory of Regulation”, *Journal of Law and Economics* 19. August: 211-240.
- Romer, T. and H. Rosenthal (1978). “Political Resource Allocation, Controlled Agendas, and the Status Quo”, *Public Choice*, 33(4): 27-43.
- Sexton, R. L. (1995). *Microeconomics*. Prentice Hall, Inc, Englewood Cliffs, NJ.
- Shepsle, K. A. and M. S. Bonchek (1997). *Analyzing Politics: Rationality, Behavior, and Institutions*. W. W. Norton & Company, New York.
- Stigler, G. J. (1971). “The Theory of Economic Regulation”, *The Bell Journal of Economics and Management Science* 2, Spring: 3-21.
- Stiglitz, J. E. (1989). *The Economic Role of the State*. Blackwell in association with Bank Insigner de Beaufort NV, Cambridge, MA.
- Witte, A. D. (1980). “Estimating the Economic Model of Crime with Individual Data”, *Quarterly Journal of Economics*, 94: 57-84.