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DO CASINOS ENHANCE CRIME?

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ABSTRACT

This article analyzes the possible impact of the 1978 introduction of casino gambling in Atlantic City on crime in that region. Pooled time-series cross-sectional data from sixty-four localities for the years 1972 to 1984 were used to investigate four types of property crimes and total violent crimes. The results suggest spatial crime spill-over from Atlantic City, where violent crime diminished most rapidly, followed by robberies and auto thefts. Larcenies declined least rapidly. The greatest postcasino crime increase was observed for violent crimes and auto thefts and the least for burglaries. A one percent increase in the distance from Atlantic City was associated with greater reduction in all crimes than was a one percent increase in police outlays.

INTRODUCTION

Enrichment of the government treasury without an increase in the current tax burden or an increase in the demand for public services is the dream of every executive and legislative member of government. California's Silicon Valley and Massachusetts's Route 9 are notable examples of how investment by private industry can raise the tax base for local government. However, that growth has brought with it a marked increase in the demand for public services and strained the infrastructure of the community.

In the annals of tax base enhancement, Atlantic City and its region hold a unique position. The gambling casinos produce millions of tax dollars annually for New Jersey, and the fruits of the housing reinvestment plan are beginning to be seen. The associated growth in resident population and concomitant demand for public services has been far less than in the two other rapidly growing areas cited above. The apparent economic growth and success of the Atlantic City region has been so stunning that Pennsylvania, Louisiana, New York, Florida, West Virginia, Illinois, and Michigan are considering legalization of gambling in order to revitalize economically depressed regions.

However, economic growth comes at a price. It is well known that unplanned and perhaps unanticipated growth can place considerable strains on the local infrastructure. Roads become congested, schools become inadequate, and municipal services may not be sufficient for a burgeoning population. But even planned growth comes at a price. The impressive tax revenues generated by the casinos of Atlantic City may have come at the

price of increased crime. Indeed, in *Money* magazine's[1] second annual rating of places to live, Atlantic City was rated last, in large part due to the incidence of crime. At the same time communities well to the north ranked near the top of the list.

The working hypothesis of this article was that casino gambling has brought with it more crime.[2] Using a before and after analysis, it was possible to separate the casino effect from the natural accretion of crime in Atlantic City and sixty-three surrounding communities for the period 1972–1984. Essentially, an economic model of crime was used. Consequently, attention was restricted to the property crimes of burglary, vehicle theft, larceny, robbery, violent, and total crimes. Controlling for wealth, unemployment, and size of police force and standardizing by population, it was found that the postcasino years (since 1978) showed a markedly higher incidence of crime. Also, crime fell with the distance, in minutes of travel, from Atlantic City.

METHODOLOGY

The database pools the information on sixty-four communities in New Jersey's Atlantic, Cape May, and Ocean Counties, with annual observations for the years 1972–1984, yielding a total of 832 observations. The data were drawn from the *Uniform Crime Reports* of the State of New Jersey, Division of State Police, Uniform Crime Reporting Unit; the *Statements of Financial Condition of Counties and Municipalities,* Department of Community Affairs; and the *Economic Report of the President.* Means and standard deviations for the variables are reported in Table 1, with the statistics reported for before and after legalized gambling, and for all years.

It is quite evident that the incidence of crime was greater after the introduction of casinos. The increase may not have been significant and may have been associated with other causative factors. For example, the unemployment rate and the assessed value of property in the community were both higher in the postcasino part of the sample.

As the unemployment rate went up, there was a higher proportion of the population for whom the expected opportunity-cost of embarking on a life of crime diminished.[3] An increase in assessed value of property in the community can be construed, on the one hand, as an increase in the expected benefit from committing a property crime in that community. On the other hand, with respect to generation of crime by local residents, the higher the income, the higher the legal opportunity-cost of crime; thus less crime would be expected. The assumption is that the value of real estate is positively related to the income of residents. Thus, the sign of assessed value depends on the relative "strength" of the two directional effects. In any case, either of these factors can account for the observed increase in crime when the data are divided at 1978.

Another view of the data is provided by the simple correlations shown in Table 2. As expected, the six types of crime were very highly correlated with one another. Communities that were more remote from Atlantic City, in travel time, had less crime and smaller police departments. Unemployment and assessed values were positively correlated with the six types of crime, for the reasons explained above. According to neoclassical economic models of criminal behavior,[4] it would be expected that the size of the police department and incidence of crime would be inversely related. This did not appear to be the case. The explanation for this apparent anomaly probably lies in the dynamics of crime, enforcement, and community decisionmaking.

The inference from Tables 1 and 2 is that although the original working hypothesis cannot be rejected, there are two plausible alternatives. That is, the introduction of casinos, increased community wealth (the value of a criminal target, or higher opportunity-cost to crime), and increased unemployment are all capable of explaining the increase in crime between the pre- and post-1978 eras.

To distinguish between the working hypothesis and the competing alternatives, the parameters of the following regression model were estimated, motivated by the results of

TABLE 1

DESCRIPTION STATISTICS BEFORE AND AFTER CASINO GAMBLING

	Before		*After*		*All Years*	
Offense	*Mean*	*S. D.*	*Mean*	*S. D.*	*Mean*	*S. D.*
Total crime[a]	54.00	1.12	57.20	1.22	55.70	1.19
Violent crime[a]	3.62	11.69	4.23	13.08	3.95	12.28
Burglary	147.01	255.90	180.39	290.60	164.98	275.50
Larceny	247.22	373.80	462.72	1144.00	363.26	883.15
Vehicle theft	28.67	76.20	42.58	112.30	36.16	97.50
Robbery	9.40	41.50	16.58	75.50	13.26	62.24
Assessed value	1.06×10^8	1.27×10^8	2.23×10^8	2.79×10^8	1.69×10^8	2.3×10^8
Unemployment rate	84.49	42.70	90.12	39.60	87.52	41.20
Minutes	—	—	—	—	47.90	21.80
# of Police	20.84	36.12	25.96	44.90	23.59	41.17

Notes: [a]Total crime and violent crime are FBI indices of crimes per 1000 population. Other crimes report the incidence. Here, violent crime includes murder, rape, and aggravated assault.

TABLE 2

SIMPLE CORRELATIONS

	Total Crime	*Violent Crime*	*Burglary*	*Larceny*	*Vehicle Theft*	*Robbery*	*Minutes*	*Unemployment Rate*	*Assessed Value*
Violent crime	0.43								
Burglary	0.88	0.37							
Larceny	0.98	0.38	0.79						
Vehicle theft	0.91	0.46	0.86	0.85					
Robbery	0.90	0.47	0.75	0.87	0.93				
Minutes	−0.13	−0.07	−0.12	−0.11	−0.21	−0.23			
Unemployment	0.14	0.19	0.17	0.12	0.15	0.15	−0.001		
Assessed value	0.68	0.11	0.66	0.68	0.54	0.46	0.02	0.08	
Police	0.93	0.4	0.87	0.87	0.93	0.90	−0.18	0.17	0.65

Notes: The correlations between minutes and unemployment and between minutes and assessed value are not statistically different from zero. All other correlations are different from zero at the 1 percent significance level.

Tables 1 and 2, from the pooled cross-section time-series data.

$$C_{it} = \alpha_0 + \alpha_1 \text{MINUTES}_{it} + \alpha_2 \text{UNEMP}_{it} + \alpha_3 \text{TASSVAL}_{it} + \alpha_4 \text{POLICE}_{it} + \alpha_5 \text{YEARDUM}_{it} + U_{it} \quad (1)$$

where C_{it} represents four types of property crime (burglary, larceny, vehicle theft, robbery), violent crime, and total crime; MINUTES is travel time from the central business district (CBD) of the ith community to the CBD of Atlantic City; UNEMP is the unemployment rate; TASSVAL is the total assessed value of property in the ith community, weighted by the state equalization ratio and corrected for inflation; POLICE is the number of police in the department; YEARDUM is a dummy variable that takes the value zero for years prior to 1978, the first year of casino operation, and one otherwise; and U_{it} is the unobserved disturbance. The model was estimated in logarithmic form in order to interpret the coefficients as elasticities, without being observation-dependent. The elasticity shows the percent response of the dependent variable to a percent change in the independent variable. Thus, the size of the coefficients can be compared between the independent variables of each equation and the various equations for a given independent variable.

Before turning to specific empirical results, there are several methodological issues to be considered. First, the variance of the incidence of crime is undoubtedly related to the size of the potential population of victims and the size of the community. Thus, the disturbance term does not have constant variance across all communities. To overcome this, the model has been standardized by population, which shows greater variability over time and across communities than does municipal land area.[5]

The next, quite common, problem is that assessed value evolves very smoothly, but it is changes in the wealth of the target that attracts criminals. To facilitate dealing with these two aspects of the model, assessed value was regressed on its own lagged value and the residuals from this equation were used as the explanatory variable in (1). The interpretation is that it is the deviation of assessed value from trend growth that attracts property crime.[6]

Finally, it was noted above that the size of a community's police force is often a response to current and past crime levels. Similarly, the deterrence hypothesis suggests that a greater number of uniformed officers should reduce crime. To ameliorate this simultaneity bias, POLICE was regressed on current and past total crime and the residuals were used as the independent variable in equation (1).[7]

REGRESSION RESULTS AND ANALYSIS

The results of estimating the parameters of equation (1) are presented in Table 3. These results are for the detrended assessed value and uniformed officers variables. All variables were weighted by the inverse of the square root of population in order to correct for heteroscedasticity, as outlined in the previous section.[8]

Contrary to expectations, the assessed value variable was mostly negative and highly significant. The POLICE variable was often negative and significant. It was positive and significant only in the larceny equation. This result is not inconsistent with other research on the subject of the deterrence hypothesis (e.g., Buck et. al, 1984).

The unemployment rate had the expected sign. It was positive and significant throughout. As legitimate employment opportunities declined, the communities in the sample had a greater incidence of all types of crime. Thus, this variable captured the local generation of crime.

The travel time variable is very interesting; MINUTES was measured as the travel time between CBDs. Thus, a community on a major thoroughfare, though more distant, may have a shorter travel time to the central business district of Atlantic city. The regression model shows unequivocally that communities with higher travel time from Atlantic city had less property crime, suggesting that less crime was "imported" from Atlantic City. Deutsch et al. (1984) provided a theoretical perspective on interjurisdictional criminal mobility, and Costanzo et. al. (1986), Lenz (1986),

TABLE 3

MODEL ESTIMATES

Dependent Variable	*Constant*	*UNEMP*	*POLICE*	*TASSVAL*	*MINUTES*	*YEARDUM*	*F*
Burglary	3.4051	.6203	−3.229	−.0839	−.5577	−.0352	
	(9.00)	(8.87)	(−7.29)	(−.43)	(−9.25)	(.53)	41.77
Larceny	2.853	.7977	.1752	−.6277	−.4476	.1673	
	(6.14)	(9.29)	(3.22)	(−2.64)	(−6.05)	(2.05)	29.59
Auto theft	1.5819	.7128	−.2189	−.3220	−.6312	.2191	
	(3.67)	(8.96)	(−4.35)	(−1.46)	(−9.20)	(2.90)	38.72
Robbery	.7635	.6076	−.1731	.1085	−.6472	.1429	
	(2.05)	(8.82)	(−3.96)	(.57)	(−10.89)	(2.18)	42.76
Violent	2.9704	.9013	−.3891	.5747	−.7153	.2188	
crime	(4.75)	(7.97)	(−5.32)	(1.79)	(−7.17)	(5.32)	29.37
Totcrim	3.8751	.7409	−.0642	−.3777	−.5011	.0864	
	(9.55)	(9.88)	(−1.35)	(−1.82)	(−7.75)	(1.21)	32.37

Notes: *t*-statistics are in parentheses. The critical values for the *t*-statistic are 2.57, 1.96, and 1.64 for 1 percent, 5 percent, and 10 percent levels of significance for two-tail tests. The critical values for the *F* statistic with 5 and 762 degrees of freedom are 3.02 and 2.21 for 1 percent and 5 percent levels of significance, respectively.

Rand (1986), and McIver (1981) discussed the empirical estimation and literature review of the travel decay function for crime.

Turning now to the working hypothesis that casinos have induced greater incidence of crime, the regression model shows that there was less crime before the introduction of casinos. It is important to remember that the effects of increased community wealth, policing, unemployment, travel time, and population have all been accounted for, and still the casino effect on crime remains.

The pattern of signs and significant regression coefficients shows the increase in crime of accessible communities was higher than any increase that could be attributed to growth. If these localities had experienced a normal increase in crime, it would have been, on the average, lower by the magnitudes of the coefficient on YEARDUM in Table 3.

CONCLUSIONS

The levels of all crimes appear to have been higher in the postcasino years, 1978 to 1984, than in the earlier period of 1972 to 1977, with other factors controlled. Both distance and police outlays were associated with less crime. The further the locality from Atlantic City, the lower the level of imported crimes, with the level of local crime generation variables kept constant. A one percent increase in the distance from Atlantic city was associated with a greater reduction in all crimes than was a one percent increase in police outlay. Violent crime, possibly exported from Atlantic City, diminished most rapidly with distance, followed by robberies and auto thefts. The least rapid decline with distance was that of larcenies. The distance elasticity of burglaries was smaller than that of auto thefts, suggesting a larger market area for burglaries (−0.5577 and −0.6312, respectively). This may suggest that cars are stolen in order to burglarize places farther away. The greatest postcasino crime increase was in violent crimes and auto thefts and the least in burglaries, with other factors held constant. Police appeared to deter all crimes in this region, and unemployment appeared to induce local crime generation. The wealth/income variable did not produce conclusive results.

The study shows the possible casino-related export of crime from Atlantic City to localities in its vicinity. This is a real cost imposed on these localities, which is ignored in

studies conducted by states that are considering casino gambling for their dilapidated recreational regions.[9] Such states should consider regionwide cost-benefit analysis, which includes, among other things, the anticipated costs of interjurisdictional crime spillover, before they choose to legalize casino gambling. Also, New Jersey channels its receipts from the casinos to statewide programs. If indeed localities adjacent to Atlantic City experience higher costs than benefits, then they should be compensated for their net social costs, rather than having these resources used to support people unaffected by the casinos.

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NOTES

1. Eisenberg, Richard, and Debra Englander, "The Best Places to Live in America," *Money* 15:8, (Aug. 1988):76–84.

2. Albanese (1985), in analyzing the effect of casinos on crime in Atlantic city found that crime per capita of daytime population decreased after the establishment of casinos in 1978. This is of dubious value. Even if it is the daytime, transient population that is victimized, it is the resident population that must pay for increased police protection.

3. On the effect of unemployment on crime, see Bloom (1966), Conyers (1979), Willis (1983), and Pirog-Good (1986). For a formal economic model of criminal behavior see Buck and Hakim (1981).

4. The seminal study is Becker (1968). But see Buck, Hakim, and Spiegel (1985) for a study of the statistical failure of the deterrence hypothesis.

5. For sociological and economic explanations of the population effect, see Mayhew and Levinger (1976), Harries (1980), and Brantingham and Brantingham (1984:151–55). Also see Wirth (1938), Sampson (1985), and Stahura and Huff (1985) for the effect of population density.

6. The regression results for this equation are

$$\begin{aligned} \text{TASSVAL}_{it} = &-11.953 + 9.309\ \text{TASSVAL}_{it-1} \\ &(.18) \qquad (.06) \\ &- .005\text{YEAR} + e_{it} \\ &(-.02) \\ &\bar{R} = .97 \end{aligned}$$

where e_{it} is the residual for period t and community i. Standard errors are in parentheses.

7. The regression results are

$$\begin{aligned} \text{POLICE}_{it} = &-3.12 + .575\ \text{TOTCRIM}_{it} \\ &(-.30) \quad (.07) \\ &+ 1.457\ \text{TOTCRIM}_{it-1} + e_{it} \\ &(.39) \\ &\bar{R} = .86 \end{aligned}$$

where TOTCRIM is the total crime index and e_{it} is the residual. Standard errors are in parentheses.

8. To test the null hypothesis that the technique of correcting for heteroscedasticity does not improve the model, the F-statistic was constructed:

$$F = \frac{\text{residual sum of squares uncorrected model}/d.f.}{\text{residual sum of squares corrected model}/d.f.}$$

For the different types of crime the F-statistics are 155.76 (BURGLARY), 163.48 (LARCENY), 158.65 (THEFT), 168.91 (ROBBERY), 156.81 (VIOLENT CRIME), and 164.05 (TOTCRIM). These are all significant at the 1 percent level. Therefore, the null of no improvement is rejected in each case.

9. For example, Florida had several referenda for gambling that have failed. Detroit is considering gambling in order to attract Canadian tourists, and Pennsylvania is studying gambling for its Pocono Mountains in order to generate year-round tourism.

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