

## ABSTRACT

Title of Thesis: THE RELATIONSHIP BETWEEN  
GAMBLING AND COUNTY LEVEL CRIME.

Sara Linn Betsinger  
Master of Arts, 2005

Thesis Directed By: Professor Charles F. Wellford  
Department of Criminology and Criminal Justice

Despite the rapid spread of various forms of legal gambling across the United States since the late 1980s and early 1990s, very little research has effectively examined the existence of a relationship between gambling and crime. Most of the research in this field has focused exclusively on cities with large gambling industries consisting of multiple casinos. Additionally, the effects of different types of gambling venues on county-level crime rates have been neglected in previous research.

This study examines: 1) the impact of the introduction of gambling venues in general on county-level crime rates, and 2) the impact of different types of gambling venues on county-level crime. Findings for both parts of the study are mixed. The opening of gambling venues in general is associated with significant decreases in rape and assault rates; at the same time, gambling venues are found to lead to significant increases in larceny and arson rates.

THE RELATIONSHIP BETWEEN GAMBLING AND COUNTY-LEVEL CRIME

By

Sara Linn Betsinger

Thesis submitted to the Faculty of the Graduate School of the  
University of Maryland, College Park, in partial fulfillment  
of the requirements for the degree of  
Master of Arts  
2005

Advisory Committee:  
Professor Charles F. Wellford, Chair  
Professor Laura Dugan  
Professor Peter Reuter

© Copyright by  
Sara Linn Betsinger  
2005

## ACKNOWLEDGEMENTS

First and foremost, I would like to thank the members of my committee, Charles Wellford, Laura Dugan, and Peter Reuter, for their guidance and patience. All three of them provided me with valuable insight on the research question, and all were willing to spend extra time helping me think through various aspects of my work, from the sources to include in the literature review to understanding fixed effects.

I also owe a great deal of gratitude to Stacy Najaka, Heather Couture, and Carlos Rocha. They each offered valuable advice on everything from selecting committee members to handling the stress of finishing this project, and they also dealt with my occasional ramblings and moments of emotional distress.

Finally, I am deeply indebted to my parents, my sister Stacey, Molly Capps, and Ann Meneses. They kept me focused on the big picture and never failed to provide words of encouragement. I was also provided with a great deal of enthusiastic support from my grandparents, Curtis and Betty Betsinger, and my aunt, Linda McCann.

## TABLE OF CONTENTS

List of Tables .....	iv
Chapter 1: Introduction .....	1
Chapter 2: Literature Review .....	8
Chapter 3: Data and Methodology .....	23
Sample.....	23
Variables .....	28
Dependent Variables.....	28
Independent Variables .....	28
Limitations to Data .....	30
Method of Analysis.....	33
Chapter 4: Results .....	35
Venue Opening .....	35
Tobit Regression .....	35
Ordinary Least-Squares Regression.....	45
Venue Type.....	50
Native American Bingo Halls.....	50
Racinos.....	55
Native American Casinos .....	59
Commercial Land-Based Casinos.....	64
Riverboat Casinos .....	68
Chapter 5: Discussions and Conclusions .....	73
References .....	81

## LIST OF TABLES

1.	Summary of Literature Review	20
2.	Descriptive Statistics of Variables	26
3.	TOBIT Coefficients for Venue Opening	36
4.	OLS Coefficients for Venue Opening	46
5.	Native American Bingo Tobit Regression Coefficients	52
6.	Native American Bingo OLS Regression Coefficients	54
7.	Racino Tobit Regression Coefficients	56
8.	Racino OLS Regression Coefficients	58
9.	Native American Casino Tobit Regression Coefficients	61
10.	Native American Casino OLS Regression Coefficients	63
11.	Commercial Land-Based Casino Tobit Regression Coefficients	65
12.	Commercial Land-Based Casino OLS Regression Coefficients	67
13.	Riverboat Casino Tobit Regression Coefficients	70
14.	Riverboat Casino OLS Regression Coefficients	72

## CHAPTER 1 - INTRODUCTION

Legalized gambling has spread rapidly throughout the United States during the past two decades. By 2003, there were thirty states that had commercial or Native American casinos (Stitt, Nichols, and Giacomassi, 2003). However, until the 1970s, casino gambling was legal only in state of Nevada. That state legalized gambling in 1931, and the city of Las Vegas has served as a gambling Mecca since that time. Because Las Vegas held a monopoly on casino gambling for such a long time, it was able to reap the benefits of tourists who spent their money in the city's casinos, hotels, restaurants, and shops (Goodman, 1995). Such achievements were eventually noticed by other states looking to boost their coffers. Inspired by the economic success of Las Vegas, New Jersey voters passed a referendum in 1976 allowing casinos to be built in Atlantic City (Miller and Schwartz, 1998). The first casinos opened there in 1978.

Legalized casino gambling continued to spread in the late 1980s and early 1990s. The Indian Regulatory Act of 1988 allowed for construction of casinos on Native American reservations (Gazel, Rickman, and Thompson, 2001; Stokowski, 1999). Additionally, states outside of Nevada and New Jersey began allowing their own commercial casinos. Commercial land-based casinos opened in the town of Deadwood, South Dakota in 1989 and in three towns in Colorado in 1991 (Stokowski, 1999). Riverboat casinos began to appear in Illinois, Indiana, Iowa, Louisiana, Mississippi, and Missouri during the 1990s (Miller and Schwartz, 1998). Pennsylvania will become one of the latest states to add to the commercial casino trend, as that state passed legislation in 2004 to allow "stand-alone gambling halls" to be built in Philadelphia (Sullivan, 2004). The state will also allow for slot machines to be added to some existing and future

licensed horse tracks. In all, with 61,000 slots, Pennsylvania will have more slot machines than all other states except for Nevada. Of course, given the current trend, other states may quickly surpass this tally by allowing additional slots to be added to existing gambling sites and by building new gambling locations.

Many states have turned to legalized gambling as a way to balance their budgets without raising resident taxes or cutting existing programs. The State of Maryland has been engaged in a debate in recent years over whether or not to add slot machines to existing horse racetracks and other locations to revitalize racing and to among other things, help pay for education. Other states are locked in similar debates. Undoubtedly, more and more states will continue to look to casino and other types of gambling as their ticket to financial renewal. Events such as these make understanding the effects of gambling on social outcomes, including crime, critical.

The effects of gambling are usually presented as being either black or white, with little room for grey in between. Opponents often argue that gambling contributes to increases in pathological gambling, bankruptcy, the spread of crime, alcoholism, and the general deterioration of the family. Such viewpoints are supported, for instance, by a report put forth by the SMR Corporation that found that casino gambling was linked to high bankruptcy rates in multiple gaming counties (de la Viña and Bernstein, 2001). Further, research by Grinols, Mustard, and Dilley, which found that casinos contributed to increases in crime, led Grinols (2000) to suggest that casino gambling should be restricted or even completely banned if it cannot pass a cost-benefit test.<sup>1</sup>

---

<sup>1</sup> It should be noted here that attempting a cost-benefit analysis for gambling poses significant challenges to researchers. As discussed by the Committee on the Social and Economic Impact of Pathological Gambling (1999), social and economic effects on both the costs and the benefits sides are often difficult to measure. The Committee concluded that “the state of research into the benefits and costs of gambling generally, and



On the other hand, proponents of gambling generally argue that the introduction of a gambling venue into a community will boost the economy by providing jobs, increasing tourism, and encouraging the growth of other businesses. Additionally, they argue that the link between casinos and crime is weak and that crime may actually decrease because unemployment usually declines in casino communities (Gazel et al., 2001). Further, with respect to bankruptcy, the previously cited study by de la Viña and Bernstein (2001) found that gambling actually appears less closely linked than unemployment to county bankruptcy rates.

Unfortunately, in some instances, both sides of the debate put forth their arguments without providing adequate empirical evidence to justify their claims. For example, research by the Committee on the Social and Economic Impact of Pathological Gambling (1999) points out that, although attempts have been made to estimate the prevalence of problem and pathological gambling in the United States, “it is important to emphasize how inadequate the research base is for drawing confident conclusions” about the pervasiveness of these problems. With respect to gambling and crime, some reports that address the issue simply state the crime either does or does not increase after a casino is opened in a community, and they then fail to describe what methodology was used in reaching such a conclusion (e.g., The Evans Group, 1996). In other instances, research studies may be empirically sound but reach mixed conclusions (e.g., Stitt, Nichols, and Giacopassi, 2003). Taken together, these studies paint conflicting pictures of the impact that casinos have on crime. This observation was shared by the National Gambling Impact Study Commission (NGISC), which was formed by Congress in 1996. After

---

into the costs of pathological gambling specifically, is not sufficiently advanced to allow definite conclusions to be drawn.”

completing a study on the effects of gambling on society, the NGISC recommended a moratorium on the further expansion of casino gambling until additional research could more clearly define gambling's role on social outcomes such as crime (Stitt, Nichols, and Giacomassi, 2003).

While ideological and academic debates about gambling continue, members of potential or current gambling communities draw their own conclusions about the effects that gambling has had or will have on their communities. A study by Giacomassi, Stitt, and Nichols (2001) compared citizen perceptions of community crime levels to actual crime data for their communities. The authors found that citizens often overestimate the effect that casinos have on crime in their communities. Even when the actual rates for some crime categories displayed significant drops, citizens perceived rates for those crimes to have increased. However, community leaders who were interviewed by the researchers were able to better estimate the effects of casinos on crime in their communities, even though their perceptions were still not entirely accurate. Studies such as this demonstrate the personal biases and confusion individuals may have in forming opinions about the impact of casinos on crime in their own communities. As such, the Giacomassi et al. study underscores the importance of continuing to evaluate the effect that gambling has on crime so that both leaders and citizens will be able to better estimate the likely effects that the introduction of a gambling venue will have.

The purpose of the current thesis is to examine the impact of the introduction of gambling venues on county-level crime. This study will examine the impact of commercial and Native American casinos, riverboat casinos, dog and horse track racinos, and Native American bingo halls on crime rates. Attempts will be made to determine

whether these different types of venues have different effects on crime, and explanations for possible differences will be offered. The current study will also attempt to determine if different venue features (e.g., the presence of at least one bar serving alcoholic beverages, the number of hotel rooms at the venue, whether or not free drinks are offered to patrons, the volume of gambling offered by the venue, etc.) are significantly related to county-level crime rates.

Based primarily on the principles put forth by routine activities theory - the combination of “a motivated offender, a suitable target, and the absence of a capable guardian” (Vold, Bernard, and Snipes, 2002) – it is believed that the results of this exercise will show that the introduction of a gambling venue into a county is associated with increases in financially-motivated crimes, including robbery, larceny, and burglary. Further, as several studies have previously found, the current exercise is expected to find that the introduction of gambling into a community is also related to increases in motor vehicle thefts and aggravated assaults. County-level murder, rape, and arson rates are not expected to demonstrate any significant relationships with the opening of gambling venues. However, overall crime rates are expected to show significant increases after gambling venues are introduced.<sup>2</sup>

Previous studies have not addressed whether or not different types of venues have different effects on crime rates. Therefore, the expected findings for this part of the analysis are speculative. Because Native American bingo halls and casinos are situated on reservations in fairly remote and rural areas, it is anticipated that the introduction of these types of venues will have significant impacts on crime rates. This expectation is

---

<sup>2</sup> I originally planned on also examining how the opening of gambling venues was impacted by region, but I had to abandon this idea due to the statistical modeling I ultimately employed.

fueled mainly by the belief that such attractions will draw in large numbers of outsiders who could serve both as suitable crime targets and as motivated offenders. At the same time, racinos are expected to have less of an impact on county-level crime rates. This hypothesis is based on the fact that the “casino” aspects of both dog and horse racinos (e.g., slots, video lottery terminals, etc.) were added well after the racetracks had already been established. Thus, it is theorized that any significant impact on crime rates caused by the opening of the venues would have already occurred when the racetracks themselves were opened. The other types of venues included in this study – commercial casinos and riverboat casinos – are usually associated with large volumes of tourists. Again, these individuals may serve as both suitable targets and as motivated offenders. Therefore, it is anticipated that the introduction of these venues into communities will have significant and positive effects on county-level crime rates.

Thus, the hypotheses for the current study are as follows:

H<sub>1a</sub>: The opening of gambling venues will be associated with increases in financially-motivated crimes, including robbery, burglary, and larceny.

H<sub>1b</sub>: The opening of gambling venues will be associated with increases in county-level motor vehicle theft and assault rates.

H<sub>1c</sub>: The opening of gambling venues will result in increases in the overall crime rate.

H<sub>1d</sub>: The opening of gambling venues will not significantly impact murder, rape, or arson.

H<sub>2a</sub>: The opening of both Native American bingo halls and Native American casinos will result in significant increases in financially-motivated crimes, assaults, motor vehicle thefts, and overall crime.

H<sub>2b</sub>: The opening of racinos will result in negligible increases in robbery, burglary, larceny, assault, vehicle theft, and overall crime rates.

H<sub>2c</sub>: The opening of commercial casinos and riverboat casinos will have significant and positive effects on robbery, burglary, larceny, assault, vehicle theft, and overall crime rates.

The next chapter will provide a review of the current literature available on the connection between gambling and community crime. Unfortunately, most of the research on this topic is fairly recent, so the list of available studies is not extensive. However, the studies that are reviewed here provide a reasonable glimpse of the current state of gambling and crime research. They also demonstrate some of the questions about gambling and crime that have yet to be answered. The third chapter will provide an explanation of the methodology that was used in the current study. The fourth chapter will present the results, and the final chapter will present the discussion, conclusions, and suggestions for future research directions in this topic.

## CHAPTER 2 - LITERATURE REVIEW

Despite the rapid spread of various forms of legal gambling across the United States since the late 1980s and early 1990s, very little research has effectively examined the existence of a relationship between gambling and crime. Existing studies have tended to focus on areas with large gambling industries consisting of multiple casinos, such as Atlantic City, New Jersey or Las Vegas, Nevada, while regions with smaller-scale gaming industries, or those with dog or horse racinos, have traditionally been ignored. Similarly, studies have failed to consider that these different types of gambling venues may account for varying levels or for different types of crime. Most studies have focused on the city-level impact of casinos on crime, while only a few have used county-level data. Additionally, there has been only one national scale examination (Grinols and Mustard, 2001) of the impact that gambling has on crime in communities, and that study fails to examine whether there are regional differences for such an impact.

Another major shortcoming for many existing studies on gambling and crime has been the absence of attempts to adjust crime rates to account for the true population at risk, which includes not only the resident population but also the tourist population. As noted by Miller and Schwartz (1998): “Even under circumstances where casino gambling may increase the raw number of crimes in an area, it may not increase an individual’s chances of being victimized.” Accordingly, Miller and Schwartz suggest that the introduction of a casino into a community may be no different from the introduction of any other type of tourist attraction into a community. However, studies investigating the connection between tourism and crime are fairly uncommon, and studies that examine a relationship between gambling, tourism, and crime are scarcer still. This is unfortunate

because it leaves unanswered the question of whether a form of gambling, the additional influx of tourists, or some combination of the two is truly responsible for an area's increase in crime. Additionally, this shortcoming may encourage researchers to rush to policy recommendations without a full understanding of the problem.

An additional setback for extant studies is that they have often produced widely divergent findings, even among the studies that look at the same cities, due to substantial differences in methodology. As noted by Miller and Schwartz (1998), "many of the findings are completely at odds." Additionally, gambling and crime studies often fail to provide adequate theoretical explanations for their findings. Thus, there are often no explanations as to why one region's casino industry may be found to have contributed to an increase in property crimes while another region's casino industry may be found to have contributed to an increase in violent crimes.

Further, some researchers fail to provide theoretical explanations for why they believe crime to be related to gambling at all. This is surprising, given the seemingly obvious applicability of routine activities theory. Routine activities theory, as put forth by Cohen and Felson, suggests that crimes occur when there is "the convergence in time and space of a motivated offender, a suitable target, and the absence of a capable guardian (police) to prevent the crime" (Vold, Bernard, and Snipes, 2002). Accordingly, as individuals venture away from their normal routines, they place themselves at greater risks of being victimized.

As pointed out by Stitt, Nichols, and Giacomassi (2003), the casino environment increases one's danger of being perceived as a suitable target by encouraging, and even drawing attention to (through buzzers and sirens), the open display of large amounts of

money. Free alcohol and/or the presence of bars on casino grounds encourage patrons to let their guards down, thus making them more susceptible to criminal actions (Stitt et al., 2003). By the same token, Stitt and colleagues note that alcohol may also lower the inhibitions of a potential offender. Additionally, Wilson (2001) points out that when increasing numbers of people are added to a community (e.g., via tourism), the number of capable guardians decreases.<sup>3</sup> Further, “if large numbers of new hotel and motel rooms are built, particularly if little security is provided and it becomes known that people are leaving valuables (jewelry, cameras, winnings) in these rooms, then an increase in burglary should not be unexpected” (Miller and Schwartz, 1998).

The studies described below provide a picture of the current state of research into the relationship between gambling and crime. They also exemplify many of the shortcomings mentioned above, some of which the current study will attempt to address. A summary of the studies is provided in Table 1 at the end of this chapter.

#### *Atlantic City, New Jersey*

In their study, Hakim and Buck (1989) examined the effect casino gambling had on crime in Atlantic City New Jersey and its surrounding communities in Atlantic, Cape May, and Ocean Counties. The authors used Uniform Crime Reports (UCR) data for these communities for the years between 1972 and 1984, allowing them to examine crime rates for the six years before and the six years after casinos opened in Atlantic City in 1978. By dividing the data in half at the year 1978, the authors examined the means and standard deviations before and after the introduction of casinos for violent crimes,

---

<sup>3</sup> At the same time, many would argue that guardianship actually increases when casinos and other gambling venues are built. While informal guardianship by individuals in the community may decrease, formal guardianship may increase through the presence of large numbers of security personnel at the gambling venue, security cameras and surveillance equipment, and larger expenditures on local police departments.



burglaries, larcenies, vehicle thefts, robberies, and total crime, as well as for community wealth (total assessed value of property), the unemployment rate, and the number of police in each community's police department.

Although Hakim and Buck observed that each of the average crime rates increased after the introduction of casinos, they also observed that the averages for unemployment, community wealth, and the number of police increased during the same period. Thus, the authors used a regression model in order to control for unemployment, community wealth, the number of police, and the number of minutes in travel time from Atlantic City to each of the communities; they also used a dummy variable in their model to represent the year. The authors noted that, while unemployment had a positive and statistically significant relationship with crime, both the number of police and the number of minutes in travel time were negatively related to crime. However, even after these variables were controlled for, Hakim and Buck concluded that the effect for the introduction of casinos remained. The authors also found that violent crime and auto thefts increased the most dramatically after casinos opened, while burglaries showed the least dramatic increase. Even so, Hakim and Buck failed to offer a theoretical explanation as to why this might be the case. They also failed to take the tourist population into account in their population at risk; doing so may have shown a decreased risk for victimization for all individuals in Atlantic City.

The Evans Group (1996) gave an opposing point of view on the impact of casinos on crime in Atlantic City. These authors did not give a description of the methodology used in arriving at their conclusions regarding changing crime rates in Atlantic City, but they stated that the city had a crime rate that was higher than the national average three

years before casinos were opened. They also asserted that crime rates fell in Atlantic County - the county in which Atlantic City is located - by 1994, "even after taking into account a decline in the overall crime rate" (The Evans Group, 1996). Unfortunately, the authors did not explain exactly how they arrived at this conclusion. However, they reached the same conclusion regarding Clark and Washoe Counties in Nevada, and for those areas the authors adjusted the "recent" post-casino crime rates for the number of tourists. Even so, without more specific information on their methodology, it is difficult and unwise to reach firm conclusions about the impact of casinos on crime in these locations using only The Evans Group study.

Reuter (1997) discussed the Atlantic City experience with casinos and crime in some detail. He noted that, using "the standard measure of crimes per capita," the overall crime rate in Atlantic City increased tremendously after casinos were opened. Accordingly, Reuter pointed out that Atlantic City experienced a jump from its ranking as the 50th most crime-ridden U.S. city with a population of more than 25,000 in 1977 to the 1st place position in 1978. Even so, Reuter noted that these statistics ignored the influx of tourists into the city every day. Still, after the average daily population (including both residents and tourists) of Atlantic City was examined for the years between 1978 and 1982, it was clear that crime increased at a faster rate than did the tourist population, even with a sizeable increase in the number of police officers employed. At the same time, Reuter noted that there was a negligible increase in homicides in the years 1978-1983, and he pointed out that the number of assaults in 1983 were "roughly in line with the increase in the average daily population" (Reuter, 1997). Unfortunately, because Atlantic City was not one of the cities of focus in Reuter's report,

the data do not extend past the early years after casinos were introduced in Atlantic City. Thus, comparisons to the broad statements made by The Evans Group (1996) are not possible. However, Reuter's discussion of Atlantic City does seem to support some of the findings put forth by Hakim and Buck (1989), and it also offers a glimpse into the impact on the true population at risk (residents and tourists) that was not provided by the previously cited authors.

#### *Riverboat and Stationary Barge Casinos*

The true focus of Reuter's 1997 report was on Illinois and Louisiana cities with populations over 20,000 and sizeable riverboat casino industries. Such cities were to serve as comparisons for the possible impact of proposed casinos in downtown Baltimore. Reuter used UCR data to examine violent and property crime rates in the two years prior to and the two years after the introduction of casinos in each city; he also examined rates for the same years in comparison cities in Illinois and Missouri. He found that his sample of cities with casinos displayed mixed crime patterns in the two years after casinos were introduced; he also noted that any crime increases that were found were modest. However, it is important to note that, due to the limited availability of data, Reuter's study focuses on a short time span before and after each of the casinos was opened. Thus, any lag that may have occurred after the opening of each casino would have been missed by his study.

Wilson (2001) also examined the effect of riverboat casinos on crime, but he focused solely on two Indiana cities with riverboat gambling: Hammond and Rising Sun. These two cities varied greatly with respect to population size, with forty times as many people living in Hammond as in Rising Sun. Additionally, while Rising Sun could be

considered rural, Hammond was only minutes away from Chicago, Illinois. The author obtained weekly interval official data from the Hammond Police Department and monthly interval official data from the Rising Sun Police Department. To supplement this official information and to reduce the threats to internal validity identified by Campbell and Stanley, Wilson also conducted interviews with police officers in each department.

Using an interrupted time-series design, Wilson initially found four out of nine offenses to increase after the opening of the riverboat casino in Rising Sun: aggravated assaults, motor vehicle thefts, driving under the influence (DUI), and public intoxications. However, after considering the influence in the increased number of personnel in the Rising Sun Police Department, Wilson questioned the true impact of the casinos on the two public disorder offenses. Thus, he concluded that the opening of the riverboat casino in Rising Sun was associated with significant increases in aggravated assaults and motor vehicle thefts, and he found that the introduction of riverboat gambling in Hammond had no effect on crime. While the author did not adjust for the number of tourists in the population at risk, he provided a justification for this by noting that the increases in crime were small to begin with, so “including the hundreds of thousands of tourists in determining rates of crime would result in drastic reductions in the rates during the postintervention period for both communities” (Wilson, 2001). Additionally, unlike many of the other studies mentioned here, Wilson’s study provided an extensive explanation of the applicability of routine activities theory to the gambling and crime problem, and he suggested that further research should examine differences between the impact of tourism on crime for traditional casinos and tourism on crime for

riverboat casinos. Still, Wilson's study was limited in that it looked at crime after only the first year of operation of each of the casinos, so it would not have caught the presence of a lag in crime increases.

Using both routine activities and hot spots theories as a guide, Stitt, Nichols, and Giacomassi (2003) studied the effect of the introduction of riverboat casinos and stationary barge casinos into communities. These authors used fifteen different socioeconomic variables to match six communities with casinos to six control communities without casinos. Stitt et al. ultimately found mixed results for each of the pairs, with some pairs showing no real change in crime rates in the casino communities and others actually showing decreases in crime in the casino communities. Still, Biloxi, Mississippi and Peoria, Illinois both exhibited large increases crime after casinos were opened. However, the authors used visitor estimates to adjust the crime rates in each location for the population at risk and, in doing so, they found that "there [were] no crimes in the casino communities that [were] statistically different from the control communities" (Stitt et al., 2003). Stitt et al. also noted the fact that they found no lag effect for crime in these communities in research they conducted in 2000. However, the authors only tested for a three year lag, and other research (Grinols and Mustard, 2001) has shown that a lag may appear between three or four years after the casino is introduced. Additionally, the authors noted that "the fact that the results are mixed suggests that there may be some contextual factors operating in some communities that allow for casinos to positively affect crime under certain, as yet unknown, circumstances" (Stitt et al., 2003). In other words, further research needs to be done to determine what factors are associated with increases in crime in certain communities.

*County-level Studies*

At the county level, Gazel, Rickman, and Thompson (2001) examined the impact of the introduction of casino gambling on crime rates in Wisconsin counties. Using Becker's rational choice-inspired economic model, the authors utilized UCR arrest data for both Part I and Part II Index crimes to examine county-level crime before and after casinos were opened. The authors found that, not only did the opening of casinos contribute to a rise in crime rates in those counties containing the casinos, but there was also an increase in the crime rates of those counties without casinos that were adjacent to two or more counties with casinos. However, this spillover effect was not present in counties that were adjacent to only one county with casinos.

Gazel and colleagues found the opening of casinos to be significantly related to the increase of "other violent crimes" (comprised primarily of aggravated assaults) and motor vehicle thefts; these findings are similar to those of Hakim and Buck (1989) for Atlantic City. However, larceny rates in the Gazel et al. study only approached statistical significance, and burglary and robbery were not significantly related to the opening of casinos. Gazel et al. did find the introduction of casinos to be significantly related to arrests for fraud, forgery, receiving stolen property, and embezzlement, as well as arrests for driving while intoxicated (DWI), liquor law violations, and disorderly conduct. Unfortunately, the authors did not do an adequate job of explaining why casino gambling would be related to certain types of crimes but not others. For example, they made no attempt to explain why the opening of casinos in Wisconsin increased Part II crimes associated with "monetary gains," such as forgery and embezzlement, while burglary and robbery did not increase. Additionally, while the authors noted the probable importance

of increased numbers of visitors into the counties that contained casinos, they did not include tourists in their population at risk because county-level visitor data were unavailable.

In a 1999 study by the National Opinion Research Center (NORC), as part of an investigation for the National Gambling Impact Study Commission (NGISC), 100 sample communities were selected to determine the impact of gambling on social and economic outcomes, including crime. The 100 sample communities were assigned codes to reflect their “casino proximity” between 1980 and 1997; communities with casinos operating within a 50 mile range were coded as a “1,” while communities without casinos nearby were coded as “0.” Forty-five of the sample communities were near at least one casino by 1997. The researchers used county-level UCR data to determine whether there were differences in crime rates for the casino- and non-casino communities. Like the other county-level analyses discussed here, this study did not adjust its crime rates for the population at risk. Ultimately, the study by NORC found that casinos did not account for a statistically significant change in crime rates. However, they did state: “This is not to say that there is no casino-related crime or the like; rather, these effects are either small enough as not to be noticeable in the general wash of the statistics, or whatever problems that are created along these lines when a casino is built may be countered by other effects” (NORC, 1999). Even so, the authors of the NORC study did not provide a theoretical explanation for their findings, so readers are left to question why the NORC sample communities failed to experience crime increases while casino communities in other studies did experience such problems.

In one of the only examinations of the relationship between gambling and crime on a national scale, Grinols and Mustard (2001) examined the impact of the introduction of casino gambling on crime rates at the county level. Grinols and Mustard used UCR data for every U.S. county for the years between 1977 and 1996, and they compared the crime rates of counties with casinos to those without casinos during that time period. The authors found that, while crime rates dropped in both sets of counties after 1991, counties with casinos experienced a drop at a much slower rate. Additionally, after American Indian casinos opened in 1992, counties housing such casinos experienced increases in each of the crime categories observed. Grinols and Mustard also noted that their study was able to determine that aggravated assaults, robbery, larceny, burglary, and rape all showed dramatic increases in casino counties after a three to four year lag; the authors noted that auto theft “showed a rising trend before casino opening, which continued unabated through the seventh year after opening.” They contended that the lag may have been the result of pathological gamblers eventually exhausting their resources, and they noted that rate increases were primarily experienced in crimes with financial motivations.

Grinols and Mustard were also able to show that there was a spillover effect of crime from casino counties into neighboring counties without casinos. Still, the authors were not able to account for the population at risk because visitor data were not available at the county level. Grinols and Mustard justified this omission by noting that rural and urban counties with locations managed by the National Park Service receive millions of visitors each year with little effect on crime. However, this argument ignores the points laid out by routine activities theory. It is doubtful that visitors to a national park or to an historical monument present the same type of criminal opportunity as do visitors to a



gambling venue; large amounts of often openly displayed cash and widely available alcohol do not usually factor into visits to locations run by the National Park Service.

Similar to Grinols and Mustard, the current study makes use of county level UCR offense data ranging from 1977 to 2001. However, the current study looks only at those counties containing gambling venues. Further, the current study attempts to determine whether different types of gambling venues (e.g., Native American casinos, dog and horse racinos, riverboat casinos, commercial land-based casinos, etc.) have varying effects on county crime rates. Finally, unlike previous studies, the current study attempts to control for venue characteristics, such as the volume of gaming offered and the amenities provided.<sup>4</sup> Methodology will be further discussed in the next chapter.

---

<sup>4</sup> As was noted in a previous footnote, I also originally planned to look at whether gambling venues in different geographical regions have varying effects on crime rates. However, due to the use of fixed effects in the statistical modeling I used, I could not examine this relationship. Additionally, I originally planned on adjusting crime rates to consider the population at risk (i.e., tourists and the resident population). Unfortunately, like previous researchers who have examined county-level impacts of gambling on crime, I found that county-level tourist estimates are not available.

Table 1: Summary of Literature Review

Author(s)	Summary of Findings	Shortcomings
Hakim and Buck (1989)	The authors examined the effects of casino gambling on Part I Index crimes in Atlantic City and the surrounding communities. They found that violent crime and auto vehicle thefts increased the most dramatically after casino openings, and burglaries showed the least dramatic increases.	The authors failed to consider the tourist population in the population at risk. They also failed to offer theoretical explanations for why some crime rates increased while others did not.
The Evans Group (1996)	The authors stated that the crime rate was already higher in Atlantic City than in the rest of the country in the three years prior to casinos opening there. They then asserted that crime rates actually fell in Atlantic County after casinos opened, even after considering already falling crime rates. The Evans group also found crime rates to fall in two gambling counties (Clark and Washoe) in Nevada after considering tourists as part of the population at risk.	The Evans Group provided virtually no information on how they reached these conclusions.
Reuter (1997)	<p>Reuter adjusted crime rates in Atlantic City to account for the tourist population and found that crime rates increased at a faster pace than did the tourist population. However, he found no significant increases in homicides and found that assault rates were consistent with the influx of tourists into the city.</p> <p>Reuter also examined the two years before and two years after riverboat casinos were opened in cities in Louisiana and Illinois with populations over 20,000, and he compared them to non-casino cities in Missouri and Illinois. He found a mixed crime pattern for the casino cities, with only modest crime increases.</p>	<p>The years examined for Atlantic City were limited to the early years after casinos were first introduced there.</p> <p>Because crime rates were only examined for the two years before and the two years after riverboat casinos were opened, the existence of a considerable lag (after 3 or 4 years) would not be detected.</p>

Table 1: Summary of Literature Review

Author(s)	Summary of Findings	Shortcomings
Wilson (2001)	Wilson examined the impact of riverboat casinos on crime in Hammond and Rising Sun, two cities in Indiana. He found increases in assaults, motor vehicle thefts, DUIs, and public intoxications in Rising Sun (the smaller city), but he questioned the DUI and public intoxication increases because of increased police personnel in the city. He found no effects on crime rates in Hammond (the larger city) after the riverboat casinos were opened.	Wilson did not consider the population at risk in computing crime rates.  Wilson failed to check for a lagged effect on crime rates.
Stitt, Nichols, and Giacomassi (2003)	The authors studied the effects of riverboat and stationary barge casinos on community crime rates. They matched six casino communities to six control communities and found mixed results for each of the pairs. Biloxi, MS and Peoria, IL showed large increases in crime after casinos were opened, but these cities were not statistically different from their controls after the population at risk was considered. The authors found no lag effect in the three years after the casinos were opened.	The authors could not explain why different communities experienced different crime effects.
Gazel, Rickman, and Thompson (2001)	The authors examined the impact of casino gambling on crime rates in Wisconsin counties. They found that county-level crime rates rose after a casino was opened, and they found a spillover effect in non-casino counties that were adjacent to two or more casino counties. Aggravated assault and motor vehicle thefts showed significant increases. Fraud, forgery, receiving stolen property, embezzlement, DWI, liquor law violations, and disorderly conduct also increased significantly.	The authors could not explain why casinos were related to increases in some crimes but not others.  Gazel, Rickman, and Thompson did not consider the population at risk in computing crime rates.
National Opinion Research Center (1999)	The authors compared forty-five sample communities that had at least one casino within a 50 mile range to communities without casinos nearby, using UCR data. They found no statistically significant change in crime rates after casinos were opened.	NORC did not account for the population at risk in computing crime rates.

Table 1: Summary of Literature Review

<b>Author(s)</b>	<b>Summary of Findings</b>	<b>Shortcomings</b>
Grinols and Mustard (2001)	This was a national scale examination of the impact of gambling on county-level crime rates. Grinols and Mustard used UCR data for every U.S. county for the years 1977-1996, and they compared counties with casinos to those without casinos. While crime rates dropped during that time frame, casino counties experienced these drops at a slower rate than non-casino counties. Aggravated assaults, robbery, larceny, burglary and rape rates showed dramatic increases in casino counties after a 3-4 year lag. Auto theft rates increased before casinos opened and continued to increase until 7 years after the casino had opened.	Grinols and Mustard could not account for the population at risk in computing crime rates.

## CHAPTER 3 – DATA AND METHODOLOGY

**Sample**

The main data used in this project come from the Federal Bureau of Investigation's Uniform Crime Reports (UCR). The study utilizes UCR offense data for the years between 1977 and 2001 for the counties containing one or more gambling venue. These include commercial and Native American land-based casinos, riverboat casinos, dog and horse track racinos, and Native American bingo halls. Casino cruise ships and card rooms were not included. Dog and horse tracks were only included if they offer another form of gambling (e.g., slots, video lottery terminals) in addition to race book betting. To be eligible for inclusion in the study, gambling venues had to open between 1981 and 1997, thus allowing for the examination of county crime rates for at least the four years prior to and the four years after the introduction of the venue.<sup>5,6</sup>

Opening dates for casinos and other gambling venues were acquired in several different ways. Following the lead of Grinols and Mustard (2001), lists of gambling venues for each state were obtained through [www.casinocity.com](http://www.casinocity.com). Additionally, I attempted to attain the *Executive's Guide to North American Casinos* that Grinols and Mustard used in their study. However, after being unable to locate this resource, I was able to obtain a copy of *Casino Executive Fact Book* ranking charts, which included opening dates for some casinos in 11 different states (Arizona, California, Colorado, Illinois, Indiana, Iowa, Louisiana, Mississippi, Missouri, New Jersey, and Oregon), from the American Gaming Association. To supplement this list, I contacted state gaming commissions. Finally, when gaming commissions were unable to supply opening dates, I

---

<sup>5</sup> An exception was made in the case of Atlantic City, where casinos began opening in 1978.

<sup>6</sup> I originally planned to examine the data for a lagged effect. However, due to time constraints, this was not possible.

contacted each individual gambling venue by telephone. This was the case for the majority of Native American bingo halls and casinos included in the study. In the event that employees of the individual gambling venues were unable supply opening dates, I completed web searches for the individual venues.

For each eligible county, I determined which gambling venue opened first. If opening dates for venues could not be determined, the counties in which those venues are located were eliminated from the study. In the case of dog and horse racetrack casinos (racinos), I used the start date of the casino features (i.e., slots, video lottery terminals, etc.) that were added to the racetrack. If there was a venue that changed names, type (e.g., from a bingo hall to a casino), or owners, I used the original opening date unless the venue was closed down and reopened at a different time. In the event that multiple venues opened in a county during the same year, the “first” venue was selected based on the volume of gaming offered. For example, if two venues opened in County A in 1995, the venue with 2,000 slots would be selected over the venue with 100 slots as the “first” venue. For every eligible “first” venue in each county, information regarding the volume of gaming, the number of hotel rooms, the hours of operation, and the presence of complimentary drinks and/or bars was obtained from [www.casinocity.com](http://www.casinocity.com).

UCR data are supplemented in this study by Census data for each county. These data were obtained for 1980, 1990, and 2000. Information on the following variables was recorded: base population; age, gender, and race distribution; median household income; and land area (in square miles).<sup>7</sup> For the years in between these decennial census years, I performed linear interpolations to obtain the figures for each variable using Microsoft

---

<sup>7</sup> I also obtained information on percent below poverty in each county for the three Census years, but I was advised by committee members against using linear interpolations for this variable. I ultimately dropped it from the model.

Excel. Additionally, I created a population density measure by dividing the number in the base population by the land area.

Ultimately, I compiled data for 144 counties in 31 different states. Of these, 4 contained Native American bingo halls, 8 held racinos, 105 contained Native American casinos, 21 contained commercial land-based casinos, and 6 held riverboatboat casinos (see Table 2 for descriptive information for all variables). It should be emphasized here that this sample of casinos, racinos, and bingo halls is not representative of legalized gambling in the United States. While the majority of my sample consists of Native American casinos, legalized gambling in the United States is dominated by commercial casinos, such as those found in Las Vegas, Nevada.<sup>8</sup> Such venues are generally larger and generate greater revenues than the venues that are included in the current study.

In addition, the current sample of gambling venues consists solely of the first venues to have opened in each county. Thus, the findings in this study may underestimate the true impact of gambling venues on crime rates since many of the counties included are home to multiple gaming venues. Future studies should overcome this problem either by isolating and focusing on counties with only one venue or by including data on all gambling venues in each county.

---

<sup>8</sup> Clark County, the county in which Las Vegas is located, could not be included in the current study because gambling began there in 1931. To be eligible for inclusion in this study, gambling venues had to have opened between 1981 and 1997.

Table 2: Descriptive Statistics of Variables

Variable	N	Mean/Percent	Std. Dev.	Minimum	Maximum
<b>Dependent Variables (per 10,000 people)</b>					
Murder Rate	3529	.62	.77	0	11.62
Rape Rate	3529	3.45	2.74	0	44.83
Robbery Rate	3529	7.97	11.40	0	121.71
Assault Rate	3529	28.90	24.23	0	539.07
Burglary Rate <sup>9</sup>	3511	113.92	59.81	7.53	552.12
Larceny Rate	3529	280.02	128.53	7.53	1412.48
Vehicle Theft Rate	3529	32.10	28.18	0	244.34
Arson Rate	3529	3.02	3.36	0	35.71
Overall Crime Rate (Excluding Arson)	3529	467.33	209.29	37.63	2036.40
Overall Crime Rate (Including Arson)	3529	470.49	210.48	37.63	2036.40
<b>Venue Opening</b>	3556	41.3%		0	1
<b>Venue Type</b>					
Native American Bingo Halls	3556	1.1%		0	1
Racinos	3556	2.4%		0	1
Native American Casinos	3556	30.7%		0	1
Commercial Land- Based Casinos	3556	5.9%		0	1
Riverboat Casinos	3556	1.1%		0	1
<b>Control Variables</b>					
Population Density	2972	221.18	499.30	.65	3987.55
Percent of Population Under 18	2992	27.38	3.43	18.83	42.00
Variable	N	Mean/Percent	Std. Dev.	Minimum	Maximum
Percent of Population Over 65	2992	13.28	3.75	3.44	36.50

<sup>9</sup> The N for burglary rate is smaller than the number of observations for the other dependent variables due to the elimination of an outlier. The population figures provided by the UCR for Prince of Wales, Alaska were considerably lower in 1984 and 1985 than in other years, probably due to a typographical error. Although I attempted to correct this problem by fixing these population typos, there was still the problem of significantly more burglaries being reported in 1984 than in any other year in the data set for the county. In fact, the resulting burglary rate was 7584.54, which was the highest burglary rate in the data set (the next highest was 552.12). Thus, this county was eliminated from all burglary rate analyses.



Table 2: Descriptive Statistics of Variables

Percent Male	2992	49.69	1.73	45.9	62.8
Percent White	2991	83.47	14.14	9.01	98.98
Percent Black	2991	6.03	12.27	0	85.61
Median Household Income	2992	26316.09	9105.4	8843	74335
Hours of Operation	3556	24.9%		0	1
Number of Hotel Rooms	3506	55.37	205.50	0	1916
Free Drinks	3556	6.6%		0	1
At Least One Bar	3556	7.6%		0	1
Number of Slots	3556	368.62	845.46	0	6701
Number of Table Games	3494	9.92	28.06	0	300
Number of Bingo Seats	3506	163.15	410.02	0	3500
Number of Electronic or Video Bingo Seats	3481	3.81	36.84	0	556
Number of Video Gaming Machines	3406	31.12	181.08	0	2100
Number of Video Lottery Terminals	3556	46.22	285.52	0	2500
Pull Tabs	3556	7.3%		0	1
Keno	3556	7.1%		0	1
Race Book Betting	3556	4.4%		0	1

## **Variables**

### **DEPENDENT VARIABLES**

The dependent variables of interest are, of course, county level crime rates. The UCR records the yearly number of the offenses for the following crimes in each county: murder, rape, robbery, assault, burglary, larceny, vehicle theft, and arson. Figures for the total number of crimes recorded for each county are also available, both with and without arson figures included in the total. The UCR also provides the county population for each year so that crime rates can be calculated. Crime rates for each crime type are calculated by dividing the total number of crimes reported by the number in the population and multiplying by 10,000. I use rates per 10,000 people instead of rates per 100,000 people because, although the mean population is 185,637, the median population for the sample is 55,993.

Although I originally planned to adjust county-level crime rates for the population at risk, I was unable to locate tourist figures for the counties included in my sample. Through conversations with Andrew Smith at the American Gaming Association, as well as conversations with individuals at multiple state and city Convention and Visitors' Bureaus, I found out that most counties do not track the number of visitors they receive.

### **INDEPENDENT VARIABLES**

#### **VENUE OPENING VARIABLE**

In the first part of the analysis, I test to see if county-level crime rates are affected by the opening of gambling venues. To do this, I created a venue opening dummy variable. For each venue and year, the venue open variable is coded as "1" if a venue is open or "0" if a venue is not open.

### VENUE TYPE VARIABLES

In the second part of the analysis, I test to see if county-level crime rates are impacted by the different types of venues. Separate dummy variables were created for each type of venue. Thus, Native American casinos, commercial land-based casinos, racinos, riverboat casinos, and Native American bingo halls were each given dummy variables so that they can be separately examined for their effects on county crime rates. These variables are coded in the same way that the venue opening variable is coded; thus, if a county contains a Native American casino, the “NACASINO” variable is coded as “1” if the casino is open and “0” if the casino is not open.

### CONTROL VARIABLES

Based on the findings and shortcomings of previous research on this topic, several independent variables are controlled for in both parts of the analysis. Age, gender, and race distribution variables are included for each county. These variables have been consistently shown to be significantly related to crime rates. In fact, as is noted by Mosher, Miethe, and Phillips (2002), “UCR data indicate that approximately 17 percent of the arrestees are under the age 18, 83 percent are male, and about 40 percent are black.” Although I am using offense rather than arrest data, there is still evidence to suggest that these variables necessitate inclusion. I also included median household income as a measure of wealth for each county.<sup>10</sup> Population density is controlled for so that the effects of a location being lightly or heavily populated can be separated from the effect of the introduction of a gambling venue.

---

<sup>10</sup> I was unsuccessful in my attempts to obtain unemployment data for each county. Although I was able to locate a REIS (Regional Economic Information System) CD-ROM, the CD only included unemployment insurance payment information (as part of a derivation of personal income); it did not include data for actual county unemployment rates. I also tried to find this data through the Bureau of Labor Statistics website (<http://stats.bls.gov>), but the site only included unemployment data dating back to 1990.

Other variables controlled for pertain to venue characteristics. Because information about revenue is not available for most Native American gambling venues, I capture the volume of gambling at each venue by including continuous variables for the numbers of slots, table games, bingo seats, electronic or video bingo seats, video gaming machines, and video lottery terminals. Further, I include binary variables for other types of gambling offered, including race book betting, pull tabs, and keno.

Since it has been suggested that unoccupied hotel rooms at casinos may serve as suitable targets for burglary, a continuous variable for the number of hotel rooms is included. Additionally, because alcohol may play a role in both lowering the inhibitions of the offender and in decreasing the precautions taken by a potential victim, the presence of alcohol at gambling venues is captured by two variables. First, a binary variable captures whether or not complimentary drinks are offered at each venue. Second, another binary variable is included to capture the whether or not there is at least one bar serving alcoholic beverages at each location. Finally, I include a binary variable for the hours of operation: the variable is coded “1” if the venue is open 24 hours, and it is coded “0” if the venue is not open 24 hours.

### **Limitations to Data**

Several limitations exist for this study simply because it utilizes official crime data. As has been well documented, official crime data often fails to provide a true picture of the number of crimes that occur. For crimes to be recorded, they have to be observed or experienced and considered important by victims or observers reported to the police, observed or responded to by the police, and finally logged by the police. Because of this process, it is believed that crimes that are considered less serious by both

citizens and police are often underreported or even unrecorded. Additionally, some crimes may occur without being noticed by others, thus eliminating the initial stage in the process of crimes being officially recorded. Further, victims may be reluctant to report crimes because they know the offender, are embarrassed or ashamed, fear retaliation, or consider the crime to be minor. All of these issues may contribute to a major underreporting of crimes by official sources.<sup>11</sup>

Census data present their own set of challenges. The greatest challenge posed by census data is underreporting. One of the most frequently cited problems with census data sets is that they fail to capture individuals who are homeless. Additionally, because the United States Census is voluntary, many people fail or refuse to participate. Further, older versions of the U.S. Census did not include many racial categories. Thus, for consistency across years, only the percent white and the percent black are included here. This means that other racial groups that may be important to this study, including Native Americans, are not controlled for.

The information concerning each gambling venue poses an additional problem. Although the opening dates I received from the *Casino Executive Fact Book* ranking charts and the individual state gaming commissions are probably accurate, the dates I was given by individuals who worked for the casinos may be susceptible to errors. Sometimes I had to speak to personnel in several different departments before I found someone who knew when the casino was opened. In other cases, it was obvious that

---

<sup>11</sup> Even when crimes are recorded, errors may occur. In this data set, outliers were examined closely. In many cases, obvious typographical errors caused crime rates to be either wildly exaggerated or underreported. Changes were made to correct typographical errors for the populations of Prince of Wales (02201) in 1984 and 1985, New Castle County (10003) in 1995, La Porte County (18091) in 1985, Mackinac County (26097) in 1997, Franklin County (36033) in 1990 and 1992, and Milwaukee County (55079) in 1998.

individuals were just guessing about the start date for a venue. In these instances, the venues were removed from the sample. However, there is still the risk that the opening date information is not completely accurate.

Additionally, the information provided concerning each venue's volume of gaming may also have mistakes. Although information I obtained from [www.casinocity.com](http://www.casinocity.com) about the number of slots and other gambling amenities seemed comparable to the information reported for the 11 states in the *Casino Executive Fact Book* ranking charts, there were some variations. Further, the information that is provided for each venue's features refers to the venue as it is at the present time; there is no way of knowing how much each venue has changed since it was first opened. For example, a casino that was opened in 1992 may have started out with 700 slots but may have over 1,000 now; because I attained information on the gaming facilities that are presently available at the venue, the effect of these facilities may be overstated.

Because there is no previous literature that deals with venue volume and amenities variables, the importance of these variables is unknown. The same can be said for venue type variables. Additionally, because sample sizes for each type of venue are limited, the external validity of the findings will also be limited. Thus, these variables should be viewed as serving only exploratory purposes. It is only hoped that these variables will provide insights that will serve as stepping stones for future research possibilities.

An additional data limitation has already been noted throughout this paper. My original intent was to obtain county level tourist data for all counties included in this study. My goal was to adjust crime rates for the true population at risk so that a more

accurate picture of an individual's risk of being victimized in a gambling county could be presented. However, as has already been noted, most counties do not track information about the number of visitors they receive. Thus, I cannot address this situation.

Additionally, because the statistical design uses fixed effects, I cannot examine how regional differences affect the impact of venue openings on crime rates. Finally, although the importance of police variables seems rather obvious, I do not include such variables here. Therefore, I am forced to speculate about the possible impact of increased levels of police personnel on some of my findings in the next chapter. Future studies should attempt to include police data whenever possible. Due to this and the other limitations mentioned above, generalization of the findings for the current sample will be limited at best.

### **Method of Analysis**

After looking at the distributions for each dependent variable, it was observed that some of the rates are stacked heavily at zero, but otherwise could be normally distributed. To account for the censoring at zero (see Smith and Brame, 2003), I use Tobit regression to model the following crime rates: murder, rape, robbery, assault, vehicle theft, and arson. The distributional patterns of the other dependent variables appear non-skewed and nearly normal. Thus, for those dependent variables, I use ordinary least-squares (OLS) regression.

In both the OLS and the Tobit models, I control for county-level fixed-effects. Fixed-effects allow me to measure the effect of changes in the venue on changes in crime rates over time. The fixed-effects model is exemplified by the equation:

$Y_{it} = \alpha + \beta X_{it} + \gamma_i + \varepsilon_{it}$ , where  $\gamma_i$  represents the fixed-effects to be estimated (Pindyk and

Rubinfeld,1998; Gould1997 ). In this equation,  $i$  indexes the counties  $1 \dots i$ , while  $t$  represents the time points  $1 \dots t$ .



## CHAPTER 4 – RESULTS

### **Venue Opening**

#### TOBIT REGRESSION

The first set of hypotheses that I examined concern the opening of venues in general. As was stated in the introduction, it was expected that the opening of any type of venue in a county would lead to increases in financially-motivated crimes, including robbery, larceny, and burglary. Additionally, based on the findings of previous studies, it was anticipated that the opening of venues would also result in increases in motor vehicle thefts and aggravated assaults. Murder rates, rape rates, and arson rates were not expected to be significantly related to the introduction of gambling venues. At the same time, overall crime rates were expected to show significant increases after gambling venues were opened.

Based on the distributional patterns of the dependent variables, I used Tobit regressions with fixed effects to model the impact of venue openings on murder, rape, robbery, assault, vehicle theft, and arson rates. Table 3 presents the regression coefficients for these Tobit models.

Table 3: TOBIT Coefficients for Venue Opening Models\*

Independent Variables	Murder Rate		Rape Rate		Robbery Rate		Assault Rate		Vehicle Theft Rate		Arson Rate	
	$\beta$	T	$\beta$	T	$\beta$	T	$\beta$	T	$\beta$	T	$\beta$	T
<b>Venue Opening</b>	.002	.04	-.508	-2.01**	.037	.10	-3.120	-1.79*	1.465	1.18	1.718	5.84**
Population Density	-.001	2.13**	-.008	-3.39**	-.003	-.80	-.013	-.78	-.045	-3.35**	-.006	-2.08**
Percent of the Population Under 18	.002	.09	-.515	7.19**	-.450	-3.70**	-2.480	-4.96**	.864	2.10**	-.108	-1.22
Percent of the Population Over 65	-.000	-.02	-.174	-2.72**	-.149	-1.24	-1.053	-2.36**	.335	.89	-.398	-4.40**
Percent Male	-.074	-2.54**	-.314	-3.19**	-.845	-5.05**	-1.690	-2.46**	-2.133	-3.68**	-.498	-4.16**
Percent White	-.022	-4.91**	-.024	-1.55	-.053	-2.08**	-.364	-3.40**	-.343	-3.80**	-.094	-5.07**
Percent Black	.077	4.61**	-.101	-1.75*	.784	8.14**	1.071	2.66**	3.721	11.09**	.106	1.54
Median Household Income	-.000	-2.21**	.000	2.67**	-.000	-4.71**	-.000	-.99	.000	.42	-.000	-2.40**
Hours of Operation	--	--	.477	2.09**	--	--	1.412	.89	--	--	-.798	-2.99**
Number of Hotel Rooms	.000	1.41	.003	4.33**	.001	.91	-.006	-1.26	-.006	-1.47	.002	2.30**
Free Drinks	-.181	-2.10**	-.346	-1.20	.620	1.29	1.293	.64	-1.869	-1.11	-.686	-2.04**
At Least One Bar	-.133	-1.57	-1.16	-4.10**	1.067	2.28**	-9.200	-4.69**	-7.851	-4.84**	-.711	-2.14**
Number of Slots	-.000	-.06	.000	.59	.000	.89	.004	3.05**	.005	4.75**	.000	.10
Number of Table Games	.000	.04	-.022	3.97**	-.016	-1.78*	-.024	-.63	-.033	-1.09	-.016	-2.57**
Number of Bingo Seats	-.000	-1.38	.001	2.44**	--	--	.002	1.26	-.005	-.45	.000	.35
Number of Video Bingo Seats	.000	.72	-.001	-.54	-.003	-.93	.023	1.62	--	--	-.000	-.07
Number of Video Gaming Machines	.000	.83	.000	.65	.001	1.37	.004	1.59	.001	.24	.000	.50
Number of Video Lottery Terminals	-.000	-.12	.000	1.08	.001	2.49**	.004	1.82*	.008	4.67**	-.001	-1.88*
Pull Tabs	.252	2.82**	-.247	-.85	--	--	-5.394	-2.66**	3.087	1.99**	-1.305	-3.83**
Keno	.029	.34	-.033	-.12	-.143	-.30	-2.315	-1.17	--	--	.378	1.13
Race Book Betting	-.041	-.33	-1.22	-2.82**	-.961	-1.35	2.801	.93	-11.480	-4.56**	-.799	-1.55
Constant	5.886	2.90	36.085	5.31	64.724	5.50	228.616	4.83	112.947	2.84	44.359	5.16
Pseudo R <sup>2</sup>	.29		.12		.31		.10		.17		.14	

\* p&lt;.10, two-tailed significance test; \*\* p&lt;.05, two-tailed significance test

### Murder Rates

As expected, murder rates are not significantly related to the opening of gambling venues. However, it is interesting that both the presence of free drinks and the presence of pull tabs at the venue remain significant in the full model.<sup>12</sup> Because the venue volume and amenities variables that I control for in this study have not been included in previous studies on the effects of gambling venues and crime, it is difficult to draw any solid conclusions as to their relevance. However, I believe that the dummy variable for pull tabs is probably more closely related to the type of venue than the volume of gambling offered. There is certainly no literature to suggest that pull tabs make gambling patrons more prone to commit murder or to become murder victims. Due to this lack of theoretical relevance, this variable can probably be excluded from future examinations of the impact of gambling venues on crime rates.

The significance of the free drinks variable poses a more interesting problem. There is reason to believe that this variable is important to include because research has suggested that the availability of alcohol lowers users' inhibitions and therefore may increase the likelihood that they are victimized (Stitt et al., 2003). At the same time, lowered inhibitions may also provide offenders with the impetus they need to commit crimes (Stitt et al., 2003). However, the direction of the free drinks variable in this model is negative, indicating that the presence of free drinks at gambling venues may serve as a deterrent to murder. It is difficult to imagine plausible scenarios that fit this situation. Therefore, it is suggested that the current results be interpreted with caution and that the free drinks variable be examined further in future research.

---

<sup>12</sup> It should be noted that, even without the additional gambling volume and amenities variables included in the model, there was no significant relationship found between the opening of gambling venues and murder rates.

### Rape Rates

While a significant relationship between rape rates and the introduction of gambling venues was not expected, I did find such a relationship. Based on the Tobit regression results, rape rates appear to have declined significantly as gambling venues were opened in the sample counties. This is especially interesting considering that, using a two-sample t-test, rape rates were shown to be significantly higher in post-venue years than in pre-venue years. This suggests the possibility that gambling variables may provide some protective factor that serves as a deterrent to rape. One possibility is that, as gambling venues open, more money is spent on area police forces and on venue surveillance. As prostitution is notoriously connected with gambling, sensitivity to the potential for stranger rape may also be heightened. In the process, such rapes may be prevented. Of course, this explanation fails to account for that fact that most rapes take place between either acquaintances or intimates. Accordingly, future research should attempt to replicate the findings of the present study while controlling for increases in community police forces and venue security.

An alternative explanation for this finding may be that the true effect of gambling venues on rape rates is lagged. Grinols and Mustard (2001) found that rape rates increased 3 to 4 years after casinos were opened. Because I did not check for a lagged effect in the current study, I could obviously not replicate these findings. Future research should address this question to see if rape rates initially decrease and later increase significantly.

As with murder rates, the additional venue volume and amenities variables paint a somewhat cloudy picture with respect to rape rates.<sup>13</sup> From the Tobit regression results, it appears as though venues that have at least one bar, have higher numbers of table games, or have race book betting have even lower rape rates. At the same time, venues that are open 24 hours, have higher numbers of hotel rooms, or have higher numbers of bingo seats have higher rape rates.

Considered individually, these variables may seem reasonable. Taken together, however, the findings for these variables seem questionable. One could reasonably argue that gambling venues with at least one bar may provide greater official guardianship than gambling venues without bars. Because alcohol is known to reduce inhibitions, venues with bars may provide extra security to prevent problems. Additionally, county police departments may increase patrols to prevent public drunkenness and driving under the influence. As was already suggested, this increased security and police presence may serve in a round-about way to reduce rapes. These same assumptions could work for the number of table games and the presence of race book betting. Venues with these forms of gambling may have increased surveillance; alternatively, counties in which these types of gambling are offered may have more frequent police patrols. Either way, this increased guardianship may deter rapes from occurring. Again, these are speculative explanations, and they do not account for rapes that occur among intimates.

On the other hand, gambling venues that are open 24 hours may allow perpetrators to find potential rape victims at any time of day, thus contributing to increases in the rape rate. Additionally, greater numbers of hotel rooms at a gambling

---

<sup>13</sup> Without these additional variables in the model, there was still a negative and significant relationship between the opening of gambling venues and rape rates.

venue may mean a greater number of opportunities for rapes to take place. Finally, the greater number of bingo seats may mean that the venue is larger and less capable of adequate guardianship. This may mean that rapists may find potential victims without being viewed as suspicious. Again, these assumptions are based mainly on rapes that occur between strangers.

Taken together, these variables do not make as much sense as they do separately. For example, if formal guardianship increases with the number of table games, why would it not also increase with the number of bingo seats? Alternatively, why would the size of the venue be an aggravating factor in the case of the number of bingo seats but a mitigating factor in the case of table games? It is doubtful that the games themselves have anything to do with rape rates. Thus, future research interested in the effects of gaming volume on crime rates should probably find better measures than the number of bingo seats, table games, slots, etc. The best measures would probably be the revenue generated by each venue. However, these figures are often unavailable for Native American venues, which made up the majority of my sample. Therefore, an alternative way of controlling for the volume of gambling offered at each venue in future studies may be to create a scale which takes into consideration the various continuous variables included here.

While the gambling volume variables presented here are problematic, the hours of operation, number of hotel rooms, and the presence of bars serving alcohol are interesting variables to consider. However, these measures would be improved if they applied not solely to the venue, but to the whole county. Thus, instead of including only the number of hotel rooms at the gambling venue, future research should consider the number of

hotel rooms in the whole county. Additionally, instead of examining whether or not a gambling venue has a bar, future research should consider the volume of alcohol served in the county through the total number of bars, liquor stores, etc. Of course, these changes have less to do with the gambling venues in particular, but these revised variables would probably make better controls than the current variables.

### Robbery Rates

The only financially-motivated crime in this group, robbery, is shown to have a positive but insignificant relationship with the opening of gambling venues. Although this finding does not match the predicted effect, it does partially support the idea that gambling venues may contribute to some increases in financially-motivated crimes.<sup>14</sup>

Some venue volume and amenities variables (i.e., the presence of at least one bar at the venue, the number of table games, and the number of video lottery terminals) are significant in the full model for robbery rates, even though the opening of venues themselves are not. The presence of at least one bar at the venue is significant and positive for robbery rates. This may mean that individuals who consume alcoholic beverages at gambling venues let down their guards and make better robbery targets. Because of these implications, future research should continue to attempt to control for the presence of alcohol at gambling venues or in gambling counties.

The number of video lottery terminals is positive and significantly related to robbery rates, but the number of table games is negative and significantly related to robbery rates. These findings seem to contradict one another. The games themselves are probably not related to robbery rates; if they were, gambling venues would not offer them

---

<sup>14</sup> Even without the venue volume and amenities variables included in the model, there was no significant relationship between the opening of gambling venues and robbery rates.

or would increase surveillance to prevent robberies. Therefore, these variables are probably not good measures for volume of gambling. Future research should attempt to find better, more meaningful measures.

### Assault Rates

While previous studies have suggested that assault rates increase when gambling venues are opened in a community, my results show that assault rates actually decreased significantly in the counties included in the sample. However, it should be noted that, without the extra venue volume and amenities variables (e.g., the number of slots, race book betting, etc.) included in the model, there was no significant relationship between gambling venues and assault rates. Even so, the direction of the venue opening variable was still negative, indicating that assault rates did decrease (though not significantly) as gambling venues were opened.

County-level assault rates appear to decrease even further if gambling venues have at least one bar. This suggests that venues with bars may have increased formal guardianship, either through increased surveillance or through greater police presence. Future research should examine this relationship further.

The number of slots, the number of video lottery terminals, and the presence of pull tabs are also significantly related to county-level assaults. However, it seems doubtful that these forms of gaming are in any way connected with assaults. Thus, it seems illogical to suggest that venues with greater numbers of slots experience less of a decrease in assault rates than do venues with fewer slots, or that venues with pull tabs experience a greater decrease in assault rates than do venues without pull tabs. These variables were included as a way to approximate the volume of gaming at a gambling



venue, but they are not the best possible measures of this construct. As has been previously suggested, revenue or some other variable may better serve as a measure of the volume of gaming offered at a gambling venue. Future research should make use of such alternatives.

### Vehicle Theft Rates

Though earlier studies have found significant increases in vehicle theft rates after gambling venues are introduced into communities, those findings are not replicated here. Although vehicle theft rates did increase as gambling venues opened, these increases are not significant in the full model. However, it should be noted that, when the impact of gambling venues on vehicle theft rates is considered without the added venue volume and amenities variables, there is a positive and significant relationship between the opening of gambling venues and vehicle theft rates.

Considering the venue amenities variables, the presence of at least one bar at a gambling venue is significantly related to vehicle theft rates, even though gambling venues themselves are not significantly related to vehicle theft rates in the full model. When venues have at least one bar, the county-level vehicle theft rate decreases significantly. This again suggests that the presence of bars at gambling venues increases formal guardianship. Thus, vehicle thefts may be deterred indirectly either through increased surveillance or increased patrolling by local police units when alcoholic beverages are sold at gambling venues. This relationship should be more closely examined in future studies.

Vehicle theft rates are also shown in this study to be significantly related to the number of slots, the number of video lottery terminals, the presence of pull tabs, and the

presence of race book betting. As has already been established, these variables are not good measures of the volume of gaming that is offered at gambling venues. Additionally, it is highly doubtful that any of these gaming forms is actually associated with vehicle thefts. Thus, these variables should not be included in future studies that attempt to control for the volume of gaming; alternative measures should be considered.

### Arson Rates

Contrary to the expectations of the first set of hypotheses, arson rates increased significantly as gambling venues were introduced into the counties in the sample. This finding is difficult to explain using any of the venue volume or amenities variables, even though some of those variables - i.e., the hours of operation, the number of hotel rooms, the presence of free drinks, the presence of at least one bar, the number of table games, the number of video lottery terminals, and the presence of pull tabs – are significant in the full model.

Even without the volume and amenities variables included in the model, I found a positive and significant relationship between the opening of gambling venues and arson rates. There seems to be no straight-forward explanation for this finding, unless the venues themselves are the targets for arsonists. Because this is unlikely, an alternate explanation is that the sample simply includes counties that have high arson rates. However, a two-sample t-test indicates that arson rates were significantly higher in post-venue years than in pre-venue years.

Because there seems to be no logical reason for gambling venues leading to increases in arsons, an alternative explanation is probable. With a pseudo- $R^2$  value of only .14, the full model does not explain much of the variation in arson rates, especially

considering the fact that the extra fixed effects variables generated probably inflated this figure somewhat. Thus, it is likely that there are some other unknown factors that are not included in the model that are better able to explain arson rates.

#### ORDINARY LEAST-SQUARES REGRESSION

I addressed the first set of hypotheses for the dependent variables with non-skewed, nearly normal distributions (i.e., burglary, larceny, and overall crime rates) using ordinary least-squares (OLS) regressions with fixed-effects. Again, the results were expected to show that financially-motivated crimes, including burglary and larceny, increased significantly after gambling venues were opened. Overall crime rates were also expected to show dramatic increases after gambling venues were introduced. The results for the OLS with fixed-effects models are presented in Table 4.

Table 4: OLS Coefficients for Venue Opening Models\*

Independent Variables	Burglary Rate		Larceny Rate		Overall Crime Rate (Excluding Arson)		Overall Crime Rate (Including Arson)	
	$\beta$	T	$\beta$	T	$\beta$	T	$\beta$	T
<b>Venue Opening</b>	-2.377	-.78	25.790	3.71**	11.075	1.07	12.483	1.20
Population Density	-.115	-4.09**	-.037	-.58	-.220	-2.29**	-.226	-2.33**
Percent of the Population Under 18	-4.127	-4.74**	-13.838	-6.93**	-20.400	-6.87**	-20.433	-6.84**
Percent of the Population Over 65	-1.393	-1.79*	-8.159	-4.57**	-10.798	-4.07**	-11.017	-4.13**
Percent Male	-.295	-.25	-18.097	-6.60**	-23.009	-5.64**	-23.357	-5.69**
Percent White	-.163	-.87	1.236	2.89**	.505	.79	.432	.68
Percent Black	-3.060	-4.35**	9.357	5.80**	12.141	5.06**	12.252	5.08**
Median Household Income	-.003	-16.35**	-.003	7.82**	-.006	-10.05**	-.006	-10.08**
Hours of Operation	-.224	-.08	-27.139	-4.30**	-17.087	-1.82*	-17.746	-1.88*
Number of Hotel Rooms	.051	5.69**	.074	3.63**	.108	3.57**	.110	3.62**
Free Drinks	-7.135	-2.04**	17.709	2.21**	12.666	1.06	12.158	1.01
At Least One Bar	-9.827	-2.87**	-16.917	-2.16**	-40.003	-3.43**	-40.766	-3.47**
Number of Slots	.004	1.68*	.015	2.89**	.030	3.83**	.030	3.81**
Number of Table Games	-.261	-3.90**	-.651	-4.24**	-1.127	-4.93**	-1.142	-4.97**
Number of Bingo Seats	-.003	-.90	-.002	-.22	.012	1.22	.012	1.23
Number of Video Bingo Seats	-.034	-1.36	.022	.39	-.000	-0.00	-.000	-0.00
Number of Video Gaming Machines	.008	1.75*	.028	2.57**	.037	2.30**	.037	2.30**
Number of Video Lottery Terminals	.015	4.03**	-.004	-.49	.025	2.05**	.025	2.00**
Pull Tabs	14.427	4.01**	-25.699	-3.17**	-24.823	-2.06**	-25.933	-2.14**
Keno	5.391	1.56	22.914	2.90**	33.640	2.86**	33.832	2.86**
Race Book Betting	-15.924	-3.02**	-25.489	-2.11**	-51.176	-2.85**	-52.169	-2.89**
Constant	304.798	3.69	1603.373	8.48	2309.055	8.20	2339.696	8.27
R <sup>2</sup>	.79		.77		.82		.82	

\* p&lt;.10, two-tailed significance test; \*\* p&lt;.05, two-tailed significance test

### Burglary Rates<sup>15</sup>

Contrary to the hypothesized effect, burglary rates actually declined as gambling venues opened. However, these declines are not significant.

Several gambling volume and amenities variables are significantly related to burglary rates, despite the fact that the venues themselves are not significantly related to burglary rates in the full model. The number of hotel rooms, the number of slots, the number of video gaming machines, the number of video lottery terminals, and the presence of pull tabs at the venue are all significant and positive. At the same time, the presence of at least one bar, the presence of free drinks, the number of table games, and the presence of race book betting are all significant and negative.

As the venue volume variables have already been discounted as true measures of volume, they will not again be addressed here. However, it is important to address the amenities variables here. The fact that burglary rates are significantly higher as the number of hotel rooms increases gives credence to the idea that unoccupied hotel rooms at gambling venues serve as suitable targets for burglaries. At the same time, the negative and significant findings for free drinks and for bars serving alcoholic beverages suggest that formal guardianship probably increases when alcohol is available at gambling venues. As has been previously suggested, counties with gambling venues may increase the funding allocated for police departments. With such increased resources, police departments are probably able to send more officers into the field to handle public disorder offenses and, in the process, may indirectly deter burglaries. At the same time, gambling venues that sell alcoholic beverages and offer free drinks to gamblers may have

---

<sup>15</sup> Regression models for burglary excluded Prince of Wales, Alaska. Because the number of burglaries that were reported in 1984 for this county was so large, the computed burglary rate per 10,000 people was higher than the population of the county. This typographical error did not affect any other crime rates.

increased surveillance to minimize any unwanted consequences to drinking behavior. This surveillance may also deter potential offenders from committing burglaries.

Although the  $R^2$  is .79 for burglary rates in this model, this figure is probably inflated both by the unnecessary gaming volume variables and by the variables generated by using fixed effects. Because of this, and because the finding for gambling venues is in the unexpected direction, future studies should examine burglary rates more closely. Additionally, the number of police officers in the county and the presence of security guards and surveillance at venues should be controlled for. Regional differences should also be considered, as burglary rates are much higher in the south than in the northeast (Mosher et al., 2002).

#### Larceny Rates

Unlike burglary rates, larceny rates did increase significantly as gambling venues opened.<sup>16</sup> This finding matched the expectations put forth by the first set of hypotheses. Additionally, gambling venues that have higher numbers of hotel rooms and that offer free drinks appear to experience even higher rates of larceny. This seems to suggest the hotels provide greater opportunities for offenders to steal small items, pick pockets, or snatch purses. Additionally, the positive and significant finding for free drinks seems to suggest that either victims let their guards down after drinking alcohol or offenders become emboldened by drinking alcohol at gambling venues.

At the same time, negative and significant findings are present for the hours of operation and the number of bars. This suggests that venues that sell alcohol and which are open 24 hours somehow increase formal guardianship in order to prevent crimes like

---

<sup>16</sup> Even without the gambling volume and amenities variables included in the model, there was a positive and significant relationship between gambling venues and larceny rates.

pick-pocketing and purse snatching from occurring. However, because the presence of at least one bar and the presence of free drinks have opposite but significant findings for larceny rates, these variables should be further examined in future studies of gambling and crime.

As has been previously demonstrated, variables including the number of slots, the number of table games, the number of video gaming machines, pull tabs, keno, and race book betting are not reasonable measures of the volume of gambling at a venue. Thus, while these variables all demonstrate significant relationships with larceny rates, they should be interpreted with caution. Future studies should use alternative variables to measure the volume of gambling at venues. Security presence at gambling venues and an increased police force in the community should also be controlled for.

#### Overall Crime Rates

Overall crime rates, both with and without arson, did increase as casinos were opened. In the full model, these increases are not significant and therefore fail to match the expected outcomes put forth by the first set of hypotheses. However, without including the venue volume and amenities variables in the model, there was a significant and positive relationship between gambling venues and overall crime rates.

In the full model, hours of operation and the presence of at least one bar are both negative and significant. As has already been suggested, venues that are open 24 hours and that sell alcoholic beverages probably have higher levels of formal guardianship than venues that do not have these features. These venues may have better surveillance and tighter security. Additionally, the counties that hold these venues may have a more

visible police presence due to the fact that alcohol is present and the venues are open 24 hours a day.

At the same time, the full model suggests that the number of hotel rooms is related to significant increases in overall crime rates. As has already been discussed, hotel rooms provide increased opportunities for rapes to occur out of notice, and hotel rooms are also suitable targets for burglaries and larcenies.

Although several gambling volume variables are significantly related to overall crime rates, these variables have already been shown to be inadequate measures of the volume of gambling that occurs at gambling venues. Future studies should use alternative measures for volume of gambling.

### **Venue Type**

The second set of hypotheses considers the possibility that different types of gambling venues have different impacts on county-level crime rates. As was stated in the introduction, it was expected that the opening of Native American casinos and Native American bingo halls in a county would lead to increases in financially-motivated crimes, assaults, motor vehicle thefts, and overall crime. At the same time, dog and horse racinos were expected to elicit increases in these crimes, but such increases were not expected to be significant. Finally, commercial land-based casinos and riverboat casinos were expected to draw large numbers of tourists and therefore significantly increase crime rates. Each venue type is examined separately below.

#### **NATIVE AMERICAN BINGO HALLS**

Based on their location on reservations in remote and rural locations, it was anticipated that Native American bingo halls would have significant and positive impacts



on robberies, burglaries, larcenies, assaults, motor vehicle thefts, and overall crime. These assertions were based on the idea that bingo halls would attract out-of-county visitors who would serve both as attractive crime victims and as willing crime perpetrators. Additionally, all of these crimes have either been shown in previous studies to be linked to the opening of gambling venues or are supported by the principles of routine activities theory. Murder, rape, and arson rates were not expected to be significantly related to the opening of Native American bingo halls.

Using a dummy variable for Native American bingo halls, I examined each dependent variable (i.e., crime rate) separately. Based on the distributions for murder, rape, robbery, assault, vehicle theft, and arson, the impact of Native American bingo halls on these rates were modeled using Tobit regressions with fixed effects. The results for these models are exhibited in Table 5.

As the results show, the outcomes anticipated by the hypothesis were only partially correct. Robbery rates did increase significantly as Native American bingo halls were opened, as was predicted. However, both the assault rate and the vehicle theft rate exhibit no significant relationship with the opening of Native American bingo halls. Additionally, both of these rates are in the opposite of the predicted direction.

While the hypothesis predicted no significant relationship between the opening of Native American bingo halls and murder, a significant relationship was found. As Native American bingo halls opened, murder rates declined significantly. The same is true for rape rates. However, the opposite was found for arson rates; as Native American bingo halls opened, arson rates increased significantly.

Table 5: Native American Bingo Tobit Regression Coefficients\*

Independent Variables	Murder Rate		Rape Rate		Robbery Rate		Assault Rate		Vehicle Theft Rate		Arson Rate	
	$\beta$	T	$\beta$	T	$\beta$	T	$\beta$	T	$\beta$	T	$\beta$	T
<b>Native American Bingo Hall Opening</b>	-.443	-1.97**	-1.410	-1.74*	2.723	2.03**	-6.391	-1.18	-6.367	-1.40	2.919	3.04**
Population Density	-.002	-2.39**	-.009	-3.99**	-.002	-.41	-.014	-.90	-.028	-2.15**	-.007	-2.76**
Percent of the Population Under 18	-.008	-.41	-.563	-8.50**	-.521	-4.63**	-2.236	-4.84**	.618	1.59	-.347	-4.23**
Percent of the Population Over 65	-.012	-.68	-.226	-3.70**	-.210	-1.86*	-1.174	-2.75**	.131	.37	-.510	-5.98**
Percent Male	-.096	-3.61**	-.274	-2.98**	-.868	-5.67**	-1.816	-2.83**	-2.730	-5.07**	-.594	-5.30**
Percent White	-.020	-4.63**	.000	.01	-.040	-1.66*	-.266	-2.56**	-.324	-3.71**	-.098	-5.43**
Percent Black	.071	4.41**	-.148	-2.64**	.816	8.93**	1.087	2.78**	3.693	11.25**	.055	.83
Median Household Income	-.000	-2.29**	.000	2.20**	-.000	-6.03**	-.000	-.32	.000	.13	-.000	-2.24**
Hours of Operation	-.104	-2.12**	.151	.91	-.004	-.01	-.913	-.79	2.774	2.86**	.177	.90
At Least One Bar	-.058	-.75	-1.22	-4.68**	.862	1.99	-6.914	-3.79**	-6.276	-4.10**	-.342	-1.10
Number of Video Bingo Seats	.001	1.59	.000	.09	-.010	-2.52**	.027	1.62	-.013	-.90	-.005	-1.47
Number of Bingo Seats	.000	.67	.000	1.61	.001	2.00**	.004	2.60**	.007	5.95**	-.000	-1.18
Pull Tabs	.210	2.65**	-.299	-1.13	1.140	2.59**	-6.840	-3.70**	.080	.05	-.639	-2.04**
Constant	7.332	3.91	34.631	5.42	68.182	6.24	220.224	4.95	151.000	4.04	58.322	7.22
Pseudo R <sup>2</sup>	.29		.11		.31		.10		.17		.13	

\* p&lt;.10, two-tailed significance test; \*\* p&lt;.05, two-tailed significance test

The impact of Native American bingo halls on burglary, larceny, and overall crime rates (both excluding and including arson) were modeled using OLS regressions with fixed effects. The results for these models are presented in Table 6.

The results substantiate the predicted significant effects for burglary, larceny, and overall crime rates. All of these rates increased significantly as Native American bingo halls were opened.

Thus, in this sample, robbery, burglary, larceny, arson, and overall crime rates increased significantly as Native American bingo halls opened. At the same time, murder rates and rape rates decreased significantly. Further, although assault and vehicle theft rates declined as Native American bingo halls were opened, these declines were not significant.

Because no previous research has examined the impact of Native American bingo halls on crime rates, it is difficult to assess the accuracy of the current findings. It should be cautioned here, however, that these findings are based on a sample of only four Native American bingo halls. Thus, these findings should not be generalized. In order to further examine the effect of Native American bingo halls on crime, future research should compare counties with Native American bingo halls to similar counties without such venues.

Table 6: Native American Bingo OLS Regression Coefficients\*

Independent Variables	Burglary Rate		Larceny Rate		Overall Crime Rate (Excluding Arson)		Overall Crime Rate (Including Arson)	
<b>Native American Bingo Hall Opening</b>	29.241	3.05**	50.787	2.34**	67.245	2.08**	70.063	2.15**
Population Density	-.100	-3.63**	-.096	-1.53	-.256	-2.74**	-.262	-2.80**
Percent of the Population Under 18	-5.497	-6.69**	-17.768	-9.56**	-25.389	-9.16**	-25.629	-9.20**
Percent of the Population Over 65	-1.531	-2.02**	-9.896	-5.77**	-13.066	-5.10**	-13.378	-5.20**
Percent Male	-1.66	-1.46	-20.846	-8.08**	-27.213	-7.07**	-27.654	-7.15**
Percent White	.091	.49	1.833	4.39**	1.474	2.36**	1.398	2.23**
Percent Black	-3.637	-5.24**	7.701	4.90**	9.515	4.06**	9.595	4.07**
Median Household Income	-.003	-18.16**	-.003	-6.91**	-.006	-10.03**	-.006	-10.07**
Hours of Operation	1.947	.95	3.854	.83	7.794	1.12	7.923	1.14
At Least One Bar	-6.264	-1.93*	-8.863	-1.21	-27.760	-2.54**	-28.218	-2.56**
Number of Video Bingo Seats	-.114	-3.79**	-.095	-1.40	-.199	-1.96**	-.203	-1.99**
Number of Bingo Seats	-.003	-1.26	-.003	-.44	.008	.90	.008	.87
Pull Tabs	13.200	3.93**	-16.854	-2.26**	-16.606	-1.49	-17.114	-1.53
Constant	394.702	4.98	1825.903	10.20	2617.27	9.80	2660.335	9.91
R <sup>2</sup>	.78		.77		.81		.81	

\* p&lt;.10, two-tailed significance test; \*\* p&lt;.05, two-tailed significance test

## RACINOS

The sample of racinos included in this study is comprised of five dog track racinos and three horse track racinos. The “casino” aspects of these racinos – the slots, table games, bingo seats, video bingo seats, and video lottery terminals - were usually added to the venues after the racetracks had already been well-established. Thus, it was hypothesized that any effect on crime rates caused by the venue would have occurred when the racetracks themselves opened. The opening of the “casino” aspects that were added to the racetracks was expected to have positive but negligible impacts on crime rates. As with the opening of gambling venues in general, the opening of racinos was expected to positively impact the following crime rates: robbery, burglary, larceny, vehicle theft, assault, and overall crime.

The impact of racinos on murder, rape, robbery, assault, vehicle theft, and arson rates was modeled using separate Tobit regressions with fixed effects. The results for these models are presented in Table 7.

The results only partially validate the predicted effects for racinos on county-level crime rates. Both robbery and assault rates increased as racinos were opened and, as expected, these increases were not significant. Additionally, there were no significant relationships found between the opening of racinos and murder, rape, or arson rates. At the same time, the finding for vehicle theft rates was in the opposite of the predicted direction, with rates actually showing negligible decreases as racinos were opened.

Table 7: Racino Tobit Regression Coefficients\*

Independent Variables	Murder Rate		Rape Rate		Robbery Rate		Assault Rate		Vehicle Theft Rate		Arson Rate	
	$\beta$	T	$\beta$	T	$\beta$	T	$\beta$	T	$\beta$	T	$\beta$	T
<b>Racino Opening</b>	-.345	-1.45	-.986	-1.15	.684	.54	4.170	.69	-7.542	-1.48	-.252	-.36
Population Density	-.002	-2.40**	.008	-3.50**	-.001	-.15	-.006	-.36	-.036	-2.69**	-.006	-2.28**
Percent of the Population Under 18	.003	.17	-.482	-7.15**	-.513	-4.38**	-2.293	-4.80**	.439	1.10	-.354	-4.12**
Percent of the Population Over 65	-.003	-.16	-.154	-2.48**	-.154	-1.32	-.904	-2.05**	.410	1.11	-.468	-5.23**
Percent Male	-.101	-3.76**	-.269	-2.90**	-.844	-5.37**	-1.284	-1.96**	-2.599	-4.73**	-.586	-5.08**
Percent White	-.021	-4.78**	-.018	-1.21	-.044	-1.74*	-.318	-2.99**	-.299	-3.35**	-.105	-5.62**
Percent Black	.074	4.63**	-.095	-1.69*	.830	8.85**	1.066	2.68**	3.792	11.36**	.048	.70
Median Household Income	-.000	-2.25**	.000	2.54**	-.000	-5.49**	-.000	-1.89*	-.000	-.32	-.000	-2.70**
Number of Hotel Rooms	.000	.45	.003	4.55**	.001	1.20	-.002	-.50	-.008	-2.01**	.000	.58
At Least One Bar	-.070	-.87	-1.182	-4.39**	1.089	2.40**	-10.080	-5.29**	-6.274	-3.93**	-.552	-1.69*
Number of Slots	-.000	-.27	.000	.16	-.000	-.07	.002	1.77*	.006	5.99**	.000	1.25
Number of Table Games	--	--	-.020	-3.74**	-.026	-3.06**	.021	.55	-.124	-3.91**	-.008	-1.18
Number of Bingo Seats	-.000	-.27	.000	1.92*	.002	5.84**	-.001	-.46	.009	7.63**	-.000	-.56
Number of Video Bingo Seats	.000	.81	-.001	-.62	-.006	-1.88*	.017	1.18	-.010	-.78	.001	.48
Race Book Betting	.213	1.20	-.548	-.89	-1.088	-1.07	2.850	.65	-9.504	-2.59**	--	--
Number of Video Lottery Terminals	.000	.24	.000	.57	--	--	.001	.26	.009	5.31**	.000	.11
Constant	7.113	3.77	32.284	5.05	65.776	5.92	197.95	4.38	143.815	3.80	58.098	7.01
Pseudo R <sup>2</sup>	.29		.11		.31		.10		.17		.13	

\* p&lt;.10, two-tailed significance test; \*\* p&lt;.05, two-tailed significance test

The separate impacts of the opening of racinos on burglary, larceny, and overall crime rates (including and excluding arson) were modeled using OLS regressions with fixed effects. The results are exhibited in Table 8.

The results are not consistent with the hypothesized effects for racinos. Larceny rates increased, and these increases were insignificant, as expected. On the other hand, burglary rates and overall crime rates actually showed decreases as racinos were opened; these decreases were significant in the case of burglary rates.

Thus, the overall picture presented by the opening of racinos is a mixed one. The dog and horseracinos in this sample are shown to be related to significant decreases in burglary rates. The findings for vehicle theft rates and overall crime rates, though insignificant, are also in the opposite of the expected direction. These crimes were expected to increase with the opening of the “casino” aspects of these racinos. As expected, murder, rape, assault, robbery, larceny and arson rates are shown to be statistically unaffected by the opening of racinos.

Once again, the reader should keep in mind that previous studies have not focused specifically on the impact of racinos on county-level crime rates. Thus, the current findings cannot be compared against other research. Additionally, because the sample of dog and horseracinos in this study is so small, generalizations about the impact of these venues should not be made based on these findings.

Table 8: Racino OLS Regression Coefficients\*

Independent Variables	Burglary Rate		Larceny Rate		Overall Crime Rate (Excluding Arson)		Overall Crime Rate (Including Arson)	
	$\beta$	T	$\beta$	T	$\beta$	T	$\beta$	T
<b>Racino Opening</b>	-25.739	-2.43**	15.146	.71	-31.402	-.87	-32.017	-.89
Population Density	-.128	-4.54**	-.046	-.73	-.251	-2.63**	-.257	-2.68**
Percent of the Population Under 18	-4.713	-5.67**	-16.686	-8.80**	-23.591	-8.37**	-23.831	-8.41**
Percent of the Population Over 65	-.985	-1.29	-8.234	-4.71**	-9.988	-3.84**	-10.260	-3.92**
Percent Male	-.647	-.57	-18.448	-7.08**	-22.859	-5.90**	-23.289	-5.98**
Percent White	-.098	-.53	1.270	3.01**	.695	1.11	.613	.97
Percent Black	-3.522	-5.09**	8.218	5.20**	10.258	4.36**	10.328	4.37**
Median Household Income	-.003	-18.06**	-.003	-7.89**	-.006	-11.05**	-.006	-11.09**
Number of Hotel Rooms	.045	5.21**	.069	3.49**	.107	3.64**	.108	3.65**
At Least One Bar	-8.101	-2.45**	-21.697	-2.87**	-46.592	-4.14**	-47.211	-4.18**
Number of Slots	.003	1.31	.010	2.40**	.023	3.41**	.024	3.42**
Number of Table Games	-.305	-4.62**	-.389	-2.73**	-.909	-4.05**	-.918	-4.07**
Number of Bingo Seats	.003	1.37	-.004	-.63	.010	1.13	.010	1.12
Number of Video Bingo Seats	-.033	-1.31	.019	.33	.003	.04	.005	.05
Race Book Betting	-.601	-.08	-20.164	-1.17**	-25.711	-1.00	-25.868	-1.00
Number of Video Lottery Terminals	.018	4.95**	--	--	.041	3.30**	.042	3.30**
Constant	328.106	4.17	1701.588	9.50	2374.237	8.91	2416.68	9.02
R <sup>2</sup>	.79		.77		.81		.81	

\* p&lt;.10, two-tailed significance test; \*\* p&lt;.05, two-tailed significance test



## NATIVE AMERICAN CASINOS

As was previously explained, it was expected that the opening of Native American casinos would lead to increases in financially-motivated crimes, assaults, motor vehicle thefts, and overall crime. These expectations were heavily based on the fact that most Native American casinos are located on reservations in rural regions. Because the reservations by themselves do not typically attract legions of visitors, it was anticipated that the addition of casinos to such locations would draw larger numbers of out-of-county tourists who would serve both as suitable crime victims and as motivated perpetrators. Murder, rape, and arson rates were not expected to be significantly related to the opening of Native American casinos, as most existing research on gambling venues in general has found insignificant links to these crime rates.

Using a dummy variable for Native American casinos, I examined their impact on each crime rate separately. The effects of Native American casinos on murder, rape, robbery, assault, vehicle theft, and arson rates were modeled using Tobit regressions with fixed effects. The results for these models are exhibited in Table 9.

Once again, the predictions laid out by the hypothesis are not completely corroborated by the statistical evidence. While both robbery and vehicle theft rates increased as Native American casinos opened, only the increases for vehicle thefts are significant. Additionally, while it was predicted that assault rates would increase significantly as these venues were opened, assault rates actually showed negligible decreases. Most surprising, rape and arson rates, which were not expected to have significant relationships with Native American casinos, both displayed significant

increases as Native American casinos were opened. However, the results do show that murder rates, as expected, are not significantly associated with Native American casinos.

Table 9: Native American Casino Tobit Regression Coefficients\*

Independent Variables	Murder Rate		Rape Rate		Robbery Rate		Assault Rate		Vehicle Theft Rate		Arson Rate	
	$\beta$	T	$\beta$	T	$\beta$	T	$\beta$	T	$\beta$	T	$\beta$	T
<b>Native American Casino Opening</b>	.116	1.59	.569	2.27**	.052	.13	-1.586	-.91	2.669	2.24**	1.076	3.62**
Population Density	-.001	-1.98**	-.008	-3.24**	-.002	-.52	-.131	-.82	-.040	-3.01**	-.005	-1.99**
Percent of the Population Under 18	-.001	-.03	-.435	-6.10**	-.450	-3.72**	-2.384	-4.80**	1.281	3.15**	-.099	-1.12
Percent of the Population Over 65	-.005	-.30	-.160	-2.54**	-.117	-1.01	-1.004	-2.28**	.343	.93	-.390	-4.39**
Percent Male	-.077	-2.71**	-.284	-2.93**	-.803	-4.92**	-1.531	-2.27**	-2.202	-3.89**	-.571	-4.82**
Percent White	-.020	-4.46**	-.016	-1.02	-.050	-1.97**	-.351	-3.30**	-.303	-3.40**	-.094	-5.09**
Percent Black	.087	5.04**	-.070	-1.17	.783	7.86**	.947	2.26**	4.167	12.23**	.192	2.63**
Median Household Income	-.000	-2.50**	.000	2.63**	-.000	-5.62**	-.000	-1.28	.000	.48	-.000	-1.20
Hours of Operation	-.117	-1.77*	-.177	-.77	.033	.09	1.232	.78	--	--	-.583	-2.17**
Number of Hotel Rooms	--	--	.004	4.99**	.001	1.06	-.001	-1.07	-.005	-1.25	.001	1.38
Free Drinks	-.180	-2.38**	-.247	-.93	.590	1.35	1.527	.82	-2.738	-1.78*	-.296	-.95
At Least One Bar	-.104	-1.34	-1.033	-3.95**	.901	2.09**	-8.386	-4.61**	-7.227	-4.81**	-.475	-1.54
Number of Slots	.000	.18	-.000	-.92	.000	.80	.003	2.25**	.005	5.06**	.000	1.11
Number of Table Games	.001	.97	-.019	-3.60**	-.015	-1.76*	-.015	-.40	-.056	-1.88*	-.015	-2.38**
Number of Bingo Seats	-.000	-1.68*	.000	2.02**	--	--	.002	1.45	--	--	-.000	-.25
Pull Tabs	.228	2.64**	-.487	-1.71*	1.764	3.99**	-5.871	-2.96**	1.845	1.21	-1.012	-3.03**
Keno	.029	.35	-.027	-.10	-.412	-.88	-2.006	-1.03	7.076	4.40**	.437	1.33
Number of Video Gaming Machines	.000	.82	-.000	-.29	.001	1.41	.003	1.12	-.001	-.64	.000	.75
Race Book Betting	.046	.41	-.825	-2.06**	-1.032	-1.57	3.506	1.25	-8.383	-3.60**	.078	.16
Number of Video Lottery Terminals	-.000	-.86	-.000	-.51	.001	2.81**	.003	1.28	.005	3.24**	-.001	-1.53
Constant	6.015	3.06	31.446	4.72	62.237	5.46	216.424	4.67	98.247	2.54	47.136	5.58
Pseudo R <sup>2</sup>	.30		.12		.31		.10		.17		.14	

\* p&lt;.10, two-tailed significance test; \*\* p&lt;.05, two-tailed significance test

The effects of Native American casinos on burglary, larceny, and overall crime rates were modeled separately through OLS regressions with fixed effects. Each of these crime rates was expected to increase significantly as Native American casinos opened. The results are displayed in Table 10.

The results of these models support only the hypothesized effect of Native American casinos on burglary rates. While these rates increased significantly, larceny and overall crime rates decreased significantly as Native American casinos were opened. The decrease in the overall crime rate is probably driven by the dramatic decrease in larceny rates, as larcenies account for the largest proportion of overall crimes.

Thus, the overall picture illustrated by the results of this analysis supports the idea that some crime rates do increase significantly as Native American casinos are opened. However, instead of increases in all financially-motivated crimes, assaults, and vehicle thefts, the current analysis finds increases in vehicle theft, burglary, rape, and arson rates. Additionally, it finds significant decreases in larceny and overall crime rates.

Unlike the previous venue types considered so far, there was a large sample of Native American casinos (N=105) to examine in the current study. However, our understanding of the impact of Native American casinos on crime rates would benefit from an examination of the effect these venues have on crime rates in different regions. Additionally, it would be helpful to compare crime rates in counties containing Native American casinos to similar counties without such venues.

Table 10: Native American Casino OLS Regression Coefficients\*

Independent Variables	Burglary Rate		Larceny Rate		Overall Crime Rate (Excluding Arson)		Overall Crime Rate (Including Arson)	
	$\beta$	T	$\beta$	T	$\beta$	T	$\beta$	T
<b>Native American Casino Opening</b>	9.288	3.04**	-25.259	-3.62**	-23.994	-2.32**	-23.136	-2.22**
Population Density	-.113	-4.01**	-.096	-1.49	-.282	-2.94**	-.288	-2.98**
Percent of the Population Under 18	-3.210	-3.71**	-15.403	-7.71**	-20.795	-7.02**	-20.820	-6.99**
Percent of the Population Over 65	-1.337	-1.74*	-8.647	-4.89**	-11.170	-4.25**	-11.384	-4.31**
Percent Male	-.136	-.12	-18.134	-6.68**	-22.051	-5.47**	-22.455	-5.54**
Percent White	-.09	-.51	.965	2.26**	.323	.51	.249	.39
Percent Black	-2.612	-3.57**	7.089	4.21**	9.576	3.83**	9.753	3.88**
Median Household Income	-.003	-17.16**	-.003	-6.47**	-.006	-9.54**	-.006	-9.54**
Hours of Operation	-6.239	-2.25**	-1.831	-.29	.755	.08	.279	.03
Number of Hotel Rooms	.057	6.56**	.038	1.91*	.082	2.76**	.083	2.79**
Free Drinks	-6.642	-2.05**	34.491	4.62**	30.082	2.71**	29.958	2.69**
At Least One Bar	-9.611	-3.02**	-3.133	-.43	-24.981	-2.30**	-25.497	-2.33**
Number of Slots	.001	.38	.020	4.16**	.029	4.00**	.029	4.00**
Number of Table Games	-.232	-3.52**	-6.011	-3.96**	-1.028	-4.56**	-1.041	-4.60**
Number of Bingo Seats	-.005	-1.67*	.001	.15	.013	1.34	.014	1.34
Pull Tabs	12.541	3.57**	-7.962	-1.00	-10.066	-.85	-10.912	-.92
Keno	4.415	1.30	37.440	4.78**	48.679	4.19**	48.955	4.19**
Number of Video Gaming Machines	.004	.79	.038	3.55**	.040	2.52**	.040	2.52**
Race Book Betting	-10.37	-2.12**	-9.210	-.82	-29.233	-1.75*	-29.402	-1.75*
Number of Video Lottery Terminals	.010	2.96**	.004	.53	.026	2.19**	.025	2.14**
Constant	263.684	3.25	1667.612	8.95	2282.765	8.25	2315.518	8.33
R <sup>2</sup>	.79		.77		.81		.81	

\* p&lt;.10, two-tailed significance test; \*\* p&lt;.05, two-tailed significance test

## COMMERCIAL LAND-BASED CASINOS

Based on their status as tourist attractions, commercial land-based casinos (including stationary boat casinos) were expected to significantly increase robberies, burglaries, larcenies, assaults, vehicle thefts, and overall crime. These venues were not expected to display significant relationships with murder, rape, or arson rates.

The impact of commercial land-based casinos on each of the following rates was modeled using Tobit regression with fixed effects: murder, rape, robbery, assault, vehicle theft, and arson. The results for these models are presented in Table 11.

The results do not support the hypothesized effects of commercial casinos on these crime rates. Only assault rates and arson rates increased as commercial land-based casinos were opened, and these increases were not significant. Each of the other crime rates modeled by Tobit regression decreased. Rape rates actually decreased significantly as commercial casinos were opened. Especially surprising, however, was the fact that robbery rates showed significant decreases with the introduction of commercial casinos. This contradicts the assumption that gambling venues increase financially-motivated crimes.

Table 11: Commercial Land-Based Casino Tobit Regression Coefficients\*

Independent Variables	Murder Rate		Rape Rate		Robbery Rate		Assault Rate		Vehicle Theft Rate		Arson Rate	
	$\beta$	T	$\beta$	T	$\beta$	T	$\beta$	T	$\beta$	T	$\beta$	T
<b>Commercial Land-Based Casino Opening</b>	-.039	-.45	-.759	-2.54**	-1.012	-2.05**	1.896	.92	-1.092	-.63	.718	2.07**
Population Density	-.001	-2.31**	-.008	-3.41**	.001	.15	-.009	-.58	-.024	-1.84*	-.007	-2.85**
Percent of the Population Under 18	.004	.19	-.449	-6.39**	-.473	-3.89**	-2.330	-4.76**	.901	2.19**	-.176	-2.02**
Percent of the Population Over 65	-.000	-.01	-.171	-2.72**	-.115	-.98	-.974	-2.22**	.372	1.01	-.403	-4.53**
Percent Male	-.077	-2.66**	-.308	-3.16**	-.896	-5.40**	-1.502	-2.21**	-2.474	-4.33**	-.513	-4.31**
Percent White	-.022	-4.97**	-.018	-1.21	-.050	-1.98**	-.347	-3.28**	-.292	-3.29**	-.102	-5.57**
Percent Black	.081	4.72**	-.064	-1.07	.887	8.90**	1.000	2.40**	4.142	11.83**	.045	.63
Median Household Income	-.000	-2.02**	.000	3.20**	-.000	-5.26**	-.000	-1.43	-.000	-.09	-.000	-1.29
Hours of Operation	-.058	-1.01	.131	.68	-.092	-.28	.292	.22	3.557	3.17**	-.066	-.29
Number of Hotel Rooms	.000	1.48	.003	4.77**	.001	1.08	-.005	-1.03	-.009	-2.18**	.001	.74
Free Drinks	-.141	-1.81*	-.072	-.27	1.011	2.28**	1.121	.61	-.939	-.61	-.178	-.57
At Least One Bar	-.091	-1.19	-.998	-3.87**	.967	2.22**	-8.363	-4.65**	-6.053	-4.00**	-.233	-.76
Number of Slots	.000	.16	-.000	-.35	-.000	-.01	.002	1.85*	.004	3.61**	.000	2.02**
Number of Table Games	-.000	-.10	-.019	-3.64**	-.023	-2.55**	-.008	-.21	-.089	-2.86**	-.017	-2.78**
Number of Bingo Seats	-.000	-1.28	.000	1.78*	.002	3.80**	.003	1.49	.009	6.34**	.000	.76
Pull Tabs	.251	2.96**	-.320	-1.15	.799	1.68*	-6.432	-3.33**	-2.909	-1.79*	-.771	-2.36**
Keno	.055	.70	.091	.35	-.231	-.52	-1.839	-1.01	7.629	4.97**	.737	2.39**
Number of Video Gaming Machines	.000	1.18	.000	.25	.000	.08	.002	.77	-.006	-3.02**	.001	1.67*
Race Book Betting	-.060	-.58	-1.038	-2.87**	-.683	-1.13	5.355	2.12**	-6.285	-2.96**	-.333	-.78
Constant	5.917	3.00	33.276	5.00	67.172	5.80	212.695	4.59	120.494	3.09	47.424	5.62
Pseudo R <sup>2</sup>	.30		.12		.31		.10		.17		.14	

\* p&lt;.10, two-tailed significance test; \*\* p&lt;.05, two-tailed significance test

The effects of the opening of commercial land-based casinos on burglary, larceny, and overall crime rates were modeled using OLS regressions with fixed effects. The results for these models are presented in Table 12.

As with the results for the Tobit regression models, the results displayed in Table 12 are mixed in relation to the hypothesized impacts of commercial casinos on crime rates. Larceny rates and overall crime rates did increase significantly as these casinos opened, but burglary rates actually decreased significantly.



Table 12: Commercial Land-Based Casino OLS Regression Coefficients\*

Independent Variables	Burglary Rate		Larceny Rate		Overall Crime Rate (Excluding Arson)		Overall Crime Rate (Including Arson)	
	$\beta$	T	$\beta$	T	$\beta$	T	$\beta$	T
<b>Commercial Land-Based Casino Opening</b>	-21.005	-5.86**	56.669	6.89**	35.136	2.86**	35.828	2.90**
Population Density	-.090	-3.30**	-.107	-1.70*	-.246	-2.62**	-.253	-2.69**
Percent of the Population Under 18	-3.167	-3.71**	-15.329	-7.84**	-20.190	-6.91**	-20.279	-6.91**
Percent of the Population Over 65	-1.573	-2.06**	-8.043	-4.58**	-10.688	-4.08**	-10.911	-4.14**
Percent Male	-1.087	-.92	-15.978	-5.88**	-21.144	-5.21**	-21.504	-5.27**
Percent White	-.144	-.78	1.058	2.51**	.403	.64	.323	.51
Percent Black	-1.613	-2.23**	5.233	3.14**	9.622	3.87**	9.684	3.87**
Median Household Income	-.003	-15.56**	-.003	-7.93**	-.006	-10.01**	-.006	-10.02**
Hours of Operation	-1.648	-.71	-15.845	-2.97**	-13.042	-1.64*	-13.115	-1.64*
Number of Hotel Rooms	.052	6.11**	.047	2.40**	.088	3.02**	.089	3.04**
Free Drinks	-2.570	-.80	24.389	3.31**	22.960	2.09**	22.910	2.07**
At Least One Bar	-8.934	-2.85**	-2.823	-.39	-24.881	-2.32**	-25.198	-2.33**
Number of Slots	.001	.53	.015	3.28**	.022	3.13**	.022	3.15**
Number of Table Games	-.183	-2.83**	-.626	-4.22**	-.965	-4.35**	-.980	-4.39**
Number of Bingo Seats	-.007	-2.44**	.007	1.09	.016	1.60	.017	1.62
Pull Tabs	14.716	4.26**	-16.186	-2.09**	-18.215	-1.58	-18.870	-1.63*
Keno	8.879	2.79**	33.052	4.53**	48.606	4.46**	49.138	4.48**
Number of Video Gaming Machines	.005	1.06	.028	2.77**	.027	1.76*	.027	1.79*
Race Book Betting	-7.250	-1.65*	1.202	.12	-8.030	-.53	-8.468	-.56
Constant	311.160	3.85	1553.186	8.40	2210.837	8.00	2244.019	8.08
R <sup>2</sup>	.79		.78		.81		.81	

\* p&lt;.10, two-tailed significance test; \*\* p&lt;.05, two-tailed significance test

Thus, the results for commercial land-based casinos in this sample suggest that many crime rates actually decrease as these venues are opened. Additionally, decreases in rape, robbery, and burglary rates are significant. Interesting though they may be, these results should be interpreted with caution. Because there are only twenty-one commercial land-based casinos included in this study, the sample size is too small to make generalizations about the impact of commercial land-based casinos on crime. In addition, the impact of regional differences is not examined here.

Additionally, in the case of New Jersey, the casino that was used in this study as the “first” casino was not actually the first casino to open in Atlantic County. As was noted in Chapter 3, to be included in the study, the “first” gambling venues for each county had to open between 1981 and 1997. This is because I originally intended to examine the possibility of a lagged effect on crime rates after casinos were opened. An exception was made in the case of New Jersey so that Atlantic City casinos could be included in the study. Thus, the start date that I used for casino gambling in Atlantic County was 1981, but commercial land-based casinos actually began opening in the county in 1978. As has been documented by much previous research, crime rates have been shown to have increased significantly after casinos were introduced in 1978. However, because of the limitations I imposed on my sample, I could not replicate those findings here.

#### RIVERBOAT CASINOS

As with commercial land-based casinos, it was hypothesized that, because they attract large numbers tourists on a daily basis, the opening of riverboat casinos would lead to significant increases robberies, burglaries, larcenies, assaults, vehicle thefts, and

overall crime. At the same time, these venues were not expected to significantly impact murder, rape or arson rates.

I used Tobit regressions with fixed effects to model the effect of riverboat casinos on murder, rape, robbery, assault, vehicle theft, and arson rates. The results of these models are presented in Table 13.

The results of the Tobit regression models challenge most of the predicted effects of riverboat casinos. While robbery rates did increase, these increases were not significant. Additionally, both assault and vehicle theft rates declined as riverboat casinos opened; these declines were significant in the case of assault rates. These results were the opposite of the predicted effect. Further, while murder and arson rates were not significantly related to the opening of riverboat casinos, rape rates exhibited a significant and negative relationship with riverboat casinos that was not predicted by the second set of hypotheses.

Table 13: Riverboat Casino Tobit Regression Coefficients\*

Independent Variables	Murder Rate		Rape Rate		Robbery Rate		Assault Rate		Vehicle Theft Rate		Arson Rate	
	$\beta$	T	$\beta$	T	$\beta$	T	$\beta$	T	$\beta$	T	$\beta$	T
<b>Riverboat Casino Opening</b>	.005	.04	-.875	-1.82*	.460	.58	-10.999	-3.28**	-3.016	-1.06	-.260	-.46
Population Density	-.002	-2.47**	-.008	-3.60**	-.002	-.69	-.007	-.44	-.032	-2.48**	-.006	-2.23**
Percent of the Population Under 18	-.002	-.10	-.478	-7.30**	-.422	-3.77**	-1.991	-4.37**	.764	1.97**	-.320	-3.90**
Percent of the Population Over 65	-.002	-.11	-.172	-2.81**	-.160	-1.42	-.757	-1.78*	.278	.77	-.454	-5.26**
Percent Male	-.093	-3.47**	-.248	-2.69**	-.771	-5.00**	-1.433	-2.24**	-2.427	-4.46**	-.566	-4.99**
Percent White	-.022	-5.06**	-.013	-.89	-.045	-1.82*	-.305	-2.93**	-.321	-3.63**	-.097	-5.31**
Percent Black	.072	4.59**	-.130	-2.36**	.774	8.55**	1.383	3.61**	3.603	11.08**	.051	.76
Median Household Income	-.000	-2.03**	.000	2.84**	-.000	-4.57**	-.000	-1.23	.000	.74	-.000	-2.48**
Hours of Operation	-.075	-1.54	.215	1.29	.381	1.38	-1.243	-1.08	4.726	4.82**	-.064	-.33
Number of Hotel Rooms	.000	1.08	.002	3.73**	.001	.92	.001	.22	-.013	-3.43**	.000	.46
At Least One Bar	-.055	-.75	-1.001	-4.05**	1.086	2.64**	-8.237	-4.79**	-6.311	-4.32**	-.289	-.98
Number of Slots	-.000	-.29	-.000	-.65	-.000	-.31	.002	2.19**	.003	3.08**	.000	1.20
Number of Table Games	.000	.09	-.010	-2.20**	-.009	-1.26	.009	.28	.019	.71	-.007	-1.31
Constant	6.925	3.75	30.929	4.91	59.309	5.49	192.112	4.39	127.82	3.44	55.183	6.86
Pseudo R <sup>2</sup>	.29		.11		.31		.10		.17		.14	

\* p&lt;.10, two-tailed significance test; \*\* p&lt;.05, two-tailed significance test

The effects of riverboat casinos on burglary, larceny, and overall crime rates were modeled using OLS regressions with fixed effects. The results are displayed in Table 14.

The results for the OLS models indicate the predicted significant effect for larceny rates. Burglary rates and overall crime rates also increased as riverboat casinos opened, but these findings are not significant.

Thus, the overall results for riverboat casinos present a mixed picture. While robbery, burglary, larceny, and overall crime rates all increased as riverboat casinos opened, only the increases in larceny rates are significant. Additionally, riverboat casinos in this sample appear to have contributed to significant reductions in assault rates and insignificant reductions in vehicle rates; these findings were the opposite of the predicted outcomes. Further, rape rates also declined significantly as riverboat casinos opened, and this finding was also unexpected.

As with most of the venue types examined in this study, the sample size for riverboat casinos is small with only six different riverboat casino counties included. Accordingly, it would be unreasonable to draw any solid conclusions based on such a small sample size. Additionally, all of the riverboat casinos included in the sample come from just three states: Indiana, Missouri, and Louisiana. As such, it is possible that effects on crime rates are due mainly to geographical trends. Future research should attempt to control for such regional effects.

Table 14: Riverboat Casino OLS Regression Coefficients\*

Independent Variables	Burglary Rate		Larceny Rate		Overall Crime Rate (Excluding Arson)		Overall Crime Rate (Including Arson)	
	$\beta$	T	$\beta$	T	$\beta$	T	$\beta$	T
<b>Riverboat Casino Opening</b>	7.692	1.29	22.770	1.68*	16.551	.82	16.070	.79
Population Density	-.088	-3.32**	-.054	-.89	-.194	-2.15**	-.199	-2.20**
Percent of the Population Under 18	-4.041	-5.00**	-15.135	-8.23**	-20.779	-7.60**	-20.992	-7.64**
Percent of the Population Over 65	-1.286	-1.70*	-8.159	-4.74**	-10.371	-4.05**	-10.640	-4.13**
Percent Male	-.270	-.24	-17.536	-6.78**	-21.688	-5.64**	-22.097	-5.72**
Percent White	-.002	-.01	1.512	3.60**	1.003	1.61	.928	1.48
Percent Black	-3.71	-5.47**	7.801	5.04**	9.803	4.27**	9.872	4.27**
Median Household Income	-.003	-17.20**	-.003	-7.04**	-.006	-9.91**	-.006	-9.94**
Hours of Operation	-1.220	-.60	-4.629	-.99	-1.605	-.23	-1.686	-.24
Number of Hotel Rooms	.040	5.14**	.061	3.46**	.092	3.50**	.093	3.50**
At Least One Bar	-3.551	-1.17	-8.086	-1.16	-25.680	-2.49**	-26.033	-2.51**
Number of Slots	-.001	-.51	.009	2.14**	.012	2.04**	.012	2.05**
Number of Table Games	-.148	-2.62**	-.407	-3.15**	-.542	-2.82**	-.548	-2.84**
Constant	285.081	3.66	1587.301	8.97	2206.639	8.40	2246.62	8.50
R <sup>2</sup>	.79		.77		.81		.81	

\* p&lt;.10, two-tailed significance test; \*\* p&lt;.05, two-tailed significance test

## CHAPTER 5 – DISCUSSIONS AND CONCLUSIONS

The purpose of this study was twofold. First, I set out to examine the impact of the introduction of gambling venues on county-level crime rates. Much of the previous research on this topic focused almost exclusively on Las Vegas or Atlantic City; other research focused solely on one type of gambling venue (e.g., riverboat or commercial casinos). Additionally, most of the existing research in this field focused on city-level rather than county-level crime. Further, only the work of Grinols and Mustard (2001) examined the impact of casinos on county-level crime on a national scale.

While Grinols and Mustard (2001) compared casino counties to non-casino counties, the current study focused solely on gambling counties. Additionally, while Grinols and Mustard (2001) examined only the effect of casinos on crime, my analysis included five different types of gambling venues: Native American and commercial land-based casinos, racinos, riverboat casinos, and Native American bingo halls. Additionally, my analysis attempted to control for each venue's hours of operation, whether or not alcoholic beverages were served, and the number of hotel rooms that each venue offered. The types and amounts of gambling offered (i.e., number of slots, presence of pull tabs, etc.) were also examined as a proximate measure for the volume of gaming at each venue.

In addition to examining the impact of gambling venues in general on county-level crime rates, the second purpose of the current study was to examine the impact of separate types of gambling venues on county-level crime. Native American bingo halls, dog and horse racinos, Native American casinos, commercial land-based casinos, and riverboat casinos were each examined separately to determine if they caused significant

increases or decreases in county-level crime rates. As with gambling venues in general, the volume of gambling and the amenities offered at each of the types of venues were also controlled for.

Both parts of the analysis produced mixed findings. With respect to the impact of gambling venues in general, it was expected that robbery, burglary, larceny, assault, vehicle theft, and overall crime rates would increase significantly as gambling venues opened. Murder, rape, and arson rates were not expected to be significantly affected. However, the statistical analyses revealed that increases in robbery, vehicle theft, and overall crime rates were not significant. Additionally, assault and burglary rates actually decreased as gambling venues were opened, and these decreases were significant for assault. Most surprising, rape rates decreased significantly and arson rates increased significantly as gambling venues were opened. Only larceny rates exhibited the predicted significant increases.

The second part of the analysis, which focused on crime rates by venue type, also led to some unexpected results. However, it should be cautioned again that most of these results were based on small samples for each type of venue,<sup>17</sup> and it should be emphasized that, because this type of relationship has not been previously examined, these results should be used only as a stepping stone for future research.

It was hypothesized that Native American bingo halls and casinos, commercial land-based casinos, and riverboat casinos would be associated with significant increases in robbery, burglary, larceny, assault, vehicle theft, and overall crime rates. At the same

---

<sup>17</sup> While sample sizes for most of the venue types were under 21, there were 105 Native American casinos included in the sample.



time, horse and dog racinos were expected to lead to negligible increases in these crimes. However, the results of the analysis were much less straightforward.

Native American bingo halls were indeed found to lead to significant increases in robbery, burglary, larceny, and overall crime rates, but these venues were also related to significant decreases in murder and rape rates. Additionally, these venues were also unexpectedly found to significantly increase arson rates. The openings of Native American casinos, on the other hand, were found to lead to significant increases in burglary, vehicle theft, rape, and arson; the latter two of these findings were unexpected. Further, both larceny and overall crime rates actually decreased significantly as these Native American casinos were opened.

The results were similarly mixed for commercial land-based casinos and riverboat casinos. The findings for commercial land-based casinos indicated that the opening of these venues led to significant decreases in rape, robbery, and burglary rates; at the same time, larceny and overall crime rates increased significantly after these venues were opened. Larceny rates also increased significantly with the opening of riverboat casinos. However, riverboat casinos also demonstrated negative and significant relationships with both rape rates and assault rates; neither of these findings was predicted by the hypothesis for riverboat casinos.

Contrary to the predicted insignificant increases, the opening of dog and horse racinos was found to lead to significant decreases in burglary rates. Vehicle theft and overall crime rates also decreased as racinos were opened and, although these decreases were not significant, the findings were in the opposite of the predicted direction. There were no significant relationships found between racinos and murder, rape, or arson rates.

As expected, robbery, assault, and larceny rates showed negligible increases as racinos were opened. Thus, like the other venues examined, the picture presented by dog and horse racinos is a cloudy one.

Including the additional venue volume and amenities variables also led to some interesting discoveries. While the amenities variables (i.e., number of hotel rooms, hours of operation, free drinks, and presence of at least one bar) were consistently related to crime rates and seem to have some valuable implications for future research, I realized during the course of the analysis that the venue volume variables (i.e., number of slots, number of bingo seats, pull tabs, etc.) were not serving their intended purpose. I originally included these variables as a way to measure the volume of gambling at venues because revenue figures are not available for most Native American gambling venues. Because over three-quarters of the venues in my sample are either Native American casinos or bingo halls, this seemed like an appealing alternative. However, I soon realized that the variables often contradicted one another and were not very good measures of the volume of gambling offered at venues.

Thus, there are many shortcomings for the current research study. As was just mentioned, the variables used to measure the volume of gambling at each venue were seriously flawed. Additionally, although the dummy variables for free drinks and the presence of at least one bar provide interesting implications about the service of alcoholic beverages at gambling venues on area crime rates, these variables sometimes contradicted one another. Alternative measures may be more suitable. Alcohol sales for the county, for example, may paint a more accurate picture of the relationship between alcohol and

crime. Accordingly, such a measure would be a better control variable than the two dummy variables that are included in the current study.

By the same token, the number of hotel rooms in a county may be a better measure than the number of hotel rooms at a particular venue. Because some gambling venues are major tourist attractions, it is reasonable to assume that additional hotels are built outside of the venue to accommodate the influx of visitors. As was shown in this study, the number of hotel rooms at a venue does seem to be related to burglary, larceny, and rape rates. Thus, including the total number of hotel rooms in the county would allow for a more accurate examination of the effect of the increased number of suitable targets that are provided when gambling venues are opened.

At the same time, including information about the number of hotel rooms in a county may also shed some light on the number of tourists that visit a gambling county in a given year. If a certain percentage of the hotel rooms are assumed to be occupied at all times, this may provide a rough estimate of the number of individuals that visit counties with gambling venues.<sup>18</sup> This would provide a starting point for measuring the true population at risk. As has already been discussed throughout this paper, including both the number residents and the number of individuals who visit a county each year in the calculation of crime rates would allow for a better estimation of person's risk of being victimized in a gambling county. Unfortunately, most counties do not keep track of the number of visitors they receive each year. Thus, studies such as this one are forced to

---

<sup>18</sup> Of course, this does not solve the problem of trying to estimate day visitors. Because some visitors to gambling venues may simply drive from the next county over and then return home when they are finished gambling, these individuals would not be included in tourist estimates derived from the number of hotel rooms in a given county.

rely on traditional crime rate calculations to measure the impact of gambling venues on community level crime.

An additional shortcoming of the current study is a difficult one to overcome. Although empirically sound research relies on sample sizes of at least 30, this criterion could not be met when I examined the impact of different gambling venue types on crime. While there were over 100 counties with at least one Native American casino, there were far fewer counties with at least one dog or horse racino, commercial land-based casino, riverboat casino, or Native American bingo hall. Because I believe that these differences are worth examining, I included them in this study. However, except for the findings for Native American casinos, the results are probably not representative of the effects that occur when these venue types are introduced into a community. As such, they cannot be used to make generalizations about what happens when a certain venue type is opened.

Because it seems unreasonable for researchers to wait until additional gambling venues are introduced into new communities in order to investigate this problem, future research should attempt to overcome this dilemma by matching existing gambling venues to similar counties without such venues. Then researchers would be able to determine whether the effects of these different venue types are truly attributable to the venues themselves or if the effects are the result of some other characteristic that could not be determined here.

Future research should also attempt to control for unemployment and other economic characteristics of each county. Although I attempted to obtain such information from two separate resources, I was unsuccessful. Thus, I could not

determine if larceny rates did increase significantly due to the opening of gambling venues or if some economic factor better explained the increase. Although it has been observed by Hakim and Buck (1989) that the effects for casinos remain after controlling for unemployment and community wealth, my study cannot validate or invalidate such a claim.

An additional shortcoming of the current research that should be corrected in future research is the lack of information about county policing and venue security effects. Although it has been suggested by previous research that the number of police is an important control variable in examining the relationship between gambling venues and crime rates (Hakim and Buck, 1989; Wilson, 2001), I did not control for the number of county police officers in this study. Another important factor to control for would be venue security and surveillance. Although it has been repeatedly suggested here that venue security and surveillance may provide a level of formal guardianship that is perhaps responsible for preventing crime, there is no statistical evidence to back this claim.

Further, more specific demographic controls should be obtained for future studies dealing with the effects of gambling venues on county-level crime rates. Although I did not discuss these variables in Chapter 4, I consistently found negative effects for demographics such as the percent male and the percent of the population under 18. This contradicts traditional findings that males and individuals under the age of 18 are responsible for higher percentages of overall crime. Additionally, attempts should be made to control for other racial groups. Unfortunately, this information is simply unavailable in earlier years of the Census. However, these racial categories would be

helpful to control for, especially in counties with higher percentages of Native Americans.

In addition, regional differences should also be considered in future research. Researchers should examine whether gambling venues have an impact in some regions but not in others, and they should consider the possibility that gambling venues may not affect some crime rates at all once regions are controlled for. Finally, researchers should attempt to include data for all of the gambling venues in a particular county in order to obtain a more accurate picture of the impact of gambling venues on crime.

The questions surrounding gambling venues and crime are far from answered. At the same time, state governments are likely to continue to push to use gambling to solve their economic crises without raising taxes. While groups with differing viewpoints continue to argue about the implications of building new casinos or adding slots to existing racetracks, researchers should refine their methods for examining the relationship between gambling and crime. Significant findings may prove invaluable to future policy decisions.

## REFERENCES

- American Casinos and Gambling in the United States  
2004 Casinocity.com. Retrieved from <http://us.casinocity.com>
- Barron, Bruce  
2004 The real gambling addict is government: Bruce Barron probes the motivations of the people welcoming slot machines in Pennsylvania. Post-Gazette.com. Retrieved from <http://www.post-gazette.com/pg/04340/421594.stm>
- Census  
2005 Britannica Student Encyclopedia. Encyclopedia Britannica Premium Service. Retrieved from <http://www.britannica.com/ebi/article?tocId=234504>
- Committee on the Social and Economic Impact of Pathological Gambling [and] Committee on Law and Justice, Commission on Behavior and Social Sciences and Education, National Research Council  
1999 Pathological gambling: A critical review. Washington, D.C.: National Academy Press.
- de la Vina, Lynda and David Bernstein  
2002 The impact of gambling on personal bankruptcy rates. *Journal of Socio-Economics* 31: 503-509.
- Evans Group, The  
1996 A study of the economic impact of the gaming industry through 2005. Evanston, Illinois: The Evans Group.
- Gazel, Ricardo C., Dan S. Rickman, and William N. Thompson  
2001 Casino gambling and crime: A panel study of Wisconsin counties. *Managerial and Decision Economics* 22: 65-75.
- Giacopassi, David, B. Grant Stitt, and Mark Nichols  
2001 Community perception of casino gambling's effect on crime in new gambling jurisdictions. *The Justice Professional* 14: 151-170.
- Goodman, Robert  
1995 The luck business: The devastating consequences and broken promises of America's gambling explosion. New York: Free Press.
- Gould, William  
1997 Interpreting the intercept in the fixed-effects model. StataCorp. Retrieved from <http://www.stata.com/support/faqs/stat/xtreg2.html>

- Grinols, Earl  
 2000 Casino gambling causes crime. Policy Forum Vol. 13. University of Illinois: Institute of Government and Public Affairs.  
 2004 Gambling in America: Costs and benefits. Cambridge: University Press.
- Grinols, Earl L. and David B. Mustard  
 2001 Measuring industry externalities: The curious case of casinos and crime. Retrieved from [www.ncalg.org/library/pdf/Casinos\\_and\\_Crime\\_Grinols\\_Mustard.pdf](http://www.ncalg.org/library/pdf/Casinos_and_Crime_Grinols_Mustard.pdf)
- Hakim, Simon and Andrew J. Buck  
 1989 Do casinos enhance crime? Journal of Criminal Justice 17: 409-416.
- Miller, William J. and Martin D. Schwartz  
 1998 Casino gambling and street crime. The Annals of the American Academy of Political and Social Science 556: 124-137.
- Mosher, Clayton J., Terance D. Miethe, and Dretha M. Phillips  
 2002 The mismeasure of crime. Thousand Oaks: Sage Publications.
- National Gambling Impact Study Commission (NGISC)  
 1999 National Gambling Impact Study Commission final report. Retrieved from <http://govinfo.library.unt.edu/ngisc/reports/fullrpt.html>
- National Opinion Research Center (NORC)  
 1999 Gambling impact and behavior study. Report to the National Gambling Impact Study Commission. Retrieved from [www.norc.uchicago.edu/new/gamb-fin.htm](http://www.norc.uchicago.edu/new/gamb-fin.htm)
- Pindyck, Robert S. and Daniel L. Rubinfeld  
 1998 Econometric models and economic forecasts, fourth edition. Boston: Irwin/ McGraw-Hill.
- Ranking Chart  
 Casino executive fact book. Acquired from the American Gaming Association.
- Reuter, Peter  
 1997 The impact of casinos on crime and other social problems: An analysis of recent experiences. Report for the Greater Baltimore Committee.
- Smith, Douglas A. and Robert Brame  
 2003 Tobit models in social science research: Some limitations and a more general alternative. Sociological Methods & Research 31: 364-388.



- Stitt, B. Grant, Mark Nichols, and David Giacomassi  
2003 Does the presence of casinos increase crime? An examination of casino and control communities. *Crime and Delinquency* 49: 253-284.
- Stokowski, Patricia A.  
1996 *Riches and regrets: Betting on gambling in two Colorado mountain towns.* Niwot: University Press of Colorado.  
1999 Social impacts of riverboat and land-based non-Native American casino gambling. In Cathy H. C. Hsu (ed.), *Legalized casino gambling in the United States: The economic and social impact.* New York: Haworth Hospitality Press.
- Sullivan, John  
2003 Trump wants a hand in Penna. slots. *Philadelphia Inquirer*. Retrieved from <http://www.philly.com/mld/inquirer/news/local/states/pennsylvania/9369066.htm>
- Vold, George B., Thomas J. Bernard, and Jeffrey B. Snipes  
2002 *Theoretical criminology, fifth edition.* New York: Oxford University Press.
- Wellford, Charles F.  
1997 Victimization rates for domestic travelers. *Journal of Criminal Justice* 25: 205-210.
- Wilson, Jeremy M.  
2001 Riverboat gambling and crime in Indiana: An empirical investigation. *Crime and Delinquency* 47: 610-640.