19 Casinos and crime in the USA

*Douglas M. Walker**

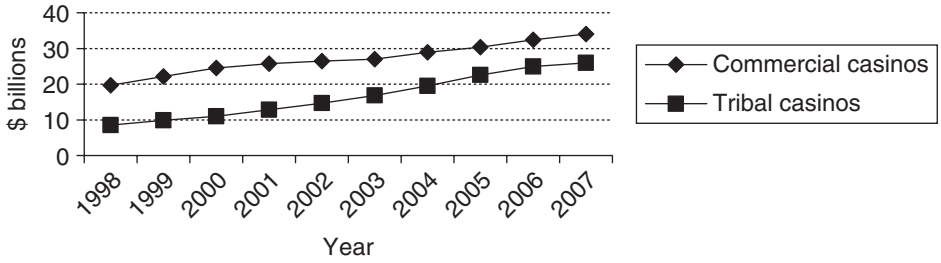
INTRODUCTION

The modern casino era in the USA began in 1931 when Nevada legalized commercial casinos. Since then, Las Vegas has grown into the premier casino destination in the USA. It was not until 1976 that commercial casinos were legalized elsewhere (Atlantic City, NJ). The latest wave of commercial and tribal casino development began with the Supreme Court's 1987 decision in *California v. Cabazon Band of Mission Indians* and the 1988 Indian Gaming Regulatory Act (IGRA). At stake in *California v. Cabazon* was whether tribal gaming fell under the State's regulatory powers. The Court held that states lacked authority to regulate tribal gambling. With the IGRA, Congress delegated power to the states to regulate Indian gaming and laid down conditions under which tribal gaming could be offered. In practice, the legislation has meant that federally recognized Indian tribes can offer a particular form of gambling on their reservation, so long as that type of gambling is not banned under state law. States are expected to negotiate with the tribes in good faith in developing state–tribal compacts for casinos. As a result of these legal events, tribal and commercial casinos began to spread across the USA in the late 1980s.

As of 2007, there were more than 460 commercial casinos operating in 12 states, with revenues of over $34 billion. Figure 19.1 shows the trend in commercial casino revenues since 1998. Taxes paid to state governments were $5.8 billion (American Gaming Association, 2008). There are over 420 tribal casinos in 29 states, with 2007 revenues estimated at over $26 billion (National Indian Gaming Commission, 2008). The trend in Indian casino revenues is also shown in Figure 19.1. Casino gambling has been one of the fastest-growing service/entertainment industries in the USA during the past two decades. Table 19.1 summarizes the commercial casino industry at the state level for 2007, showing revenues, taxes paid, and legalization and beginning operation dates.

Prior to the new wave of commercial casino legalization in the 1990s, many people regarded the casino industry as being run largely by organized crime, perhaps as portrayed in the movie *Casino* (1995). However, as new states legalized commercial casinos they created government regulatory bodies. Most casinos are now corporate owned and managed, and the old stereotype of casinos as mob money-laundering operations has faded.[1] Still, crime associated with casinos is a major issue of contention in the casino legalization and expansion debate.

The American Gaming Association (AGA) represents much of the commercial casino industry. It provides information and research about the industry to the public, and promotes the industry's interests to the media, politicians and the public. Among the information the industry publishes each year in its annual survey, *The State of the States*, is a survey of the public. One telling statistic is that the acceptance of gambling, and casino gambling in particular, is relatively high. Around 85 percent of the public



Sources: AGA (2008) and NIGC (2008).

Figure 19.1 US casino revenues, 1998–2007

Table 19.1 Commercial casino states, 2007[a]

State	Year legalized	Date casino(s) opened	No. of casinos operating in 2007	2007 revenues (millions)	2007 taxes paid (millions)
Colorado	1990	Oct. 1991	45	819	115
Illinois	1990	Sept. 1991	9	1983	834
Indiana	1993	Dec. 1995	11	2625	842
Iowa	1989	Apr. 1991	17	1363	315
Louisiana	1991	Oct. 1993	18	2566	559
Michigan	1996	July 1999	3	1335	366
Mississippi	1990	Aug. 1992	29	2891	350
Missouri	1993	May 1994	12	1592	417
Nevada	1931	1931	270[b]	12849	1034
New Jersey	1976	1978	11	4921	475
Pennsylvania	2004	Oct. 2007	6	1090	473
S. Dakota	1989	Nov. 1989	36	98	15
Totals	–	–	467	34132	5795

Notes:
[a] The Nevada casino count includes only casinos with gaming revenues over $1 million per year.
[b] Revenue data for Indian casinos are generally not public, so they are excluded from the table.

Source: Calcagno et al. (2010), using data from AGA (2008).

regards casino gambling as either 'perfectly acceptable for anyone' or 'acceptable for others but not me personally' (AGA, 2008, p. 40). Even earlier studies by researchers have indicated a majority of people approve of gambling; see Miller and Schwartz (1998, p. 125). This acceptance is perhaps unsurprising, given that the overwhelming majority of states have legalized gambling of some type, with more than 40 state governments sponsoring lotteries. State sponsorship of legalized gambling would be unlikely if the majority of Americans felt gambling was immoral or should otherwise be banned.

Despite a widespread belief among Americans that casino gambling is an acceptable

activity, there are still concerns about how the introduction of casinos will affect a local economy. The effects of casinos on local employment, spending, tax revenues; the effects of casinos on other gambling and non-gambling industries; and the social impacts of legalized gambling are all important issues routinely debated when states contemplate the introduction or expansion of commercial casinos. I have addressed many of these issues previously (Walker, 2007). Among the issues, the impact casinos may have on crime has garnered a lot of attention from policy-makers and researchers.

In this chapter I review the modern literature on the relationship between casinos and crime in the USA, particularly during the past 25 years. The review is organized chronologically. This organization is chosen because the casino industry has expanded outside of Las Vegas and Atlantic City only in the last 20 years, and as the industry has spread to new states, new data have become available, and the opportunity to perform research has likewise improved. Thus one can generally expect the more recent studies – since 2000 – to be more sophisticated than earlier ones – pre-2000. The studies examined here focus on how introducing casinos may affect local crime rates. In most cases, the studies examine some or all Index I crimes reported in the FBI's Uniform Crime Reports (UCR). These include aggravated assault, rape, robbery, murder, larceny, burglary and auto theft. I shall not focus on particular types of crime, and instead focus on general findings regarding the relationship between casinos and overall crime rates. There is no discussion of organized crime, as there appears to be little evidence that today's casino industry is mob-run. Indeed, much of the crime related to casino gambling may be from problem or 'pathological' gamblers. The last section of this chapter gives a brief overview of the literature on problem gambling, and reports on the relationship between individuals' gambling losses and propensities to commit crimes. The papers examined here appear primarily in peer-reviewed journals.[2] My goal is to discuss the most important studies that have appeared in the economics and social science literatures.

An important caveat is that the literature review focuses mostly on commercial, rather than tribal, casinos. This is because data available from tribal casinos are severely limited; since tribes are sovereign governments, they are not required to publicly disclose casino data. Thus empirical research on tribal casinos is scarce.

THEORY: CASINOS AND CRIME

Prior to discussing the methodologies and findings of particular studies on casinos and crime, it is worthwhile to spend some time introducing some of the theoretical and methodological issues that have played a major role in the development of this narrow topic in the economics-of-crime literature. First we discuss some theories that help to explain why crime and casinos may be related. We then discuss how crime is measured. This issue comprises several different factors that can have a surprisingly large impact on the results of empirical analyses. Interestingly, many of the important measurement issues were raised in some of the earliest papers to study casinos and crime. Yet only recently have researchers attempted to rigorously address these issues.

In public debates over casino gambling, crime is one of the most common issues raised by critics of casinos. This is for good reason: crime statistics often indicate a large

increase in crime corresponding to the introduction of casinos. Is it something about the activity of gambling that leads to crime? Are casino patrons somehow different from other people? Researchers have posited several theories for how casinos may be related to crime.

Economic Theory of Crime

An economic theory of crime based on rational choice suggests that criminals are rational utility-maximizers, that they calculate the risk of being caught, the potential penalties, and weigh those against the potential benefits of engaging in crime. Elements of the well-known economic approach to crime developed by Becker (1968) can certainly be applied to the issue of casinos and crime. However, most of the research on this issue is framed in the context of more specific theories of crime. In particular, the 'routine activities theory' and 'hot spot' theories of crime have often been used as frameworks for analyzing the relationship between casinos and crime. However, these frameworks are not inconsistent with an economic approach to crime.

Routine Activities Theory

The 'routine activities approach' by Cohen and Felson (1979) can be applied to increasing crime activity following the introduction of casinos. The routine activities theory holds that criminal activity increases when three conditions hold simultaneously: likely offenders, suitable targets and a lack of enforcement against crime. Obviously, these conditions may characterize a new casino development in a previously undeveloped area, or an area into which now there will be a large influx of tourists. Sherman et al. (1989) emphasize that a critical contribution of this theory is noting that not only are the numbers of offenders and targets, but also 'the factors affecting the frequency of their convergence in time and space'.

Jarrell and Howsen (1990) examine the specific effect of tourists or 'strangers' in an area on crime. In analyzing 120 counties in Kentucky, they conclude that 'tourism, which represents a group of highly transient individuals, has a positive impact on the crimes of burglary, larceny, and robbery' (p. 490). However, they find little connection between visitors and assault, murder and rape. A casino would represent a clear example of the routine activities theory of crime, as potential criminals and victims may be attracted to casinos. The application of this theory to the casino issue becomes more interesting once one distinguishes between 'casino-based' and 'community-based' crimes. This distinction was raised initially by Curran and Scarpitti (1991). Casino-based crimes may not conform as well to the routine activities explanation of crime, as the security technology and enforcement on casino premises are extremely effective and permeate the entire location. However, community-based crimes (i.e. those criminal acts that do not occur on casino properties) may better conform to the routine activities conditions described above. Although policing in communities usually increases with the introduction of casinos, it is unclear whether police per capita increases proportionally to the number of casino tourists. If it does not, then per capita policing actually falls. This may contribute to ripe conditions for community-based crimes, as suggested by the routine activities theory.

Hot Spot Theory

Sherman et al. (1989) explain a related theory of crime incidence, the 'hot spot' theory of crime. In extending the routine activities theory, these authors found empirical evidence in Minneapolis that over 50 percent of calls to police were attributed to only 3 percent of places (addresses) in the city. Even more interesting is that calls reporting predatory crimes were extremely concentrated, with all robberies, rapes and auto thefts reported in less than 3 percent of places in the city. When a casino is introduced into a small town, for example, the casino grounds may well act as a hot spot for crime.

Pathological Gambling

Aside from the simple fact that casinos are likely to attract a large number of potential targets for criminals, and that these people will often be carrying large sums of cash, often drinking alcohol, and are outside of their familiar surroundings, a large source of casino-related crime may be due to 'pathological gamblers'. These are individuals who gamble to such an extent that the activity has serious negative impacts on their personal lives, careers, or financial status. In some cases, problem gamblers lose their life savings at casinos; they destroy marriages; they commit crimes to get more money to gamble; they end up in bankruptcy, and some even commit suicide.[3]

Clearly, problem gambling is a very serious issue that affects numerous people. It is beyond the scope of this chapter to examine these issues in depth. However, researchers have estimated that approximately 1.6 percent of adults in the USA and 3.9 percent of young adults under 18 may qualify as pathological gamblers (Hales et al., 2008, p. 795). Not all of these individuals necessarily commit crimes, but researchers suspect that this population may have a relatively high propensity to commit crimes. In short, pathological gambling may be an important explanation for some of the crime that may accompany the introduction of casinos.[4]

Economic Development

The above theories have explained why casinos may contribute to increased crime. However, it is also possible that casino development might decrease crime, on net. This may occur, for example, if the introduction and operation of casinos create increased demand for labor, on net, and lead to higher wages. The resulting increase in standard of living might decrease the propensity to engage in criminal activities.[5]

Measurement Issues

The recent spread of commercial and tribal casinos across the USA has been very controversial, as casino gambling often stirs strong emotional reactions both from those with a 'moral' opposition to gambling and from social libertarians. These views are often shared by policy-makers and voters whose strongest interest may be tax revenues, employment, or regional economic development. One concern that is always raised in casino debates, of course, is the crime that may accompany casinos. It is worthwhile discussing what should be measured when a researcher studies casinos and crime.

As noted earlier, nearly all studies discussed in this chapter use the Index I reported crimes found in the FBI's Uniform Crime Reports (UCR) data.[6] In some cases the types of offenses are aggregated; in others they are considered individually. Most studies examine the crime rate, i.e. the number of reported offenses divided by the population. Studies examine the crime rate at the state level, county level, or city level. One important question to be considered at the outset of any study is: what is the appropriate way to calculate the crime rate?

Virtually all studies of casino communities find that the raw number of reported crimes and arrests increases following the introduction of casinos. This is hardly surprising, as the large influx of tourists means more potential criminals and more potential victims. It would be rather shocking if such an increase in population did not correspond to an increase in criminal activity. One key to interpreting the studies reviewed below is how they have handled the local and visiting population. As is clear from the discussion of the routine activities and hot spot theories of crime, whenever a large tourist attraction is introduced, there is likely to be an increase in the number of crimes committed in the area.

The standard crime rate is simply measured as the number of crime incidents (c) divided by the population (p), or c / p. Thus we have a measure of the likelihood that a particular person will be victimized by crime. If we distinguish between 'residents' (r) and 'visitors' (v), for both the crimes committed (i.e. crimes committed either by residents, c_r, or by visitors c_v) and the population targeted by criminals (i.e. either members of the resident population, p_r, or the visiting population, p_v, can be victimized by crime), then we get a better picture of how different crime rate calculations would be interpreted.[7] The traditional crime rate measure counts all crimes committed in an area (e.g. nation, state, or county), divided by the population in that area, c / p, or using the resident/visitor notation it would be $(c_r + c_v) / p_r$. However, if there is a large amount of tourism to the area, some researchers argue, this crime rate will overstate the actual risk of being victimized by crime. To correct this, the visiting population should be added to the denominator, so that it accurately reflects the 'population at risk' of being victimized. The crime rate thus becomes $(c_r + c_v) / (p_r + p_v)$. On the other hand, if we are simply interested in calculating the raw number of crimes, relative to the resident population, regardless of the volume of tourism to the area, then the standard crime rate can be used. But this will overstate the risk of being a crime victim, the more so the larger the visiting population. In the case of casinos, which are often located in less populated areas, the tourism they draw can represent a significant change in the population. Thus the distinction between 'population' and 'population at risk' *vis-à-vis* the crime rate is an important one.

Another factor worth reiterating here is the location in which the crimes are committed. Whether the crimes are being perpetrated on the casino premises or in the outside community will have a real effect on who is being victimized: residents or visitors. Finally, it would be ideal for analyzing risk to potential victims if data were available on who is victimized by crime and who the criminals are (i.e. residents or visitors).

These measurement issues will be highlighted throughout the following review of the literature.

EMPIRICAL EVIDENCE: 'EARLY' STUDIES (1985–2000)

As indicated in the introduction to this chapter, the door was opened for the spread of commercial casinos with the passage of the IGRA in 1988. The potential that casinos would cause crime has been a concern in each state to have legalized casinos. Yet research on the relationship between casinos and crime was sparse prior to the IGRA. Once casinos started to spread, however, interest in research grew. The 'early' studies on casinos and crime include Albanese (1985), Friedman et al. (1989), Hakim and Buck (1989), Buck, et al. (1991), Curran and Scarpitti (1991), Giacopassi and Stitt (1993), Chang (1996), Stokowski (1996), Miller and Schwartz (1998), and General Accounting Office (2000).[8]

Albanese (1985)

Albanese (1985) is one of the first published studies on the casino–crime relationship. Albanese examines the Atlantic City, NJ, experience with casinos. However, he uses annual data only from 1978 to 1982. Albanese notes that ideally he would perform a time-series analysis, but at the time he undertook the study, data availability was limited. For example, he indicates that visitor count data were not reliably available for Atlantic City prior to 1978 (p. 41). Using the limited data available, Albanese performs a variety of correlation tests, including partial correlation calculations to control the effects that other factors may have had in explaining the change in crime in Atlantic City after the introduction of casinos.

A simple correlation between casinos and crime in Atlantic City is very strong (Albanese, 1985, p. 42). However, once Albanese accounts for other relevant factors through partial correlation (i.e. visiting population; police enforcement; number of hotel rooms and apartments, homes, and businesses; and the number of index crimes reported in the rest of the state), he concludes that the influx of visitors is the primary cause of the increase in reported crime. He writes:

> the growth in the number of visitors to Atlantic City has surpassed increases in crime to the point that the personal risk of victimization is declining to some extent. Therefore, the increase in serious crime in Atlantic City has been more than offset by an increasing population there. The [result] has been a slight *reduction* in the likelihood of being victimized there. (1985, p. 43)

In examining the effect of casinos on burglary, Albanese (ibid.) concludes that 'the slight overall increase in the number of burglaries between 1978 and 1982 actually masks a sharp *decline* in the individual risk of being burglarized'. Overall, Albanese confirms that the number of reported crimes increased in Atlantic City as casinos were built and expanded there during 1978–82. However, he argues, when accounting for the number of visitors to the area, the actual risk of being victimized decreases.

Albanese's (1985) empirical analysis is rather simplistic. Correlation statistics are inferior to regression analysis, in terms of accounting for other relevant factors that might explain crime. And the limited data raise further questions about Albanese's results. Despite this, Albanese makes a very important contribution to the literature on casinos and crime because he outlines some important factors to consider when analyzing crime rates: 'crime statistics can be extremely misleading when they fail to account for: (1)

changes in the population at risk, (2) changes in criminal opportunities, (3) changes in law enforcement resources and priorities, and (4) changes in crime elsewhere in the State' (Albanese, 1985, p. 40–41). The considerations noted by Albanese (1985) are useful to keep in mind as we examine subsequent studies on the casino–crime relationship. Albanese elaborates on these considerations:

(1) Changes in the population at risk

What is interesting is the risk to an individual of being victimized by crime. In a case in which there is a large influx of tourists, it is important to consider the tourists in calculating the crime rate. Ignoring visitors may lead to an overstatement of the risk of being victimized. As Albanese (1985, p. 41) explains,

> A city with a population of 100 citizens might experience 10 reported Index crimes in a year. Therefore, the probability that any one citizen will be the victim of one of these crimes is 1 in 10 (i.e., 10 in 100). If the population of this city suddenly doubles to, say, 200 citizens, it is likely that the number of crimes that occur there will also rise – simply because there are more people to be offenders and victims. If the number of crimes also doubled to 20, it would appear as if crime increased 100 percent. However, this is not the case. If 200 people are now at risk and 20 crimes are committed, the probability of being a victim is *still* 1 in 10 (i.e., 20 in 200). Therefore, the risk of being victimized by crime can remain the same when both population and crime increase together.

Of course, at a national level, the influx of visitors from other nations represents a small change in the 'population at risk'. So the larger the market, arguably the less important it would be to account for visitors, if our goal in following the crime rate is to assess the risk to individuals of being victimized by crime.

(2) Changes in criminal opportunities

Albanese argues that new hotels often accompany new casinos. This increase in the number of hotel rooms represents an increase in criminal opportunities, and Albanese argues that these should be controlled for in isolating the effect of casinos on crime. However, this argument is rather weak. Yes, hotel rooms may represent possible targets for thieves, but the number of visitors, if available, is probably a better measure of potential victims than is hotel rooms. After all, modern casino hotels have state-of-the-art security, and it is unlikely that break-ins to hotel rooms represent a significant portion of casino-related crime. Nevertheless, Albanese's general point is valid: changes in criminal opportunities may affect the amount of crime being committed and reported.

(3) Changes in law enforcement resources and priorities

Albanese (1985, p. 41) argues that if casinos are introduced and more police are hired, the increase in the police force alone might lead to more crime being reported, simply because there are more police looking out for crime, even if the actual number of crimes has not changed. Alternatively, a larger police force may create a larger deterrent and could lower crime.

(4) Changes elsewhere in the State

Albanese argues that the crime trend near the casinos must be compared to what is happening elsewhere in 'non-casino' areas. If, in the case of 1980s New Jersey, the overall

crime trend is positive, then that increasing rate should be a baseline for considering the effects of casinos on crime in Atlantic City.

Although the Albanese (1985) study can hardly be held up as a standard for future empirical research, he does outline some important principles that may be helpful in evaluating subsequent casino–crime studies.

Friedman, Hakim, and Weinblatt (1989)

Friedman et al. (1989) examine more rigorously the casino–crime relationship in Atlantic City. They use regression analysis with panel data for 64 localities near and including Atlantic City, for the 1974–84 period. This time frame allows for three pre-casino and eight post-casino years, respectively. The analysis controls for the accessibility of Atlantic City from the community in question; an interaction between accessibility and a 'postcasino years' dummy, taking a value of 1 for 1978–84; population size of the locality; unemployment rate; real-estate values; and population density.

Friedman et al. (1989) clearly improve on previous studies on Atlantic City casinos and crime, as these authors use a panel model. They find that, even accounting for community population, crime in the post-casino years is higher than in the pre-casino years. However, the increase occurs in both casino-accessible and non-accessible communities (p. 621). The telling variable is the interaction term between accessibility and post-casino years. This variable is positive and statistically significant, and indicates 'considerably higher crime in the post-casino years in the adjacent or accessible localities relative to the other localities'. The authors further note that 'the higher crime level in the accessible localities may be attributed to temporary visitors to the casinos and resident criminals from Atlantic City that choose to operate outside their city' (p. 621).

Importantly, Friedman et al. (1989) do not account for several of the factors that Albanese (1985) notes are critical for determining the effects of casinos on crime. In particular, Friedman et al. (1989) do not account for visitors explicitly in analyzing the casino effect on crime. Nevertheless, this study is one of the first to suggest that casinos cause crime in a market outside of Las Vegas.

Hakim and Buck (1989)

Hakim and Buck (1989) is very similar to the study by Friedman et al. (1989), but examines data from 1972 through 1984. As in the previous study, these authors ignore the effect of the visiting population in assessing the effects of casinos on crime. Yet they acknowledge that 'the variance of the incidence of crime is undoubtedly related to the size of the potential population of victims and the size of the community' (p. 413). As an attempt to fix this, they 'standardize the model by population' (ibid.). Yet it is unclear whether this effectively addresses the visiting population to Atlantic City and the effect it may have on crimes and victims. As in the Friedman et al. (1989) study, Hakim and Buck (1989) find that casinos have made crime worse in the Atlantic City region.

Ochrym (1990)[9]

This is another study that focuses on the crime rate in Atlantic City. The motivation for this study is a review of the literature that shows a strong relationship between the 'seasons in crime and tourism' (Ochrym, 1990, pp. 128–9), in places such as Miami and Hawaii. The question this raises is: when casinos appear to spur crime, is it due to tourism generally, or casinos in particular? This is a critical question in understanding the relationship between casinos and crime and, unfortunately, it is one that no researcher has adequately addressed.

Ochrym's (1990) empirical analysis is limited to simple means difference tests and a regression model utilizing only dummy variables to indicate which types of crimes had changed between 'pre-tourism' and 'post-tourism' eras. Ochrym (1990) compares crime rates in two large urban areas (Newark and Camden), which are meant to represent non-tourism cities, with three smaller tourist communities (Atlantic City, Seaside Heights and Wildwood), all in New Jersey. By comparing the means of crime rates prior to tourism (1967–75) and after (1976–87), Ochrym tests whether tourism and/or casinos increase crime.

The first potential problem with this analysis arises with the dates chosen. Although casinos were legalized in Atlantic City in 1976, they did not actually open until 1978. One would not expect a new tourism effect due to casinos in Atlantic City until 1978.[10] Another potential issue is that, since control variables were not included in the analysis, it is not clear that tourism, which Ochrym hopes to isolate, is actually isolated by this analysis.

Despite these, and other potential problems, Ochrym (1990) finds that the coastal tourist towns, including Atlantic City, had a higher mean crime rate in the 'post-tourism' time period than did the large urban cities.[11] This suggests that tourism spurs crime. Furthermore, the results indicate that the mean crime rates among the tourist cities were not significantly different from each other. Ochrym concludes that casino tourism is not significantly different from non-casino tourism, and that the increased crime in Atlantic City is due to tourism, generally, rather than casinos in particular.

Despite the serious limitations of this analysis, Ochrym (1990) does raise a critical issue that previous and subsequent authors have not addressed adequately: is casino tourism fundamentally different from other types of tourism?

Buck, Hakim and Spiegel (1991)

Buck et al. (1991) use data from 1972 to 1986 to examine the introduction of Atlantic City casinos, and the associated crime, on property values. Although the analysis is similar to their previous two studies, in this paper the authors advance research on Atlantic City crime by measuring the effect on property values. Again they focus on 64 Atlantic City and surrounding communities, during the 1972–86 period. This gives them five pre-casino periods and ten post-casino periods. Their general findings are that casino development has a positive impact on real-estate values, and these benefits are more pronounced closer to the development and the greater the accessibility to the developing area. At the same time, however, if the development also attracts or otherwise increases crime, this will reduce property values. This effect, too, decreases with distance from the

casinos. Using their pre-casino data, the authors predict what property values would have been in the absence of the crime associated with casinos. They then compare these estimated values with the actual values post-casino to isolate the impact of casinos on crime. Their results suggest that the property values have decreased as a result of crime associated with the introduction of casinos. They provide an empirical estimate of the costs of casino crime to community residents.

Although dated, this study provides a useful example for some later studies on the effects of casinos, as manifest in property values. Buck et al. (1991) do consider the effects of changes in police manpower, as suggested by Albanese (1985). They also allude to the effect of the visiting population, but only with respect to casino employees (p. 291). However, they ignore the effects of the casino patrons as visitors. Still, their study estimates the effects of development on property values resulting from economic development and the crime that may be associated with such development.

Curran and Scarpitti (1991)

Curran and Scarpitti (1991) echo the concerns by Albanese (1985), and emphasize that there are two schools of thought regarding how the influx of casino visitors should be handled. Curran and Scarpitti (1991) frame their analysis directly as a reaction to the work by Hakim et al., who did not account for Atlantic City casino visitors in analyzing crime there, in any of their studies.

Admittedly, the number of crimes committed in Atlantic City increased after casinos were introduced. However, there are two opposing views on how the 'population at risk' should be measured in the crime rate. Curran and Scarpitti (1991, pp. 435–6) explain, 'the first position rejects the idea that the population at risk should be adjusted for the influx of tourists who come to Atlantic City; the second accepts this adjustment'. Curran and Scarpitti show that the raw crime rate data from 1968 to 1989 show a clear increase in the crime rate in Atlantic City after casinos were introduced; the index jumps 200 percent in Atlantic City from 1978 to 1989, while it increased only 1 percent in the state overall (p. 442). However, they argue that once the number of tourists is accounted for in the crime rate's 'population at risk', the crime effect from casinos disappears. This conclusion is based on an analysis of Atlantic City crime as a percentage of total state crime (p. 442). One wonders if the authors could draw the same conclusion if they did not frame the crime rate in proportional terms.

An important contribution of the Curran and Scarpitti paper is that they raise the issue of 'casino-based' versus 'community-based' crimes. In a five-year analysis of Atlantic City crime data (1985–89), they find that around 64 percent of reported Index offenses occurred on casino premises (p. 444). They also report that 92 percent of these crimes were larceny–thefts, and that the majority of violent crimes occurred in the community, not on casino premises. When they calculate the crime rate based on the crimes committed in the community (not at the casinos) divided by the resident population, they find starkly different results than the unadjusted Uniform Crime Report (UCR) data suggest: a decline in community crime by 16 percent during the 1985–89 period (pp. 446–7). Even calculating the crime in casinos by the visiting population, the authors find a lower crime rate than the UCR data suggest.[12]

The analysis by Curran and Scarpitti (1991) represents a number of important con-

tributions that are critical when considering subsequent casino–crime research. First, they discuss the effect that casino visitors may have to the crime rate data. They emphasize that a failure to adjust crime rates by visitors will lead to an overestimate of crime caused by casinos. Further, they emphasize the distinction between casino-based and community-based crimes. For jurisdictions considering the legalization of casinos, they may have real concerns about how casinos may cause criminal activity to spill out into the community. Curran and Scarpitti's distinction of crime based on its location can help communities better understand how casinos contribute to crime, and better assess how casinos may affect the risk of crime to the average resident near a casino.

Giacopassi and Stitt (1993)

Giacopassi and Stitt (1993) may be the first rigorous paper to address casinos and crime outside of Nevada or Atlantic City; it focuses on Biloxi, Mississippi. In reviewing the literature, these authors also raise several of the issues emphasized by Albanese (1985) and Curran and Scarpitti (1991), particularly the issue of how to address the many visitors that will be attracted to casino communities.

Giacopassi and Stitt (1993) examine reported crimes in Biloxi, MS, for a period of two years: one year before and one year after the introduction of casinos (1991–93). The authors recognize that an analysis of such a short period can hardly be considered conclusive. In addition, they highlight a number of potential problems that may arise from their choice of data. In any case, they find a statistically significant increase in larceny–theft and motor vehicle theft (p. 126), and an increase in other crimes (burglary, credit card fraud), but these were not statistically significant. Although the authors did not account for visitors in examining the crime data, they do indicate that vehicle traffic to the region increased 230 percent after the casinos opened (p. 127). They further suggest that their crime statistics should be adjusted to reflect this influx of tourists, when better data become available.

As with the other studies reviewed thus far, the paper by Giacopassi and Stitt (1993) indicates an increase in the number of crimes reported after the introduction of casinos. But as with many of the other studies, the issues of 'population at risk' and casino-based versus community-based crimes are not addressed. Thus the change in crime that they find resulting from the introduction of casinos has an unclear impact on the risk to Biloxi residents.

Chang (1996)

Another study on the effects of casinos on crime in Biloxi, MS, was published by Chang (1996). This study reviews much of the prior literature discussed above in this review. Chang (1996) examines trends for 188 different criminal offenses in Biloxi from 1986 to 1994. The criminal offenses were grouped into 11 categories. The results indicate that the number of robberies increased significantly after the introduction of casinos, but the number of 'mischief' offenses decreased. In the remaining nine crime categories used by Chang, there were no significant effects linked to casinos. (Although he does not present the results from the 188 offenses individually, Chang, 1996, p. 435 reports that of the 118 offenses, 31 were not tested because they had ten or fewer occurrences; 12 offenses

increased, seven decreased, and 68 had insignificant changes following the opening of casinos.) A dummy variable for all criminal offenses was also insignificant, leading Chang (1996, p. 434) to conclude that 'within the first two years of casino operations, there was no evidence that crime had increased in Biloxi, in general' (ibid.).

Like Albanese (1985), Curran and Scarpitti (1991) and Giacopassi and Stitt (1993), Chang also (1996, p. 434) estimates the effects of crime taking into consideration the number of visitors to Biloxi, an estimated 20 000 visitors per day. When estimating crime rates and adjusting the population by the number of visitors attributed to casinos (10 000), Chang finds that crime rates decrease drastically in the first year following casinos, but then return to pre-casino levels in the second year after casino introduction (p. 435).

As with other previous studies, one major limitation of the Chang (1996) paper is that it analyzes a very short post-casino period. General conclusions about the effects of casinos on crime cannot be drawn from such studies.

Stokowski (1996)

Colorado introduced casinos in several small mining towns in the early 1990s. These towns are the focus of the casinos and crime study by Stokowski (1996). As with most of the previous studies, this one includes a literature review that focuses on some of the same controversies highlighted above, in particular, how to deal with the number of visitors that casinos attract with respect to the effect of casinos on crime.

In her analysis of small mining towns in Colorado, Stokowski (1996) presents annual offense, arrest and population data from 1989 to 1994. As in previous studies, when the crime data are evaluated relative to the county populations, the introduction of casinos results in a large increase in the number of offenses and arrests. Lacking data on casino visitors, Stokowski uses traffic counts as a proxy for visitors. In the years prior to the introduction of casinos (1989–91), traffic counters indicated an average of around 3500 cars per day. In the years after casinos were introduced, traffic counts increased markedly to over 10 700 per day in 1992 and almost 14 000 in 1994. Once the crime offenses are adjusted for the county estimated population and average daily traffic count, Stokowski (1996, p. 68) concludes, 'while residential populations have increased only minimally in the gaming counties, tourist visits increased dramatically. At this point in time, tourist visits have increased faster than crime, slightly reducing the chance that people will be victims of crime.'

Although the Stokowski study presents a variety of interesting data, it is, at best, anecdotal. She simply compares data before and after the introduction of casinos, but without controlling for factors that may have affected crime, traffic and population changes in the regions surrounding the casinos. Still, since the casinos studied are in small mining towns that were more or less stagnant prior to the introduction of casinos, one could argue that there may not be complicating factors that have been ignored.

One other contribution of the Stokowski (1996, p. 69) paper is that her discussion on crime detection and monitoring within the casinos alludes to an important issue with respect to 'on premises' versus 'community' crimes. Since nearly everything that happens on the grounds of casinos is subject to security camera scrutiny, one can argue that crimes committed are more likely to be reported than in the outside community. Although Stokowski does not differentiate between casino and community crimes, one

could argue that the number of casino crimes likely increases significantly. To the extent that 'visitors' to the area are the majority of casino customers, then the crime caused by the casinos may affect the local population even less than suggested by Stokowski's data.

Miller and Schwartz (1998)

The literature review by criminologists Miller and Schwartz (1998) makes a strong case that the visiting population must be taken into consideration when analyzing the crime associated with casinos. In fact, they dedicate almost three pages (pp. 129–31) to discussing the issue, echoing Albanese's (1985) concerns, but also lambasting authors who have ignored the issue. For example, they write, 'although the mathematical models used by Hakim and his fellow researchers are elegant, they are fatally flawed by the same problem as the simple studies: they are based on per capita crime rates' (p. 130). In short, they reiterate the previously discussed concerns about how to count tourists in the crime rate data:

> This brings us to a conclusion that . . . policymakers may find that several seemingly opposite sides of this debate are all correct. Casino gambling may not increase crime more than tourism does, it may not increase street crime at all per capita if tourists are included in the average daily population count, but it will almost certainly increase the raw amount of crime, which will mean more work for police, more court sessions, and more filled jail cells. (Miller and Schwartz, 1998, p. 131)

Although this study does not provide any data or empirical analysis, it does raise some concerns about the direction of research on the relationship between crime and casinos.

General Accounting Office (2000)

This section examines nearly all of the peer-reviewed studies on gambling and crime in the USA that were cited by the 1999 *Final Report* of the National Gambling Impact Study Commission (NGISC, 1999, pp. V-9–11). The NGISC study was subsequently reviewed by the General Accounting Office (GAO, 2000), in a report prepared for US representative Frank Wolf. The analysis in the GAO report focuses on a case study of the Atlantic City experience. In reviewing previous studies, the GAO also raises the 'visitor' effect on the crime rate, explaining,

> Because New Jersey and local government officials emphasized that any crime data analysis should include in the population the number of visitors Atlantic City receives daily, we calculated the crime rates with and without adjustments to Atlantic City's population to include the influx of visitors and nonresident workers to the city. While we show crime rates based on both the city's unadjusted population and the city's adjusted population, we believe that the more appropriate method is the method that includes the adjusted population. We agree with some researchers' comments that visitors become part of the pool who may both commit and become victims of crime and therefore should be added to the resident population when calculating the crime rate. In contrast, other researchers have stated that calculating the crime rate using the unadjusted population (local residents only) provides a more complete picture of the impact of crime on the local geographic area. They stated that regardless of whether visitors are included in the crime rate calculation, the actual increase in the number of crimes affects the local area's law enforcement costs. (GAO, 2000, p. 36)

The GAO study analyzes various Index I crimes, showing crime rates from 1977 to 1997, both adjusted and unadjusted for visitors and non-resident workers. Although the GAO analysis is a simple calculation of crime rates for different years, and does not control for other factors that might impact crime, one important contribution of the GAO study is that it compares crime rates in Atlantic City to the US rates and those of New Jersey. The findings indicate that, generally, the level of crime in Atlantic City was higher than in the USA and New Jersey, even after adjusting the population for visitors (Table II.2, p. 37). The Atlantic City crime rates unadjusted for visitors were up to five times higher than the adjusted crime rate.

Unfortunately, the crime rate calculations in the GAO study do not go back early enough to draw strong conclusions regarding the overall effects of casinos on crime. However, one can see that the crime rate in 1997 was about half what it was in 1980 if the population is adjusted for visitors. Even if the adjustment is not made, however, the crime rate in 1997 was lower than it was in 1980.

Although the GAO study (2000) did not appear in a peer-reviewed journal, it is discussed here because it reviews the NGISC (1999) and also contributes an original study of Atlantic City, which is often one of the worst cases touted by critics in describing the negative social effects of casinos. Yet, even in this case, the GAO was unable to provide a conclusive result: 'whether [social problems] would be better or worse without the presence of casinos in Atlantic City remains unknown' (GAO, 2000, p. 42).

Summary of 'Early' Studies

As a review of articles makes clear thus far, the findings regarding casinos and crime are heavily dependent on the analytical framework used. In general, these studies suggest that casinos cause crime if the visitors are not included in the population component of the crime rate. However, when crime rates are calculated without factoring in the number of tourists or visitors, almost all studies show that casinos lead to higher crime rates. This is consistent with common sense, which suggests that if there is a large increase in the number of people in an area, there is likely to be an increase in the number of crime incidents. Table 19.2 summarizes the findings of the studies reviewed thus far. The table lists information on the casino market studied, general findings, and whether visitors were considered in calculating the crime rates. The table suggests that whether a researcher finds an impact of casinos on crime correlates strongly with whether the visitors are accounted for in the population.

In many cases, these studies are methodologically or empirically weak. The studies analyze data for only a very short time frame (in one case, as little as two years), do not control for other factors that may impact crime, and/or do not distinguish between crime attributable to casinos specifically and to tourism generally. Indeed, few of the studies above perform econometric analyses in which they control for relevant variables. Most of the shortcomings in the research up to this point may be attributed to the lack of available data. We cannot draw any strong conclusions regarding the relationship between casinos and crime based on the studies discussed above. What we can do is confirm that how crime is measured will have a significant impact on the crime rate in casino jurisdictions. This result is consistent with the routine activities theory of crime.

Table 19.2 Casino–crime rate studies, 1985–2000

Study	State/region studied	Years analyzed	Year casinos opened	Casinos increase crime rate?	Population adjusted for visitors?
Albanese (1985)	Atlantic City	1978–82	1978	No	Yes
Friedman et al. (1989)	Atlantic City	1974–84	1978	Yes	No
Hakim and Buck (1989)	Atlantic City	1972–84	1978	Yes	No
Curran and Scarpitti (1991)	Atlantic City	1985–89	1978	No	Yes
Giacopassi and Stitt (1993)	Biloxi, MS	1991–93	1992	Yes	No
Chang (1996)	Biloxi, MS	1986–94	1992	No	Yes
Stokowski (1996)	Colorado	1989–94	1991	No	Yes
General Accounting Office (2000)	Atlantic City	1977–97	1978	No	Yes

EMPIRICAL EVIDENCE: 'RECENT' STUDIES (2001–2009)

The trend toward commercial casino legalization slowed drastically in the late 1990s, perhaps due in part to the recommendation of the NGISC (1999, Chapter 1, pp. 47–48). Michigan was the last state to introduce casinos in 1996, until 2004, when Pennsylvania legalized casinos (but with slot machines only). Despite this slowdown in casino introduction, the states that adopted earlier now have long enough track records with casinos that data availability has improved somewhat in the last ten years. The studies in this section are often more comprehensive, analyzing longer time periods and often more cross-sections of states with casinos. Still, most of these later studies also suffer from some data limitations.

Gazel, Rickman, and Thompson (2001)

This study of casino counties in Wisconsin extends earlier work by these authors, who completed several studies on the effects of tribal casinos in Wisconsin for the Wisconsin Policy Research Institute in the mid-1990s.[13] In this paper, Gazel et al. (2001) present one of the most comprehensive and technical analyses of casinos and crime up to that time. They use panel data on all Wisconsin counties from 1981 to 1994.[14] As of 1992, tribal casinos were operating in 14 of Wisconsin's 72 counties. The authors use a dummy variable to indicate whether a county had a casino operating in a particular year. The dependent variable in their model is the natural log of the crime rate. Although their analysis does not account for the visiting population in the different counties, they argue that county fixed effects will capture the effects of transient populations. It is true that a series of county dummy variables would account for county-level idiosyncrasies. However, the

volume of tourism is arguably a key piece of information. The model used by Gazel et al. is unable to distinguish between a 'casino' effect on crime and a general 'tourism' effect because the researchers do not have county-level tourism data.

Still, Gazel et al. (2001) argue that their empirical results suggest that casinos have a significant impact on increasing crime, whether measured in offenses or in arrests.[15] In the full model of all Index crimes, casinos are found to have a weak but positive impact on crime. However, when the model is partitioned into the groups 'property crimes' and 'violent crimes', or into individual property and violent crimes, the casino variable is never found to be statistically significant. For some reason, the authors re-test the model using specifications 'where insignificant variables and variables with coefficients of the wrong signs were omitted, and where all control variables were omitted' (p. 69). They provide no justification for doing this, nor do they discuss the potential consequences of this practice on their results. This practice undoubtedly will increase the significance of the casino variable that remains in the model, but it raises serious questions about the validity of their analysis and conclusions.[16]

Wilson (2001)

Commercial casinos were legalized in Indiana in 1993, and the first casino opened there in December 1995. Wilson (2001) is the first study of which I am aware to examine the relationship between casinos and crime in Indiana. He analyzes weekly data in one casino market (Hammond), and monthly data in another market (Rising Sun). Wilson utilizes weekly data for Hammond, from January 1992 through June 1997. For Rising Sun he uses monthly data from January 1993 through September 1997. His time-series analysis focuses on Index offenses and simple assault in terms of the frequency of crime, not the crime rate. In one market (Hammond), he does not find any significant relationship between casinos and crime. However, he does find an impact in one market on aggravated assaults and theft. Still, Wilson concludes, 'finding that the frequency of crime in general did not increase during the postcasino period, it is unnecessary to examine rates of crime because they would have fallen by necessity' (p. 635) if tourists were included in the crime rate calculation.

Like previous studies, then, Wilson (2001) finds that casinos increase the frequency with which crimes are committed after the introduction of casinos, but he still concludes, 'These somewhat attenuated effects on crime suggest the enhanced criminal opportunity created by riverboat casinos did not increase the overall frequency of individual offenses as might be expected from routine activities theory and related tourism literature' (p. 610).

Giacopassi, Stitt and Nichols (2001)

This study examines residents' perceptions of criminal activity, as it relates to the introduction of casinos into several different communities. The authors conducted over 2700 interviews of residents in communities in Illinois, Iowa, Missouri and Mississippi that have had casinos for at least four years. The communities include Alton, Biloxi, East Peoria, Peoria, Sioux City, St Joseph, St Louis City and St Louis County. The survey asked individuals a variety of questions about demographics, the respondents' own gambling behavior, and their perceptions of the effects casinos in their area have had on

various types of crime. The survey results indicated that individuals tend to overestimate the negative effects of casinos on crime, leading Giacopassi et al. (2001, p. 165) to conclude:

> It is clear that citizens' perceptions do not accurately reflect changes in crime after casinos enter a community. In this regard, the residents' perceptions are consistent with findings that show that respondents tend to over-estimate gambling's impact on pathological gambling in a community and also the casino industry's connection with organized crime. It appears that these faulty perceptions result in the attribution of causal links between a casino's presence and crime that do not generally exist, at least not to the degree that is commonly assumed by the public.

The conclusions of this study are questionable, however. The authors formatted the survey question as in these examples (2001, pp. 156–7): 'What effect do you think the presence of casinos has had on the amount of crime in your community?' 'Would you say casino gambling has caused an increase, decrease, or has had no effect at all?' 'With regard to people being physically assaulted, do you think casino gambling has caused a large increase moderate increase, small increase, no change at all, small decrease, moderate decrease, or large decrease?'

The question immediately above was repeated for each of the different types of crimes analyzed. The potential problem with the conclusions by Giacopassi et al. (2001) is that the questions are phrased in terms of the absolute number of crimes committed, not the crime rate (i.e. the number of crimes adjusted by the local population or the 'population at risk'). So the authors compare the survey respondents' perceptions in terms of total number of crimes to the crime per capita or crimes adjusted by the population at risk. If the survey respondents were not asked the question in terms of crime per capita, then it would be very surprising if their perceptions of raw crime did not exceed per capita crime (either adjusted for local population or local plus visiting population).

Still, in many cases, the per capita crimes decreased. Assuming resident populations did not fluctuate drastically, the analysis would still support the conclusions by Giacopassi et al. (2001), even considering the issue raised above. It appears that the public's perceptions of crime are worse than the reality.

In a complementary study to the one discussed immediately above, Giacopassi et al. (2000) explicitly focus on the effect of tourists in calculating the crime rate. They analyze the same casino communities as in their 2001 study, and note that the population-at-risk measure will necessarily lead to a lower estimated crime rate than use of the population measure (2000, p. 210). Still, in the communities they tested, they found mixed results for the effect of casinos on crime. In some markets the introduction of casinos was followed by increases in some crimes and decreases in others. The results did not change markedly when the population at risk was used instead. However, in the end, Giacopassi et al. (2000, p. 214–15) conclude: 'It appears the reluctance of researchers to include tourism and population-at-risk variables works to the detriment of achieving a fuller understanding of how crime varies within and across communities.'

Evans and Topoleski (2002)

This study examines crime and other effects of tribal casinos only. It is interesting because it is among the first of the crime studies to analyze county-level data. The

authors posit a panel data model for 1985 through 1998. However, because they wish to analyze the effects of tribal casinos only, Evans and Topoleski drop states that have commercial casinos. As a result, New Jersey, Illinois, Indiana, Missouri, Colorado, Indiana, Mississippi, Nevada and South Dakota are omitted from their analysis. What remains in their sample are states that have only tribal casinos. These tend to be relatively small properties, but this is certainly not always the case (e.g. Foxwoods and Mohegan Sun in Connecticut).

Evans and Topoleski (2002) use the FBI's Index crime data from the UCR. They are the first authors to analyze casinos and crime and also acknowledge the potential problems inherent in using the UCR data (p. 38). However, they explain that they delete observations from their model in cases for which a large fraction of the data is imputed. Still, it is unclear how the imprecise crime data affect their results.

Their estimated results indicate no change in crime in casino counties relative to non-casino counties, through three years after casino openings. However, four or more years after casino openings, they find a statistically significant increase in property crimes (4.4 percent of the median value of opening-year crime). The authors attribute this increase entirely to auto thefts and larceny. In explaining this result, they note: 'the greater concentration of people into small geographical areas generated by the casino opening is the most likely reason for the crime increase' (p. 42). Their results also indicate a statistically significant impact of casinos on violent crimes, but only in the fourth year after casino adoption, or later (ibid.). They suggest that this lag in the increase in crime may be due to the development of pathological gambling, but they neglect to discuss any of the theoretical or empirical literature that would support their claim. Still, that is perhaps as a good a guess as any as to why there might be a lag prior to the increase in crimes. As in some previous studies, Evans and Topoleski (2002) did not account for the visiting population when calculating the crime rate, so no conclusions can be drawn regarding the risk of crime faced by county residents or visitors.

One important contribution of this paper is that the authors explicitly compare the experience in tribal casinos with non-casino counties. This helps them to isolate the casino-specific effect. However, because the casino counties are designated only by dummy variables, there is no control in the model for other types of tourism that may exist in the casino or non-casino counties, nor is there any accounting for the size of the casinos or their volume. If casinos create crime, we would expect this effect to be sensitive to the level of casino activity. Yet this paper does not attempt to account for the size/volume of the casinos. Nor have other studies, for that matter.

As is obvious from other studies, the results of this study do not necessarily apply to casinos in other states, or to commercial casinos. Still, this study provides another piece of interesting information on the link between casinos and crime.

Stitt, Nichols and Giacopassi (2003)

In one of the more carefully designed studies of the relationship between casinos and crime, Stitt et al. (2003) examine the effects of casinos in six new casino jurisdictions, relative to six control communities. The control communities were not chosen randomly; rather, they were carefully selected by matching, as closely as possible, each casino community with a non-casino community similar on 15 different demographic variables (see

Stitt et al., 2003, pp. 262–3). The study is set up as a test of the routine activities and hot spot theories of crime, discussed above. The data used in this study appear to be the same basic data as used in their earlier studies (2000, 2001). For all communities used in the analysis, at least four years of data were available prior to and after the introduction of casino gambling (p. 260).[17] This is longer than in many of the studies previously reviewed.

The casino communities, along with their control communities are (with control community listed in parentheses): Sioux City, IA (Waterloo, IA), St Joseph, MO (Fort Smith, AR), Alton, IL (Rockford, IL), Peoria, IL (Rockford, IL), Biloxi, MS (Pensacola, FL), and St Louis, MO (Richmond, VA). Notably, Biloxi is the only city in the group which has more than one casino; it has nine.

The analysis in this paper is a simple comparison of crime rates in the casino communities with the rates in the control communities. The authors calculate the crime rates using both the resident population and the population at risk. The number of visitors to the casino communities was calculated by dividing the estimated direct tourism expenditures by the average amount of money spent per trip per visitor. The resulting figure estimates the number of annual visitors to a community. The authors acknowledge that this estimate is imperfect, but it may be the best measure available.

The results from their analysis are, in short, mixed. In some casino communities casinos have led to less crime, relative to the control communities (Sioux City and Alton). In other cities casinos exacerbate the crime problem (Peoria and Biloxi). In the two remaining communities, the results are mixed (St Joseph and St Louis). Based on the results of a Wilcoxon Rank Sum Test, the authors conclude:

> casinos do not have any systematic effect on crime with the possible exception of larceny, liquor violations, and possibly prostitution. However, when examining crime rates adjusted for the population at risk, even these crimes are not statistically different between the casino and control communities (Stitt et al., 2003, p. 280)

One caveat regarding the Stitt et al. (2003) paper is needed. The authors note that it is well known that 'no research has as yet been able to theoretically and empirically demonstrate that casinos are, indeed, different from other tourist attractions resulting in different incidence of crime' (p. 255). However, the authors are not clear in explaining the extent to which the control communities they utilized in their study also had tourism (i.e. non-casino tourism) in volumes similar to the casino communities they were compared to. In the explanation of factors considered in choosing the control communities, tourism is not listed as one of the criteria (pp. 262–3). For this reason, it is unclear whether the Stitt et al. analysis can distinguish between casino crime and tourism crime.

Another potential problem with this analysis is that, although the authors choose the control communities based on a number of demographic criteria, they do not employ regression analysis. They have not controlled for variables that may affect the crime rates in the casino or control communities. So we cannot really discern from this analysis the extent to which differences in crime rates between casino and control communities (positive or negative) can be attributed to casinos. Still, these authors have made a sincere attempt to design the study to isolate the marginal effect of casinos on crime by comparing crime rates in casino communities with those in control communities.

Finally, Stitt et al. (2003, p. 281) make an interesting point in noting that

> Biloxi is the only casino jurisdiction in the current study that has multiple (nine) casinos, and Biloxi draws by far the largest number of tourists of any of the communities examined. Similarly, it is the casino jurisdiction that, arguably, has experienced the greatest increase in crime. These facts are consistent with viewing casinos as hot spots and casino tourists as engaging in the type of routine activities that would lead to higher rates of crime.

This point suggests that perhaps the level of crime in casino communities will be sensitive to the amount of gambling or the number of casinos. This certainly makes sense, as a larger number of casinos, *ceteris paribus*, is likely to attract more tourists. More tourists may lead to more crime, according to the routine activities and hot spot theories of crime.

Betsinger (2005)

Although it was not peer reviewed, Betsinger (2005) is interesting because it raises many of the critical issues in analyzing the effect of casinos on crime. The study is comprehensive, in the sense that it analyzes the crime effects from various types of gambling, including riverboat casinos, land-based casinos, horse racing, greyhound racing and bingo halls. Betsinger performs a county-level analysis, including 144 counties in 31 states in the study (p. 25), from 1977 through 2001 (p. 23). In her overall analysis, which does not distinguish among different forms of gambling, Betsinger reports that increases in robbery, vehicle theft and overall crime rates were not significantly affected by the introduction of gambling (p. 74). Furthermore, assault and rape saw statistically significant decreases, but arson and larceny rates increased significantly as a result of legalized gambling.

When the different gambling industries were analyzed individually, Betsinger (2005, p. 75) also reported mixed results:

> 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 . . .

Several caveats are necessary. First, in the case of land-based and riverboat casinos, her observations are limited (21 land-based casino counties and only six riverboat counties). This precludes drawing strong conclusions or inferences from the analysis.

Betsinger (2005, p. 9) discusses the importance of using the population at risk in measuring the crime rate, noting that the failure to do so 'may encourage researchers to rush to policy recommendation without a full understanding of the problem'. However, Betsinger does not have the necessary county-level tourism data to measure the population at risk (p. 28). Another potential problem with the analysis is that Betsinger does not control for unemployment (p. 78), nor does she control for policing or venue security (p. 79), one of the critical control factors identified by Albanese (1985).

Nevertheless, Betsinger (2005) does make some valuable contributions to the literature by her attempt to control for the volume of gambling, which previous studies have ignored. Betsinger includes variables in her regressions for the numbers of slot machines, bingo seats etc. One other novel aspect of Betsinger's study is that she controls for

amenities that accompany casinos, such as hotel rooms, and has variables for hours of operation, free drinks and the presence of at least one bar. Unfortunately, she reports, these variables did not contribute much to the model (p. 76). Overall, although this study makes some important contributions to the casino–crime debate, its conclusions must be interpreted carefully.

Grinols and Mustard (2006)

Grinols and Mustard (2006) represents the most comprehensive study of the link between casinos and crime to date.[18] These authors examine county-level crime data in every US county from 1977 through 1996. Perhaps the only complaint one can have about the scope of this study is that it does not extend to later years. Nevertheless, this study improves upon most of the previous studies, covering more casino markets and a longer sample period than most previous studies.

The paper represents an important contribution because the authors utilize an econometric analysis of panel data, rather than simply calculating crime rates, or comparing crime rates before and after the introduction of casinos, as many predecessors did. Their analysis includes numerous control variables that account for potentially critical determinants of criminal activity; most of these have been ignored by previous researchers. The authors analyze the effect that the introduction of a casino has on the crime rate in the county between two years prior to casino introduction and five years after the introduction of casinos. Although the average crime rate is falling during the sample period in their study, their results indicate that crime rates fell less in casino counties than in non-casino counties. The casinos appear to increase crime beginning around four years after their introduction. This result is similar to that found by Evans and Topoleski (2002) in their study of tribal casinos. Grinols and Mustard conclude that approximately 8 percent of casino county crime can be attributed to casinos. All Index I crimes (except murder) are found to be exacerbated by casinos. They estimate the costs of casino crime to be around $75 per adult per year in the USA (pp. 28, 41).

As with other studies, there are limitations to this study too.[19] Most importantly, Grinols and Mustard do not adjust their county crime rates by tourists (i.e. they use the population, rather than the population at risk). As other researchers have shown, ignoring the visiting population will tend to overstate the crime rate as an indication of the risk of being victimized. However, Grinols and Mustard explain that the risk of being victimized is not their concern in their paper. Instead, they are interested in the 'costs to the host county associated with a change in crime from whatever source. We are therefore interested in the total effect of casinos on crime . . .' (p. 35). If one interprets the 'total effect of casinos' to mean the change in reported crimes, then they clearly show that the number of reported crimes increases after casinos are introduced. One can question the importance of this finding, however, since an increase in crime would be correlated with any large influx of tourists, casino-related or not. Unfortunately, their analysis does not allow them to truly distinguish between a 'casino' and 'tourism' effect on crime.[20]

Despite these issues, the Grinols and Mustard (2006) study is likely to be the benchmark for future studies. It does represent a significant improvement over previous studies. This is due to the scope of their study (this paper examines crime in all US counties for a relatively long sample period). In addition, their attempt to control for other

factors that might affect crime is the most comprehensive to date. Other researchers have already begun using the Grinols and Mustard framework for subsequent analyses.[21]

Barthe and Stitt (2007)

This study is an analysis of where crimes occur relative to casino locations in Reno, NV. The authors note that a sizable portion (22 percent) of Reno's reported crimes occur within 1000 feet of major casinos. (Around 40 percent of incidents within 1000 feet of all the casinos were attributed to the actual casino addresses.) Barthe and Stitt (2007) explore how the location of crimes can complicate the analysis of a casino–crime relationship.

When the authors divide Reno into three zones, the central zone being the downtown area containing the major casinos, they find a relatively high crime rate in the casino zone. In that zone, the crime rate is 103.52 per 1000 people; it is 19.4 at the zone next to the casino zone, and only 14.2 at the outer zone (Barthe and Stitt, 2007 p. 134). However, once the estimated tourist population is used in the calculation of the casino zone crime rate, it falls to 14.6, 'suggesting that from a potential victim's perspective, the downtown area may be safer than the surrounding, "casino-free" areas' (p. 134).

Although there is some other analysis presented by Barthe and Stitt (2007), perhaps the main contribution of this paper is an examination of and emphasis on where crimes take place. This issue relates to the 'casino-based' and 'community-based' issue raised in Curran and Scarpitti (1991). The paper also emphasizes how sensitive crime rates are to the tourist population. However, since the study examines only one market in one year (2003), and the analysis does not control for non-casino factors that may affect crime, its results cannot be assumed to be representative of a general case; nor does the study definitively explain the impact of casinos on Reno crime.

Barthe and Stitt (2009a, 2009b)

These papers represent an extension of the above paper. In the first study, Barthe and Stitt (2009a) examine police call data to ascertain whether calls to police were significantly different between casino and non-casino 'hot spots' in Reno, NV. They focused on the locations, timing and quantity of police calls in the two types of area. They conclude:

> crime hotspots near casinos do not appear to be very different (by crime type and temporal factors) from hotspots in other parts of the city. The biggest differences lie in casino hotspots generating more calls for drunken behaviors and larcenies . . . This research should reassure local officials and law enforcement agencies that the mere presence of casinos will not produce an inordinate amount of property or disorder crime within their jurisdiction. (Barthe and Stitt, 2009a, pp. 12, 13).

In the second study, Barthe and Stitt (2009b) focus on the timing of calls for police service. They are interested in determining whether there is a large difference in the timing pattern for police calls made near casinos versus elsewhere. We might expect a significant difference; given casinos are open 24 hours, perhaps casino-based criminal activity is likely to be more evenly distributed around the clock (p. 4).

As one can clearly see in the graphical depictions of police call timing, there appears

to be little significant difference between the volume of casino-zone and non-casino-zone calls at various times throughout the day (Barthe and Stitt, 2009b, pp. 7–10). Again in this paper, Barthe and Stitt (2009b, p. 13) argue that there is little evidence to support the contention by many researchers that casinos are 'different' than tourism, in terms of their effect on crime:

> While it has been consistently argued by many that casinos generate crime, this latest analysis is yet another empirical verification that casinos venues may not be all that different from non-casino environs in terms of crime prevalence and patterns. Barthe and Stitt (2007) provided evidence that casinos may not be deserving of the label 'hot spots' for crime. Then, Barthe and Stitt (2009a) further found that casino generated 'hot spots' were not very different from non-casino 'hot spots' in terms of criminogenic patterns. (Ibid.)

One potentially serious limitation with these analyses, as the authors acknowledge, is that police calls from casino premises may be understated if casino customers call in-house security rather than the local police (2008, p. 12). Furthermore, as this study examines only Reno, a well-developed casino jurisdiction, the results here may not apply to other casino markets. However, this study provides a valuable framework for subsequent analysis of casino-based versus community-based crimes.

Reece (2010)

The paper by Reece (2010) represents perhaps the most carefully crafted study on casinos and crime to date. Reece improves upon the Grinols and Mustard (2006) study and previous studies by accounting for several factors that had been neglected. This study is limited because it examines casinos and crime only in Indiana. However, it provides a good blueprint for future researchers to study other casino markets.

The major contribution of the Reece (2010) study is that it introduces control variables that have not been utilized in previous studies, usually because of data limitations. First, Reece controls for tourism by using the number of hotel rooms in the county as an explanatory variable in his model. Since hotels often follow new casinos, the number of hotel rooms in a county can proxy for tourism in the county. It may be the case that 'hotels' cause crime, rather than casinos. This variable will help to isolate the casino effect from a tourism effect. Second, Reece is one of few researchers to account for casino volume (using turnstile count) in studying the effects of casinos on crime. Most previous studies utilize only a dummy variable to indicate the presence of one or more casinos. But if casinos cause crime, then one would expect the volume of casino gambling to be an important explanation of the level of crime. Third, Reece includes a measure of enforcement in his analysis. This is critical because the economic model of crime (or the routine activities theory) suggests that, if there is a greater degree of law enforcement, it will raise the cost of committing crimes. His variables for enforcement include the aggregate arrest rate for violent crimes (p. 20).

Another important contribution of Reece's (2010) study is that it explains the potential concerns with some previous studies because they apparently did not deal with various problems with the UCR data. Reece's care with the data makes it likely that his analysis avoids some of the potential problems in other papers that have also used the UCR data (Reece, 2010, pp. 8–10).

Reece begins with the basic model posited by Grinols and Mustard (2006). He improves on it by including measures of casino activity, tourism volume and law enforcement. He first analyzes the growth of hotel rooms in casino counties. He finds that new hotel rooms follow the introduction of casinos into counties, and that these hotel rooms 'seem to reduce the levels of larceny and motor vehicle theft' (p. 24). He continues, discussing casinos and crime:

> I find very limited support for the proposition that new casinos increase local crime rates. Opening new casinos appears to increase the number of burglaries in the county after a lag of a few years. Opening new casinos appears, however, to reduce the number of motor vehicle thefts and aggravated assaults. Increased casino activity, measured using turnstile count of casino patrons, seems to reduce rates of larceny, motor vehicle theft, aggravated assault, and robbery. These results do not match those of earlier studies that show large increases in a broad range of local crime rates after opening new casinos. (Ibid.)

Reece points out that the significance of the turnstile count in his model suggests that 'leaving out a measure of casino activity when estimating the effect of casinos on crime is a serious specification error' (p. 25). The same argument applies to the hotel room variable. Finally, although Reece tests the effect of enforcement, his results are insignificant in explaining crime (p. 21).

The results from this study emphasize the importance of accounting for tourism, casino volume and law enforcement. Although previous researchers have discussed these issues, Reece is the first to effectively control for them all in an analysis of casinos and crime. As Reece notes (2010, p. 24), his results are based solely on Indiana data, and cannot be generalized. Of course, there are other potential problems in this analysis, but Reece's study does introduce a number of critical improvements to the analysis of casinos and crime.

Summary of 'Recent' Studies

Several things stand out from a comparison of the 'early' studies with the 'recent' ones. The first thing to notice is that the quality of the analyses has, generally, drastically improved. While early studies had relatively few markets to study, were plagued by data limitations, and often relied on simple comparisons of crime statistics, the more recent studies have generally exhibited higher-quality analyses that relied on more complete data, larger markets and econometric analysis. Table 19.3 summarizes the findings of the more recent studies on casinos and crime. As with the early studies, one thing that stands out is that how the researcher deals with tourists – in measuring the crime rate – appears to have a considerable effect on the results. Often, when tourism is accounted for in the model, the crime effect of casinos is diminished or it disappears entirely.

UNRESOLVED ISSUES

As the casino industry has spread across the USA, so has researcher interest in understanding the economic effects of casinos. Still, there are many unresolved questions. Even with the large amount of research examining the relationship between casinos and crime,

Table 19.3 Casino–crime rate studies, 2001–2009

Study	State/region studied	Years analyzed	Year casinos opened	Casinos increase crime rate?	Population adjusted for visitors?
Gazel et al. (2001)	Wisconsin	1981–94	(Tribal)	Yes	No
Wilson (2001)	Indiana	1992–97	1995	No	No
Evans and Topoleski (2002)	National (tribal only)	1985–1989	(various)	Yes	No
Stitt et al. (2003)	Various	1980s–90s	(various)	Mixed	Yes
Betsinger (2005)	144 counties in 33 states	1977–2001	(various)	Mixed	No
Grinols and Mustard (2006)	All US counties	1977–1996	(various)	Yes	No
Barthe and Stitt (2007, 2008, 2009)	Reno, NV	2003	1937	No	Yes
Reece (2009)	Indiana	1994–2004	1995	No	Yes

little is known. In this section I summarize some of the most important, yet unresolved, issues that cloud our understanding of the relationship between casinos and crime.

First, one thing is clear from the research. When casinos are introduced into a city or region, they will attract tourists. And with a larger population of potential criminals and victims, there will be more crime incidents. This is a straightforward implication of routine activities theory, and every study has shown that. But what is more interesting is whether the introduction of a casino actually makes the area less safe. Hence most authors have argued that using a crime rate where the population is measured as the 'population at risk' (i.e. resident population plus tourists) is the relevant one. Unfortunately, visitor data are often difficult to acquire. But most studies that calculate the crime rate using both the resident population and the resident plus tourist population show the adjustment to make a significant difference in the results. Typically, when tourists are considered in the crime rate, any effect of casinos on crime diminishes or disappears. Still, more evidence is needed.

Tarlow (2006, p. 102) provides an insightful discussion on casino tourism and crime, explaining:

> it is hard or impossible to distinguish between crimes based on the social impacts of tourism versus those based on the social impact of casinos. The lack of clear definitions and imprecise data often means that the researcher can find almost any conclusion about which he/she is desirous. The tautological bias in most of these studies should be recognized.

Indeed, Tarlow discusses the problems associated with determining who is being victimized (residents or tourists), how to distinguish where casino districts end, and what types of crimes can be attributed to the impacts of casinos.

Curran and Scarpitti (1991) raise the issue of casino-based versus community-based crimes, and Barthe and Stitt (2007, 2009a, 2009b) provide a related empirical analysis on the location of criminal offenses. However, no researcher has provided an in-depth analysis of how casinos may affect the distribution of crime offenses. This question also

plays into the 'what are we trying to measure?' issue. Presumably, most researchers are interested in measuring how casinos affect safety. But if the concern is for the costs of enforcement, then other measures may be more relevant.

A third issue that deserves increased attention is the identity of the victims – resident or tourist. Just as the location of committed crimes can be useful for tailoring the analysis to the question at hand, the home addresses (city or zip code, not necessarily street address) of the criminals and victims may also be useful. Everyone agrees that the number of crimes will increase when casinos enter a market, simply because more people are coming into the area. But no one knows if the increase in criminal activity is due to new criminals coming in, new victims coming in, or – most likely – a combination of changes among resident and visiting criminals and victims. Unfortunately, data on victim category (resident or tourist) as well as criminal category would be very difficult, if not impossible, to collect on any sufficient scale.

A fourth issue to consider is the differentiation among types of casinos. In some markets riverboat casinos are the only type allowed; other states have both land-based and riverboat casinos. It is conceivable that these different types of casino have different effects on crime. Similarly, there may be differences in how tribal and commercial casinos affect crime. Yet few studies have addressed these issues rigorously.

CONCLUSION

It seems clear that crimes in casino jurisdictions will increase as tourists are drawn to casinos. Very little is understood as to whether it is the casino *per se* or tourism that is the cause of increased crime. Similarly, little is known about whether casino jurisdictions are safer or less safe than non-casino or non-tourist jurisdictions. As more data from more jurisdictions become available, we may hope that researchers will design better studies to take these issues into consideration. The study by Reece (2010) is a good step. Reece attempted to account for casino activity (through turnstile count), the increase in tourism (through hotel rooms), and for law enforcement changes. The inclusion of these variables goes a long way in satisfying the necessary considerations for effectively measuring the effects of casinos on crime outlined by Albanese (1985). When these factors are considered, Reece found little evidence of a positive relationship between casinos and crime. However, his results are limited to casinos in Indiana, and there is no reason to expect that that experience will necessarily be the same as in other casino markets.

The issues discussed in this chapter outline numerous opportunities for researchers to improve our understanding of how casinos and crime are linked. More work is needed to understand both the general economic relationship between casinos and crime and the individual-level analysis of problem gamblers' propensities to commit crimes. Quality data that would enable the testing of important hypotheses are difficult to find. However, as more jurisdictions have longer-term experiences with casinos, researchers should find it easier to come to some stronger conclusions on the relationship between casinos and crime. Currently, the evidence is mixed. Some studies suggest that casinos cause crime, while others argue that it is more likely a tourism effect. More research is needed. A better understanding of these issues will have important economic, sociological and political implications, as legislators continue to consider legalized casinos as a way to deal with ongoing fiscal crises.

NOTES

* I thank David Mustard for helpful comments and the other participants of the Critical Issues Symposium held at Florida State Unoversity in March 2009. Participants of the 14th International Conference on Gambling and Risk-Taking, in May 2009, also provided helpful feedback.

1. Albanese (1985) discusses the issue of organized crime in examining crime in Atlantic City shortly after casinos were introduced there. He discusses several government studies that concluded that organized crime was not really an important issue with commercial casinos, even as far back as the late 1970s. See Albanese (1985, p. 40). Niño Fidance (2009) contends that the mob never controlled the Las Vegas regulatory institutions, although it may have controlled some individual casinos. Still, even as late as 1996, a majority of Americans 'agreed with the statement that legalized gambling 'opens the door to organized crime' (Giacopassi et al., 2001, p. 152).
2. Of course, a number of studies on casinos and crime have not been unpublished, or were written as reports for industry, state or special interest organizations. These papers are not focused on here because they have not, in general, undergone a rigorous peer review process.
3. The diagnosis of pathological gambling has its own branch in the gambling literature. Several competing diagnostic instruments are used by psychologists to identify potential pathological gamblers.
4. There is an enormous literature on the diagnosis and treatment of pathological gambling. This topic is the focus of most of the articles published in the *Journal of Gambling Studies* and *International Gambling Studies*. See these sources for more information on problem gambling behaviors.

   Although the issue of 'rational addiction' (Becker and Murphy, 1988) has been discussed in the context of pathological gambling (i.e. Mobilia, 1993; Walker and Barnett, 1999), researchers in this area – mostly psychologists and sociologists – are openly hostile towards a rational addiction approach to gambling problems.

   Surprisingly, there is relatively little research on the extent to which pathological gamblers engage in criminal activities. Much of the research in this area is limited to surveys of Gamblers Anonymous members. One recent study that relies on a representative survey of 6145 young adults in the USA has shown that individuals who have lost more money gambling are significantly more likely than others to engage in criminal behavior. Interestingly, these results do not apply to lottery or casino game players. Types of gambling that did have a significant impact on the propensity to commit crimes include cards, horse racing, and betting on sporting events (Clark and Walker, 2009).
5. Grinols and Mustard (2006, pp. 31–2) discuss some of the different mechanisms through which casinos may affect crime.
6. It is beyond the scope of this review to discuss the issues surrounding the choice of crime variable, i.e. reported offenses versus arrests. Those issues have been extensively discussed in the literature.
7. The term 'visitors' follows Grinols and Mustard (2006). Alternatively, this has been termed 'strangers' (Jarrell and Howsen, 1990), or, more commonly, simply 'tourists'.
8. The cut-off at 2000 for 'early' is arbitrary, but I think empirical research began to increase in quality around that time.
9. Post (2008) reports that Ochrym was recently appointed to the NY Racing and Wagering board.
10. One could argue that there would have been a large inflow of labor and capital with the building of the casinos. However, it is unlikely that this would be similar to the tourism effect which Ochrym claims to be measuring.
11. Ochrym (1990) uses the residential population in calculating the crime rates.
12. This calculation would assume that all visitors are casino patrons and are the victims of the crimes.
13. For a concise version of this research, see Thompson et al. (1997).
14. In some models they analyze non-index arrests, rather than reported crimes; those data were available from 1985 to 1994 (Gazel et al., 2001, p. 68).
15. In some of the models they also include dummies for counties that border either a single casino county or two or more casino counties, finding that casinos contribute to neighboring county crime.
16. Regressing crime rates on a constant term and a group dummy indicating the presence of legalized gambling in the county is strictly equivalent to conducting a simple means difference test to assess whether crime rates differ significantly between counties that allow gambling and counties that do not. There is a vast statistical literature indicating that simply because means differ by some categorical variable, there is no implication that they differ because of that variable. In this case, just because crime rates are higher in gambling counties does not mean that they are higher because of gambling. Indeed, the change in crime rates could result simply from the tourism the casino counties experienced.
17. This yields at least eight years of data for each city. However, the specific time periods analyzed are not disclosed. Casinos were introduced in each of the jurisdictions in the early 1990s.

18. Earlier versions of this paper, dating back to 1999, have been discussed in several of the other papers reviewed here (e.g. Betsinger, 2005).
19. These issues and several others are debated in an exchange between the author and Grinols and Mustard, published in *Econ Journal Watch* in 2008. See Walker (2008a, 2008b) and Grinols and Mustard (2008a, 2008b).
20. In a follow-up study (Grinols et al., 2009) find that National Park visitors have no effect on local crime rates. Such visitors are likely quite different from casino visitors, and they suggest that the type of visitor is important for determining the crime effect of casino visitors. One would expect, for example, that National Park visitors may include a relatively large proportion of children relative to casino visitors.
21. Such analyses (e.g. Reece, 2010) are not limited to crime. For example, Cotti (2008) uses a county-level analysis based on Grinols and Mustard's to analyze the employment effects of casinos. He finds that casinos increase employment, on net, and tend to stimulate wages, which is likely to result in economic growth. This finding has implications about the crime effects of casinos. However, employment effects are beyond the scope of this chapter.

REFERENCES

Albanese, J. (1985), 'The effect of casino gambling on crime', *Federal Probation*, **48**, 39–44.

American Gaming Association (2008), *2008 State of the States: The AGA Survey of Casino Entertainment*, Washington, DC: AGA.

Barthe, E. and B. Stitt (2007), 'Casinos as "hot spots" and the generation of crime', *Journal of Crime & Justice*, **30** (2), 115–40.

Barthe, E. and B. Stitt (2009a), 'Impact of casinos on criminogenic patterns', *Police Practice and Research*, **10** (3), 255–69.

Barthe, E. and B. Stitt (2009b), 'Temporal distributions of crime and disorder in casino and non-casino zones' *Journal of Gambling Studies*, **25** (2), 139–52.

Becker, G. (1968), 'Crime and punishment: an economic approach', *Journal of Political Economy*, **76** (2), 169–217.

Becker, G. and K. Murphy (1988), 'A theory of rational addiction', *Journal of Political Economy*, **96** (3), 675–700.

Betsinger, S. (2005), 'The relationship between gambling and county-level crime', University of Maryland thesis.

Buck, A., S. Hakim and U. Spiegel (1991), 'Casinos, crime, and real estate values: do they relate?' *Journal of Research in Crime and Delinquency*, **28** (3), 288–303.

Calcagno, P., D. Walker and J. Jackson (2010), 'Determinants of the probability and timing of commercial casino legalization in the US', *Public Choice*, **142** (1–2), 69–90.

Chang, S. (1996), 'The impact of casinos on crime: the case of Biloxi, Mississippi', *Journal of Criminal Justice*, **24** (5), 431–6.

Clark, C. and D. Walker (2009), 'Are gamblers more likely to commit crimes? An empirical analysis of a nationally representative survey of US young adults', *International Gambling Studies*, **9** (2), 119–34.

Cohen, L. and M. Felson (1979), 'Social change and crime rate trends: a routine activity approach', *American Sociological Review*, **44**, 588–608.

Cotti, C. (2008), 'The effect of casinos on local labor markets: a county level analysis', *Journal of Gambling Business and Economics*, **2** (2), 17–41.

Curran, D. and F. Scarpitti (1991), 'Crime in Atlantic City: do casinos make a difference?', *Deviant Behavior*, **12**, 431–49.

Evans, W. and J. Topoleski (2002), 'The social and economic impact of Native American casinos', NBER Working Paper 9198. Cambridge, MA: NBER.

Friedman, J., S. Hakim and J. Weinblatt (1989), 'Casino gambling as a "growth pole" strategy and its effects on crime', *Journal of Regional Science*, **29** (4), 615–23.

Gazel, R., D. Rickman and W. Thompson (2001), 'Casino gambling and crime: a panel study of Wisconsin counties', *Managerial and Decision Economics*, **22** (1–3), 65–75.

General Accounting Office (GAO) (2000), 'Impact of gambling: economic effects more measurable than social effects', Washington, DC: US General Accounting Office.

Giacopassi, D. and B. Stitt (1993), 'Assessing the impact of casino gambling on crime in Mississippi', *American Journal of Criminal Justice*, **18** (1), 117–31.

Giacopassi, D., B. Stitt and M. Nichols (2000), 'Including tourists in crime rate calculations for new casino jurisdictions: what difference does it make?' *American Journal of Criminal Justice*, **24** (2), 203–15.

Giacopassi, D., B. Stitt and M. Nichols (2001), 'Community perception of casino gambling's effect on crime in new gambling jurisdictions', *The Justice Professional*, **14**, 151–70.
Grinols, E. and D. Mustard (2006), 'Casinos, crime, and community costs', *Review of Economics and Statistics*, **88** (1), 28–48.
Grinols, E. and D. Mustard (2008a), 'Correctly critiquing casino–crime causality', *Econ Journal Watch*, **5** (1), 21–31.
Grinols, E. and D. Mustard (2008b), 'Connecting casinos and crime: more corrections of Walker', *Econ Journal Watch*, **5** (2), 156–62.
Grinols, E., D. Mustard and M. Staha (2009), 'How do visitors affect crime?' Working paper.
Hakim, S. and A. Buck (1989), 'Do casinos enhance crime?' *Journal of Criminal Justice*, **17** (5), 409–16.
Hales, R., S. Yudofsky and G. Gabbard (2008), *Textbook of Psychiatry*, 5th edn, Arlington, VA: American Psychiatric Publishing.
Jarrell, S. and R. Howsen (1990), 'Transient crowding and crime', *American Journal of Economics and Sociology*, **49** (4), 483–94.
Miller, W. and M. Schwartz (1998), 'Casino gambling and street crime', *Annals of the American Academy of Political & Social Science*, **556**, 124–37.
Mobilia, P. (1993), 'Gambling as a rational addiction', *Journal of Gambling Studies*, **9** (2), 121–51.
National Gambling Impact Study Commission (NGISC) (1999), *Final Report*, Washington, DC: NGISC.
National Indian Gaming Commission (NIGC) (2008), 'NIGC announces 2007 Indian Gaming Revenues', press release Washington, DC, available online at http://www.nigc.gov/ReadingRoom/PressReleases/PressReleasesMain/PR93062008/tabid/841/Default.aspx.
Niño Fidance, L. (2009), 'The mob *never* ran Vegas', *Gaming Law Review and Economics*, **13** (1), 27–40.
Ochrym, R. (1990), 'Street crime, tourism, and casinos: an empirical comparison', *Journal of Gambling Studies*, **6** (2), 127–38.
Post, P. (2008), 'Ochrym named to N.Y. Racing and Wagering Board', *Thoroughbred Times*, (23 December).
Reece, W. (2010), 'Casinos, hotels, and crime', *Contemporary Economic Policy*, DOI: 10.1111/j.1465-7287.2009.00172.x.
Sherman, L., P. Gartin and M. Buerger (1989), 'Hot spots of predatory crime: routine activities and the criminology of place', *Criminology*, **27**, 27–55.
Stitt, B., M. Nichols and D. Giacopassi (2003), 'Does the presence of casinos increase crime? An examination of casino and control communities', *Crime & Delinquency*, **49** (2), 253–84.
Stokowski, P. (1996), 'Crime patterns and gaming development in rural Colorado', *Journal of Travel Research*, **34** (3), 63–9.
Tarlow, P. (2006), 'Crime and tourism', in J. Wilks, D. Pendergast and P. Leggat (eds), *Tourism in Turbulent Times: Towards Safe Experiences for Visitors*, Boston, MA: Elsevier, pp. 93–105.
Thompson, W., R. Gazel and D. Rickman (1997), 'Social and legal costs of compulsive gambling', *Gaming Law Review*, **1**, 81–9.
Walker, D. (2007), *The Economics of Casino Gambling*, New York: Springer.
Walker, D. (2008a), 'Do casinos really cause crime?' *Econ Journal Watch*, **5** (1), 4–20.
Walker, D. (2008b), 'The diluted economics of casinos and crime: a rejoinder to Grinols and Mustard's reply', *Econ Journal Watch*, **5** (2), 148–55.
Walker, D. and A. Barnett (1999), 'The social costs of gambling: an economic perspective', *Journal of Gambling Studies*, **15** (3), 181–212.
Wilson, J. (2001), 'Riverboat gambling and crime in Indiana: an empirical investigation', *Crime & Delinquency*, **47** (4), 610–40.