

The Economics of Casino Gambling

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Casino gaming has been a growth industry in the United States over the past three decades. The number of states permitting some form of casino gaming climbed from only one as recently as 1978 to approximately 27 by the end of the 1990s, and casinos could be found in destination resorts, in former mining towns, on riverboats, in urban or suburban settings, and on Indian reserves. In 1970, when casinos were legal only in Nevada, gross gaming revenues -- the net amount of money won by casinos from all customers -- was \$540 million; in 1997, it had grown to more than \$25 billion (Christiansen, 1998). The economic success of casino gaming has been reflected in the rapid growth of Nevada, which was among the three fastest growing states in the United States for each of the last four decades of the 20th century. Nevada's major city, Las Vegas, was one of the five fastest growing metropolitan areas in the country in each decade over the same period.

This recent expansion of casino gambling and commercial gaming is striking, and is illustrated in Table 1. It reflects the growing popularity of an activity that has long been condemned or at least frowned upon as being either a waste of time and resources, or a potential cancer on the fabric of society (Goodman, 1995). However, gambling and especially casino gaming have remained controversial. In 1996, motivated by pressure from anti-gambling groups as well as more general concerns, Congress mandated the National Gambling Impact Study Commission -- with members including representatives from the casino industry, gaming regulators, labor unions, and Christian groups, among others -- whose charge was to investigate the social and economic implications of gambling on society.¹

**GROSS REVENUES BY SECTOR#
U.S. COMMERCIAL GAMING
INDUSTRIES, 1982 AND 1997
(\$millions, 1997
dollars)**

SECTOR	1982	1997	Average Growth Rate
Parimutuel*	\$4,644	\$3,811	-1.31%
Lotteries**	\$3,609	\$16,567	10.69%
Casinos‡	\$6,985	\$20,528	7.45%
Bookmaking	\$43	\$96	5.46%
Card rooms	\$83	\$700	15.26%
Bingo, Charitable	\$1,956	\$2,430	1.46%
Indian gaming	\$0	\$6,678	not meaningful
TOTAL	\$17,321	\$50,899	7.45%

Revenues retained by operators after payment of prizes

* includes horse racing, dog racing and jai alai

** includes video lottery terminals

‡ excludes Indian casinos, but includes non-casino devices

Source: Christiansen (1998), p. 11.

The purpose of this paper is to examine the major changes that have developed in the casino and gaming industries over the past 40 years, to lay out some of the economic principles that have shaped the development of permitted gaming, to discuss the public policy directions and controversies that have evolved with the expansion of legal gambling, and to provide some insight into the future directions of such gambling.

A Brief History of the Spread of Casinos in North America Since 1960

In the early 1960s, commercial gaming in the United States was at a low ebb. Lotteries had been prohibited throughout the country since before the turn of the century (Clotfelter and Cook, 1989). Casinos, off-track betting, bookmaking and sports wagering were illegal everywhere except Nevada.² The only major forms of permitted gambling were bingo and horse racing. Bingo was typically offered by churches and fraternal organizations, justifying itself as a soft form of gambling that provided socialization opportunities and raised money for good causes. With racing, one could make legal wagers only at race tracks with live racing in about 30 states. Even social gambling, like a poker game around the kitchen table, was illegal in many states (Ciaffone, 1991).

Nevada, which had authorized casinos and other forms of gambling in 1931, was under siege from organized crime fighters from the Attorney General's office, the Justice Department, Congressional Committees, and the FBI in the 1950s and early 1960s. There was strong sentiment that Nevada had violated an implicit moral code against gambling to which all the other states had adhered, thus creating a safe haven for professional gamblers and casino operators who -- in the eyes of critics -- could only bring harm to society.³ Prior to the 1970s, the casino industry in Nevada could be characterized as a "pariah" industry (Skolnick, 1978). Though the industry was distinguished by high profits and economies of scale, it lacked access to mainstream sources of financial capital through either debt or equity markets, and therefore had to rely on creative, sometimes questionable, sources of financing in order to expand (Brill, 1978). Journalistic exposés of the day discussed in lurid detail corrupt and sensational events that surrounded the history of casinos in Las Vegas, and ties to various identified criminals and organizations (Reid and Demaris, 1963).

The legal climate for American casinos began to shift in the 1970s. In 1969, Nevada passed

the Corporate Gaming Act, permitting publicly traded corporations to hold gambling licenses for the first time (Eadington, 1982). Within a few years, corporations with established reputations in other industries -- such as Hilton, MGM, Holiday Inns, and Ramada -- had entered the casino industry in Nevada.

In 1976, New Jersey's voters authorized casino gaming in Atlantic City, making it the second state with legal casinos. By the mid-1980s, the number of casinos operating in Atlantic City increased to twelve, and the volume of business -- as measured by gaming winnings by operators -- briefly eclipsed that of Las Vegas. By calendar year 1998, however, Las Vegas had regained the lead with gaming revenues of \$5.5 billion compared to Atlantic City's \$4 billion.

New Jersey took a different approach than Nevada to shaping its casino industry. Casino operations in Atlantic City had to be built to specific size and space allocation criteria, which limited potential investors to those organizations that could raise the requisite financial capital, and indicated from the outset that the industry would develop as an oligopoly. In contrast, Nevada has had few barriers to entry into its casino industry. Nonetheless, economies of scale and scope pushed the major Nevada casino markets in Las Vegas and Reno toward oligopolistic status as well, even though the state's major tourism areas continue to have large numbers of far less significant smaller casinos. In fiscal 1998, for example, Las Vegas had 78 unrestricted casino licenses, generating total revenues of \$9.1 billion, gaming revenues of \$4.9 billion and net income before federal income tax of \$860 million. However, the largest 21 Las Vegas Strip casinos accounted for 73 percent of these total revenues, 69 percent of gaming revenues, and 98 percent of profits (State Gaming Control Board, 1998).

A number of serious efforts were made to legalize casinos in other states between 1978 and 1988, including in Florida, New York, Colorado, Minnesota, Ohio, Pennsylvania, and Massachusetts, among others. Some of these efforts used the initiative or referendum process, while others tried legislative action, but all the campaigns fell short (Dombrink and Thompson, 1990). However,

beginning in late 1988, three events set the stage for the rapid expansion of casinos and casino-style gaming. In October, Congress passed the Indian Gaming Regulatory Act that defined the relationship of states to tribes in regulating Indian gaming within their borders (Eadington, 1990). In November, South Dakota voters authorized limited stakes gambling in the declining former mining town of Deadwood, South Dakota. And in March 1989, the Iowa legislature authorized limited stakes casino gaming on riverboats on that state's waterways.

Over the next decade, casinos spread rapidly in response to these catalysts. Small stakes casinos were authorized by initiative in three rural mining communities in the mountains of Colorado in 1990 (Stokowski, 1996). Riverboat casinos were legalized in the states of Illinois, Mississippi, Louisiana, Missouri and Indiana between 1990 and 1993. Indian casinos opened in over 20 states between 1990 and 1997 (U.S. General Accounting Office, 1997). The cities of New Orleans (in 1992) and Detroit (in 1996) authorized land-based urban casinos; the resulting New Orleans monopoly casino went bankrupt in 1995 but was scheduled to re-open in 1999, and the three permitted Detroit casinos had not yet opened by mid-1999.

Commercial gaming also expanded in the 1980s and 1990s with the legalization of slot machines or other electronic gaming devices outside of casinos. Race tracks in Iowa, Delaware, Rhode Island, West Virginia, New Mexico and Louisiana commenced operations of electronic gaming at their facilities in the 1990s. Video poker machines appeared in bars and taverns or arcades in Montana, Louisiana and South Carolina. Under the guise of the state lottery, video lottery terminals -- typically video poker machines without coin output -- were introduced in Oregon and South Dakota. Race tracks and other businesses in various other states lobbied for permission to offer slot machines on their premises as well.

A number of factors contributed to the spread of casinos and casino-style gaming in the 1990s. The general apprehension about casino gaming that had dominated public attitudes in the United States

gave way to greater public acceptance of gambling as a form of recreational activity, with corresponding changes in legal restrictions on gambling (Harrah's, 1997). As the ownership structure shifted to publicly traded corporations, the historic stigma that had long linked casino gaming to organized crime diminished considerably (Johnston, 1992). There was also a strong cross-border effect in the legalization process. When residents of one state where casinos were prohibited would travel to another state to partake in casino gaming, this export of spending, jobs and tax revenues encouraged states that were adjacent to those with permitted casinos to consider legalization. This was particularly the case with the various riverboat gaming jurisdictions.⁴

The expansion of casino gaming in the United States has close parallels in other countries. Casinos had been prohibited in the United Kingdom until the 1968 Gaming Act provided a new legal basis for them (Kent-Lemon, 1984). Casinos in Australia were illegal until 1972, when enabling legislation at the state level authorized a single casino in Tasmania (Mossenson, 1991). In Canada, charitable casinos first appeared in western provinces in the late 1970s, when temporary casinos allowing small stakes betting to raise money for nonprofit enterprises were permitted at the annual summer exhibitions such as the Calgary Stampede and Edmonton's Klondike Days. Over time, the charitable casinos became less temporary, constraining regulations were relaxed, and regulatory authorities were established at the provincial level, thus paving the way for more substantial casinos in the 1990s (Campbell, 1994).⁵

Price and Pricing in the Casino Industry

In the United States, casinos generate the greatest proportion of their gaming revenues from slot machines and other gaming devices. In 1998, 65.3 percent of Nevada's gaming revenues came from

slot machines and 30.6 percent from table games. In Atlantic City, 1998 slot machine win was 70.1 percent, and in Colorado (with \$5 wagering limits), 94.5 percent was won by slot machines in 1998. This is a dramatic change over the past two decades. In 1980, for example, Nevada's table games accounted for 55.6 percent of the total gaming win.

The most popular casino table games are the traditional European games of blackjack, craps, roulette, and baccarat. There are a few new casino games that have emerged in the past two decades, mainly card game variants of stud poker such as pai gow poker, Caribbean stud, three card poker, and Let It Ride. Pai gow, sic bo, and keno are all minor games that have Chinese origins. Pai gow is played with dominos, sic bo is played with three dice, and keno is a variant of the Lotto game offered by most state lotteries. For a full description of casino games and their strategies, see Vancura (1996).

The total amount of money wagered, which is the product of the average size of wager and the number of wagers made, is known in the gambling trade as the "handle." The actual amount of money lost by the player, or retained by the operator, is referred to as the "win." The actual win can be positive or negative at any particular (short term) gambling session. However, the house advantage is the price a customer pays on average to make, say, a \$1 wager, and it prevails in the long term.⁶

For most casino games, the house advantage can be measured with a probability analysis of the game, sometimes in combination with the strategies being used by the customer. Many casino games and gaming devices can be categorized as fixed odds games, where -- because of the physical, mechanical or electronic methods used in determining the outcomes, along with the payout schedules -- the player cannot alter the house advantage of specific wagers. Thus, in the long run, the players as a group will lose a fixed percentage of the handle. Games that involve betting on the turn of a wheel like roulette and wheel of fortune, or betting on throws of dice like craps or sic bo, and sometimes betting on hands of cards that are dealt like baccarat meet this description. Slot machines -- at least those

without progressive jackpots -- are also fixed odds wagers betting against an electronically or mechanically determined outcome.

Games that use progressive payouts -- where, for example, the jackpot prize increases as long as there is no winner -- have house advantages that change as the size of the prize changes. Progressive payouts are used as enhancements with slot machines, lottery-style games such as keno, and side bets at some minor casino table games such as Caribbean Stud and Let It Ride. Of course, progressive payouts are also a major characteristic of popular lottery games such as Lotto (Clotfelter and Cook, 1989).

Some casino games have elements of strategy, which implies that players can influence the house advantage through their strategic decisions on size of wager or on the play of the game. Blackjack, pai gow, pai gow poker, and Caribbean stud are all examples of table games with some strategic dimensions. Video poker and its variants are examples of electronic gaming devices with strategic dimensions, in the sense that the player can either make choices in the course of playing the game or vary the amount of the bet when underlying conditions change. These would be classified as games of mixed chance and skill (Vancura, 1996).

All of the above are so-called "banked" games, where the customer is gaming against the casino. Contests between players -- such as poker in casinos or card clubs, or pari-mutuel wagering at race tracks -- are so-called "percentage" games. In such games, the operator of the contest will typically charge a commission on the handle or the winnings, extract a percentage of the handle, or charge a fee per hand or a seat-rental fee based on time at the game.⁷

Table 2 presents statistical properties of some of these games. The first column shows the house advantage; that is, the percentage the house takes out of a dollar bet on average. The second column shows the standard deviation of a single wager (the square root of the average squared

deviation of all possible outcomes from the house advantage). The third column shows the standard deviation of the actual aggregate outcome of 1,000 one unit wagers made at the game. The fourth column expresses the standard deviation of the actual outcome of 1,000 one unit wagers as a percentage of the handle, and thus notes the percentage deviation from the house advantage that can be expected.

TABLE 2
STATISTICAL PROPERTIES OF SELECT CASINO
GAMES AND DEVICES
ASSUMING AN INITIAL WAGER OF 1 UNIT

GAME	House Advantage#	Standard Deviation (one wager)#	Standard Deviation (1,000 wagers)#	Standard Deviation (House Advantage after 1,000 wagers)#
Craps*	1.41%	1.0	31.6	3.16%
Blackjack †	0.50%	1.1	34.8	3.48%
Roulette (American) ††	5.26%	5.7	179.8	17.98%
Roulette (European) ††	2.70%	5.8	182.1	18.21%
Baccarat*	1.25%	1.0	31.6	3.16%
Pai Gow Poker †	2.50%	1.0	31.6	3.16%
Video Poker †,‡	2%	2.3	73.7	7.37%
Slot Machines ‡	5%	10.6	335.2	33.52%
Keno.	28%	42.3	1,336.3	133.63%

* Standard wager

** Assumes the player makes the same one unit wager 1,000 times.

† Assumes the player plays optimal strategy with typical house rules

†† Single number wagers

Approximate

‡ typical

The following illustration allows for an interpretation of these statistics. After 1,000 standard craps “pass line” bets (that is, betting the dice shooter will win), a player on average would be behind by 14 units (1.4 percent of the handle), with a standard deviation of 31.6 units (3.16 percent of the handle). Furthermore, because of the Central Limit Theorem, the aggregate outcome and mean of this game can be approximated by a normal distribution at this volume of play (Epstein, 1967).⁸ Based on this approximation, there is a 95.5 percent chance that after 1000 plays, the player's actual performance will be somewhere between 49 units ahead of the game and 77 units behind (that is, the expected loss of 14 units plus or minus two standard deviations). The probability the player would be ahead at this point would be approximately 33 percent.

Various theories of gambling have been put forward. One view is that gambling is an example of

socially unproductive profit seeking, because players whose predominant motivation for gambling is to increase their economic well-being are wasting their time due to the reality that, in the long run, they must lose (Grinols and Omorov, 1997). This is not too different than the 19th century argument put forward by Thorstein Veblen (1899), who posited that gambling makes people superstitious because they try to impute causality into events of pure chance. Because of that, a greater presence of gambling makes society (in the aggregate) "stupid" and reduces industrial efficiency because the prevalence of irrational thinking undermines the understanding of the cause-effect relationships that underlie production processes.

Alternatively, one can view consumers of gambling services as rational economic actors, who are typically purchasing a commodity that offers entertainment and excitement, as well as some hope of acquiring a higher level of income and wealth, in spite of the games' negative expected monetary value. Within the context of the modern casino, one can argue that the customer is purchasing a package of entertainment amenities centered on casino gaming activities. Indeed, in competitive destination resort casino markets -- such as Las Vegas, Atlantic City, and Mississippi -- casinos use loss leader or cross-subsidizing pricing strategies in restaurant, accommodation, parking, and entertainment offerings with the intent of inducing such customers to gamble in their facilities. A variant of this approach is complementaries or "comps" -- goods and services provided for free to customers who meet certain minimum betting requirements (Gilmore, 1998).

A variety of examples of price discounting of casino games have been introduced into specific niche markets in recent years. For example, the global top-end baccarat market has been as large as \$2 billion in recent years, though the Asian financial crisis that began in 1997 brought about a rapid contraction for the period immediately following. A small number of players -- probably fewer than 1,000 -- make up the bulk of the premium baccarat market (Curtis, 1997). To attract such custom, a

half-dozen Las Vegas casinos, competing against a handful of top-end casinos located in London, Australia and Macao, have built elegant suites and villas for millions of dollars per unit to accommodate such players, along with offering a full array of travel amenities, services and cuisine. However, casinos compete most significantly over internal policies like maximum limits that such top-end players are permitted to wager, credit facilities, advanced deposit requirements, and the handling of cash. Moreover, casinos often provide discounts to these customers by offering rebates on losses and commissions paid on handle (Eadington and Kent-Lemon, 1992).

At a less glitzy level, discounting also takes place in casinos with slot "clubs" that are linked to player tracking systems. Players accumulate points as a function of handle that they generate at a particular casino, or among all the casinos owned by a specific company. The points are redeemable for prizes; for complementary meals, rooms or entertainment; or for cash. The obvious purpose of slot clubs is to develop stronger customer loyalty. But slot clubs also provide the casino with information on players, including frequency and length of play, handle, and amounts won or lost. In turn, this information can be combined with personal data for a variety of marketing purposes, such as evaluating a player's value to the casino, determining levels of comps, making direct mail marketing appeals, and inviting valuable customers to tournaments and other special events.

There is evidence that players are price sensitive to the house advantage offered at various games, even though such information is often not readily available to them. With slot machines, house advantage can only be learned by experience or by word of mouth. Regular and local players play more frequently than tourists, and probably share their experiences more than tourists, and as a result are more price sensitive. Thus, the house advantage tends to be lower for slot machines for casinos that cater to local players than for those that cater to tourists; for example, in 1998, the house advantage for gaming devices on the Las Vegas Strip, which caters to out-of-state tourists, was 5.92 percent, whereas

for the Boulder Strip a few miles south, which markets itself primarily to local residents, was 4.26 percent (State Gaming Control Board, 1998). Of course, locals are more single-minded consumers of gaming services and therefore local casinos compete more on price of all offerings, including gaming and food. Tourist-oriented casinos compete more on quality and product differentiation.

Another example of price sensitivity can be seen with roulette. Both American and European roulette pay 35 to one on single number wagers. American roulette, with the numbers 1 to 36, a zero and a double zero, has 38 equally likely outcomes, whereas European roulette, with only a single zero, has 37 outcomes. As a result, American roulette is approximately twice as expensive to play as European roulette.⁹ Because of this, roulette is a fairly minor table game in the United States; in Nevada it generated only 8.3 percent of the table game win in 1998. However, in other countries, roulette is often the dominant revenue generator among table games. In the United Kingdom, for example, roulette generated 61.4 percent of the "drop" (purchase of chips) and a similar percentage of the table game win in 1997. (Gaming Board for Great Britain, 1998).

The extent of market competition among casinos also puts downward pressure on prices of casino games. Nevada is undoubtedly the most competitive casino market in the world, and as a result, the house advantage that prevails in its games tends to be lower than in less competitive markets. For example, in 1997, the house advantage for all gaming devices in Nevada was 5.11 percent, whereas in Atlantic City, with only a dozen competing casinos and no slot machines permitted outside casinos, the house advantage for all gaming devices was 8.4 percent (Donaldson, Lufkin & Jenrette, 1999).

Market Structures and Ownership Regimes

A wide variety of approaches have been undertaken to promote the public interest and to

mitigate perceived social impacts from gambling.

The best place to look for an example of highly competitive casino markets is the state of Nevada. Nevada possesses a respected regulatory structure that oversees the most laissez faire casino industry in the world. Providing commercial gambling services in Nevada requires a license from the State Gaming Control Board (Cabot, 1995). The fundamental requirements for licensing in Nevada are meeting probity standards and access to legitimate financial capital. An unrestricted gaming license permits the licensee to operate any number of gaming devices and table games, though local ordinances can constrain location and size, and require certain amenities. Altogether, there were over 400 unrestricted gaming licenses in Nevada in 1998, of which about 230 generated annual gaming revenues of \$1 million or more. However, economies of scale and scope in Nevada's casino industry has led to a high concentration of revenues, and an even higher concentration of profit, in the hands of the largest gaming companies and operations.

Other states have attempted to limit gambling to particular cities or particular types of operations. New Jersey, for example, mandated a wide variety of size, design and product mix conditions that effectively limited the industry only to large gaming operations in a single city. At the time the enabling legislation was enacted, there was concern in New Jersey that a Nevada-style approach, allowing small and medium-sized operators into the market, would make control difficult and would invite organized crime and other chicanery into the industry (Sternleib and Hughes, 1983).

The approach taken in the mining town casino communities of South Dakota and Colorado effectively limited casino gaming operations to specific districts in the towns and into qualifying -- typically historic -- structures. Furthermore, South Dakota limited licensees to no more than 30 games or devices each. As a result, the casinos in the four towns of these two states have involved a large number of small- to mid-sized operations, with limited product differentiation. The size and zoning

constraints, along with limited maximum wagers, also prevent the kind of evolution of the industry that has characterized Nevada.

The riverboat states have generally chosen legislative models that limit supply below what the market could bear, and encourage regional monopolies or oligopolies. This created significant economic rents and, in some cases (like Louisiana) led to allegations of corruption in the bidding processes for the allocation of limited gaming licenses (O'Brien, 1998, pp. 98-125).

Mississippi, on the other hand, vied for the Nevada model. As a result, it has seen its casino industry evolve in a market driven fashion that has allowed the industry to develop multi-dimensional destination resort centers -- particularly in Biloxi and Tunica County -- that offer a wider variety of non-gaming amenities, such as accommodation, food product, outdoor recreation, and entertainment, than is typical in other riverboat states.

The urban casinos that were authorized in New Orleans and Detroit were an attempt to create exclusive franchises. The philosophy was that such casinos would concentrate positive economic impacts more than competitive alternatives; they would be easier to regulate and control; and that it would be easier for state and local governments to extract economic rents for public purposes from such operations. However, with allegations of corruption and a bitterly contested bankruptcy, New Orleans' experience provides a cautionary example of what might happen if governments try to extract too much in the way of economic rents (Rittvo, 1997).

In other countries, outright government ownership of casino operations is often favored, as in Canada, Holland, Austria and the Philippines. With the exception of Ontario and Nova Scotia, these government monopolies are also operated by government organizations. As a result, they can be more influenced by political considerations and objectives besides profitability, and are subject to many of the same inefficiencies to which apply to other government run enterprises. In contrast, the Australian

approach to permitted casinos adheres to a philosophy of allowing monopoly casinos in major cities, as well as in a few destination resort locations (Mossenson, 1991). However, all Australian states besides Western Australia also permit gaming devices to operate outside of casinos, which tend to absorb much of the demand for casino-style gaming and thus reduce the ability of the monopoly casinos to extract rents. The approach in these jurisdictions — when private operators are involved — is to use competitive bidding processes to award licenses. However, in Malaysia and Macao, governments granted exclusive monopoly casino franchises to private operators without going through an initiative or legislative process (Cabot, Thompson and Tottenham, 1994).

Constraints on Permitted Gambling and Effects on Profitability

From society's perspective, what sets gambling aside from many other commodities is its longstanding relegation as one of the "vices." Along with alcohol, tobacco, illicit drugs, and the commercial sex industry, gambling has historically been a morally questionable and controversial consumption activity (Eadington, 1998). Along with the other mentioned vices, it has been subject to a wide variety of controls, including restrictions on where gaming can take place; prohibitions against or limits on advertising and the granting of credit; maximum limits on wager size or amounts players are permitted to lose; restricted hours of operation; and curbs on the types of games or gaming devices that might be offered. The variation of restrictions can range from strict prohibition to relatively unconstrained permission.

However, when the provision of a vice is legally limited, demand does not vanish, and there will often be an opportunity to capture excess profits by meeting that demand. Such opportunity may have particular appeal for entrepreneurs or organizations willing to work outside the law and without the protection of contract. Thus, when a vice, such as gambling, is prohibited or sharply limited, it can lead

to underground economy dealings that have significant social costs and consequences of their own (Reuter, 1983).

Much of the casino gaming that was authorized in the United States in the 1990s placed considerable limitations upon the size, type, or number of casino facilities; the terms and conditions under which customers could gamble; and the locations where gambling was allowed to take place. The effect in various jurisdictions, especially in the short term, was to create situations where providers of gambling services -- or other economic stakeholders -- were able to capture significant amounts of economic rents. Table 3 presents a summary of constraints for the eleven states that had legislatively authorized casino gaming by 1999.

**REGULATORY CONSTRAINTS AND
LEGISLATIVELY AUTHORIZED CASINOS, 1998**

STATE (date of enabling legislation)	# OF CASINOS (maximum allowed)*	1998 gaming revenues, (\$million)	Location	Credit allowed?	Wager limits	Loss limits
Nevada (1931)	230	\$8,065	local zoning	yes	none imposed	none
New Jersey (1976)	13	\$4,045	Atlantic City only	yes	none imposed	none
Iowa† (1989)	3	N/A	navigable rivers	no	\$5 maximum	\$200 per excursion
Iowa†,# (1994)	12	\$496	navigable rivers	no	none imposed	none
Illinois† (1990)	10 (10)	\$1,107	navigable rivers	yes	none imposed	none
Mississippi† (1990)	29	\$2,177	designated waterways	yes	none imposed	none
Louisiana† (1991)	14 (15)	\$1,323	designated waterways	yes	none imposed	none
Louisiana** (1992)	0 (1)	\$0	site of Convention Center	yes	none imposed	none
Colorado (1990)	51	\$479	3 designated mining towns	no	\$5 maximum	none
South Dakota (1988)	53	\$44	Deadwood only	no	\$5 maximum	none
Missouri† (1992)	12	\$853	designated waterways	no	none imposed	\$500 per excursion
Indiana† (1993)	11 (11)	\$1,339	designated waterways	yes	none imposed	none

Michigan** (1996)	0 (3)	\$0	Detroit only	yes	none imposed	none
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* As of 1998

† riverboat

casinos

Iowa relaxed restrictions on its

riverboats in 1994

** specified downtown

location

N/A not

applicable

In some cases, the constraints were significant in preventing the market from reaching a competitive equilibrium. For example, in Illinois, the combination of restrictions to no more than ten riverboat gaming licenses and 1,250 "gaming stations" per license resulted in a considerable undersupply of casino gaming product, especially in the Chicago metropolitan area during the first few years of riverboat casino operations. (A gaming station is a place -- a slot machine or a seat at a gaming table -- where a customer could gamble.) The economic rents captured by the state's riverboat casino operators, especially those operating near Chicago, eventually led the legislature to increase the maximum percentage tax on casino winnings from 20 percent to 35 percent in 1997.

Such constraints can create disadvantageous competitive conditions in comparison to other regional gaming alternatives. For example, Iowa passed restrictive legislation allowing riverboat gaming in 1989, but legislation later passed over the next two years in Illinois and Mississippi was less confining. Soon thereafter, three of the five original Iowa boats left the state for more accommodating new gaming markets in Mississippi. In 1994, new Iowa legislation removed a mandated cruising requirement, as well as limits on wager size and overall losses. As a result, in local markets that bridged the two states, market share going to Iowa's boats jumped from about 30 percent to 70 percent overnight (Nichols, 1998). The pressure then shifted to Illinois to relax its restrictions. This pattern of states leapfrogging

each other to reduce their original restrictions on gambling is a common one.

One of the more interesting dimensions of casino gaming legislation is whether or not there is any linkage between statutory or regulatory constraints and the actual mitigation of perceived or real social impacts. In retrospect, many of the constraints imposed in new jurisdictions have turned out to be more symbolic than real in providing protections against adverse social effects that might be associated with permitted casino gaming.

Rules that mandate that riverboat casinos make actual cruises are a case in point. Supposedly the primary purpose for mandated cruising for riverboat casinos is to provide protections for customers against their own potential excesses by limiting what they can lose on a particular excursion, and to protect communities against the adverse "neighborhood effects" that land-based casinos might bring about. However, there is no evidence that suggests customers will get themselves into more or less difficulty with their gambling with mandated cruising than without, and there is no evidence that suggests mandated cruising alters neighborhood crime in comparison to land-based casinos. However, the Iowa/Illinois experience demonstrates that customer preference is against mandated cruising. Companies involved in operating riverboat casinos have little interest in cruising their boats; by doing so, they increase their costs of operation and the risks of maritime accidents while undermining their customers' preferences. Local governments must provide adequate safety and rescue resources for cruising riverboats in case of accident. Furthermore, cruising adds to problems of land-based traffic congestion and queuing as customers must adhere to the fixed cruising schedules while getting on and off the boats. The only obvious beneficiaries of mandated cruising are those economically linked to maritime operations.

At best, riverboat casino legislation is a means of imposing restrictive zoning on casinos in political jurisdictions and otherwise limiting the popularity and extent of gaming's presence. However,

the rules on mandatory cruising have to be considered either economically inefficient or just plain eccentric; one could describe it as regulation by inconvenience. As might be expected, in those states with mandated cruising requirements for riverboat casinos, there has been ongoing political pressure to remove the requirement and thus "rationalize" the riverboat casino industry.

The purported intent of establishing constraints on casino operations is to mitigate some of the social impacts that might be associated with less restrictive gaming, or else to concentrate the positive economic impacts from casino legalization on investment, job creation, and development into certain geographic areas. However, unintended side effects of such constraints include reductions in overall demand for casino gaming from potential customers because of the inconveniences involved; increased economic rents accruing to operators or to the government in the form of excise taxes when artificial barriers to entry limit supply; and dampened incentives for the casino industry to more fully develop non-gaming complementary amenities -- such as hotels and entertainment venues -- because of lower expected return on investment. Some restrictions, such as prohibitions against a casino granting credit, or forbidding the use of bank debit cards in gaming devices or at gaming tables, undoubtedly lessen the amount of "impulse spending" by some casino customers. However, the impact of such rules on social costs are difficult to measure, as is discussed in the next section.

Cost-Benefit Analysis and the Rationales for Legalizing Casinos

The potential gains from allowing casino gambling can be usefully grouped into three areas. First, many of those who gamble do so in moderation and receive enjoyment from the overall entertainment experience, and their gain in utility should be counted as a benefit. However, in society's overall cost-benefit calculation, the consumer surplus portion of benefits derived from consumption of

gambling services tends to be discounted; the extent of discount is related to the strength of moral criticism that gambling receives in the society considering it.

The public policy arguments in favor of legalized casino gambling have paid little attention to the wants and whims of potential customers of such gaming activities. Rather, legalization of casino gaming has been viewed more as a means to achieve ends of "higher purpose." The higher purpose can be fulfilled by capturing and directing the economic rents that arise when the state legalizes a previously prohibited but popular activity. A second area of gains from casino gambling are the promises of ancillary economic benefits from having a casino, such as job creation, investment stimulation, tourism development, economic development or redevelopment, urban or waterfront revitalization, or the improvement of the economic status of deserving or underprivileged groups (Economic Development Review, 1995).

Historically, casinos have often been introduced to capture economic benefits from "exporting" casino gaming to customers from regions where the activity is prohibited. Jurisdictions that legalized casinos were often resource poor, or under economic duress. One or both of these factors apply to Monaco (1863), Nevada (1931), Macao (in the early 20th century), the Caribbean (1960s), and Atlantic City (1976), and help explain why many of the newly authorized American jurisdictions were keen on having casinos. East St. Louis, Illinois; Gary, Indiana; Tunica County, Mississippi; Shreveport, Louisiana; New Orleans, and Detroit have experienced varying degrees of economic distress in recent years. It was believed that casinos -- as long as they could bring about injections of spending from outside the area -- would create jobs, stimulate local investment, and enhance local government revenues.

Various studies have documented the economic gains and growth stimulated by communities and regions from their newly introduced casino industries (Arthur Anderson, 1997; Walker and

Jackson, 1998). However, the methodology to distinguish fully between absolute measures of economic impacts and incremental impacts -- in comparison to what would have taken place in the absence of casino authorization -- is still in need of considerable refinement.

A final benefit from the legalization of casino gambling is as an additional source of revenue to the public sector. Maximum tax rates on gross gaming revenues in American casinos range from 6.25 percent (Nevada) to 35 percent (Illinois). Taxes on casinos are not an important source of public sector revenues for most states in the United States; only Nevada is heavily dependent on casino gaming tax receipts. Nonetheless, non-Indian casinos paid over \$2 billion in percentage taxes to the various states on gaming revenues in 1997, and Connecticut's two Indian casinos paid \$236 million to the state that year. In comparison, states generated revenues of approximately \$10 billion from net proceeds of lotteries (after expenses and payment of prizes) in 1997.

This "second class" status of gambling as a commodity -- and of gamblers as customers whose demands are not fully respected in the public policy formulation process -- has created a volatile political environment for permitted gambling. In effect, a good portion of the desirability of gambling as a commercial activity is dependent upon its ability to fulfill ancillary economic objectives. Casino gambling is valued for what it can do rather than for what it is.

On the other side of the cost-benefit calculation, at least some of the opposition to gambling is a straightforward moral disapproval, which I will not discuss further here. In addition, the public opposition to the spread of casino-style gambling has been driven mainly by fears of adverse social impacts. Some examples include: pathological or excessive gambling and related consequences; neighborhood crime issues linked to casinos, such as burglaries, robberies, prostitution, loan sharking, and drug dealing; political corruption and other compromises of law enforcement or judicial processes; and infiltration of gambling operations by criminals, organized or otherwise. Many of these issues have

not yet been adequately researched, so their actual linkages to casino gaming are not well understood (Margolis, 1997).

The most important of the social impacts are related to the phenomenon of "problem" or "disordered" gambling. Our understanding of the social costs of problem gambling is limited because, until quite recently, little public policy oriented research was conducted on the topic -- and even the work done was of varying quality and was difficult to compare (Schaffer, Hall and Vander Bilt, 1997) or suffered from weak methodology (Thompson, Gazel and Rickman, 1997). The key question is not whether problem gambling is harmful -- more or less by definition, it surely is. Problem gambling can and does result in significant personal disruptions and even tragedy. The hard issues are the extent to which problem gambling is increased by legalization of casinos, and the difficulties of separating personal costs and social costs.

Studies have recently attempted to identify the extent of social costs linked to changes in the legal status of gambling and place it into a benefit/cost setting. For example, a National Opinion Research Center (1999) study, prepared for the National Gambling Impact Study Commission, estimated that about 2 percent of U.S. adults have had moderate to severe problems with gambling in their lifetimes, and about 1 percent have experienced such problems in the past year. They estimated costs to individuals or society from such effects as poor physical and mental health, job loss and unemployment, at between \$1,000 and \$2,000 per year, with additional "lifetime" costs from divorce, bankruptcy or arrests of \$5,000 to \$6,000 per affected individual. Applying these estimates to 200 million American adults, a crude measure of costs per annum of problem gambling might be about \$3.5 billion, of which \$3 billion is in the category of annual cost (1 percent of 200 million adults multiplied by annual costs of \$1500), and about \$0.5 billion is in amortized lifetime costs (2% of 200 million adults multiplied by lifetime costs of \$5500, spread over a 50 year average lifetime.)

However, studies in this area are fraught with conceptual difficulties and are supported by only limited empirical evidence (Walker and Barnett, forthcoming). Many of the costs identified are internal to the individual or the household, as opposed to external -- borne by society -- and are therefore difficult to place into a cost/benefit framework. Furthermore, if one were interested in estimating the opportunity costs of legalized gambling, the appropriate basis for comparison would be costs that accrue under a reasonable alternative legal status (i.e. if gambling were either totally prohibited or permitted without any constraints, each state of nature would will have its own non-zero costs of problem gambling associated with it). Thus, these estimates are of limited usefulness and interpretation.

If a local community carries out an informal benefit/cost framework as its justification for legalizing casino-style gaming, certain types of gaming are going to be inherently more acceptable than others. Jurisdictions that are able to become net exporters of gambling services -- by attracting a high proportion of their customers from outside the region -- will be able to generate considerably greater incremental local economic benefits than those jurisdictions whose casinos cater predominantly to local clientele (Eadington, 1998). In similar fashion, casino markets that cater primarily to tourists or other non-residents will experience less visible negative social and political impact than those whose customers are their neighbors. Thus, destination resort casinos, such as those found in Nevada, Atlantic City, or Mississippi, will meet with stronger political acceptance than urban or suburban casinos, such as those found in Missouri or upstate Illinois and Indiana. In a similar vein, casino-style gambling permitted outside of casinos -- such as with slot machines, video poker machines, or video lottery terminals placed in bars and taverns or other age restricted locations -- will score lower on the benefit/cost computations, and will therefore meet with greater political opposition prior to implementation, or greater political backlash if they become established.

The Future of Commercial Gaming

For the past three decades, the driving force behind the growth of casino gaming in the United States and in many other countries has been that state and national governments have relaxed their earlier rules limiting casino gambling. However, in the immediate and intermediate future, advances in gambling technologies may create a new set of public policy questions.

Slot machines -- now electronic gaming devices -- are likely to continue to be the gaming products of choice in jurisdictions that permit them. But the traditional slot machine -- insert a coin, pull a handle -- will likely become as obsolete as the Model A Ford. The guts of the modern gaming device are already dominated by computer chips, high resolution graphics programming, and random number generators, rather than the fly-wheels and tension springs of the old slot machines. Games within games, mega-payouts, branding with popular television games and pop culture logos, a wide variety of bonus pays and other player incentives, and allusions to skill and fantasy, are already supplanting the impersonal and monotonous spinning reels based on pure chance. The new machines are increasingly fueled by bill acceptors or credit card swipes, and operated with button pushes or touch screens. As in other areas of modern life, it is likely that in the gambling industry we are only seeing the beginning of an ongoing wave of innovative changes driven by new computer-based technologies.

The level of policy tension surrounding such gambling activity is likely to increase. Competition among manufacturers is pushing the cutting edge of what makes such devices successful, entertaining and popular: the excitement or "adrenaline" factor inherent in the games. The combination of immediate electronic access to funds, and the impulsiveness that fast action gambling can encourage, may lead to a greater degree of excessive spending on gambling by many consumers. Overall, gaming devices have indeed become more productive in recent years -- measured in win per unit per day -- by increasing the

rate of play, the ease with which one can enter money into the machine, and the psychological appeals to players seeking what machines can offer them.

Such enticing gaming devices might be judged acceptable in destination resort casinos such as those found in Las Vegas, Atlantic City, or Biloxi. However, these machines can easily be located in local retail or entertainment outlets. In fact, internet gambling and variations of interactive television gambling are already technically possible and -- in varying degrees and locales -- available. Thus, the technological ability has arrived to deliver the most popular, the most exciting, and perhaps the most addictive forms of gambling into one's living room, bedroom or office.

There is an evolutionary trend for permitted gaming that parallels what has occurred over the decades with the movie industry. The 20th century has seen the distribution of commercial movies to the general public evolve from center city theaters of considerable stature and architectural quality, to suburban shopping malls in the form of multi-screen complexes, and into the home in the form of video tapes, pay-per-view and cable channels. The future promises on-demand downloading of digitalized movies into computerized home entertainment centers.

The evolution of casino-style gaming has been following a similar path. The present trends suggest casino-style gaming is moving or will be moving from site-specific destination resort mega-casinos serving broad markets, like Las Vegas and Atlantic City, to urban and suburban casinos and entertainment centers that are smaller and more differentiated and that serve a more localized market, and then on to various gaming opportunities in the home or the neighborhood.¹⁰ As permitted gambling gets closer to where people live, criticism of its negative effects are likely to increase. After all, most societies have prohibited most forms of gambling for almost all of history. When casino gaming has been permitted in the 19th and 20th centuries, it was either located away from where people lived, or was restrictive with respect to who could gamble. This has changed, and as a result, we will probably

see ongoing political tensions regarding gambling and public policy.

The current controversy over internet gambling poses an interesting illustration of the varying tensions that new technologies, latent demand, concern over social impacts, and protection of existing established markets bring into play. Without legal status and credible regulation, customers of internet gambling would run the risk of getting involved with gambling schemes that might be rigged, and would have no assurance that winnings would be paid. Furthermore, there are few controls to prevent minors, or other vulnerable groups, from participating. In the United States, legislation to ban internet gambling was entertained by Congress in 1999, with the support of the casino industry and various other gaming interests. The broad strategy was to keep internet gambling on the fringes of commercial gaming by creating criminal or civil penalties for suppliers and internet providers. This would also keep mainstream corporations -- who would have the resources and credibility to provide consumer protections -- from becoming purveyors of internet gambling services (Cabot, 1998). In contrast, various countries, including Australia and New Zealand, have moved forward with enabling legislation to authorize, regulate and tax internet gambling operations, opening the door to legitimizing a new sector of the gaming industry. In light of the difficulties of constraining internet commerce at the borders of political jurisdictions, internet gambling promises to provide ongoing controversy and challenges.

An additional complication will come into play if, as gaming becomes increasingly available and therefore more subject to competitive economic pressures, economic rents diminish. If, at the same time that the rents from such activity are diminishing, permitted gambling is increasingly successful at drawing business away from other more "legitimate" activities, such as restaurants, bars and taverns, or movie theaters, such industries may act as leaders in efforts to roll back the availability of gambling.

American society is ambivalent about the desirability of permitted gambling, and is struggling to find a comfortable balance. If new technologies push gambling to unacceptable levels by making it too

available, too exciting, and too dangerous, public acceptance of gambling could reverse itself. It is not inconceivable that permitted gambling could be made less available should the body politic decide that what is gained from gambling -- including the pleasures of the activity itself -- cannot justify the social disruptions and economic dislocations it brings about (Rose, 1991). But in light of current trends or attitudes, this possibility is not yet an even money bet.

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1. The National Gambling Impact Study Commission came into existence with the passage of Public Law 104-169 (1996). The Commission was scheduled to issue its final report in mid-1999.
2. There had been previous waves of legalization of gambling in America, followed by prohibition. Rose (1991, p. 75) describes the current expansion as the "third wave," and notes that in 1910, at the end of the "second wave," the only legal gambling that remained in the United States was horse race betting in Maryland and Kentucky.
3. The Nevada casino industry's formative years have been popularized and romanticized (somewhat inaccurately) by such Hollywood movies as *Bugsy*, *Hoffa*, *The Godfather (I and II)*, and *Casino*.
4. Competition among adjacent states or provinces for one another's citizens as customers (as in the United States, Canada and Australia) can lead to greater amounts of legalization of casinos than would be the case where such legislative decisions were made at a federal or national level (as in the United Kingdom) (Donahue, 1997, pp. 7-77).
5. The cross-border effect was also an influence on the spread of casinos in Canada. The province of Ontario opened government-owned but privately operated border casinos in Windsor and Niagara Falls in 1994 and 1996 respectively, primarily to cater to U.S. customers from the metropolitan areas of Detroit and Buffalo. The government-owned and operated Quebec casino

at Hull was positioned to draw customers from the neighboring metropolitan area of Ottawa, Ontario. Furthermore, various Canadian provinces permitted video lottery terminals to be widely placed in age-restricted locations such as bars and taverns during the 1990s.

6. The house advantage is not to be confused with the "hold percentage," a measure commonly used by casinos to monitor the performance of table games. Hold percentage is defined as the ratio of "win" to "drop," where drop is the amount of chips purchased at the table and consequently, the amount of money or money equivalents placed in the "drop box" at the table.
7. These distinctions have some legal importance. In California, for example, banked table games are illegal but non-banked table games and parimutuel wagering structures are legal under certain circumstances. Therefore Indian tribes within the state have the right under the federal Indian Gaming Regulatory Act to offer non-banked games and parimutuel gambling schemes (Kelly, 1995).
8. Random variables summarizing the outcomes for sequences of most "short odds" casino games can be described by the binomial distribution. For a large enough sample size -- that is, n large enough to overcome skewedness -- the binomial distribution is closely approximated by a normal distribution. A game is not "short odds" if it has very large payouts that correspond to very low probability events, in which case the number of plays must become considerably larger than 1000 plays before the binomial approximation truly applies. Of those games listed in Table 2, slots, video poker and keno would not be "short odds" games.
9. The house advantage for most wagers at American roulette is $(2/38)$ or 5.26 percent, whereas European roulette has a house advantage of $(1/37)$ or 2.70 percent.
10. There is a tendency for existing gaming industries to oppose further expansion of casino-style gaming because of potential erosion of profitability. Thus, Atlantic City interests have opposed casinos in Pennsylvania, and Nevada casinos have opposed the spread of Indian gaming in California.