CASINO OPERATIONS MANAGEMENT

SECOND EDITION

Jim Kilby
Jim Fox
Anthony F. Lucas

CASINO OPERATIONS MANAGEMENT

CASINO OPERATIONS MANAGEMENT

SECOND EDITION

Jim Kilby
Jim Fox
Anthony F. Lucas

WILEY

John Wiley & Sons, Inc.

CONTENTS

PREFACE

For the authors, this book represents the fulfillment of a vision—to create a reference book for individuals working in the gaming industry as well as a resource for those with a desire to learn more about one of the most rapidly expanding industries in the world. This book provides the reader with an in-depth view of many facets of gaming operations.

The authors have made their best effort to ensure that this book is error free. Nevertheless, errors are unavoidable. Should you find any errors or if you have any suggestions on how to make this text better, the authors would appreciate your input. Please direct all e-mails to Jim Kilby@usa.net. When errors are identified, the corrections are published at www.JimKilby.com. Please visit the website. An instructor's manual (0-471-46008-7) supporting this book is available, along with PowerPoint presentations directly related to the content of each of the chapters through the publisher's website, www.wiley.com/college.

Gaming exists in most of the United States in various forms. It is present in our everyday lives, whether in the form of charitable games, lotteries, horse or dog racing, bingo or casinos. The growth of gaming all over the world over the past few years has been as rapid as in the United States. (Of course, areas including Australia, Egypt, and Europe have permitted the operation of casinos for many years.)

It is important for the reader to gain an understanding of how gaming achieved its present standing and to develop a better understanding of what has made the industry so successful. The history of gaming is reviewed, along with the regulatory environment that has been and will continue to be an integral part of the industry. The regulatory environment is one of the most dynamic areas of the gaming industry, as new regulations are continually introduced and existing regulations are modified at both the federal and state levels.

Topics discussed within the book range from staffing and organizational guidelines to casino marketing and player rating systems. The table games, slots, sports book, and race book areas are examined in depth in a manner that provides unique insight into the operation of the area, as well as the perspective of the casino operator. The authors have also provided a comprehensive description of how common casino games are played, as well as explaining in detail the mathematics of the games.

Throughout the book, the authors use terminology that is common in the gaming industry. The glossary at the end of the text provides an explanation of many of the key terms.

The gaming industry is one of excitement as well as one of risk. The authors hope that this book conveys much of this excitement while providing information to help understand and reduce that risk.

Jim Fox would like to take this opportunity to thank his daughter, Meghan, for her patience and understanding. He would also like to thank his parents for their lifelong encouragement and support. In addition, he would like to thank the following individuals for their friendship and support: Susan Fox, Green Valley High School; Kurt Houser, Chandler Police Department; Wayne Smith, MGM Grand Detroit; Ellen Ma, Bellagio; Nora Lonnquist; David Chan, Casino MonteLago, Las Vegas; Karl Houser; the Rhoades family; and Tom Roche.

Jim Kilby would like to thank the following individuals for their inspiration, motivation, help, and friendship: Jesse Ferrell, Executive Casino Host, Harrah's Las Vegas; Tom Newman, Vice President of Table Games, Golden Nugget, Las Vegas; Roy Brennan, Casino Executive, Palms Casino, Las Vegas; Andrew MacDonald, CEO, PBL Gaming Operations, Sydney, Australia; Lloyd Rosenberg, Professor Emeritus of Statistics and Computer Information Systems, City College of New York; Melody Larsen, Assistant to the CEO, Curtco Robb Media, Los Angeles; Jack Pappas, Director of Planning and Analysis, Tropicana, Las Vegas; Richard Olsen, former Counsel to Resorts International, Inc., Bal Harbor, Florida; Ray Gambardella, Casino Executive, Palace Station, Las Vegas; Dr. Shiang-Lih Chen, Widener University; and Minnie Kilby, loving mother.

Anthony Lucas would like to thank Sarah Lucas for her patience and encouragement. In addition, the following individuals must be recognized for their contributions to this book and their support for the advancement of casino management science: Brad Goldberg, Will Dunn, Guy Wolcott, Jake Fischer, Janice Fitzpatrick, Yvette Harris, and Felix Rappaport. It is their efforts and commitment to research that allow meaningful articles and textbooks to be written.

The authors would like to give special thanks to the following individuals: Tyrus Mulkey for providing information relevant to the chapter on the history of gaming; Jim and Raelene Palmer for their friendship, review, and comments; Terry Ridgeway, Associate Professor of Economics, UNLV; and Stanley Ko, author, for his various contributions. The authors would also like to give a special thanks to those who helped make this second edition possible: Marcus E. Prater, Vice President Marketing, Bally Gaming Systems, Las Vegas; George Stamos, Marketing Communications Manager, Bally Gaming Systems, Las Vegas; Joshua Marz, Product Manager, Shuffle Master Gaming, Las Vegas; Joie Murphy, Senior Marketing Coordinator, Shuffle Master Gaming, Las Vegas; Jocelina Santos, Ph.D.; and Jacob Coin, Executive Director, California Nations Indian Gaming Association.

CASINO OPERATIONS MANAGEMENT

THE HISTORY OF MODERN GAMING

NEVADA: THE BIRTHPLACE OF MODERN GAMING

Since Nevada's inception into statehood in 1864, the state's lawmakers have passed legislation that directly impacts gambling on eight separate occasions. Four of these bills enacted laws that either restricted or prohibited gambling altogether, and the other four enacted laws that permitted some form of gambling. Regardless of the laws in effect, gambling has always been an integral part of Nevada's history.

In 1869, when Nevada was only five years old, the first bill legalizing gambling was passed. The bill originally passed both houses in 1865, but succumbed to Governor Henry G. Blasdel's veto (Hadley, 1981). The bill was resurrected in 1869, at which time the governor's veto was successfully overridden by the legislature.

Casino gambling in Nevada lasted until 1909, when the state legislature passed a law outlawing all forms of gambling. It is interesting to note that the law did not become effective until late in 1910, which provided casino operators with almost 20 months to successfully move their operations underground. As a result of this delay in the implementation of the law, the prohibition proved to be ineffective.

In the late 1800s and early 1900s, Nevada had a reputation of providing activities considered illegal or immoral elsewhere in the United States. Activities ranging from "quickie" divorces to illegal prize fights could be readily found there. To this day, Nevada has one of the world's most liberal residency requirements for obtaining a divorce and the distinction of having several counties which permit legalized prostitution.

In 1911, the 1909 prohibition was relaxed to permit "social" games such as poker, provided the dealing of cards changed hands and the house (casino operator) did not take a percentage from the players' wagers. As innocent as this latest modification appeared, this provision was repealed in 1913.

During the next legislative session in 1915, laws were re-enacted that permitted social games and nickel slot machines. The slot machines could pay off in cigars, drinks, or other prizes valued at $2 or less. The legaliza-

tion of social games and slot machines would prove to be only the beginning of what was to become Nevada's gambling future.

THE WIDE OPEN GAMBLING BILL

Two events subsequently occurred that would dramatically affect Nevada gambling. The first to occur was the stock market crash of October 29, 1929, which was appropriately called "Black Tuesday." The second event was the funding of the Hoover Dam project by the U.S. Congress only three months following the crash. These two events provided the impetus for the introduction and subsequent passage of Assembly Bill 98, which is better known as the Wide Open Gambling Bill.

The subsequent depression proved to be very hard on the state and, as a result, in 1931 Assemblyman Phil Tobin from the tiny town of Winnemuca, Nevada, introduced Assembly Bill 98 in an attempt to provide economic relief. Phil Tobin and the supporters of his bill felt that passage of the bill would accomplish three things:

1. Legalized gambling would provide the state with much-needed revenue through gaming taxes.
2. Legalized gambling would enhance business in general.
3. With the impending construction of the Hoover Dam and the thousands of federal workers who would be required for the project, there was concern that the U.S. government would move to shut down the many illegal casinos that were flourishing in Las Vegas less than 40 miles away. Supporters of the bill believed the only way to prevent federal intervention in these illegal activities was to legalize gambling. How could the federal government intervene if gambling was legal? Interestingly, this tactic was to prove successful (Roske, 1977).

On March 19, 1931, Governor Fred Balzar signed historic Assembly Bill 98 into law. During the same legislative session, the legislators passed a bill lowering the residency requirements for divorce from three months to six weeks.

Assembly Bill 98 legalized the following games:

- Faro
- Monte
- Roulette
- Keno
- Fan-Tan
- Twenty-One
- Blackjack
- Seven-and-a-half

- Big Injun
- Craps
- Klondyke
- Stud Poker
- Draw Poker
- Slots

Legalized gambling provided a welcome new source of state revenue. Each gambling establishment (casino) was charged $25 monthly for each card game, $10 monthly for each slot, and $50 monthly for each table game. The tax was determined by the number of devices and not the amount of the casino win.

The tax revenues were to be split, with 75% going to the county where the casino was located and the remaining portion going to the state. Since the county received most of the tax revenue, the responsibility for collection of the taxes and enforcement of gambling laws was placed with the county sheriff.

The original version of the bill failed to provide for any means of regulation. Cheating and operating a casino without a license were forbidden. Any operator found guilty of cheating was forced to forfeit his license for one year; however, no agency was assigned the power of enforcement. This omission was rectified eight days later when the legislature empowered local authorities to regulate gaming or prohibit it entirely (Vallen, 1988).

THE BULL PEN CASINO

If gambling is legal in the state, why shouldn't it be legal within the walls of the state prison in Carson City? As unlikely as this sounds, gambling was to be a recreational activity made available to prison inmates. In 1932, the Bull Pen Casino opened in the Carson City prison and was operated by inmates, who were allowed to keep their profits. Naturally, the casino customers were all inmates as well.

In order to operate a game, the game boss (inmate) had to satisfy a prison administrative board that he could afford to bankroll the game. After obtaining approval from the board, the only other requirement was that the game boss contribute a fixed amount of the proceeds to an Inmate Welfare Fund. With the exception of this limited form of taxation, the game boss was allowed to run his game and keep the profits. The Bull Pen Casino provided the game boss with one of the few benefits of receiving a long prison sentence.

In the Bull Pen Casino's prime, an inmate could gamble at blackjack, craps, chuck-a-luck, roulette and poker. There was even a window where an inmate could bet on any horse race in the country and another window for betting on sporting events (Soares, 1985). Unfortunately for the

game boss, the prison casino was closed in 1967 and replaced with more constructive and probably less profitable programs.

THE GRANDEST CLUB IN SOUTHERN NEVADA

The Meadows Supper Club opened in Las Vegas on May 2, 1931, less than two months after passage of the bill legalizing casino gambling. No expense was spared in building the most luxurious casino in Nevada, complete with its own landing strip for wealthy clients. The casino, which cost $300,000, included 100 hotel rooms and was the grandest club in southern Nevada (*Las Vegas Review Journal*, 1986). During the prohibition years, the Meadows Supper Club was known as "the place" to buy liquor.

The Meadows Supper Club, Las Vegas' first legitimate night spot, was built by Tony Cornero and his two brothers Frank and Louis. The Cornero brothers claimed that they had built the Meadows with the understanding that the city would give them a monopoly on prostitution. The Corneros believed that city officials had promised to close down "Block 16" (*Las Vegas Review Journal*, 1986) which was located on First Street just north of Fremont in downtown Las Vegas and was known as the place where "Every Saturday night is New Year's Eve." (*Las Vegas Review Journal*, 1986).

The Meadows Supper Club, which was located at Boulder Highway and Charleston, was plagued with bad luck from the beginning. The hotel burned to the ground in 1932 after firemen refused to fight the fire because the Club was outside the city limits (*Las Vegas Review Journal*, 1986). The Club eventually went bankrupt in 1937 and was sold within a year to a builder from California (*Nevadan Magazine*, 1990).

After leaving Las Vegas, Tony Cornero operated a gambling ship anchored three miles off the shore of Santa Monica, California, the SS *Rex*. Every week, thousands of Californians would drive to the pier, where water taxis took them to the SS *Rex*. Unfortunately for Cornero, California state officials became outraged by his operation and in 1939, California Attorney General Earl Warren sent 250 agents to close down the SS *Rex* (*Las Vegas Review Journal*, 1986). Tony Cornero died of a heart attack while shooting craps at the Desert Inn in 1955 (*Las Vegas Review Journal*, 1986).

BIG-TIME GAMBLING

During the early years, little or no attempt was made to market the casinos. This was to change when in 1935 Raymond Smith and his son Harold came to Nevada. With an investment of only $500, Raymond Smith opened Harold's Club in Reno (Greenlees, 1988). Only 20 feet wide at first, Harold's Club grew and during the 1970s claimed the title as the largest casino in Nevada. Mr. Smith, also known as "Pappy," was an ex-

traordinary promoter. He was a great visionary and realized that proper marketing could lead to substantial profits.

Pappy Smith is credited with many "firsts" in gambling. Among these was his innovation of placing the casino directly adjacent to the street. Prior to Smith's arrival, most casinos were located either in the back room or upstairs. He was also the first to introduce mouse roulette, which provided for a special wheel with 38 numbered holes placed around its perimeter. A mouse was released from a hole in the center of the wheel and the winning number was determined by the hole to which the mouse ran.

Pappy Smith was also the first casino operator to hire women dealers, and his casino housed the first escalator in the state. Harold's Club was the first casino to conduct a national outdoor advertising campaign. At one point, Harold's Club had over 2,300 billboards placed on major highways throughout the United States (*Nevada Magazine,* 1981).

In 1937, a second gambling pioneer, Bill Harrah, opened his Bingo Club in Reno (Greenlees, 1988). Harrah was the first to introduce corporate management philosophies to the gaming industry. At the time of his death in the mid-1970s, Harrah's Reno and Harrah's Lake Tahoe casinos were two of the largest and most successful in the state.

THE BIRTH OF THE LAS VEGAS STRIP

During the years 1935 through 1946, northern Nevada was the center of gambling. During this same period, the gaming industry in Las Vegas was growing in size and importance. In 1940, Clark County, which includes the city of Las Vegas, had a population of only 16,414 people. Just two years later, the population had skyrocketed to 34,247, which represented an increase of over 100%.

Legend has it that on a hot summer day in 1939, hotelier Thomas Hull had a flat tire on old Highway 91 just south of downtown Las Vegas. Mr. Hull could not help noticing the large number of cars that passed him while he was waiting for a mechanic to arrive. Consequently, Thomas Hull opened the El Rancho Vegas in 1941 across from where the Sahara Hotel & Casino stands today. On October 30, 1942, the Last Frontier Hotel & Casino joined the El Rancho and became the second casino on the Las Vegas Strip. In 1960, the El Rancho, like the Meadows Supper Club, was destroyed by fire and the casino was never rebuilt. The Frontier Hotel and Casino today is located on the same spot as the original Last Frontier.

BUGSY

When the "Wide Open Gambling Bill" was passed in 1931, betting on horse races and sporting events was not legalized. The amendment legalizing wagering on these events did not come until ten years later. When

casinos were first allowed to offer betting on horse races, no method was established for the legal casinos to determine the outcome of races and how much the winning horses paid. Trans-America wire service, which, incidentally, was controlled by the Capone mob in Chicago, was established to answer this need (Reid & Demaris, 1964).

The West Coast representative for the Trans-America wire service was none other than the infamous gangster Benjamin "Bugsy" Siegel, who came to Las Vegas with his friend Moe Sedway in 1941 to promote the wire service. With monopoly control of the wire service, Bugsy and his gang gained a foothold in the legal casinos of Las Vegas (Vallen, 1988, p. 10; Reid & Demaris, 1964, p. 13).

Once familiar with Las Vegas gambling, Bugsy initially bought into and subsequently sold the El Cortez. He then decided that the town needed its first "plush" casino-hotel. Up to this point in Nevada's gaming history, most casinos sported a Western theme and lacked the elegance of the Miami Beach–type hotels. To satisfy this perceived gap in the market, Bugsy decided to gain control of the Flamingo Hotel & Casino on the Las Vegas Strip, which had begun construction in January 1945 under the ownership of a businessman from Los Angeles.

The hotel was named after Hollywood starlet Virginia Hill, who was also Bugsy's girlfriend. Looking back, historians always refer to Bugsy as the developer, but at the time Bugsy's name was never mentioned as a principal. The developer of record was the Nevada Projects Corporation.

On Thursday, December 26, 1946, although its 97 hotel rooms were not ready for occupancy, the Flamingo Hotel & Casino opened to the public. One would have thought that the opening of the $5 million resort would have been on the front page of the *Las Vegas Review Journal*. Instead, the day the Flamingo opened, the headlines announced the death of comedian W. C. Fields. The opening did make the newspaper, but not until page three.

The Flamingo was crowded with customers on opening night. The "cafe entertainment" was headlined by Jimmy Durante, Xavier Cugat, and Rose Marie. But since the rooms were not yet complete, customers had to stay at the El Rancho Vegas, the Last Frontier, or in one of the few rooms in downtown Las Vegas. Two nights later, a visit that was billed as the largest gathering of film stars outside the confines of Hollywood included the patronage of such notables as Veronica Lake, Lucille Ball, George Raft, William Holden, Brian Donlevy, Ava Gardner, and Peter Lawford.

In spite of all the hoopla, the casino immediately began to lose money and was closed on February 1, 1947, so that the construction could be completed. During the initial opening period, the casino lost over $100,000. The casino was reopened on March 27, 1947, and this time the rooms were completed and the customers had a place to stay. Unfortunately for Bugsy, the casino continued to lose money. Convinced he was skimming casino proceeds, his mob partners had him killed on June 20,

1947, at the Beverly Hills home of Virginia Hill, who had ended their relationship one day earlier (Reid & Demaris, 1964, p. 28).

Bugsy was buried in a $5,000 silver-plated casket following a five-minute ceremony attended by only five mourners. Ironically, at the time of Bugsy's death, the Flamingo had improved operations and was making money (*Las Vegas Review Journal*, 1986). In retrospect, the opening of the Flamingo is viewed as a turning point in the history of Las Vegas gambling.

HOWARD HUGHES

Texas millionaire Howard Hughes came to Las Vegas in 1966 and immediately began to purchase casinos. Hughes owned 100% of Hughes Tool Company, which was an oilfield supply company founded by Hughes' father, who had patented a rotor bit used in the drilling of oil wells. Before coming to Las Vegas, Hughes had owned RKO Studios and a major interest in TransWorld Airlines. He was a well-known and respected businessman. His entry into gambling legitimized the industry and gave it a much-needed perception of respectability.

Hughes' entry into the gaming industry began on April 1, 1967, with his purchase of the Desert Inn from reputed Cleveland mobster Moe Dalitz for $13.25 million (Goodwin, 1985). The purchase was not without some controversy, as Hughes became the first and only person to be granted a gaming license without appearing before the Gaming Control Board. With the assistance of Governor Paul Laxalt, who was anxious to improve the tarnished image of Las Vegas, Howard Hughes was able to move swiftly through the licensing process and continue to expand his ownership in the gaming industry.

In July 1967, Hughes acquired the Sands for $14.6 million and followed this with the purchase of the Frontier on September 22, 1967. Hughes continued his buying spree with the acquisitions of the Castaways for $3 million and the Silver Slipper for $5.3 million. In September 1968, Hughes purchased the partially completed Landmark for $17.3 million, but the gaming license was not approved until January 1969. Within a period of a little more than one year, Howard Hughes had spent $65 million and had acquired four of the top fifteen hotels on the Las Vegas Strip. The 2,000 hotel rooms he owned represented 20% of the total hotel rooms on the Strip.

The purchase of so many casinos by one individual concerned both the administration of President Lyndon Johnson and Nevada's Gaming Commission. Fearing dominance in the industry was detrimental to free competition, the U.S. Department of Justice intervened when Hughes attempted to purchase the Stardust. After determining that the Department of Justice had no jurisdiction in the matter, Nevada's Gaming Commission approved Hughes' license for the Stardust on April 30, 1968.

Subsequently, the Department of Justice requested a 90-day delay in the acquisition so that they could investigate. Hughes' plans to purchase the Stardust for $30.5 million were voluntarily terminated in August 1968. Harold's Club in Reno, purchased in 1970, would prove to be the seventh and final acquisition in Hughes' string of casinos.

After Hughes' entry into gaming, a Corporate Gaming Act was passed in 1969 by Nevada's gaming regulators. Prior to the passage of this act, every owner of a casino was required to be individually licensed. With public corporations, licensing of thousands of stockholders was impractical. The Corporate Gaming Act allowed publicly traded corporations to own casinos without requiring every single stockholder to be licensed.

The act was made retroactive to July 1, 1967, and was prompted by Hughes' decision to divest ownership in Hughes Tool Company, which he had solely owned. The act opened the door for other public corporations to move with greater ease into the gaming industry. Today, the general rule applied is for a stockholder to own 10% of the voting stock in a public corporation before being required to obtain a gaming license.

MODERN-DAY LAS VEGAS

Las Vegas has grown into a city where tower cranes used for constructing high-rise buildings are as common a sight as neon lights. The building boom that began with Bugsy Siegel has continued with only slight interruptions. The last few years in Las Vegas have seen the construction of themed mega-resorts, best exemplified by properties such as the Bellagio, the Venetian, The Mirage, Mandalay Bay, New York-New York, MGM Grand, and the Luxor.

These properties, typified by themes that are carried throughout their every facet, include amenities such as world-class conference centers, art museums, upscale retail shopping areas, restaurants featuring award-winning chefs, full-service spas and high-end suites, all aimed at diversifying and expanding the demographic base of the casino customers. The mega-resorts also feature large numbers of hotel rooms (currently as many as 5,000 rooms at the MGM Grand) and multipurpose arenas, which may seat up to 17,000, used for concerts and sporting events.

Tourists visiting the Las Vegas Strip today can stay at the five-star Bellagio featuring a man-made lake, view the panorama of the city from the top of the 1,149-foot-high Stratosphere Tower, which resembles the famous Space Needle in Seattle, and visit replicas of the Empire State Building, Coney Island, and the Statue of Liberty (New York-New York) all in one day. Other tourist attractions include the Eiffel Tower (Paris), a ship battle between a pirate ship and a British frigate (Treasure Island), a lion

encounter (MGM Grand), a pyramid (Luxor), a volcano (The Mirage), and several roller coasters.

Other projects under construction include Wynn Resort, which is currently anticipated to have a completion cost in excess of $2 billion and is expected to open in the spring of 2005, and a monorail that will extend from the MGM Grand to the Las Vegas Convention Center, with stops at a number of casinos on the east side of the Las Vegas Strip. These projects will further enhance the image of Las Vegas as a vacation destination.

STEVE WYNN

It is impossible to discuss modern-day Las Vegas without mentioning Steve Wynn. Perhaps no one individual has acted as a greater agent of change in the face of the gaming industry over the past decade than Steve Wynn. Mr. Wynn is credited by many in the industry with transforming Las Vegas into a world-class resort destination.

Mr. Wynn today is the mastermind behind Wynn Resort, which will be the most ambitious project built to date in Las Vegas. Wynn Resort will be located on the Las Vegas Strip on the site that was previously home to the historic Desert Inn. The new mega-resort will include approximately 2,700 hotel rooms, a 111,000-square-foot casino, 18 restaurants, an 18-hole golf course, full-service Ferrari and Maserati dealerships, and a 2,000-seat domed showroom with a stage in the round. A 150-foot man-made mountain with a five-story waterfall and an art gallery featuring works by Picasso and Van Gogh will also highlight the property. Wynn Resort should serve to further establish Mr. Wynn as one of the modern-day innovators in the gaming industry.

Formerly, Mr. Wynn was the Chairman of the Board and Chief Executive Officer of Mirage Resorts, Incorporated, which was acquired in 2000 by MGM Grand and became MGM MIRAGE, but his odyssey in the gaming industry really began in 1972, when he made a major investment in Golden Nugget, Inc.

Mr. Wynn's focus of attention later became the construction and subsequent sale of the Golden Nugget Hotel & Casino on the Boardwalk in Atlantic City. The casino was built in 1980 and sold to Bally's in 1987 for $440 million. The proceeds from this sale helped to fund the construction of The Mirage, which opened in Las Vegas in 1989.

The Mirage, with its South Seas tropical theme, represented a large gamble, but would become one of the most successful properties in the history of the gaming industry. The property was one of the first to fully integrate a clear theme throughout the operation and include a signature entertainment feature in the volcano provided free to the public as a marketing hook. The Mirage helped to act as a catalyst during a $5 billion building boom that further established Las Vegas as the fastest-growing

city in the United States and one of the top tourist destinations in the world.

In October 1993, Mr. Wynn's next project, Treasure Island, opened adjacent to The Mirage. Treasure Island, in the same manner as The Mirage, features a prominent theme and signature entertainment. The property has a pirate theme, and several times daily visitors can see at no charge a battle between a pirate ship and a British frigate. The ship battle is complete with actors, cannon fire, and the sinking of the British ship.

Mr. Wynn's final two projects with Mirage Resorts were the elegant and award-winning Beau Rivage in Biloxi, Mississippi, and the Bellagio, which has become the only five-star mega-resort in Las Vegas. Both of these properties opened in 1999 and represent prime examples of the imagination, creativity, and attention to detail for which Steve Wynn is known.

SOL KERZNER

Sol Kerzner, chairman of Sun International Hotels Ltd., has redefined the scope and scale of destination resort/casino development and operation throughout much of the world. Mr Kerzner's company, Sun International Hotels, is an international leader in family entertainment and gaming destinations with over 12 resorts and casinos on Paradise Island, in the Bahamas; in the United States; on the Indian Ocean island of Mauritius; and in the Middle East.

Mr. Kerzner has gained international acclaim for his imaginatively designed, high-quality, spectacular resorts. Examples include the unique $850 million Atlantis, Paradise Island–themed resort, and the exclusive Ocean Club in the Bahamas. Sun International also has a 50% interest in Trading Cove Associates, a partnership created to work with the Mohegan Tribe to develop and manage the Mohegan Sun Casino in Uncasville, Connecticut. Mohegan Sun is currently one of the largest casino resort destinations in the world.

Sol Kerzner's career spans some 40 years in the hotel/resort and casino industries. He founded both of Southern Africa's largest hotel groups, Southern Sun Hotels and Sun International South Africa. He is acknowledged as the architect of the casino-resort industry in sub-Saharan Africa and has contributed significantly to the enormous success that the Indian Ocean island of Mauritius has achieved as a quality tourist destination. One of Mr. Kerzner's best-known projects, Sun International's Sun City complex, including the $267 million African fantasy theme resort, the Lost City at Sun City, was the most ambitious resort development ever conceived in Africa.

With the completion in 1992 of the Lost City and its internationally acclaimed luxury hotel, the Palace of the Lost City, Mr. Kerzner turned his attention to international development. In May 1994, he acquired Par-

adise Island Resorts from Resorts International. The Paradise Island properties, including Atlantis, the Ocean Club, and several other smaller resorts, were placed in a new company named Sun International Hotels Limited.

The 1,147-room Atlantis, Paradise Island, features a marine habitat, offering guests a complete range of water experiences, including several swimming pools, a river ride, one of the Bahamas' most beautiful beaches, and an outdoor, open-air aquarium with millions of gallons of water and more than 100 species of marine life in numerous exhibit lagoons. Entertainment at Atlantis also features a world-class casino, fine themed dining, and sports, which include golf, tennis, and a complete range of water-related activities.

In October 1996, Mr. Kerzner opened the Mohegan Sun gaming resort in Connecticut to a crowd of 60,000 on its first day. Initially, the gaming resort occupied 240 acres on the Thames River and featured an authentic Native American theme celebrating the heritage of the Mohegan Indians, 3,000 slot machines and 180 gaming tables, and more than 20 food and beverage outlets, including specialty facilities for children. Sol Kerzner was born August 23, 1935, in the Johannesburg suburb of Troyeville, the son of Russian immigrants to South Africa. In 1958 he was graduated as a chartered accountant and worked as an accountant with one of Durban's largest firms, rising to become a junior partner by the age of 25.

In 1969, in partnership with South African Breweries, he established the chain of Southern Sun Hotels, which revolutionized tourism throughout the country and was responsible for the leisure resort of Sun City. By 1983 the company was operating 30 luxury hotels with more than 5,000 rooms. These covered a broad spectrum of city and resort establishment complexes. From 1969 to 1983, Southern Sun's net income grew at an annual compound growth in earnings per share of more than 30%.

In 1983, Kerzner decided to concentrate on casino resorts within the company's portfolio and sold his shares in Southern Sun to focus on Sun International (South Africa). Having acquired control of the hotel-casino interests of Southern Sun Hotels, he shortly thereafter acquired the hotel-casino interests of Rennies Consolidated Holding Limited, and this transaction gave Sun International control of the major casino resorts in southern Africa.

GAMING CONTROL

HISTORY OF GAMING CONTROL IN NEVADA

When Assembly Bill 98 became law in 1931, the responsibility for enforcement of the law rested with the local authorities. Cheating and operating without a license were illegal, and it was the county sheriff's job to see that these things did not happen. Since the county received 75% of the table tax, it was also the sheriff's responsibility to serve as the tax collector. Anyone seeking a gaming license had to be approved by a local five-member board made up of the sheriff, the local district attorney, and three county commissioners.

Local gaming control and enforcement lasted until 1945, when Nevada lawmakers imposed a 1% tax on the gross gaming win for each casino, which was to be collected in addition to the table tax. A requirement was also established at this time providing for casino operators to obtain a gaming license from the state as well as the local authorities. Once the tax on gross gaming win was established, responsibility for issuing the license and collection of the tax was assigned to the State Tax Commission, which was made up of the governor as chairman and six commissioners.

Estes Kefauver

In 1950, a U.S. Senator from Tennessee named Estes Kefauver chaired a Senate committee investigating organized crime's influence in America. The final report issued by the committee was highly critical of Nevada's regulatory environment and had the following to say:

> The licensing system which is in effect in the state has not resulted in excluding undesirables from the state, but has merely served to give their activities a seeming cloak of respectability. (U.S. Congress, 1951)

When the Tax Commission began issuing gaming licenses, all currently licensed operators were merely "grandfathered in" and no attempt was

made by the Commission to clean house (Skolnick, 1978, p. 117). Many of the licensed operators were either members of or had connections with organized crime.

In testimony before the committee, Nevada's lieutenant governor admitted that little or no effort had been made to screen applicants. The publicity of the hearings brought national prominence to Kefauver. In 1956, Kefauver ran second to Adlai Stevenson as the Democrats' choice for president (Vallen, 1988, p. 12).

Nevada's legislature realized that if gaming was to continue to prosper, changes had to be made to clean up the industry. Consequently, the Gaming Control Board (the Board) was created by the legislature in 1955. The Board's sole responsibility was to keep undesirables out of the industry. To accomplish this, the Board began conducting a thorough background investigation of each gaming license applicant. After completing its investigation, the Board would make a recommendation to the Tax Commission as to whether the applicant should receive a license. The ultimate decision on licensing still rested with the Tax Commission regardless of the Board's recommendation.

This approach to licensing lasted until 1959, when the current Gaming Control Act was passed. The Gaming Control Act relieved the Tax Commission of any authority concerning gaming and established a Gaming Commission that was to act in unison with the Gaming Control Board to govern the industry.

Nevada Gaming Control

Whether in Nevada, Atlantic City, or Deadwood (South Dakota), gaming control has three common objectives:

1. To ensure that gaming is conducted honestly. This is accomplished by the prevention of cheating and fraud by both the casino's customers and management.
2. To ensure that the industry is free from corruption and the involvement of organized crime. This is accomplished by preventing unsavory or unsuitable persons from having any direct or indirect involvement in gaming.
3. To ensure that all taxes owed are properly paid. This is accomplished by maintaining strict control over the financial practices of the licensee.

In Nevada, the responsibility for achieving these objectives rests with the Gaming Commission and the Gaming Control Board. The organizational chart shown in Fig. 2.1 depicts these two agencies.
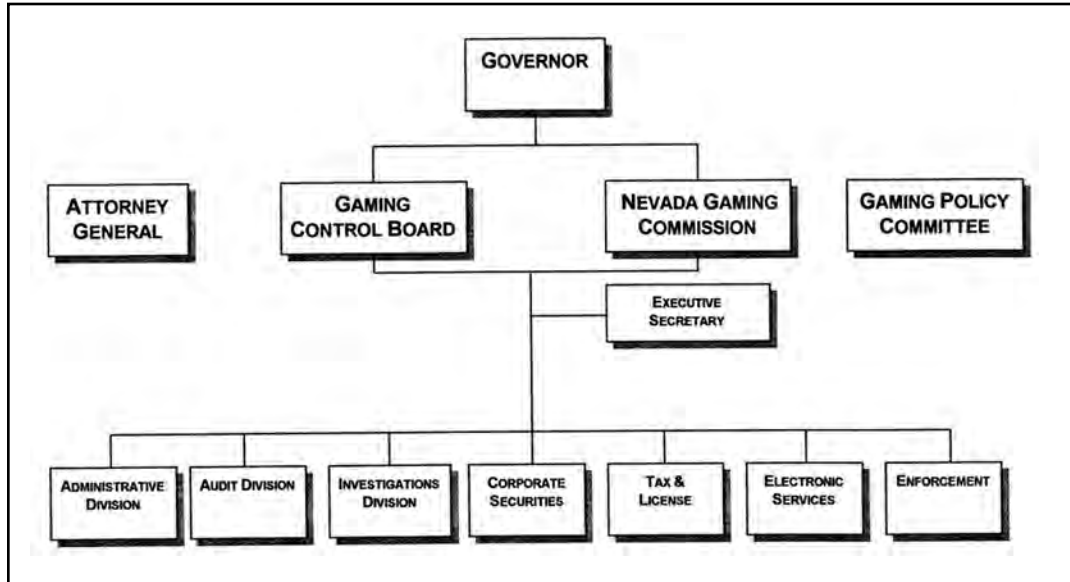
Figure 2.1   Nevada Gaming Control Organizational Structure

The Gaming Commission

Nevada's Gaming Commission has two primary responsibilities: (1) to enact all gaming regulations and (2) to serve as the final authority on all licensing and disciplinary matters. The five members of the Commission are appointed by the governor to four-year terms. Interestingly enough, in view of their enormous responsibility, the Commission members serve in a part-time capacity.

In selecting the members of the Commission, the governor can choose whomever he or she wishes, provided that:

1. No more than three Commission members are from the same political party,
2. None of the Commission members is actively engaged in or has a direct interest in gaming, and
3. Preferably, no more than two members are from the same occupational area.

Gaming Control Board

The Board's primary responsibilities are to protect and police the casinos (Goodwin, 1985, p. 46). The Board is made up of three members who are

also appointed by the governor and serve four-year terms, similar to members of the Commission. One distinct difference between the Board and the Commission is that the Board members are full-time rather than part-time. The Gaming Control Act dictates to the governor whom he cannot choose for the Commission and, in contrast, whom he must choose for the Board. Individuals selected to be Board members must be proficient in certain areas of expertise.

The chairman of the Board must have five years of sound administrative experience. One member must be a certified public accountant with five years of experience in general accounting, or be an expert in corporate financing, auditing, economics, or gaming. The third member must have full training and experience in the field of investigations, law enforcement, law, or gaming. Most often, this member is either an attorney or a retired police official. The various departments of the Board are assigned to those members with the necessary functional skills.

Divisions of the Board

Investigations   When an individual submits an application for a gaming license, the Investigations Division of the Board conducts a routine, but thorough, background investigation. In completing the background investigation, Board personnel will contact law enforcement agencies where the applicant has lived, as well as the Federal Bureau of Investigation (FBI). Investigative agents with the Board fall into either the background or financial category (Vallen, 1988, p. 19). The applicant bears the entire cost of the investigation, including all agent salaries and travel expenses.

Enforcement   The Enforcement Division serves as the law enforcement arm of the Board. Each agent has police officer authority and routinely conducts undercover observations of gaming licensees. In addition, this division:

1. Investigates player disputes,
2. Reviews surveillance systems,
3. Inspects and approves gaming tokens,
4. Investigates and enforces the casino's compliance with the regulations and general standards of operations,
5. Arrests anyone attempting to cheat the casino, and
6. Reviews all existing and new work card permits.

Audit   The Audit Division is the largest division of the Board. All agents hold accounting degrees, and the majority are certified public accountants. Every three years, each Group I and II licensee will be audited by

Audit Division staff to determine whether the proper gaming and entertainment taxes were reported and whether compliance has been maintained with gaming regulations. The Audit Division also reviews and evaluates the internal control system of each licensee, monitors the financial stability of each licensee, and monitors compliance with currency transaction reporting requirements (see Chapter 5).

Attorney General

In addition to the divisions listed, a staff of attorneys has been assigned to the Board and Commission by the Attorney General's office. The primary responsibility of the attorneys is to serve as legal counsel to the Board and the Commission.

Gaming Policy Committee

The Gaming Policy Committee was established in 1961 to give the governor a voice in policymaking. The exclusive purpose of the Committee is to discuss gaming policy, and its recommendations are advisory only and nonbinding to either the Gaming Control Board or the Gaming Commission. The Committee meets on an ad hoc basis at the request of the governor and has not been convened since 1984. The expertise of the Committee members should yield sound advice concerning policy. The nine-member Committee is chaired by the governor, and the remaining eight members come from the following agencies and professions:

1. One member from Nevada's Gaming Commission
2. One member from Nevada's Gaming Control Board
3. One member from the State Senate
4. One member from the State Assembly
5. Two representatives from the general public
6. Two representatives of gaming licensees

The Board and the Commission designate their representatives, and the remaining six members are appointed by the governor.

Gaming Licensing

The Nevada Supreme Court has repeatedly upheld its 1931 decision that casinos are "privileged enterprises." There is a general rule that persons have a constitutional right to engage in "useful trades and occupations." Casinos are not considered useful trades and occupations; hence, it is a privilege to operate a casino. Federal court has ruled that "gaming is a privilege reserved to and conferred by the state and does not carry with it those rights inherent in useful trades and occupations."

In addition to being a privilege to operate a casino, it is also a privilege to work in a casino as a key employee, and to gamble in a casino. Any of these rights can be summarily taken away by the Board and the Commission (Goodwin, 1985, p. 52).

All companies, their officers, and principal owners must be licensed or found suitable. Anyone seeking a gaming license must first prepare an application and submit it to Applicant Services, a subdepartment of the Investigations Division. As mentioned earlier, the applicant bears the entire cost of the investigation. Once the application is prepared, it is reviewed and an estimate is made as to how much the investigation will cost. The applicant then prepays this estimated cost.

The application is submitted to the Board, at which time an investigative team is assigned to the case. After the investigation, the applicant appears before the Board to answer any questions that have arisen from the background and financial investigation. The Board then makes a recommendation as to the suitability of the applicant. Approximately two weeks later, the applicant comes before the Commission for another independent review. At the end of their questioning, the members of the Commission will vote on whether the applicant should receive a license.

The recommendation made by the Board determines what the Commission must do if the applicant is to be licensed. If the Board unanimously recommends against licensing, then a unanimous vote by the Commission is required for the license to be granted. If the Board unanimously recommends licensing or this vote is split, then only a majority of Commission votes are necessary for approval or denial.

Classifications of Nevada State Gaming Licenses

The type of casino the applicant chooses to operate determines the type of license that is necessary. Nevada gaming licenses are either restricted or nonrestricted.

Restricted   If the applicant chooses to operate no more than 15 slots and no table or poker games, then a restricted license must be obtained. In addition, the machines must be incidental or adjunct to the primary business.

Nonrestricted   An applicant wishing to operate more than 15 slots and/or one or more table games (including poker) and/or a race book or sports pool must first obtain a nonrestricted gaming license. Two other types of gaming licenses qualify as nonrestricted: a stand-alone race book or sports pool, and a slot route operator's license. A slot route operator's license allows the holder to place slot machines in licensed locations and share in profits without being named on the license issued to the location.

Hotel Room Requirements

Effective July 1, 1992, the state of Nevada requires a minimum number of hotel rooms before it will issue a nonrestricted state gaming license for a casino to be newly constructed. In the past, the number of hotel rooms was only a local requirement. Under current requirements, the applicant must have at least 200 rooms before the state will issue the license if the population of the county is 100,000 or greater. If an applicant wishes to open a race book or sports pool only, the hotel room requirement does not apply.

In addition to the state license, the applicant must secure a local license. Local jurisdictions have their own requirements before issuing a license. If the local room requirement is greater than the state requirement, then the local requirement applies. For example, a casino must have at least 20 slots and/or three or more table games for the city of Reno to classify the casino as nonrestricted.

Any casino operation classified as nonrestricted in Reno must have at least 300 hotel rooms before a local gaming license will be issued. The state requirement is met at "200 rooms," but another 100 rooms are required before Reno will issue the local license. Whenever the state and local room requirements differ, the larger requirement must be met before the casino can open.

In Clark County, 300 rooms are required before a nonrestricted gaming license is issued. In all cases, increases in the room requirement are not made retroactive. That is, you are allowed to operate with the rooms required at the time the license was issued.

What the Commission Is Looking for in an Applicant

Any approval by the Commission will not be granted unless the Commission is satisfied that:

1. The applicant is a person of good character, honesty, and integrity.
2. The applicant's background, reputation, and association will not result in adverse publicity for Nevada and its gaming industry.
3. The applicant has adequate business competence and experience for the role for which application is made.
4. Funding for the operation is adequate and from a suitable source.

Key Employee Licensing, Finding of Suitability, and Work Permits

Two other types of approval are needed in addition to the approval to operate a casino: the approval to work in the casino as a key employee and the finding of suitability approval.

Finding of Suitability An individual may be called forward by the Commission to be found suitable. In these cases, the individual must be found suitable to continue his or her relationship with the licensee. Typically, those called forward for suitability are individuals who have influence or a relationship with a licensee, but who are not directly involved in the control of the gaming operation. The following classes of individuals are those most likely to be called forward for a finding of suitability:

1. Mortgage holders
2. Landlords
3. Lessors of property and equipment
4. Lenders
5. Junket representatives
6. Those doing business on the premises
7. Those providing goods or services

Key Employee Licensing   When three or more members of the Commission believe that the public interest would best be served by having a key employee licensed, then the employee must be licensed. Regulation 3.110 states the following:

> Any executive, employee, or agent of a gaming licensee having the power to exercise a significant influence over decisions concerning any part of the operation of a gaming licensee or who is listed or should be listed in the annual employee report required by Regulation 3.100 is a key employee.

Twice each year, each nonrestricted licensee is required by Regulation 3.100 to submit an Employee Report. The report includes the following categories of employees who are actively engaged in the administration or supervision of the casino operation:

1. All individuals who make more than $75,000 annually
2. Any individual who can approve casino credit limits
3. Any individual who can approve the use of rim credit
4. Any individual who can extend a player's credit limit by the greater of 10% or $1,000
5. Any individual who can recommend or approve the settlement or write-off of a credit instrument
6. Any individual who has the authority to hire or terminate supervisory casino personnel
7. Any individual who is a gaming or security shift manager
8. Any individual who has the authority to authorize complimentaries for other than food or beverage; examples include complimentaries extended for rooms or airfare

9. All individuals with the authority to manage the following departments: accounting; food and beverage; cage; credit and collections; personnel; internal audit; security; surveillance; entertainment; sales and marketing
10. Any individuals who can enter into a contractual arrangement that is binding on the licensee and is reportable under Regulation 8.130 (Transaction Reports)
11. Any individual who has been represented to the Board or Commission by the licensee as being important to the operation of the gaming establishment
12. Any person who individually or in conjunction with a group formulates management policy

As you can see, the annual Employee Report may include dozens of employees, but few are ever called forward for key employee licensing or suitability. Key employees are restricted from gambling in the casinos where they work. Therefore, it is important to note what Regulation 5.013 says:

> No officer, director, owner or key employee of an entity which holds a gaming license in this state shall play or place a wager at any gambling game, slot machine, race book or sports pool which is exposed to the public for play or wagering: (a) by that gaming licensee; or, (b) at or within the establishment which is owned or operated in whole or in part by that gaming licensee. This regulation shall not apply to the playing of or wagering on poker or panguingui.

Work Permits   A work permit of some form is required in most gaming jurisdictions. The work permit generally provides a photograph of the employee and must be in the possession of the employee while on duty. Work permits are issued by state or local authorities in most jurisdictions.

ATLANTIC CITY GAMING

In November 1976, this question was presented to the voters of New Jersey:

> Shall the Constitution be amended, as agreed to by the Legislature, to authorize the Legislature to establish and regulate gambling casinos in Atlantic City, with the State's revenues therefrom being applied solely to reduce property taxes, rentals, and telephone, gas, electric and municipal utilities charges of eligible senior citizens and disabled residents of the State?

Once referred to as "the Queen of resorts," Atlantic City in 1976 was a decaying city (Pollack, 1987, p. 22) which had become populated largely with criminals, con artists, and prostitutes. In the year before the gambling referendum was presented to the voters, Atlantic City:

- Was one of the nation's most distressed cities
- Had lost 25% of its population in the preceding 15 years
- Was the poorest city in the state by a dozen different measures
- Was top in the FBI's crime statistics in seven different categories
- Included a concentration of elderly people that made it the second oldest city in the nation
- Had a 20% unemployment rate in-season and a 40% rate off-season

The time was certainly right for the gambling issue to pass, and it did, by a three-to-two margin. The introduction of the gambling bill had as its main objective the restoration of Atlantic City.

Gaming Control in Atlantic City

Before the gaming act was passed by New Jersey's legislators, the jurisdictions of Nevada, Puerto Rico and Great Britain were visited to determine the best control model. After these different models of control were reviewed, the Casino Control Act was passed in 1977 and became regarded as the toughest ever enacted in the United States.

The Casino Control Act created two agencies to control Atlantic City gambling: the Casino Control Commission and the Division of Gaming Enforcement. These two agencies are very similar to their Nevada counterparts—the Gaming Commission and the Gaming Control Board, respectively.

Casino Control Commission

The Casino Control Commission is an independent division of New Jersey's Department of Treasury. The Commission is composed of five members appointed by the governor to five-year terms. When the Casino Control Act was first passed, it stipulated that only the chairman would serve in a full-time capacity, with the remaining commissioners serving part-time. The legislators later decided that the workload and responsibility of the Commission was too great for part-time members. Consequently, the Act was amended to provide that all commissioners would serve full-time. As in Nevada, no more than three members of the Commission can be from the same political party (N.J.S.A., 5:12–51, 1988).

The duties of the Commission are to (1) enact all gaming regulations and (2) serve as the final authority on all licensing and disciplinary matters. In addition, the Commission must be present through its inspectors

and agents at all times during the operation of any casino, and has the responsibility of collecting all fees and taxes due the state. Provisions for the continuous presence of Commission personnel represented a significant departure from the gaming control model employed by Nevada.

Division of Gaming Enforcement (DGE)

The DGE has only one director, appointed by the governor, who reports directly to the State Attorney General. The director's term coincides with that of the governor. Once the governor decides not to run or is defeated, the director of the DGE's term expires.

The duties and responsibilities of the DGE are much the same as those of Nevada's Gaming Control Board:

1. The investigation of all applicants for a gaming license, followed by a recommendation to the Commission as to whether the applicant should be licensed
2. Reviews and audits of casino operations
3. Enforcement of the Casino Control Act and its regulations
4. Prosecution of licensee violators before the Commission
5. Performance of continuing reviews of operations through on-site observations to ensure compliance with the Act and Regulations

The DGE's findings serve only as a recommendation to the Commission and, as opposed to their standing in Nevada, have no impact on the way the Commission members must vote in order for an applicant to receive approval. Nor does the director's recommendation determine how many Commission votes are necessary for applicant approval. In New Jersey, for an applicant to be approved as an operator, he or she must receive four yes votes. Approval for employee licensing requires only a simple majority.

New Jersey's Casino Control Commission has forced several gaming giants out of the industry, most notably William T. O'Donnell, Bally's chairman and president at the time, and Clifford and Stuart Perlman, major stockholders of Caesars World. As the result of adverse background investigations, the Casino Control Commission forced all three to divest themselves of their respective companies before permanent licenses would be issued (Demaris, 1986, pp. 196, 206). Hugh Hefner experienced the ire of New Jersey's regulators when the Playboy Club came up for licensing; he received only three of the four minimum votes necessary for licensing. In this case, Hefner was not willing to sell his interest in Playboy, and, as a result, Playboy was not issued a permanent casino license.

Classifications of New Jersey's State Gaming Licenses

Unlike Nevada, Atlantic City offers only one type of gaming license, which is a nonrestricted license that includes a requirement of at least 500 rooms before the license will be issued.

Licensing

In addition to the companies, their officers, and principal owners, most employees in Atlantic City also have to be licensed. Three categories of employees must be licensed: Key License (category 1), Gaming License (category 2a), and Nongaming License (category 2b).

Key License   Includes casino and hotel policymakers, ranging from the general manager/president and casino manager to the pit bosses. On the hotel side, positions included range from the vice president of hotel operations to the director of food and beverage.

Gaming License   Applies to those directly involved in the operation of the gambling: floorpersons, dealers, boxmen, and the like.

Nongaming License   Applies to those who work in a casino but are not directly involved in the play of the games, such as cocktail waitress, maintenance, mail delivery, or any job that requires access to the casino floor.

INDIAN GAMING

Indian gaming is the most rapidly developing segment of the domestic gaming industry (see Table 2.1). Before the Pilgrims set foot on Plymouth Rock, North America was populated by hundreds of Indian tribes. Each tribe existed as a "sovereign government," which meant that the tribes governed themselves as independent states. The concept of owning land came with the European settlers.

In exchange for land, the Indians entered into treaties with European nations, and later the United States, that guaranteed the tribes' continued recognition as sovereign nations. In 1831, in *Cherokee Nation v. Georgia,* the Supreme Court ruled that Indian nations have the full right to manage their own affairs, govern themselves internally, and engage in political and legal relationships with the federal government. Basically, what exists today are states within states.

Gaming has long been a part of tribal culture. Many of the traditional games are still played today at Indian ceremonies and celebrations. The tribes have always believed that they have the right to conduct gaming on Indian lands. In *California v. Cabazon* (1987), the Supreme Court upheld

Table 2.1 Growth in Tribal Gaming (1997 to 2001)

Gaming Revenue Range	1997		2001		Change (2001 over 1997)			
	Number of Operations	Revenue (in thousands)	Number of Operations	Revenue (in thousands)	Number of Operations	%	Revenue (in thousands)	%
$100 million and over	15	$3,298,611	39	$ 8,398,523	24	160.00%	$5,099,912	154.61%
$50 to $100 million	22	$1,676,320	19	$ 1,415,755	–3	–13.64%	–$260,565	–15.54%
$25 to $50 million	35	$1,182,924	43	$ 1,528,611	8	22.86%	$345,687	29.22%
$10 to $25 million	52	$ 890,465	57	$ 976,442	5	9.62%	$85,977	9.66%
$3 to $10 million	53	$ 311,960	51	$ 340,019	–2	–3.77%	$28,059	8.99%
Under $3 million	89	$ 91,167	81	$ 76,029	–8	–8.99%	–$15,138	–16.60%
	266	$7,451,447	290	$12,735,379	24	9.02%	$5,283,932	70.91%

Source: National Indian Gaming Commission.

the tribes' rights as sovereign nations to conduct gaming on Indian lands, free of state control, if similar gaming is permitted within the state where the reservation is located.

The U.S. Congress further clarified this right with the passage of the Indian Gaming Regulatory Act (IGRA) in 1988. The Act established the judicial framework that governs Indian gaming. It also established the National Indian Gaming Commission within the Department of Interior (see Fig. 2.2). The National Indian Gaming Commission (NIGC) is composed of three members:

- A chairman, who is appointed by the president of the United States with consent of the Senate, and
- Two associate members appointed by the Secretary of the Interior.

Each member is appointed to a three-year term and must pass a rigorous background investigation by the U.S. Attorney General. Before appointment, each member must show that he or she:

- Has not been convicted of a felony or gaming offense, and
- Has no financial interest or management responsibility for any Indian gaming management contract.

Further, IGRA established three classes of games with specific controls for each:

- **Class I gaming** is defined as traditional Indian gaming and social gaming for minimal prizes. Regulatory control is vested exclusively in tribal governments.
- **Class II gaming** is defined as the game of chance commonly known as bingo (whether or not electronic, computer, or other technological aids are used in connection therewith) and, if played in the same location as the bingo, pull tabs, punch boards, tip jars, instant bingo, and other games similar to bingo. Class II gaming also includes non-banked card games, that is, games that are played exclusively against other players rather than against the house or a player acting as a bank. The Act specifically excludes slot machines and electronic facsimiles of any game of chance from the definition of Class II games. Tribes retain their authority to conduct, license, and regulate Class II gaming so long as the state in which the tribe is located permits such gaming for any purpose and the tribal government adopts a gaming ordinance approved by the Commission. Tribal governments are responsible for regulating Class II gaming with Commission oversight.
- **Class III gaming** includes all forms of gaming that are neither Class I nor Class II. Games commonly played at casinos, such as slot machines, blackjack, craps, and roulette, fall in the Class III category, as
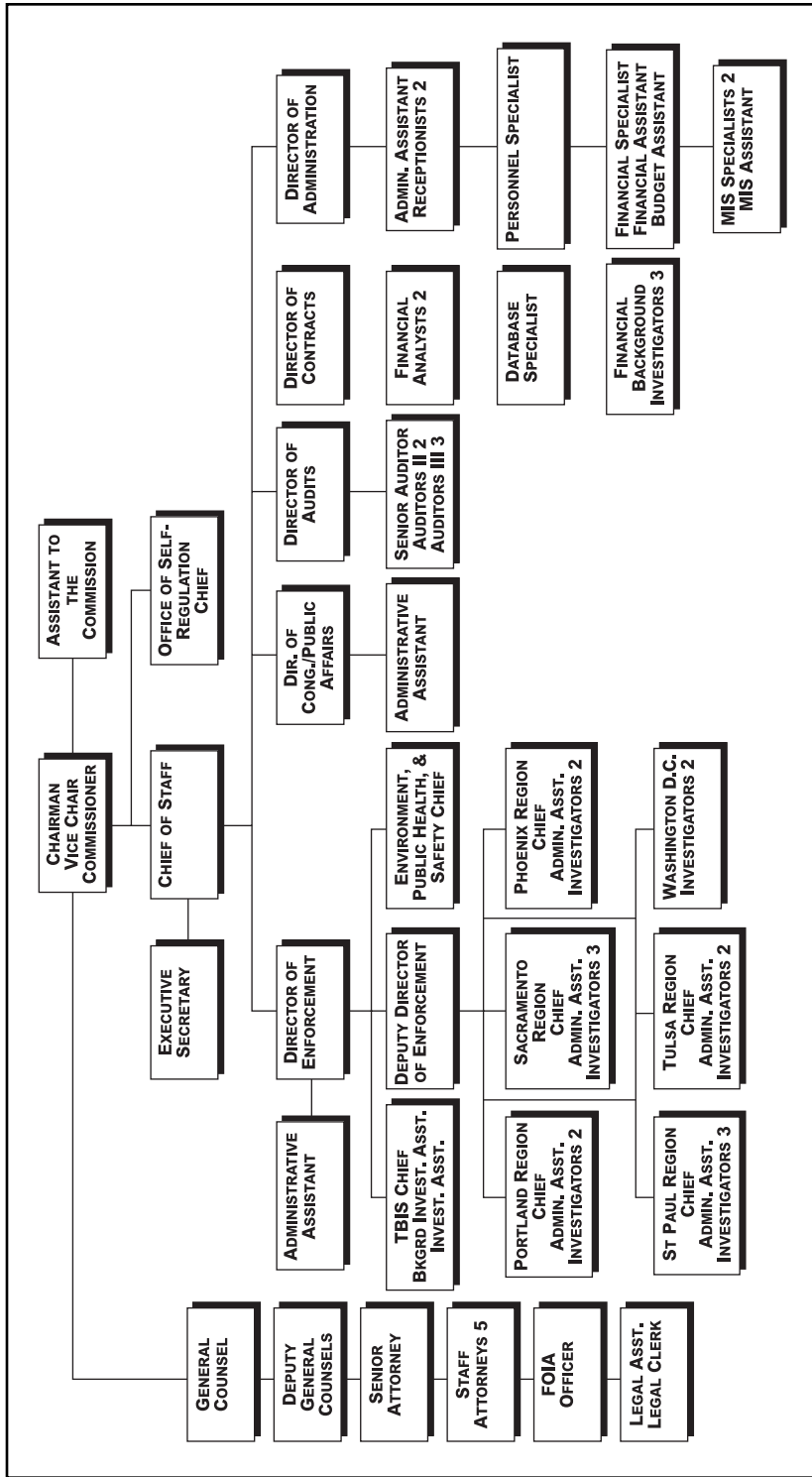
Figure 2.2 NIGC Organizational Chart

well as wagering games and electronic games of chance. Class III is often referred to as casino-style gaming. The Indian Gaming Regulatory Act established how Class III gaming is to be regulated. IGRA requires the negotiation of a gaming "compact" for Class III gaming between the tribe and the state where the tribe is located. It is the tribal/state gaming compact that specifies how the regulatory activity is to be carried out, as well as in what role the tribal gaming commission (as the primary regulator) will serve, and in what role the state's regulatory arm will serve.

Powers of the Commission

(a) Budget approval; civil fines; fees; subpoenas; permanent orders. The NIGC shall have the power, not subject to delegation—

(1) Upon the recommendation of the Chairman, to approve the annual budget of the Commission;

(2) To adopt regulations for the assessment and collection of civil fines;

(3) By an affirmative vote of not less than two members, to establish the rate of fees that are paid by each Class II or Class III gaming activity regulated by the Commission;

(4) By an affirmative vote of not less than two members, to authorize the Chairman to issue subpoenas; and

(5) By an affirmative vote of not less than two members and after a full hearing, to make permanent a temporary order of the Chairman closing a gaming activity.

(b) Monitoring; inspection of premises; investigations; access to records; mail; contracts; hearings; oaths; regulations. The NIGC—

(1) Shall monitor Class II gaming conducted on Indian lands on a continuing basis;

(2) Shall inspect and examine all premises located on Indian lands on which Class II gaming is conducted;

(3) Shall conduct or cause to be conducted such background investigations as may be necessary;

(4) May demand access to and inspect, examine, photocopy, and audit all papers, books, and records respecting gross revenues of Class II gaming conducted on Indian lands and any other matters necessary to carry out the duties of the Commission;

(5) May use the United States mail in the same manner and under the same conditions as any department or agency of the United States;

(6) May procure supplies, services, and property by contract in accordance with applicable federal laws and regulations;

(7) May enter into contracts with federal, state, tribal, and private entities for activities necessary to the discharge of the duties of the Commission and, to the extent feasible, contract the enforcement of the Commission's regulations with the Indian tribes;

(8) May hold such hearings, sit and act at such times and places, take such testimony, and receive such evidence as the Commission deems appropriate;

(9) May administer oaths or affirmations to witnesses appearing before the Commission; and

(10) Shall promulgate such regulations and guidelines as it deems appropriate.

Powers of the Chairman

(a) The Chairman, on behalf of the Commission, shall have power, subject to an appeal to the Commission, to—

(1) Issue orders of temporary closure of gaming activities;

(2) Levy and collect civil fines;

(3) Approve tribal ordinances or resolutions regulating Class II gaming and Class III gaming; and

(4) Approve management contracts for Class II gaming and Class III gaming.

Before a tribe can offer any Class II gaming, the tribe must first adopt an ordinance outlining how the gaming will be regulated. The Chairman must approve this ordinance. The ordinance must provide that:

1. Net revenues from gaming are not to be used for purposes other than:
   a. The funding of the tribal government operations or programs,
   b. To provide the general welfare of the Indian tribe and its members,
   c. To promote tribal economic development, and,
   d. To donate to charitable organizations or
   e. To help fund operations of local government agencies.
2. Annual audits are conducted by outside agencies,
3. All contracts for supplies, services, or concessions for amounts in excess of $25,000 annually (except contracts for professional legal or accounting services) related to gaming shall be subject to independent audits,
4. The construction and maintenance of the gaming facility and the operation of the gaming is conducted in a manner that protects the environment, public health, and safety, and
5. There is a licensing system that ensures that:
   a. Background investigations are conducted on primary management officials and key employees of the gaming enterprise and
   b. Include a means of licensing primary management officials and key employees of the gaming enterprise, with prompt notification to the Commission of the issuance of such licenses, and

  c. A standard whereby any person whose prior activities, criminal records, reputation, or habits and associations pose a threat to the public interest or to the effective regulation of gaming shall not be eligible for employment, and

  d. Notification by the tribe to the Commission of the results of such background check before the issuance of any such license.

6. Net revenues from any Class II gaming operation conducted or licensed by the tribe may be used to make per capita payments to members of the Indian tribe, provided:

  a. The tribe has prepared a plan to allocate revenues,

  b. That plan has been approved by the Secretary of the Interior, and

  c. The interests of minors and other legal incompetents entitled to receive payments are protected and preserved, and

  d. The disbursements are subject to federal taxation.

Class III gaming is lawful on Indian lands if:

1. The gaming is authorized by an ordinance or resolution that
2. Is adopted by the governing body of the tribe that has jurisdiction over such lands,
3. The form of gaming is permitted within the state where the Indian lands are located, and
4. Is conducted in accordance with a tribal-state compact entered into by the Indian tribe and the state.

Tribal-State Compact

Any tribe seeking to operate Class III gaming must request the state, where the Indian lands are located, to enter into negotiations for the purpose of creating a tribal-state compact. Before taking effect, the compact must be approved by the Secretary of the Interior. The compact will address:

1. The application of criminal and civil laws and regulations of the Indian tribe or the state that are directly related to the licensing and regulation of the gaming,
2. The allocation of criminal and civil jurisdiction between the state and Indian tribe necessary for enforcement of such laws and regulations,
3. The assessment by the state of any monies in such amounts necessary to defray the cost of regulating the gaming,
4. The taxation of the Indian tribe in amounts comparable to those assessed by the state for comparable activities,
5. Remedies for breach of contract,

6. Standards for operation, maintenance, and licensing of the gaming facility, and,

7. Any other subjects directly related to the operation of the gaming facility.

Management Contracts for Class III Gaming

Tribes choosing to offer Class III gaming may initially lack the management experience necessary to construct and operate a sophisticated gaming operation. Consequently, the NIGC established a means for a tribe to enter into a management contract with individuals, or a company, more experienced in the field of gaming. Class III management contracts are subject to the following:

- All contracts must be approved by the chairman of the NIGC;
- The tribe and company must provide to the chairman the names, addresses, and other pertinent background information on each person or entity having a direct financial interest in, or management responsibility for, such contract. If a public corporation, this information must be provided to the chairman for each individual who serves on the board of directors and each of its stockholders holding 10% or more of its outstanding stock;
- A description of previous experiences each person has had with Indian gaming contracts and the gaming industry in general;
- A complete financial statement of each individual having a direct financial interest in, or management responsibility for, such contract;
- The management fee shall not exceed 30% of the net revenues unless the management entity has provided a significant capital investment. If the chairman is satisfied with the capital investment and income projections, he or she may approve a fee of not more than 40% of net revenues;
- The contract term shall not exceed five years, except that, upon the request of the tribe, the chairman may authorize a term that exceeds five years but does not exceed seven years.

Commission Funding

As of 2002, the schedule of fees paid annually to the Commission by each gaming operation that conducts Class II and Class III gaming is:

- No more than 2.5% of the first $1,500,000, and
- No more than 5% of amounts in excess of $1,500,000 of the gross revenues from regulated gaming activities, and
- No more than $8,000,000 per year per gaming activity.

Reservation Land

Tribes are permitted to buy land and place it in trust, thereby making the land part of the reservation. The NIGC established October 17, 1988, as the date that land must be in trust in order for the tribe to offer Class III gaming. Exceptions to this date are: (1) Such lands are located within or contiguous to the boundaries of the reservation as of October 17, 1988, (2) the Indian tribe had no reservation on October 17, 1988, (3) such lands are in Oklahoma and are located within the boundaries of the Indian tribe's former reservation, (4) such lands are contiguous to other land held in trust or restricted status by the United States for the Indian tribe in Oklahoma, or (5) such lands are located in a state other than Oklahoma and are within the Indian tribe's last recognized reservation within the state.

Indian Gaming Facts (from http://indiangaming.org/library/index.html)

SIZE
- Total number of federally recognized Indian tribes: 562.
- Number of tribal governments engaged in gaming (Class II or Class III): 201.
- Number of tribal governmental gaming operations: 321 (several tribes operate more than one facility).
- Number of states with tribal governmental gaming (Class II or Class III): 29
- Number of tribal-state gaming compacts: 249.

REVENUE
- Tribal governmental gaming revenue in 2001: $12.7 billion (less than 10% of total gaming industry).
- Many tribes operate gaming facilities primarily to generate employment.

EMPLOYMENT
- Total number of jobs: 300,000.
- National percentage of Indian to non-Indian employees: 25% Indian, 75% non-Indian.
- In areas of high unemployment like North and South Dakota, 80% of tribal governmental gaming employees are Indian.

LAND
- IGRA requires that land taken into trust status must (1) benefit the tribe, (2) *not* be detrimental to the surrounding community, and (3) be approved by the state governor.
- Only 23 total land-into-trust acquisitions since 1988 for gaming purposes.
- Only 3 off-reservation land-into-trust acquisitions since 1988 (only 78 total acres).

PER CAPITA PAYMENTS

- Three-fourths of gaming tribes devote all of their revenue to tribal governmental services, to economic and community development, to neighboring communities, and to charitable purposes, and do not give out per capita payments.
- Tribal government services, economic and community development, general tribal welfare, charitable donations, and any requirements for aid to local governments must be provided for before a tribe can file for a "Revenue Allocation Plan."
- The Secretary of the Interior must approve any per capita payments as part of a "Revenue Allocation Plan."
- Only about one-fourth of tribes engaged in gaming distribute per capita payments to tribal members (73 tribes).
- Tribal members receiving per capita payments pay federal income tax on these payments.

REGULATION

Tribal governmental gaming is regulated on three levels:

- Indian nations are primary regulators of Indian gaming. Under the Indian Gaming Regulatory Act (IGRA), tribes establish the basic regulatory framework for Indian gaming.
- State regulation may be included in tribal/state compacts for Class III gaming.
- Federal agencies enforce laws relating to Indian gaming, including the National Indian Gaming Commission, the Interior Department, the Justice Department, the FBI, the IRS, the Secret Service and the Treasury Department's Financial Crimes Enforcement Network.

Federal law makes it a crime punishable by up to ten years in prison to steal, cheat, or embezzle from an Indian gaming operation, and that law is enforced by FBI 18 USC § 1163.

CHAPTER THREE

GAMING TAXES

GAMING TAXES

When gambling was first legalized in Nevada in 1931, the only levy was in the form of a table tax or slot machine fee. Card games were assessed $25 monthly, table games $50 monthly, and slot machines $10 monthly. This levy lasted for 14 years until March 28, 1945, when Nevada's state legislature imposed a 1% tax on any gross casino win over $3,000 per quarter through Senate Bill No. 142. This gross win tax was in addition to the table tax already in place. The governor, E. P. Carville, opposed the tax and attached the following note to the bill:

> Senate Bill 142 imposes on the gambling business a type of tax which the State of Nevada has avoided in the past as a matter of policy. It has been strenuously argued that the gambling business is in an entirely different category from what we may, for the mere sake of differentiation, term legitimate business.
>
> I feel, however, that with the State making this departure from its fixed policy, the effort will be made to extend the imposition of this type of taxation, and that the wiser course would have been to avoid this type of taxation, and obtain a just contribution from the gambling business by imposing a higher license fee.
>
> Approximately two years of operation under Senate Bill No. 142 will make available to the next Legislature most valuable information, such as: the amount actually realized by this 1% tax; the workability of this law; the difficulties, if any, encountered in its enforcement. Present guesses may be supplanted then by definite information, which will enable the Legislature to weigh the situation for taking intelligent action thereon.
>
> It is for these reasons that I have permitted Senate Bill No. 142 to become law.
>
> Respectfully submitted,
> E. P. Carville
> Governor

The governor was certainly right about one thing: ". . . the effort will be made to extend the imposition." In the next legislative session, the gross win tax was increased to 2%.

Gaming Taxes—Nevada

Nevada's nonrestricted casinos are required by NRS 463.370 to prepare monthly reports (Figs. 3.1 and 3.2) to determine their tax liability. A cash method of accounting is used, which means that the casino does not pay gaming taxes until the funds are collected. The tax is calculated as follows: preceding month's gross gaming win minus any credit issued during the month that is still outstanding at month's end; plus any previously issued credit that is collected during the month; equals the gross gaming win figure on which the tax is assessed.

Once the gross gaming win is calculated, the licensee pays taxes at the following rates:

- 3.5% on all gross gaming revenues of $50,000, or less, per month
- 4.5% on the next $84,000 in monthly gross gaming revenues
- 6.75% on all monthly gross gaming revenues greater than $134,000

Casino credit plays a major role in many of the larger casinos. For example, Bellagio, The Mirage, Caesars Palace, MGM Grand, and the Venetian rely to a great extent on premium players for casino revenue. One thing that premium players generally have in common is that they play on credit. Interestingly, the state of Nevada requires the payment of taxes not at the time the credit is extended, but at the time the credit is repaid by the player. Repayment of credit for premium players may not occur for an extended period of time because of the large dollar amounts involved, which results in a deferral of the associated gaming tax.

Often casinos find it necessary to "settle" a marker for an amount less than the face value. When a settlement occurs, NRS 363.371 provides for payment of the gaming tax only on the money actually collected by the casino. Credit instruments are often settled to:

1. Induce partial payment
2. Compromise a dispute
3. Retain a patron's business for the future

Frequently, in today's competitive market, an agreement is reached between the casino and a premium player to discount the face amount of any subsequent credit instruments to induce timely payment. For example, a deal may be negotiated between a player and the casino whereby, if the player loses, he receives a 10% discount on his losses. If the player wins, he is paid the actual dollar amount of the winnings. Discount

NGC-01 (08-01-03)

NEVADA GAMING COMMISSION
Monthly Gross Revenue Report

This report, together with your remittance payable to the order of the NEVADA GAMING COMMISSION, is required to be filed MONTHLY, NOT LATER THAN THE 24th DAY OF THE MONTH, covering the preceding calendar month.

For Gaming operations during the month of:
Filing Deadline:

Account No., Name, Address, Zip Code

Please correct if in error

For Office Use Only

Check Number _____

Batch Number _____

Entry Date _____

1. **GROSS REVENUE** before adjustments [from NGC-31] $_____

2. **ADJUSTMENTS:**
   A. Cage credit issued $_____
   B. Collections in areas other than the pit
   C. Net of return checks
   D. **NET ADJUSTMENTS** [Line 2A + 2B +/- 2C] _____

3. **LOSS CARRY-OVER:** from _____ Reg. 6.110(7)
   [not to exceed Line 1 + Line 2D] _____

4. **GROSS REVENUE** $ [Line 1 +/- Line 2 – Line 3] $_____

5. **LICENSE FEE COMPUTATION:** NRS 463.370(1)
   A. 3.5% of the first $50,000 on line 4 $_____
   B. 4.5% of the next $84,000 on line 4
   C. 6.75% of the remainder of line 4

6. **ESTIMATED FEE DUE BASED ON GROSS REVENUE** [Line 5A + 5B + 5C] $_____

7. **ESTIMATED FEE ADJUSTMENT** NRS 463.370(5)(b)
   A. Current month's actual FEE DUE [Line 6] $_____
   B. Est. payment on _____ (_____)
   C. Estimated Fee Adjustment [Line 7A – 7B] _____

8. **SUBTOTAL** [Line 6 +/- Line 7C] _____

9. **CREDIT from PRIOR PERIOD** [not to exceed Line 8]
   Total CREDIT available _____ _____

10. **SUBTOTAL** [Line 8 – Line 9] _____

11. **ADVANCE ESTIMATED PAYMENT** NRS 463.370(3) [THREE (3) times the amount on Line 6]
    Note: Applies only to the first FULL month of operation for a NEW LICENSEE _____

12. **TOTAL DUE BEFORE PENALTY** [Line 10 + Line 11] _____

13. **PENALTY FOR LATE PAYMENT:** NRS 463.270(5)
    A. Fewer than 10 days late: 25% of line 12 but not less than $50 or more than $1000. $_____
    B. Ten or more days late: 25% of line 12, but not less than $50 or more than $5,000.
    PENALTY DUE [Line 13A or Line 13B] _____

14. **TOTAL AMOUNT DUE:** [Line 12 + Line 13] $_____

15. **TOTAL REMITTANCE** Check Number: _____ $_____

Please make remittance payable to the Nevada Gaming Commission and return to
State Gaming Control Board, Tax and License Division, P.O. Box 8004, Carson City, NV 89702-8004

I, _____ , certify and declare under the penalties of perjury that I am the
_____ of the business named above; that this is a true, correct and complete report
(Owner, Partner, President, Treasurer, Other-describe)
to the best of my knowledge, information, and belief; and that this application and report is made with the knowledge and consent of all other individuals licensed.

Dated _____   Signed _____

Person to contact regarding this report: Name: _____   Phone: _____

RETURN ORIGINAL AND MAKE DUPLICATE FOR YOUR RECORDS

Figure 3.1   Monthly Gross Revenue Report (Form NGC-01)

NEVADA GAMING COMMISSION – MONTHLY GROSS REVENUE STATISTICAL REPORT

NGC-31
(01-23-02)

Group: _____

FILING DEADLINE FOR
THIS REPORT:

For Gaming operations during the month of:

(For Commission Use Only)

SECTION A

CODE	SLOT MACHINES	NO. OF UNITS	COINS IN ($)	DROP ($)	GROSS REVENUE ($)
010	1 Cent				
011	5 Cent				
012	10 Cent				
013	25 Cent				
014	50 Cent				
015	$1.00				
016	Megabucks				
017	$5.00				
018	$25.00				
020	$100.00				
021	$500.00				
022	Multi Denomination				
024	Other Denominations				
053	Adjustments				
	TOTALS				

SECTION B

CODE	TABLE GAMES	NO. OF UNITS	PIT CREDIT ISSUES ($)	PIT CREDIT PAYMENT (CHIPS)($)	PIT CREDIT PAYMENT (CASH)($)	DROP ($)	WIN ($)	GROSS REVENUE ($)
002	Craps							
003	Roulette							
001	Twenty-One							
005	Wheel of Fortune							
007	Mini-Baccarat							
006	Baccarat							
037	Pai Gow							
056	Caribbean Stud							
057	Let It Ride							
039	Sic-Bo							
044	Red Dog							
043	Pai Gow Poker							
059	3-Card Poker							
009	Other Games							
	(Describe Below):							
050	Adjustments							
	TOTALS							

PROGRESSIVE KENO (Check One)? ☐ Yes ☐ No

ACCOUNTING METHOD USED FOR RECORDING
RACE AND SPORTS BOOK REVENUE (Please Check One):
☐ CASH: All cash wager received for the day less
all cash paid out for day.
☐ MODIFIED ACCRUAL: All wagers for the events
completed for the day less cash paid out.

The HASH TOTAL is a number comprised of the following
subtotals added together.

SECTION A: ("NO. OF UNITS" TOTAL CONVERTED TO DOLLARS)
        ("COINS IN" TOTAL)
        ("DROP" TOTAL)

SECTION B: ("NO. OF UNITS" TOTAL CONVERTED TO DOLLARS)
        ("PIT CREDIT ISSUES" TOTAL)
        ("PIT CREDIT PAYMENTS" (CHIPS) TOTAL)
        ("PIT CREDIT PAYMENTS" (CASH) TOTAL)
        ("DROP" TOTAL)
        ("WIN" TOTAL)

SECTION C: ("NO. OF UNITS" TOTAL CONVERTED TO DOLLARS)
        ("WRITE" TOTAL)

SECTION D: ("NO. OF UNITS" TOTAL CONVERTED TO DOLLARS)

SECTION C

CODE	COUNTER GAMES	NO. OF UNITS	WRITE ($)	GROSS REVENUE ($)
025	Keno			
026	Bingo			
035	Race Book			
048	Race Parlay Cards			
052	Race Pari-Mutuel			
034	Sports Parlay Cards			
036	Sports Pool			
004	Football			
008	Basketball			
033	Baseball			
058	Sports Pari-mutuel			
051	Adjustments			
	Totals			

PERSON TO CONTACT
REGARDING THIS REPORT

NAME _____

PHONE NUMBER _____

HASH TOTAL

SECTION D

CODE	CARD GAMES	NO. OF UNITS	GROSS REVENUE ($)
030	Poker		
031	Pan		
032	Other Card Games		
054	Adjustments		
	TOTALS		

TOTAL GROSS REVENUE
(Add Sections A, B, C, D)

Enter on Line 1 of Form NGC-1

I, _____, certify and declare under the penalties of perjury that I am the_____
(Owner, Partner, President, Treasurer, Other)
of the business named above; that this is a true, correct and complete report to the best of my knowledge, information, and belief; and that
this report is made with the knowledge and consent of all other individuals licensed.

Dated _____   Signed_____

**Please return to State Gaming Control Board, Tax and License Division
P.O. Box 8004, Carson City, NV 89702-8004**

Figure 3.2 Monthly Gross Revenue Statistical Report (Form NGC-31)

arrangements of this type also result, under NRS 363.371, in the payment of tax only on the amount actually collected by the casino.

Although such an arrangement appears to cost the casino only 10%, the cost is actually much greater. It is not uncommon, depending on how long the player plays, for a 10% discount to cost the casino as much as 50%. Regardless of how much the player loses, the casino earns only the amount of the theoretical win. Any amount won by the casino over and above this theoretical win amount is only held in escrow by the casino.

NRS 363.371 does provide for some circumstances under which the Gaming Control Board may assess gaming tax on unpaid credit. These circumstances include: failing to obtain the player's signature or other written acknowledgment of the debt; failing to obtain the player's address; failing to provide evidence that a reasonable effort was made to collect the debt; failing to provide evidence that the casino checked the player's credit history prior to extending credit; and requesting that the unpaid balance not be confirmed at the time of an audit by the Gaming Control Board. The Statute also provides certain exemptions related to slot machines, such as the cost of personal property distributed to a player as the result of a winning wager.

Atlantic City's Gaming Taxes

The tax rate in Atlantic City is 8% of the adjusted win paid on an annual basis. The adjusted win is equal to the gross win less the smaller of 4% of the gross win or the provision for bad debt. A casino in Nevada can afford to be more daring in issuing credit since taxes are not generally payable on any uncollected amounts. In New Jersey, the casino must still pay a large amount of the tax even if none of the outstanding credit is collected. Consequently, bad credit issuance decisions result in a substantial cost as far as the gaming tax is concerned.

INTERNAL CONTROL SYSTEMS

In April 1968, Nevada's gaming regulators adopted Regulation 6. One of its primary objectives was to increase assurance that casino licensees were properly paying the required amount of gaming taxes. Regulation 6 requires each nonrestricted licensee to maintain detailed records pertaining to any revenue subject to gaming taxes or fees for a period of at least five years. Failure by a casino licensee to maintain records as required may be determined by the chairman to be following an unsuitable method of operation. In a situation where records supporting taxable gaming revenue cannot be evidenced by the licensee, the Gaming Control Board may use other means to determine the amount of tax that should have been paid.

Regulation 6 also requires each casino licensee to establish administrative and accounting procedures providing for control over the internal

fiscal affairs of the licensee. The procedures must be designed in a manner to reasonably ensure the following:

1. Assets are safeguarded.
2. Financial records are accurate and reliable.
3. Transactions are properly authorized by management.
4. Transactions are properly recorded to facilitate reporting of gaming revenue and taxes, and to maintain accountability of assets.
5. Access to assets is through specific authorization by management.
6. Asset accountability is periodically compared with actual assets and discrepancies are investigated.
7. Adequate segregation of functions, responsibilities, and duties exists.

The casino licensee is required by Regulation 6 to submit a written system of internal controls that describe the administrative and accounting procedures established by the licensee. The written system of internal controls (the system) is lengthy and covers every department subject to gaming or entertainment tax. The document must address: administrative and accounting procedures; duties and responsibilities of personnel, organization, and structure; physical safeguards and controls and detailed operating procedures as they relate to the gaming areas. The chief financial officer and chief executive officer (or licensed owner) must submit a signed letter attesting to the system's compliance with the requirements of Regulation 6.

In 1987, Regulation 6 was revised to include Minimum Internal Control Standards (MICS), which were developed and issued by the Gaming Control Board. The MICS established specific control procedures that were required to be in place within the operation of each nonrestricted licensee. Licensees were required, at the time the MICS were initially adopted, to revise their systems to comply with the MICS requirements. MICS were established for the following areas: table games; slots; bingo; keno (computerized); race and sports book; card games; cage and credit; entertainment; internal audit; and currency transaction reporting.

Alternative procedures that provide adequate control may be approved by the chairman based on a written request for a variance by the licensee. Otherwise, the licensee is expected to comply with the MICS. The licensee is required, on an annual basis, to have an independent accountant perform a comparison of the system submitted by the licensee to the MICS and to issue a report that identifies any procedures the accountant believes do not satisfy the MICS or any variations from the MICS granted by the chairman. The report must also include responses from licensee management addressing any items of apparent noncompliance noted.

The last revision to the MICS occurred on May 1, 1997. As part of this revision, MICS were established for electronic data processing. The Minimum Internal Control Standards for all gaming areas are available through the State of Nevada's website by accessing the Gaming Control Board Audit Division area. During 2002 and early 2003, the Nevada Gaming Control Board was in the process of making substantial revisions to the MICS, which become effective on January 21, 2004.

DIFFERENCES BETWEEN NEVADA'S AND NEW JERSEY'S INTERNAL CONTROLS

As is the case in Nevada, New Jersey regulators also require nonrestricted gaming licensees to submit a system of internal controls, which become their operational regulations. In Nevada, the licensee has broad latitude in creating the internal control system that best suits the operation, whereas in New Jersey there is little flexibility in this process. Table 3.1 illustrates how Nevada and New Jersey differ in their requirements for internal controls.

Table 3.1   Internal Controls Requirements, Nevada and New Jersey

Nevada	*New Jersey*
• Each casino presents its system of internal controls to the Board. • Each system is evaluated, individually, against a set of basic minimum standards of operation and control. • If these minimum standards are met, the casino is allowed to operate using its own methods and style of internal controls. • Even though the basic minimum standards are the same, each Nevada casino may have a different way of operating.	• All systems of internal control are prescribed by statute and leave little room for innovation or changes.

C H A P T E R   F O U R

CASINO MANAGEMENT

THE MANAGEMENT PYRAMID

One of the keys to success for a casino, or any business venture, is the effectiveness of the management team. The experience and organization of the management team have a direct impact on the profitability of the casino operation. The mission of this chapter is to present and discuss the organizational structure of a typical casino and hotel along with descriptions of the responsibilities of a number of the key positions within the operation. The chapter also provides a discussion of how to determine the number of employees needed to staff these key positions.

Although every department and position is equally important to the success of the organization, only the positions within the casino department or those that are integral to the day-to-day operations are detailed. At the bottom of the chart are the front-line employees, including dealers, cage cashiers, and change attendants. Toward the top of the chart are the management positions, including the games manager, the director of casino marketing, and the vice president of casino operations.

As employees move up within the organizational structure, the skills necessary to perform the job functions change. Front-line employees need technical skills to fulfill their position responsibilities, whereas employees at the top of the chart require fewer technical skills and more management skills. The *management pyramid* (Fig. 4.1) depicts the relationship between the skills required and the level of the management.

CASINO ORGANIZATIONAL STRUCTURE

The organizational structure presented in Figs. 4.2 and 4.3 would be found at a typical casino in many different gaming jurisdictions. Variations based on the size of the operation, as well as the number and type of games offered, are common. The reporting relationships and the assignment of responsibilities may also vary, depending on a number of variables, ranging from the skills and experience of the particular individuals
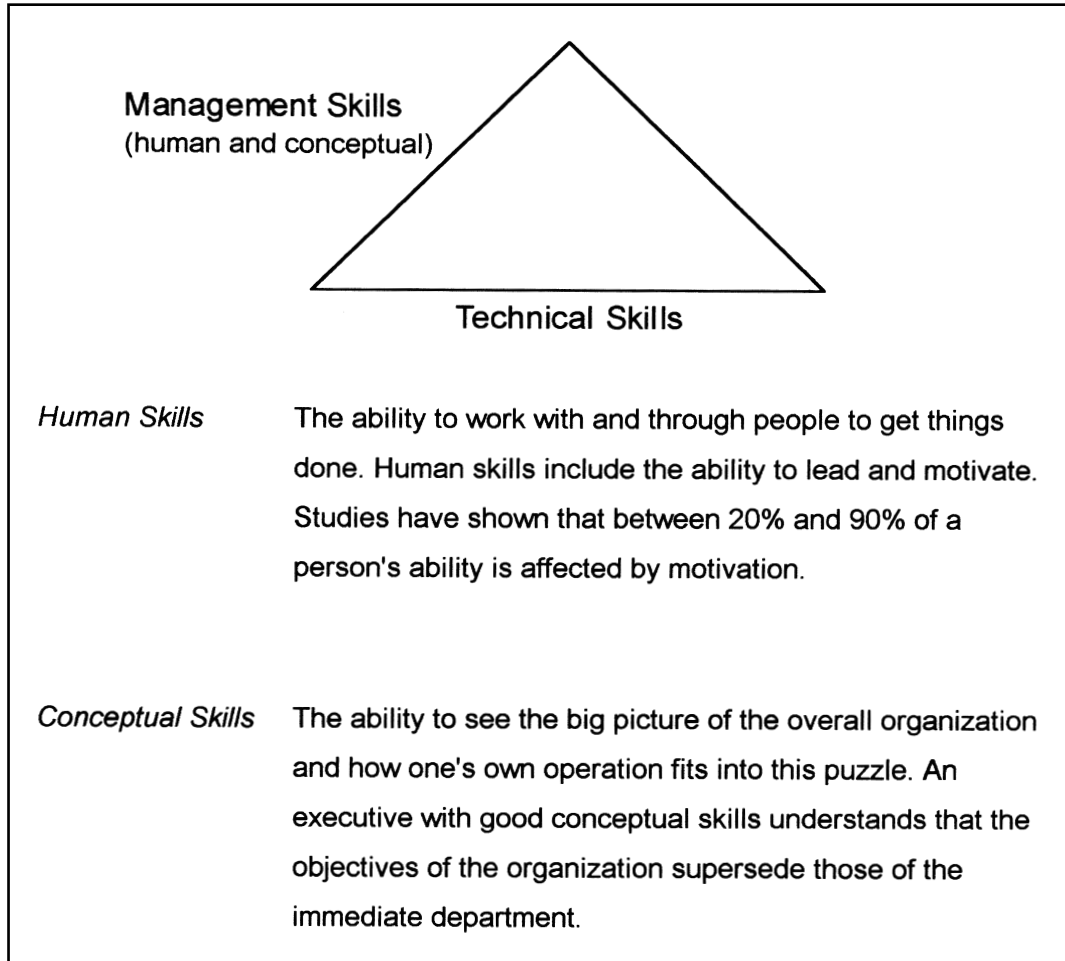
Management Skills
(human and conceptual)

Technical Skills

Human Skills   The ability to work with and through people to get things done. Human skills include the ability to lead and motivate. Studies have shown that between 20% and 90% of a person's ability is affected by motivation.

Conceptual Skills   The ability to see the big picture of the overall organization and how one's own operation fits into this puzzle. An executive with good conceptual skills understands that the objectives of the organization supersede those of the immediate department.

Figure 4.1   The Management Pyramid

to requirements within the specific gaming jurisdictions. These variations are too numerous to be addressed in this chapter.

The typical organization starts with the president and branches out, based on functional responsibilities. The departments are divided along functional lines to provide for specialization as well as separation of responsibilities for accountability and control. The vice presidents of security, human resources, and finance all perform responsibilities that require them to operate independently of the operating department heads.

For example, it would not be in the best interest of the operation for the director of surveillance, who is responsible for monitoring activity within the casino, to report directly to the vice president of casino operations. Although at first glance there might appear to be some benefits to aligning the
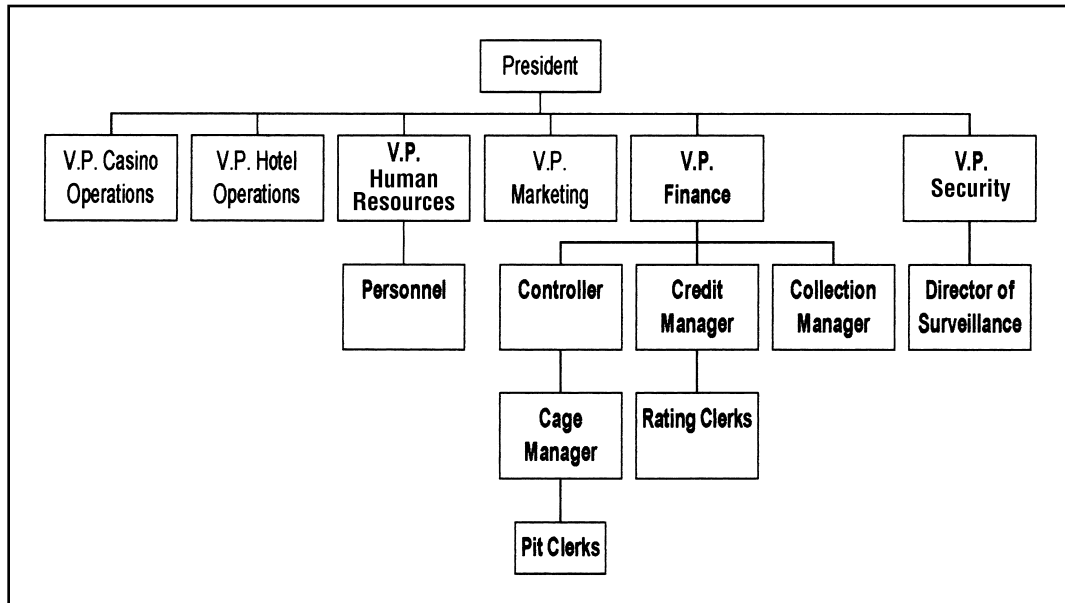
Figure 4.2   Typical Casino Hotel Structure and Noncasino Departments of Particular Importance to Casino

organization in this manner, the director of surveillance must be free to perform responsibilities that include reporting on regulatory violations observed, as well as infractions noted involving casino personnel. The director of surveillance and his or her staff are a key part of the protection of the gaming operation and its assets, and any impairment of these responsibilities has a direct impact on the success of the operation.

Generally, the vice president of finance reports to the president directly. Depending on the ownership structure of the casino, the vice president of finance may instead have a direct reporting relationship to a representative of the owners. The vice president of finance is a key position in any casino organization, since the responsibilities of this position include establishing and tracking performance against budgetary guidelines, auditing the results of operations, regulatory compliance, and, in most casinos, overseeing the cage, credit, and collection functions. This individual is not only a check and balance on the other operating departments, but is also responsible for safeguarding the assets, including the cash maintained for the day-to-day operation of the casino.

The following are brief position descriptions for many of the key positions indicated in the organizational chart presented (Fig. 4.2) relevant to noncasino departments:

- President (General Manager)—Responsible for the overall operation of the casino, including the hotel and all related operations. The re-
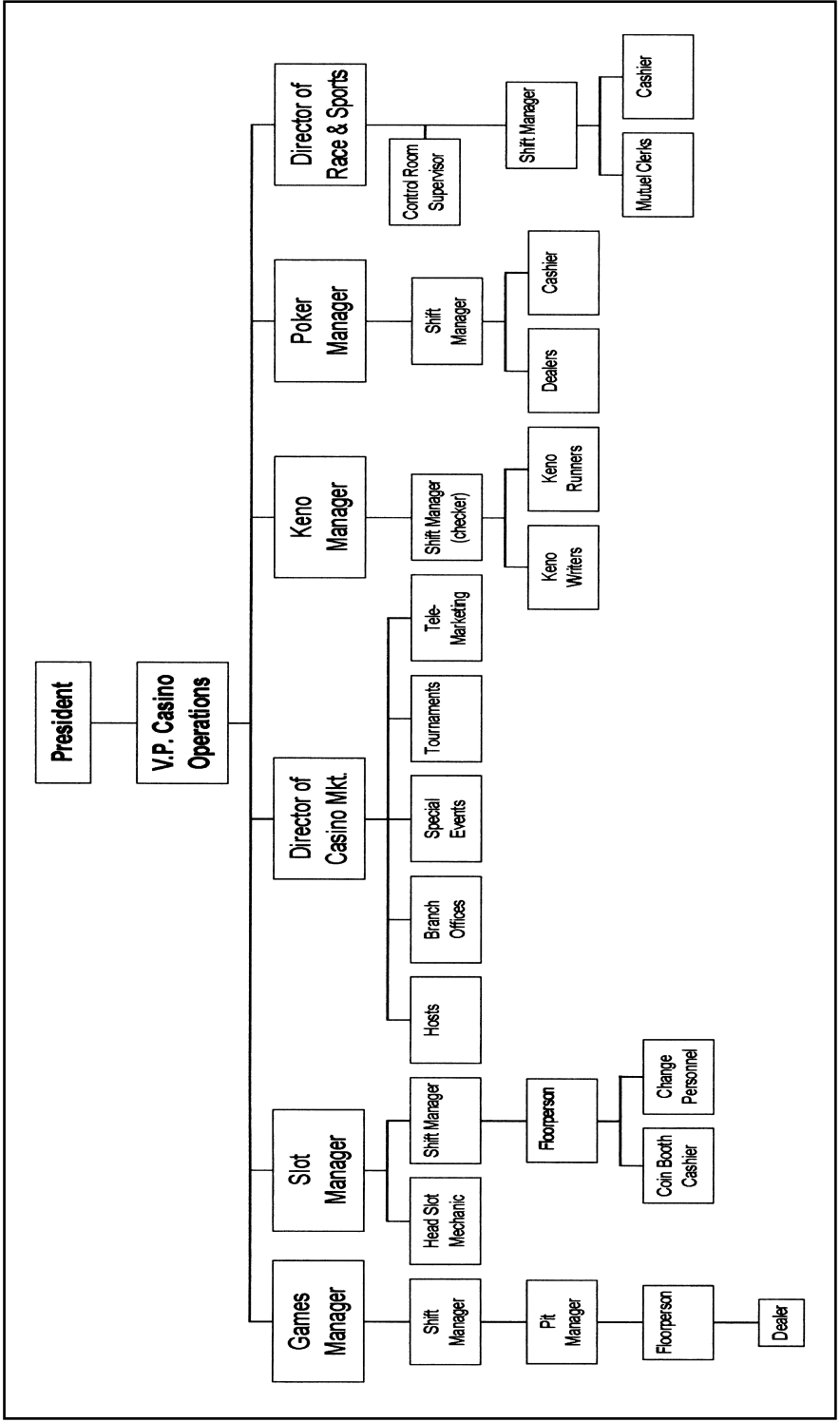
Figure 4.3 Typical Casino Structure

sponsibilities of this position are strategic as well as day-to-day in nature. Ultimately, all personnel report to the president. The person in this position reports to representatives of the owners.

- Vice President of Finance—Responsible for all financial activities for the operation. Direct reports normally include accounting, cage, credit, collections, information systems (IS), and purchasing.
- Vice President of Casino Operations—Responsible for the overall operation of the casino, including slots, table games, and other gaming operations such as keno, race and sports, and poker. Gaming and gaming compliance are two critical areas of responsibility for this individual.
- Vice President of Human Resources—Responsible for employment, compensation, benefits, labor relations, training, and workers' compensation functions, as well as compliance with applicable federal, state, and local requirements pertaining to these areas.
- Vice President of Security—Responsible for surveillance, security, investigations, safety, and risk management, which includes handling insurance issues and guest loss complaints.

The following are brief descriptions for many of the key positions indicated in the organizational chart presented (Fig. 4.3) relevant to the typical casino structure:

Table Games
- Games Manager (Casino Manager)—Responsible for table games operations and personnel. Supervises the shift managers.
- Shift Manager—Responsible for the operation of table games and the associated personnel during a particular shift. Supervises the pit managers and all other table games personnel during the shift.
- Pit Manager—Responsible for overseeing the operation of the table games in a designated pit. Supervises the floorpersons and dealers within the pit and is also responsible for customer relations and games protection.
- Floorperson—Responsible for supervising the operation of a group of table games within a pit. Supervises the dealers at the assigned tables. Also responsible for compliance with house rules and rating player action.
- Dealer—Responsible for the operation of a given table game. Dealers must comply with house rules for the conduct of the particular game.
- Pit Clerk—Completes pit transactions such as fills, credits, and markers through the use of the casino computer system or manually. This position may report to either cage or casino supervisory personnel.

Slots
- Slot Manager—Responsible for the operation of the slot department, including selection of machines and determination of floor configura-

tion, as well as machine maintenance and operation. Supervises the shift managers and head slot mechanic.

- Shift Manager (Slots)—Oversees the operation of the slot department, including all personnel during a particular shift. Responsibilities include customer relations and verification of large jackpot payouts.
- Head Slot Mechanic—Responsible for the maintenance and repair of all slot machines. Also maintains records pertaining to all slot machines, including location, par sheets, and any changes to the machine. Supervises and trains all of the slot mechanics.
- Floorperson—Responsible for participating in the verification and conduct of jackpot payout and hopper fill transactions. Supervises change attendants and booth cashiers.
- Change attendants—Perform customer service transactions, including making change. Also responsible for an assigned bank.
- Booth cashiers—Responsible for completing jackpot payout and hopper fill transactions. Also responsible for making change and redeeming coins for slot customers.

Casino Marketing
- Director of Casino Marketing—Responsible for all aspects of marketing the casino, including developing and maintaining a database of customers. Also responsible for designing and implementing programs to attract new and repeat customer visits. Oversees operation of the slot club, casino hosts, branch offices, tournaments, and special events.
- Hosts—Responsible for identifying and attracting new casino customers, as well as servicing the needs of the existing customer base.

Other Casino Departments
- Keno Manager—Responsible for the operation of the keno department including staffing, customer relations, game integrity, compliance with gaming regulations, and financial performance.
- Keno Shift Manager—Responsible for the operation of the keno game during a particular shift. Involved in verifying payouts on winning tickets.
- Keno Writer and Runner—Provides service to customers by accepting wagers and handling payouts on winning tickets. Writers are based behind the keno counter, whereas runners go to where customers may be, such as restaurants and lounges.
- Poker Manager—Responsible for the operation of the poker department, including staffing, customer relations, game integrity, compliance with gaming regulations, and financial performance.
- Poker Shift Manager—Responsible for the operation of the poker games during a particular shift. May perform as the poker cashier as well as conducting tournament activities.

- Poker Dealer—Responsible for the operation of a given poker table. Dealers must comply with house rules for the conduct of the particular game.
- Director of Race and Sports—Responsible for the operation of the race and sports department, including staffing, customer relations, game integrity, compliance with gaming regulations, and financial performance.
- Race and Sports Shift Manager—Responsible for the operation of the race and sports book during a particular shift. Race and sports shift managers are responsible for administrative functions relevant to updating event information in the computer system as well as verifying payouts on winning wagers.
- Race and Sports Writer (Mutuel Clerk) and Cashier—Provide service to customers by accepting wagers and handling payouts on winning tickets.

Security and Surveillance
- Security Officer—Responsible for protecting the assets of the casino. Participates in casino transactions, including table fills and credits, and may participate in slot transactions, including jackpot payouts and hopper fills. Observes card and dice transfers and maintains security over the drop and count process. Controls access to keys permitting access to sensitive and restricted areas.
- Director of Surveillance—Responsible for the operation of the surveillance department, including staffing, games and guest protection, communicating with regulatory authorities, asset protection, and monitoring compliance with rules surrounding game conduct (house rules), gaming regulations, and internal control procedures.
- Surveillance Officer—Observes, records, and reports suspicious or improper activities within the casino operation. Focus is on compliance with gaming regulations, house rules, internal control procedures, and asset protection.

CASINO HOTEL SYSTEMS

Computer systems have become an integral part of all aspects of the casino hotel operation. It is common for computer systems to be used to record revenue in gaming areas such as slots and keno, as well as other casino hotel areas including hotel operations (front desk, room reservations, etc.), retail, restaurants, spa, and ticketing (box office), to name a few. Such systems are also heavily relied upon in the back of the house for operations including accounting, payroll, and purchasing. Understanding these systems and how they are integrated to accumulate and report data is important to successfully managing the casino hotel operation.

Figure 4.4 provides an illustration of typical casino hotel systems, including the purpose, data sources, information flows, and examples of information in the system.

System	Purpose	Data Source(s)	Information Flows to:	Examples of Information in System
Hotel System	To manage the operations of and record related transactions of the hotel operations	Data input at point of transaction; direct interface from other revenue systems, including food and beverage, retail, ticketing, and casino systems; Internet reservations; PBX system	Daily managers' report, general ledger/financial statements, labor analyses/reports, complimentary reports and analyses, other management analyses and statistical reports; food and beverage system; casino system; PBX system, accounts receivable system	Room revenue, room rates, room configurations, occupancy, reservations, room rates, housekeeping status, hotel guests
Food and Beverage System	To manage the operations of and record related transactions of the food and beverage outlets department	Data input at point of transaction; direct interface from hotel system	Daily managers' report, general ledger/financial statements, labor analyses/reports, hotel system, IRS tip compliance processing and reporting; inventory purchasing system; gaming required entertainment tax/report filings	Food and beverage revenue, menu items
Casino Systems (Table games and marketing can be one system or two separate interfaced systems)	To manage the operations of and record related transactions of the casino games department	Customer (table games) ratings, hotel system, cage transactions, soft count process, credit and collections transactions/entries	Daily managers' report, general ledger/financial statements, labor analyses reports, complimentary reports and analyses, hotel system, food and beverage system, ticketing system, customer analysis/profitability reports, database marketing mailings and analyses; casino host analyses; casino receivables reports and agings; federal, state, and local government required gaming tax/report filings	Table games revenues, casino customer play, table games statistics, casino customer complimentaries, casino event data, casino marker balances and history
Slot Systems (Slot operations and marketing can be one system or two separate interfaced systems)	To manage the operations and record the related transactions of the slot department; to maintain the slot player club	Transactions at slot machines; hard and soft count process; manual input	Daily managers' report, general ledger/financial statements, labor analyses/reports, complimentary reports and analyses, hotel system, customer analysis/profitability reports, food and beverage system, ticketing system, database marketing mailings and analyses; slot club reporting and analyses; federal, state, and local government required gaming tax/report filings	Slot revenues, slot statistics, slot club customer accounts, machine history

Figure 4.4 (a)   Casino Hotel Systems (Courtesy of Janice Fitzpatrick)

System	Purpose	Data Source(s)	Information Flows to:	Examples of Information in System
Keno System	To manage the operations of and record related transactions of the keno operations	Data input at point of transaction	Daily managers' report, general ledger/financial statements, labor analyses/reports, customer analysis/profitability reports, federal, state, and local government required gaming tax/report filings	Keno revenues, keno game statistics, keno customer information
Race and Sportsbook System	To manage the operations of and record related transactions of the race and sportsbook operations	Data input at point of transaction	Daily managers' report, general ledger/financial statements, labor analyses/reports, customer analysis/profitability reports, federal, state, and local government required gaming tax/report filings	Race and sportsbook revenue, R & S statistics
Retail System	To manage the operations of and record related transactions of the retail operations	Data input at point of transaction; direct interface from hotel system	Daily managers' report, general ledger/financial statements, labor analyses/reports, hotel system	Retail revenues, Item inventory, sales statistics
Ticketing System	To manage the operations of and record related transactions of the entertainment venues	Data input at point of transaction, interface to outside ticketing systems; direct interface from hotel system	Daily managers' report, general ledger/financial statements, labor analyses/reports, hotel system; gaming required entertainment tax/report filings	Event revenue, statistics
Time and Attendance System	To record employees' hours worked	Employees swipe time clocks	Payroll system, daily managers' report, labor analyses/reports, IRS tip compliance processing and reporting	Employee time, employee database
Inventory Purchasing System	To facilitate the purchasing, warehousing, and receiving processes	Manual/electronic input; Internet; food and beverage system	Daily managers' report; accounts payable system; vendor analyses	Inventory items purchased and consumed, restaurant items, purchasing statistics

Figure 4.4 (b)   Casino Hotel Systems (Courtesy of Janice Fitzpatrick)

System	Purpose	Data Source(s)	Information Flows to:	Examples of Information in System
Human Resources/ Payroll	To maintain employee records and to pay employees	Data input or electronic transmission via human resource processing; payroll hours from time and attendance system	Employee records, payroll checks and W-2s, general ledger/financial statements; regulatory reporting; benefit providers/ administrators	Employee files including names, SS#, pay rates, history, deductions, vacation, sick pay
Accounts Payable System	To process and pay invoices/bills	Inventory purchasing system interface; payroll system interface for garnishments and other nonemployee payments; manual input of invoices	General ledger/financial statements; checks for payment of goods and services, regulatory reporting; minority vendor monitoring and reporting	Vendors, payment history, invoice history
Fixed Asset System	To account for company fixed assets and record depreciation expense	Accounts payable, manual input	General ledger/financial statements; IRS tax reporting; fixed asset reports	Capital assets, depreciation records
Accounts Receivable System	To facilitate billing process for hotel operations	Hotel system, manual input	General ledger/financial statements; customer billing statements; accounts receivable reports and aging analyses	Hotel customer transaction history and account balances
General Ledger/ Financial Reporting	To maintain accounting books and report operating results	Payroll, accounts payable, casino, keno, race and sports book, slots, hotel, retail, ticketing, and food and beverage systems through either direct interface or manual input	Financial reports (external and internal); 10-Qs, 10-Ks, etc.	Financial history

Figure 4.4 (c)   Casino Hotel Systems (Courtesy of Janice Fitzpatrick)

STAFFING

Proper staffing levels within the casino contribute directly to the adequacy of customer service and the profitability of the casino operation. Management must be able to forecast the number of anticipated customers who will visit the casino during different periods and provide staffing levels that will be appropriate to service these customers. Overstaffing or understaffing may have negative consequences for the bottom line of the casino.

Overstaffing may result in the casino's incurring labor costs that are unnecessary to meet actual customer demand. Understaffing may result in loss of revenue due to customers leaving the casino because of inadequate service or unavailability of gaming positions at their desired game. Either of these conditions is undesirable for casino management. The following discussion, using a hypothetical casino, provides a methodology for determining proper staffing levels based on the number of tables in operation during different days of the week.

How many employees are needed to staff a casino under the following conditions:

a. Dealers will work 60 minutes at the table, followed by a 20-minute break.
b. Floorpersons will receive breaks totaling 100 minutes out of each 480-minute shift (eight hours).
c. The following numbers of tables are assumed to be required by day for blackjack (BJ), dice, and baccarat:

BJ Tables Open:

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Days	40	40	40	40	60	60	48
Swing	40	40	40	40	60	60	40
Grave	20	20	20	24	24	24	20

Dice Tables Open:

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Days	8	8	8	8	10	10	8
Swing	8	8	8	8	10	10	8
Grave	2	2	2	3	3	3	2

Baccarat Tables Open:

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Days	2	2	2	2	3	3	2
Swing	2	2	2	2	3	3	2
Grave	1	1	1	2	2	2	1

In order to determine the number of employees required to staff the casino under these conditions, the casino manager would need to consider the following:

1. The number of stations needed to be open for each day of the week must be determined. A station is defined as a position that must be staffed for the entire shift. In blackjack, there is one station per game. In craps, there are three stations: the stickman and two base dealers. Relief dealers will be considered in the computations to follow.

BJ Stations Required:

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Days	40	40	40	40	60	60	48
Swing	40	40	40	40	60	60	40
Grave	20	20	20	24	24	24	20

Dice Stations Required:

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Days	24	24	24	24	30	30	24
Swing	24	24	24	24	30	30	24
Grave	6	6	6	9	9	9	6

Baccarat Stations Required:

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Days	6	6	6	6	9	9	6
Swing	6	6	6	6	9	9	6
Grave	3	3	3	6	6	6	3

2. How many dealers are needed to keep the required number of stations open and still allow for 20-minute breaks after every 60 minutes on duty?
    a. If the employee works 60 minutes on and 20 minutes off, the cycle is 80 minutes.
    b. The total stations multiplied by 80/60 (1.33 multiplier) determines the number of dealers needed per shift.
    c. The following indicates the number of employees needed in each gaming pit for Monday:

BJ Employees Needed:

	Mon		
Days	40 $\times \dfrac{80}{60}$	=	53.3
Swing	40 $\times \dfrac{80}{60}$	=	53.3
Grave	20 $\times \dfrac{80}{60}$	=	26.7
Total			133.3

Dice Employees Needed:

	Mon		
Days	24 $\times \dfrac{80}{60}$	=	32.0
Swing	24 $\times \dfrac{80}{60}$	=	32.0
Grave	6 $\times \dfrac{80}{60}$	=	8.0
Total			72.0

Baccarat Employees Needed:

	Mon		
Days	6 $\times \dfrac{80}{60}$	=	8.0
Swing	6 $\times \dfrac{80}{60}$	=	8.0
Grave	3 $\times \dfrac{80}{60}$	=	4.0
Total			20.0

d. If the same method of calculation is applied to each day of the week, the following number of dealer shifts will be needed each week:

	Mon	**Tue**	**Wed**	**Thu**	**Fri**	**Sat**	**Sun**	**Total**
BJ	133.3	133.3	133.3	138.6	192.0	192.0	144.0	= 1066.5
Dice	72.0	72.0	72.0	76.0	92.0	92.0	72.0	= 548.0
Baccarat	20.0	20.0	20.0	24.0	32.0	32.0	20.0	= 168.0

e. Each dealer will work only five of every seven days; therefore, the following numbers of dealers are needed on the payroll to meet the demands of the casino:

BJ   1066.5 ÷ 5 = 213.30
Dice   548.0 ÷ 5 = 109.60
Baccarat   168.0 ÷ 5 =   33.60

f. What about vacations? If only the numbers of dealers indicated above are provided, the casino will not be able to schedule the dealers time off for vacation. To allow for vacation, the average vacation time per employee per year must be determined. If it is assumed each employee will receive a two-week vacation each year, the employee will work 50 weeks out of every 52. Using the same methodology as in number 2 above, the number of dealers needed when vacation is factored in is determined as follows:

BJ $213.30 \times \dfrac{52}{50} = 221.83$

Dice $109.60 \times \dfrac{52}{50} = 113.98$

Baccarat $33.60 \times \dfrac{52}{50} = 34.94$

3. To this point, the total number of dealers on payroll has been calculated so that each works:
   a. 60 out of every 80 minutes,
   b. Only five days out of every seven, and
   c. Receives a two-week vacation each year.

4. The number of floorpersons on staff also needs to be determined. The number of floorpersons needed is calculated in the same manner as for dealers; however, eight hours is considered the cycle for a shift. If floorpersons are scheduled for a one-hour break and two 20-minute breaks each shift, then each employee will work 380 out of every 480 minutes (eight hours in a shift multiplied by 60 minutes).
   a. Based on the number of BJ stations indicated in number 1 above and assuming one floor station is needed for every four BJ tables, the following stations are required:

BJ Floorperson Stations Required:

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Days	10	10	10	10	15	15	12
Swing	10	10	10	10	15	15	10
Grave	5	5	5	6	6	6	5

BJ Floorperson Needed Monday:

						Mon
Days	10	×	$\frac{480}{380}$	=	12.6	13.0
Swing	10	×	$\frac{480}{380}$	=	12.6	13.0
Grave	5	×	$\frac{480}{380}$	=	6.3	7.0
	Total					33.0

b. Using the same method demonstrated with the dealers, the number of floorperson shifts needed each week can be calculated as follows:

	Mon	Tue	Wed	Thu	Fri	Sat	Sun		Total
Days	13.0	13.0	13.0	13.0	19.0	19.0	16.0	=	106.0
Swing	13.0	13.0	13.0	13.0	19.0	19.0	13.0	=	103.0
Grave	7.0	7.0	7.0	8.0	8.0	8.0	7.0	=	52.0

c. If each employee is only to work five days of every seven, how many floorpersons are needed on the payroll?

Days	106.0	÷	5	=	21.20
Swing	103.0	÷	5	=	20.60
Grave	52.0	÷	5	=	10.40

d. Allowing for a two-week vacation for each, how many floorpersons are necessary?

Days	21.20	×	$\frac{52}{50}$	=	22.05
Swing	20.60	×	$\frac{52}{50}$	=	21.42
Grave	10.40	×	$\frac{52}{50}$	=	10.82

If Number of Tables Open Varies Greatly from Day to Day:

The formulas presented may not yield enough employees to staff the busiest day; therefore, the minimum number of employees is determined on the basis of the number required to staff the casino on the busiest day. As an example of this, consider the following:

BJ Stations Required:

	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
Swing	25	25	25	25	60	60	60	=	280 Stations

Table 4.1 Blackjack Opening Game Schedule

	8	9	10	11	12N	1	2	3	4	5	6	7	8	9	10	11	12M
Tables Open	12	12	16	16	20	20	28	28	28	28	32	32	40	40	40	40	40
Dealers Needed	16	16	21.3	21.3	26.7	26.7	37.3	37.3	37.3	37.3							
Dealers Available	16	16	22	22	27	27	38	38	38	38							

SHIFT:

	8	9	10	11	12N	1	2	3	4	5	6	7	8	9	10	11	12M
4 A.M.–12 noon	16	16	16	16													
12 noon–8 P.M.					21	21	21	21	21	21	21	21					
10 A.M.–6 P.M.			6	6	6	6	6	6	6	6							
2 P.M.–10 P.M.							11	11	11	11	11	11	11	11			
Dealers Scheduled	16	16	22	22	27	27	38	38	38	38							
Dealers Available (from above)	16	16	22	22	27	27	38	38	38	38							
Difference	0	0	0	0	0	0	0	0	0	0							

Dealers Needed Daily:

| 33.3 | 33.3 | 33.3 | 33.3 | 80 | 80 | 80 |

The formula indicates 74.67 employees are necessary to staff the casino; however, 80 employees are required to staff the busiest days, which are Friday, Saturday, and Sunday.

$$\left(280 \times \frac{80}{60}\right) \div 5 = 74.67$$

In practice, few casinos have only three dealer shifts per day. Commonly, there may be between four and six different dealer starting times. Table 4.1 illustrates a blackjack opening game schedule, between the hours of 8:00 A.M. and 12:00 midnight, with seven different starting times. Each dealer works 60 minutes on and 20 minutes off.

The opening of the tables should approximate the player demand. In this example, the casino has as few as 12 tables open in the morning, when demand is low, and 40 games open in the afternoon. Using the Tables Open line, determine: (1) why the shifts started when they did and (2) why seven different shifts were needed. Remember, each dealer is to work eight hours. Try to fill in the blank areas.

CURRENCY REPORTING

HISTORY

Concerned that casinos provided a means for drug traffickers to launder their illicit profits, the Secretary of the Treasury made a determination in 1985 that the definition of a financial institution under Title 31 of the Bank Secrecy Act (31C.F.R., Part 103) would be expanded to include casinos. Deemed financial institutions, every casino within the jurisdiction of the U.S. federal government (Nevada, Atlantic City, and Puerto Rico) was required to begin complying with requirements for the reporting of transactions involving more than $10,000 in cash during any 24-hour period. In addition to stopping money laundering, it was hoped that the required reporting would provide the Internal Revenue Service with an increased means of identifying tax evaders.

For years, general businesses such as automobile dealerships, jewelry stores, hotels and even restaurants, have been required to report all cash transactions in excess of $10,000, received in a trade or business, to the Internal Revenue Service (Internal Revenue Service Code 6050I). Before the inclusion of casinos, financial institutions were limited to the following:

1. Banks
2. Brokers or dealers in securities
3. Currency dealers or exchangers
4. Issuers, sellers, or redeemers of traveler's checks or money orders
5. Licensed transmitters of funds
6. Telegraph companies

In May 1985, the following paragraph was added to Title 31:

Each casino shall file a report of each deposit, withdrawal, exchange of currency, gambling tokens or chips, or other payment or transfer, by, through, or to such casino which involves a transaction in currency of more than $10,000. Multiple currency trans-

actions shall be treated as a single transaction if the casino has knowledge that they are by or on behalf of any person and result in either cash in or cash out totalling more than $10,000 during any twenty-four hour period (Code of Federal Regulations ap. 1, Part 103.22).

The classification of casinos as financial institutions was, to say the least, an unwelcome change. Operators believed that the new requirements would discourage or severely curtail the extremely profitable high-end segment (high rollers) of the customer base. The casino industry initially argued strongly against the change, but it became evident after months of dialogue that nothing could be done about the impending reclassification. Casinos would soon report under Title 31.

Nevada's regulators believed that the need for individual casinos to report directly to the Treasury was an intrusion by the federal government that should be avoided if possible. The regulators were successful in persuading the Secretary of the Treasury to allow each jurisdiction, if it so desired, to develop its own method of implementing the controls and reporting procedures necessary to comply with Title 31 requirements. The final decision by the Department of the Treasury gave each gaming jurisdiction two options:

1. Obtain an exemption from direct reporting to the Department of the Treasury by developing its own system of implementing, and monitoring for compliance, the reporting requirements; or
2. Report directly to the Department of the Treasury subject to Title 31 of the Bank Secrecy Act, with the Department of Treasury responsible for monitoring compliance.

Nevada's regulators, with the support of Nevada's gaming industry, decided to develop their own regulatory system for monitoring compliance, which was to become known as Regulation 6A. Before it was implemented, Regulation 6A had to be reviewed and accepted by officials from the Department of the Treasury. After months of negotiations, Nevada's self-regulation model was accepted. Even though Regulation 6A is administered by Nevada's gaming regulators, casinos are still required to submit all reports to the Internal Revenue Service.

Both Atlantic City and Puerto Rico opted for maintaining compliance with the specific requirements of Title 31. In subsequent years, casinos in all other jurisdiction, including Illinois, Indiana, Iowa, Michigan, and Mississippi, along with the Native American casinos, have commenced operations under the currency transaction reporting requirements of Title 31.

NEVADA'S REGULATION 6A MODEL

Prohibited Transactions

There are three types of transactions that are strictly prohibited:

1. Nevada's system is designed to prevent certain methods of laundering money. As a result, cash-for-cash exchange transactions in excess of $3,000 are prohibited. This does not include exchanges of chips or tokens for cash, but does include exchanges of foreign currency for U.S. currency.
2. A casino may not issue its check for cash in an amount exceeding $3,000. The one exception is the issuance of a check for verified winnings. For example, a patron winning a large slot jackpot may receive his winnings by check.
3. Issuing a check or wire transfer for winnings to a third party is prohibited. The check must be issued in the name of the winning patron.

Currency Transaction Reports

The form (Form 8852—see Fig. 5.1) used to report currency transactions under Regulation 6A is known as a Currency Transaction Report by Casinos—Nevada (CTRC-N). This form is comparable to the form used to report currency transactions under Title 31 (Form 103 [formerly Form 8362]—see Fig. 5.2).

Since both Title 31 and Nevada's Regulation 6A require reporting any patron whose total transactions during a 24-hour period exceed $10,000, Regulation 6A provided for a specific methodology for keeping track of multiple transactions. The Multiple Transaction Log (MTL) is designed to provide a written record of all cash transactions exceeding $3,000 in order to facilitate compliance with the aggregation requirements of Title 31. The MTL is used in all gaming areas and the casino cage.

Regulation 6A also requires that in certain situations transactions in amounts less than $3,000 must be combined and included on the MTL if the combined amounts exceed $3,000. An example of this is a situation in which a slot employee pays out a slot jackpot of $2,000 in cash to a customer, and then the same slot employee an hour later pays out another $2,000 jackpot in cash to the same customer, all within the same 24-hour period. In this case, the slot employee would be expected to log a $4,000 amount for the patron on the MTL and note that it was the result of multiple transactions.

Under Regulation 6A, the CTRC-N should include the following information:

1. The date and time of the transaction
2. The amount of the transaction

Form 8852

(May 1997)

Department of the Treasury
Internal Revenue Service

Currency Transaction Report by Casinos—Nevada

▶ Please type or print. ▶ Use this form for transactions occurring after April 30, 1997.

(Complete all applicable parts—see instructions)

OMB No. 1506-0003

1 Check appropriate box(es) if: **a** ☐ Amends prior report **b** ☐ Supplemental report

Part I   **Person(s) Involved in Transaction(s)**

Section A—Person(s) on Whose Behalf Transaction(s) Is Conducted (Patron)   **2** ☐ Multiple persons

3 Individual's last name or Organization's name	4 First name	5 M.I.

6 Permanent address (number, street, and apt. or suite no.)	7 SSN or EIN

8 City	9 State	10 ZIP code	11 Country (if not U.S.)	12 Date of birth M M D D Y Y Y Y

13 Method used to verify identity: **a** ☐ Examined identification credential   **b** ☐ Known patron - information on file   **c** ☐ Organization   **d** ☐ Other _____

14 Describe identification credential:

   a ☐ Driver's license/State I.D.   **b** ☐ Passport   **c** ☐ Alien registration   **d** ☐ Other _____

   e Issued by: **f** Number:

15 Customer account number

Section B—Individual(s) Conducting Transaction(s)—If other than above (Agent)   **16** ☐ Multiple agents

17 Individual's last name	18 First name	19 M.I.

20 Permanent address (number, street, and apt. or suite no.)	21 SSN

22 City	23 State	24 ZIP code	25 Country (if not U.S.)	26 Date of birth M M D D Y Y Y Y

27 Method used to verify identity: **a** ☐ Examined identification credential   **b** ☐ Known patron - information on file   **c** ☐ Other _____

28 Describe identification credential:

   a ☐ Driver's license/State I.D.   **b** ☐ Passport   **c** ☐ Alien registration   **d** ☐ Other _____

   e Issued by: **f** Number:

Part II   **Amount and Type of Transaction(s) (Complete Box 31 or 32)**   **29** ☐ Multiple transactions   **30** ☐ Dissimilar transactions

31 CASH IN: (in U.S. dollar equivalent)

a Purchase of casino chips, tokens, and other gaming instrumentalities $ _____

b Deposit (front money or safekeeping)   _____

c Payment on credit (including markers)   _____

d Table game cash bet lost   _____

e Non-table game cash bet   _____

f Other (specify) _____ _____

g Enter Total Amount of CASH IN transaction . ▶ $ _____

32 CASH OUT: (in U.S. dollar equivalent)

a Redemption of casino chips, tokens, and other gaming instrumentalities $ _____

b Withdrawal of deposit (front money or safekeeping)   _____

c Advance on credit (including markers)   _____

d Payment on bet (including slot jackpot)   _____

e Currency paid from wire transfer in   _____

f Negotiable instrument cashed (including checks)   _____

g Travel and complimentary expenses and gaming incentives _____

h Payment for tournament, contest, or other promotions _____

i Other (specify) _____

j Enter Total Amount of CASH OUT transaction ▶ $ _____

33 Date of transaction (see instructions) M M D D Y Y Y Y	34 Time of transaction ___ : ___ ☐ A.M. ☐ P.M.	35 Foreign currency used _____ (country)

36 Additional Information

Part III   **Casino Reporting Transaction(s)**

37 Casino's trade name	38 Casino's legal name	39 Employer identification number (EIN)

40 Address (number, street, and apt. or suite no.) where transaction occurred	41 Contact telephone number ( )

42 City	43 State	44 ZIP code	45 Country (if not U.S.)

Sign Here ▶

46 Name and title of recorder/handler	47 Signature of recorder/handler	48 Date of signature M M D D Y Y Y Y
49 Name and title of reviewer	50 Signature of reviewer	51 Date of signature M M D D Y Y Y Y

For Paperwork Reduction Act Notice, see page 2.   Cat. No. 23511I   Form **8852** (5-97)

Figure 5.1 (a)   Currency Transaction Report by Casinos—Nevada (CTRC-N)

Multiple Persons or Multiple Agents
(Complete applicable parts below if box 2 or box 16 on page 1 is checked.)

Part I　(Continued)

Section A—Person(s) on Whose Behalf Transaction(s) Is Conducted (Patron)

3 Individual's last name or Organization's name	4 First name	5 M.I.

6 Permanent address (number, street, and apt. or suite no.)	7 SSN or EIN

8 City	9 State	10 ZIP code	11 Country (if not U.S.)	12 Date of birth M M D D Y Y Y Y

13 Method used to verify identity: **a** ☐ Examined identification credential　**b** ☐ Known patron - information on file　**c** ☐ Organization
d ☐ Other _____

14 Describe identification credential:
a ☐ Driver's license/State I.D.　**b** ☐ Passport　**c** ☐ Alien registration　**d** ☐ Other _____
e Issued by:　　　　　　　　　　　　**f** Number:

15 Customer account number

Section B—Individual(s) Conducting Transaction(s)—If other than above (Agent)

17 Individual's last name	18 First name	19 M.I.

20 Permanent address (number, street, and apt. or suite no.)	21 SSN

22 City	23 State	24 ZIP code	25 Country (if not U.S.)	26 Date of birth M M D D Y Y Y Y

27 Method used to verify identity: **a** ☐ Examined identification credential　**b** ☐ Known patron - information on file　**c** ☐ Other _____

28 Describe identification credential:
a ☐ Driver's license/State I.D.　**b** ☐ Passport　**c** ☐ Alien registration　**d** ☐ Other _____
e Issued by:　　　　　　　　　　　　**f** Number:

Paperwork Reduction Act Notice.— The requested information is useful in criminal, tax, and regulatory investigations and proceedings. Pursuant to Nevada Gaming Commission Regulation 6A (Reg. 6A), Nevada casinos classified as "6A licensees" are required to provide the requested information. Reg. 6A is administered by the Nevada Gaming Control Board and Nevada Gaming Commission. Nevada casinos comply with Reg. 6A in lieu of 31 U.S.C. 5313 and 31 CFR Part 103 based upon an exemption granted to the state of Nevada by the U.S. Department of the Treasury.

You are not required to provide the requested information unless the form displays a valid OMB number. The time needed to complete this form will vary depending on individual circumstances. The estimated average time is 19 minutes. If you have comments concerning the accuracy of this time estimate or suggestions to improve this form, you may write to the Tax Forms Committee, Western Area Distribution Center, Rancho Cordova, CA 95743-0001. **Do not** send a completed form to this address. Instead, see **When and Where to File** below.

General Instructions

Form 8852, Currency Transaction Report by Casinos-Nevada (CTRC-N).—Use the May 1997 version of Form 8852 for reportable transactions occurring after April 30, 1997. Use the Nevada Gaming Control Board Currency Transaction Report and Currency Transaction Incident Report for reportable transactions occurring before May 1, 1997.

Who Must File.—Any Nevada casino that qualifies as a 6A licensee pursuant to Reg. 6A; generally, casinos with greater than $10,000,000 in annual gross gaming revenue and with over $2,000,000 of table games statistical win.

Exceptions.—Certain persons are not considered patrons pursuant to Reg. 6A. Transactions with these persons are not reportable. See Reg. 6A for details.

Identification Requirements.—Before completing a reportable transaction with a patron, a 6A licensee must obtain a valid, reliable identification credential from the patron. See Reg. 6A for details.

What To File.—A 6A licensee must file Form 8852 for a reportable transaction with a patron as outlined in Reg. 6A. A reportable transaction is a transaction that involves more than $10,000 in cash. Also, smaller transactions occurring within a designated 24-hour period that aggregate to more than $10,000 in cash are reportable if the transactions are the same type transactions within the same monitoring area or if different type transactions occur within the same visit at one location. Do not use Form 8852 to report receipts of cash in excess of $10,000 that occur at non-gaming areas; instead use **Form 8300,** Report of Cash Payments Over $10,000 Received in a Trade or Business.

When and Where To File.—File each Form 8852 by the 15th calendar day after the day of the transaction with the:

IRS Detroit Computing Center
ATTN: CTRC-N
P.O. Box 32621
Detroit, MI 48232-5604

Keep a copy of each form filed for five years from the date of filing.

Suspicious Transactions.—If a suspicious transaction involves more than $10,000 in cash, complete a Form 8852 as well as a **Form TDF 90-22.49,** Suspicious Activity Report by Casinos (SARC). **Do not** complete

Figure 5.1 (b)　Currency Transaction Report by Casinos—Nevada (CTRC-N)

FINCEN Form **103**
(Formerly Form 8362)
(Rev. March 2003)
Department of the Treasury
FINCEN

Currency Transaction Report by Casinos

▶ Previous editions will not be accepted after September 30, 2003.
▶ Please type or print.
(Complete all applicable parts--See Instructions)

OMB No. 1506-0005

1 If this Form 103 (CTRC) is submitted to **amend a prior report** check here: ☐ and attach a copy of the original CTRC to this form.

Part I Person(s) Involved in Transaction(s)

Section A--Person(s) on Whose Behalf Transaction(s) Is

2 ☐ Multiple persons

3 Individual's last name or Organization's name

4 First name

5 M.I.

6 Permanent address (number, street, and apt. or suite no.)

7 SSN or EIN

8 City

9 State

10 ZIP code

11 Country (if not U.S.)

12 Date of birth __/__/____ M M D D Y Y Y Y

13 Method used to verify identify: **a** ☐ Examined identification credential/document **b** ☐ Known Customer - information on file **c** ☐ Organization

14 Describe identification credential: **a** ☐ Driver's license/State ID **b** ☐ Passport **c** ☐ Alien registration **d** ☐ Other
 e Issued by: **f** Number:

15 Customer's Account Number

Section B--Individual(s) Conducting Transaction(s) - If o

16 ☐ Multiple persons

17 Individual's last name

18 First name

19 M.I.

20 Address (number, street, and apt. or suite no.)

21 SSN

22 City

23 State

24 ZIP code

25 Country (if not U.S.)

26 Date of birth __/__/____ M M D D Y Y Y Y

27 Method used to verify identify: **a** ☐ Examined identification credential/document **b** ☐ Known Customer - information on file **c** ☐ Organization

28 Describe identification credential: **a** ☐ Driver's license/State ID **b** ☐ Passport **c** ☐ Alien registration **d** ☐ Other
 e Issued by: **f** Number:

Part II Amount and Type of Transaction(s). Complete all it

29. ☐ Multiple transactions

30 CASH IN: (in U.S. dollar equivalent)

 a Purchase(s) of casino chips, tokens, and other gaming instruments $_____ . 00
 b Deposit(s) (front money or safekeeping) _____ . 00
 c Payments(s) on credit (including markers) _____ . 00
 d Currency wager(s) _____ . 00
 e Currency received from wire transfer(s) out _____ . 00
 f Purchase(s) of casino check(s) _____ . 00
 g Currency exchange(s) _____ . 00
 h Other (specify): _____ _____ . 00

 i Enter total of CASH IN transaction(s) $_____ . 00

31 CASH OUT: (in U.S. dollar equivalent)

 a Redemption(s) of casino chips, tokens, and other gaming instruments $_____ . 00
 b Withdrawal(s) of deposit (front money of safekeeping) _____ . 00
 c Advance(s) on credit (including markers) _____ . 00
 d Payment(s) on wager(s), including slot jackpot(s) _____ . 00
 e Currency paid from wire transfer(s) in _____ . 00
 f Negotiable instrument(s) cashed (including checks) _____ . 00
 g Currency exchange(s) _____ . 00
 h Travel and complimentary expenses and gaming incentives _____ . 00
 i Payment for tournament, contest or other promotions _____ . 00
 j Other (specify): _____ _____ . 00

 k Enter total of CASH OUT transaction(s) $_____ . 00

32 Date of transaction (see instructions) __/__/____ M M D D Y Y Y Y

33 Foreign currency used: _____
(Country)

Part III Casino Reporting Transactions

34 Casino's trade name

35 Casino's legal name

36 Employer identification number (EIN)

37 Address (number, street, and apt. or suite no.) where transaction occurred

38 City

39 State

40 ZIP code

Sign Here ▶

41 Title of approving official

42 Signature of approving official

43 Date of signature __/__/____ M M D D Y Y Y Y

44 Type or print preparer's name

45 Type or print name of person to contact

46 Contact telephone number (____) ____-____

For Paperwork Reduction Act Notice, see page 4.

Cat. No. 37041B

FinCEN Form **103** (Rev. 3-03)
(Formerly Form 8362)

Figure 5.2 (a) Currency Transaction Report by Casinos (CTRC)

Multiple Persons or Multiple Agents

(Complete applicable parts below if box 2 or box 16 on page 1 is che

Part I   **Person(s) Involved in Transaction(s)**

Section A--Person(s) on Whose Behalf Transaction(s) Is   2 ☐   Multiple persons

3 Individual's last name or Organization's name	4 First name	5 M.I.

6 Permanent address (number, street, and apt. or suite no.)   7 SSN or EIN

8 City	9 State	10 ZIP code	11 Country (if not U.S.)	12 Date of birth __ __ / __ __ / __ __ __ __ M M D D Y Y Y Y

13   Method used to verify identify: **a** ☐ Examined identification credential/document   **b** ☐ Known Customer - information on file   **c** ☐ Organization

14   Describe identification credential: **a** ☐ Driver's license/State ID **b** ☐ Passport **c** ☐ Alien registration **d** ☐ Other

  e Issued by: **f** Number:

15   Customer's Account Number

Section B--Individual(s) Conducting Transaction(s) - If o   16 ☐   Multiple persons

17 Individual's last name	18 First name	19 M.I.

20   Address (number, street, and apt. or suite no.)   21 SSN

22 City	23 State	24 ZIP code	25 Country (if not U.S.)	26 Date of birth __ __ / __ __ / __ __ __ __ M M D D Y Y Y Y

27   Method used to verify identify: **a** ☐ Examined identification credential/document   **b** ☐ Known Customer - information on file   **c** ☐ Organization

28   Describe identification credential: **a** ☐ Driver's license/State ID **b** ☐ Passport **c** ☐ Alien registration **d** ☐ Other

  e Issued by: **f** Number:

General Instructions

Form 103. Use this revision of Form 103 (formerly 8362) for filing on reportable transactions. However, the July 1997 version of Form 8362, Currency Transaction Report by Casinos (also referred to as a CTRC), can still be used until September 30, 2003.

Suspicious Transactions. If a transaction is greater than $10,000 in currency as well as suspicious, casinos must file a Form 103 and must report suspicious transactions and activities on FinCEN Form 102, Suspicious Activity Report by Casinos (SARC). Also, casinos are required to use the SARC form to report suspicious activities involving or aggregating at least $5,000 in funds. **Do not** use Form 103 to **(a)** report suspicious transactions involving $10,000 or less in currency or **(b)** indicate that a transaction of more than $10,000 is suspicious.

When a suspicious activity requires immediate attention, casinos should call 1-800-800-2877, Monday through Friday, from 9:00a.m. to 6:00p.m. Eastern Standard Time (EST). An Internal Revenue Service (IRS) employee will direct the call to the local office of the IRS Criminal Investigation (CI). In an emergency, consult directory assistance for the local IRS CID office.

Who must file. Any organization duly licensed or authorized to do business as a casino, gambling casino, or card club in the United States (except casinos located in Nevada) and having gross annual gaming revenues in excess of $1 million must file Form 103. This includes the principal headquarters and every domestic branch or place of business of the casino or card club. The requirement includes state-licensed casinos (both land-based and riverboat), tribal casinos, and state-licensed and tribal card clubs. Since card clubs are subject to the same reporting rules as casinos, the term "casino" as used in these instructions refers to both a casino and a card club.

Note: *Nevada casinos must file Form 8852, Currency Transaction Report by Casinos - Nevada (CTRC-N), to report transactions as required under Nevada Regulation 6A.*

What to file. A casino must file Form 103 for each transaction involving either currency received (Cash In) or currency disbursed (Cash Out) of more than $10,000 in a gaming day. A gaming day is the normal business day of the casino by which it keeps its books and records for business, accounting, and tax purposes. Multiple transactions must be treated as a single transaction if the casino has knowledge that: **(a)** they are made by or on behalf of the same person, and **(b)** they result in either Cash In or Cash Out by the casino totaling more than $10,000 during any one gaming day. Reportable transactions may occur at a casino cage, gaming table, and/or slot machine. The casino should report both Cash In and Cash Out transactions by or on behalf of the same customer on a single Form 103. **Do not** use Form 103 to report receipts of currency in excess of $10,000 by non-gaming businesses of a casino (e.g., a hotel); instead, use **Form 8300,** Report of Cash Payments Over $10,000 Received in a Trade or Business.

Exceptions. A casino does not have to report transactions with domestic banks, currency dealers or exchangers, or commercial check cashers.

Identification requirements. All individuals (except employees conducting transactions on behalf of armored car services) conducting a reportable transaction(s) for themselves or for another person must be identified by means of an official or otherwise reliable record.

Acceptable forms of identification include a driver's license, military or military dependent identification card, passport, alien registration card, state issued identification card, cedular card (foreign), or a combination of other documents that contain an individual's name and address and preferably a photograph and are normally acceptable by financial institutions as a means of identification when cashing checks for persons other than established customers.

For casino customers granted accounts for credit, deposit, or check cashing, or on whom a CTRC containing verified identity has been filed, acceptable identification information obtained previously and maintained in the casino's internal records may be used as long as the following conditions are met. The customer's identity is re-verified periodically, any out-of-date identifying information is updated in the internal records, and the date of each re-verification is noted on the internal record. For example, if documents verifying an individual's identity were examined and recorded on a signature card when a deposit or credit account was opened, the casino may rely on that information as long as it is re-verified periodically.

When and where to file: File each Form 103 by the 15th calendar day after the day of the transaction with the:

    IRS Detroit Computing Center
    ATTN: CTRC
    P.O. Box 32621
    Detroit, MI 48232

A casino must retain a copy of each Form 103 filed for 5 years from the date of filing.

Penalties. Civil and/or criminal penalties may be assessed for failure to file a CTRC or supply information, or for filing a false or fraudulent CTRC. See 31 U.S.C. 5321, 5322, and 5324.

Figure 5.2 (b)   Currency Transaction Report by Casinos (CTRC)

   3. The transaction type
   4. The patron's name
   5. The patron's permanent address
   6. The method used to verify the patron's identity and residence and a description of the document used, including number (e.g., driver's license, military I.D., passport)
   7. The patron's Social Security number
   8. The patron's date of birth and account number with the casino filing the report
   9. The signature of the casino employee handling the transaction and recording the information
   10. The signature of a casino employee, other than the employee who recorded the transaction, who reviewed the report prior to filing.

Under Regulation 6A.030, examples of transactions exceeding $10,000 that would result in the filing of a CTRC-N include:

   1. Transactions in which cash is received from a customer:
       a. Losing cash wager placed at a table game
       b. A cash wager placed at another gaming area such as keno, and the race and sports book.
       c. Chip or token purchase
       d. Marker payment (i.e., payment on a credit balance owed to the casino by the customer)
       e. Front money deposit (i.e., deposit made at the casino cage and used by the customer to gamble in the casino in a manner similar to playing on casino credit).
   2. Transactions in which cash is paid out to a customer:
       a. Redemption of casino chips
       b. Payment of a winning wager such as a winning keno, race and sports book, or bingo ticket.
       c. Withdrawal of a front money deposit
       d. Customer cashes a check at the casino cage or makes a withdrawal against a consumer credit card in cash at the cage
       e. Cashing out points accumulated by the customer through the casino's slot club
       f. Customer receives cash from a wire transfer received by the casino
       g. Payment of winnings received through participation in a tournament such as a slot or poker tournament.
       h. Other payments made to a customer, such as a marketing incentive or reimbursement for travel expenses.

Transactions that require the filing of a CTRC-N must have cash on one side of the transaction, meaning the casino must be either receiving

cash from the customer or must be paying cash to the customer. A CTRC-N may result either from a single cash transaction in excess of $10,000 or from the aggregation of amounts in excess of $3,000 that in combination exceed $10,000. If the latter case, then it must be designated on the CTRC-N that the report was filed as a result of multiple transactions. In no case is a report ever filed as a result of combining cash-in transactions with cash-out transactions. This rule applies to reports filed under both Regulation 6A and Title 31.

One interesting requirement under Regulation 6A applies to a customer who wishes to cash out more than $10,000 of the casino's chips in a single transaction, but refuses to provide the casino with his name and identification documentation to casino personnel. In this case, the casino is not allowed to cash out the chips and may also be required to report the transaction to the Nevada Gaming Control Board.

If the casino discovers at some point that the customer's same-type transactions have exceeded the $10,000 threshold without a CTRC-N first being completed as required, then the casino must complete the report after the fact. If the customer refuses to provide the information necessary to complete the report, then the casino must "bar" the customer from all gaming activities, in all gaming areas, until the information is subsequently provided. The customer is not only barred from this casino, but from any other casinos owned and operated (i.e., affiliated) by the same company within the state of Nevada. The customer may be removed from the barred list by subsequently providing the required information.

Multiple Transaction Log (MTL)

The Multiple Transaction Log (MTL) was established to keep track of individual transactions exceeding $3,000 that, in total, may exceed $10,000 during a 24-hour period. These logs are required in all departments responsible for the preparation of Currency Transaction Reports. Any type of transactions exceeding $3,000 require entry in the MTL.

The MTL (Fig. 5.3) contains:

1. A description and, if known, the name of the patron
2. The table number, if the transaction occurred in the pit
3. The time, date, type, and amount
4. Signature of the casino or cage personnel recording the entry

These logs are maintained for a 24-hour period, with a predetermined cutoff time that is selected by the individual casino. After the end of the 24-hour period, the MTLs for each gaming area and the casino cage are turned in to the accounting department for review and storage. Every 24 hours, each department initiates a new MTL, and it is

CAGE LOG OF MULTIPLE CASH TRANSACTIONS   CASINO CAGE   DATE ___/___/___   PG ____ OF ____

TYPE
1 Chip redemption (evidence of gaming)
2 Chip redemption (no evidence of gaming)
3 Chip purchase
4 Front money deposit
5 Marker payment
7 Payoff of winning wager in cash
8 Other cash transaction (specify in remarks)

RACE
C Caucasian
B Black
R Oriental
O Other

HAIR COLOR
1 Black   4 Gray
2 Brown   5 Red
3 Blond   6 Thin

AGE
1 21–35
2 36–50
3 51–65
4 65+

BUILD
H Heavy
M Medium
T Thin

HEIGHT
1 5′–5′6″
2 5′7″–6′
3 6′+

TIME (AM/PM)	AMOUNT	TYPE	NAME OF PLAYER (if known)	INFO ON FILE	SEX	RACE	HAIR	AGE	BUILD	HT	REMARKS/PROOF OF GAMING & PIT SUP. NAME	CASHIER'S SIGNATURE

(DESCRIPTION OF PLAYER: SEX, RACE, HAIR, AGE, BUILD, HT)

Figure 5.3   Multiple Transaction Log (MTL)

70

the responsibility of supervisory employees in the individual departments to review the MTLs for their respective departments throughout the shift to ensure that compliance is maintained with the aggregation requirements.

In general, Regulation 6A requires that only like-kind transactions are aggregated for purposes of preparing a CTRC-N. This means that only transactions of the same type, such as chip purchases, are aggregated together. The casino would not aggregate a chip purchase with a front money deposit or a marker payment.

The exception to this rule occurs when a "single visit" occurs. The Regulation defines a single visit as one "continuous appearance at a given location uninterrupted by a patron's physical absence from that given location during a designated twenty-four-hour period." Under what is known as the single visit rule, the casino must aggregate all cash transactions conducted by a patron, going in the same direction (all cash-ins with other cash-ins, but not with cash-out transactions), while continuously at a single location. An example of this is a situation in which a patron purchases $4,000 chips at the blackjack table with cash, then purchases another $4,000 in chips with cash, and subsequently places a $4,000 losing cash wager. If the transactions were all conducted at the same table during the same 24-hour period, without the patron leaving the table, then a CTRC-N would be required for $12,000 for the aggregated dissimilar transactions.

Under normal circumstances when the single visit rule is not in effect, a CTRC-N would not be required for the transactions described in the example. Instead, a log entry on the MTL would be required for each of the transactions and the $10,000 threshold would not have been exceeded for the same-type transactions that would have been aggregated (i.e., $8,000 of chip purchases). The single visit rule basically represents the application of Title 31 rules that would be followed in casinos outside Nevada for aggregation of cash transactions.

Front Money and Safekeeping Deposits

The Regulation provides for unique ways of handling player deposits for front money or safekeeping. Each casino has two options when handling either type of deposit:

1. Physically segregate the cash deposited in a designated location and return the same cash to the patron, or
2. Record the number of bills in each denomination of the cash deposit. When the deposit is returned to the player, it is returned in the same denominations and number of bills of each denomination as in the original deposit.

What If the Patron Refuses to Comply?

Since casino owners are forced by the Regulation to obtain the necessary information, the casino must bar the patron from gaming as described previously until he complies. Each gaming area is required to maintain information relevant to any such patron. Many casinos have chosen to utilize a "barred patron log," which lists the patron's name, if known, and description. All personnel in gaming areas and security are expected to routinely review this log.

Benefit of Choosing 24-Hour Window

The Regulation provides that each casino can determine when its 24-hour day begins and ends. This has proven extremely beneficial in minimizing the effect on individual players. For instance, if the casino's 24-hour period begins at midnight, one night for the patron could overlap two nights for reporting purposes. If the player lost, or bought-in, for $10,000 or less before midnight and then bought-in for another $10,000 after midnight, reporting is not necessary. When the regulation was first enacted, many casinos chose early morning as the 24-hour cut-off, but it did not take long for them to change to a time that more closely divided the patrons' period of play.

Benefit of Segregating Like-Kind Transactions

Another benefit of Regulation 6A is the categorizing of transactions. Transactions such as chip purchases, money play losses (losing cash wagers), and marker payments are all considered to be separate transactions. Regulation 6A indicates that a transaction of a given type has to exceed $10,000 in order to be reportable on a CTRC-N. This separation of transaction types for reporting purposes allows a player to purchase chips in the amount of $10,000, have money play losses up to $10,000, buy back $10,000 worth of markers, make race and sport wagers of $10,000 and deposit $10,000 in cash as front money during the casino's 24-hour day—all without the casino's having to prepare a report.

Regulation 6A and Title 31 were reluctantly accepted by both management and players. It is extremely difficult for a casino employee to approach a player just after he has lost a bet that brought him over the $10,000 threshold, and request his driver's license. At this point, the player may be in no mood to comply with the casino's request.

Since 1985, the players have grown accustomed to Regulation 6A and, in the process, many have developed their own methods to avoid reporting.

It is also important to note that the player need not be bothered if the casino has the necessary information on file. Many casinos photocopy a

player's driver's license when an application for credit or check cashing is made, and there is no need to ask the patron for identification if this information is on file. Once a positive player identification is made for a report, subsequent reports can be made based on the prior identification as long as the player is known to the casino employee handling the transaction.

It is not necessary to inform the player that the report is being prepared. It is only necessary to inform the patron if the casino does not know who the player is and, consequently, must see identification. When Regulation 6A was first implemented, many casinos felt obligated to notify the player that a report was being prepared. Most casinos now simply prepare the report if the information is available.

Nevada's Regulation 6A provided a uniform method of complying with the regulations of the Department of the Treasury. Every casino knew what was expected of it and how to handle most situations. In contrast, Atlantic City and Puerto Rico had only a single-paragraph explanation contained in Title 31 to provide them with guidance on how to maintain compliance. Since 1985, each casino in these jurisdictions has developed a system it believes provides for compliance with Title 31. One additional difference between the jurisdictions is that betting of cash and pit marker redemptions are prohibited by regulation in both Atlantic City and Puerto Rico.

Monitoring Compliance with Regulation 6A

Recognizing the need for a system of consistent and recurring compliance monitoring procedures, the Nevada Gaming Control Board issued Minimum Internal Control Standards (MICS) for Currency Transaction Reporting, which require the performance of procedures by both internal audit departments and independent accountants. The MICS specify that internal audit personnel for the casino review established procedures in all casino departments subject to Regulation 6A by interviewing appropriate personnel in these areas on a quarterly basis. Testing of all types of documentation prepared pursuant to Regulation 6A is also required to be completed by internal audit personnel on at least an annual basis with the documentation tested being selected from each quarter.

The MICS outline procedures for walk-throughs of Regulation 6A procedures in branch offices maintained by casinos that had more than $1,000,000 of combined cash transactions in the preceding business year. An additional requirement, which serves to highlight the importance of Regulation 6A compliance for both the Nevada regulators and the Department of the Treasury, is the one asking that all exceptions discovered by the internal auditors be documented and forwarded to management, which is defined to include owners, the board of directors, and the department heads responsible for the exceptions.

The MICS have similar requirements for independent accountants in conjunction with the preparation of an annual report, which is required per Regulation 6A.110 to be prepared and submitted. The report must address the casino's level of compliance during the year and all instances of non-compliance with Regulation 6A that were either discovered as a result of procedures they perform or that were brought to their attention, regardless of the severity of the noncompliance. The MICS procedures include four hours of unannounced observations per quarter of the casino cage, pit, and sports book areas, walk-throughs, testing of documentation, and review of training programs established by the casinos, in order to periodically communicate to casino personnel the requirements of Regulation 6A.

The MICS indicate that the independent accountant procedures may be performed instead by qualified internal audit personnel as long as the independent accountants review the work of the internal auditors. Depending on the casino, having the procedures performed by the internal auditors may provide a cost-effective alternative. These monitoring procedures have helped the casinos ensure the effectiveness of their compliance systems by providing frequent feedback to management and, at the same time, have provided independent assurance to the Nevada regulators that casinos are maintaining adequate compliance with Regulation 6A.

TITLE 31 REPORTING

In Nevada, cash-for-cash exchanges over $3,000 are prohibited, but Atlantic City and all other gaming jurisdictions within the United States do not have the same restrictions. In these jurisdictions it is permitted to exchange cash for cash as long as a CTRC is prepared as required if the total of the exchange or exchanges exceeds $10,000. In these jurisdictions cash-in and cash-out transactions are aggregated separately for the purpose of reporting.

Examples of cash-in include front money or safekeeping deposits as well as chip purchases in the pit. If a player deposited $5,000 in front money with the casino cage and then purchased another $5,001 in chips with cash in the pit, a report would be required under Title 31. Atlantic City's casinos are required to use their casino computer systems for the purpose of aggregating pit buy-ins and casino cage transactions. Most casino systems will provide the ability to generate a daily report that identifies any patrons whose aggregated cash transactions have exceeded the reporting threshold for which a report is required to be prepared and submitted by the casino. These reports from the casino system may be used by the casino to ensure that all reportable transactions have been properly identified.

One of the primary benefits of Regulation 6A for Nevada has been the ability to self-regulate compliance. However, one of the resulting trade-

offs has been the additional administrative burden that was placed on Nevada's casinos in the form of the $3,001 threshold for aggregation and the required use of the MTL to record transactions exceeding this threshold. The MTLs are generally prepared manually by casino personnel and capture many transactions that would not specifically be required to be accounted for under Title 31.

The exemption that has allowed the casino industry to operate under Regulation 6A in Nevada has been an ongoing source of discussion by representatives of the Department of the Treasury. The first revisions to Regulation 6A became necessary in 1997, based on changes to the Bank Secrecy Act. As a result of these changes, representatives of the Department of the Treasury worked closely with the Nevada regulators and industry personnel to arrive at modifications that would be agreeable to all interested parties. At that time, there was discussion within Nevada as to whether the Regulation 6A exemption should be maintained or whether it was in the best interest of the casino industry to instead operate under Title 31. It was decided that extending the exemption was best for all parties, and the changes became effective May 1, 1997.

The following are among the more substantive changes that resulted in 1997:

1. The threshold used for aggregating multiple transactions increased from $2,500 to $3,000.
2. The threshold for prohibited transactions also increased to $3,000 from $2,500.
3. Suspicious Activity Reporting (SAR) requirements were included in Regulation 6A for the first time. These requirements included the use of a Suspicious Activity Report (See Fig. 5.4) and provided for the designation by each casino of a Suspicious Activity Analyst.
4. Training and compliance programs were required.
5. Funds transfer requirements were addressed in detail.
6. Addition of the single visit rule, discussed previously in this chapter, whereby all cash-ins or all cash-outs are aggregated for a patron during a single continuous and uninterrupted appearance at a single casino area such as a gaming table or slot machine.
7. Regulation 6A was defined to include only those casinos with gross annual gaming revenue exceeding $10 million and $2 million in table games win. This "10 and 2 rule" effectively exempted smaller casinos from having to comply with the administrative burden of Regulation 6A. In order to be exempt, the casino must have revenue under either the $10 million or the $2 million specified. These casinos are not, however, exempt from currency transaction reporting requirements, as they are still required to comply with the requirements of Title 26, which applies

FinCEN 102

FinCEN Form
April 2003

Previous editions will not be
accepted after December 31, 2003

Suspicious Activity Report
by Casinos and Card Clubs

▶ Please type or print. Always complete entire report. Items
marked with an asterisk * are considered critical (see instructions).

OMB No. 1506 - 0006

1 Check the box if this report corrects a prior report (see instructions on page 6) ☐

| Part I | Subject Information | 2 Check box (a) ☐ if more than one subject   box (b) ☐ subject information unavailable |

*3 Individual's last name or entity's full name | *4 First name | *5 Middle initial

*6 also known as (AKA- individual), doing business as (DBA- entity) | 7 Occupation / type of business

*8 Address | *9 City

*10 State | *11 ZIP code | *12 Country (if not U.S.) | 13 Vehicle license # / state (optional)
a. number | b. state

*14 SSN / ITIN (individual) or EIN (entity) | *15 Account number   No account affected ☐   Account open ? Yes ☐ No ☐ | 16 Date of birth ___/___/___ MM   DD   YYYY

*17 Government issued identification (if available)
a ☐ Driver's license/state ID   b ☐ Passport   c ☐ Alien registration
d ☐ Other _____
e Number: | | | | | | | | | | | | | | | f Issuing state or country_____

18 Phone number - work   (| |) | | | — | | | | |
19 Phone number - home   (| |) | | | — | | | | |
20 E-mail address (if available)

21 Affiliation or relationship to casino/card club
a ☐ Customer   b ☐ Agent   c ☐ Junket / tour operator   d ☐ Employee   e ☐ Check cashing operator
f ☐ Supplier   g ☐ Concessionaire   h ☐ Other (Explain in Part VI)

22 Does casino/card club still have a business association and/or an employee/employer relationship with suspect?
a ☐ Yes b ☐ No If **no**, why? c ☐ Barred d ☐ Resigned e ☐ Terminated f ☐ Other (Specify in Part VI)
23 Date action taken(22) ___/___/___ MM   DD   YYYY

| Part II | Suspicious Activity Information |

*24 Date or date range of suspicious activity
From ___/___/___ MM DD YYYY   To ___/___/___ MM DD YYYY
*25 Total dollar amount involved in suspicious activity
$ | | | | , | | | , | | | .00

* 26 Type of suspicious activity:
a ☐ Bribery/gratuity
b ☐ Check fraud (includes counterfeit)
c ☐ Credit/debit card fraud (incl. counterfeit)
d ☐ Embezzlement/theft
e ☐ Large currency exchange(s)
f ☐ Minimal gaming with large transactions
g ☐ Misuse of position
h ☐ Money laundering
i ☐ No apparent business or lawful purpose
j ☐ Structuring
k ☐ Unusual use of negotiable instruments (checks)
l ☐ Use of multiple credit or deposit accounts
m ☐ Unusual use of wire transfers
n ☐ Unusual use of counter checks or markers
o ☐ False or conflicting ID(s)
p ☐ Terrorist financing
q ☐ Other (Describe in Part VI)

| Part III | Law Enforcement or Regulatory Contact Information |

27 If law enforcement or a regulatory agency has been contacted (excluding submission of a SARC), check the appropriate box.
a ☐ DEA
b ☐ U.S. Attorney (** 28)
c ☐ IRS
d ☐ FBI
e ☐ U.S. Customs Service
f ☐ U.S. Secret Service
g ☐ Local law enforcement
h ☐ State gaming commission
i ☐ State law enforcement
j ☐ Tribal gaming commission
k ☐ Tribal law enforcement
l ☐ Other (List in item 28)

28 Other authority contacted (for box 27 g through l) ** List U.S. Attorney office here. | 29 Name of person contacted (for all of box 27)

30 Telephone number of individual contacted in box 29   (| |) | | | — | | | | |
31 Date Contacted ___/___/___ MM   DD   YYYY

Catalog No. 35636U

Figure 5.4 (a)   Suspicious Activity Report by Casinos and Card Clubs (SARC)

Part IV   **Reporting Casino or Card Club Information**

*32 Trade name of casino or card club

*33 Legal name of casino or card club

*34 EIN

35 Address

*36 City

*37 State

*38 ZIP code

39 Type of gaming institution

a ☐ State licensed casino   b ☐ Tribal licensed casino   c ☐ Card club   d ☐ Other (specify)_____

Part V   **Contact for Assistance**

*40 Last name of individual to be contacted regarding this report

*41 First name

*42 Middle initial

*43 Title/Position

*44 Work phone number

(   )   —

*45 Date report prepared

____/____/_____
MM   DD   YYYY

Part VI   **Suspicious Activity Information - Narrative***

Explanation/description of suspicious activity(ies). This section of the report is critical. The care with which it is completed may determine whether or not the described activity and its possible criminal nature are clearly understood by investigators. Provide a clear, complete and chronological description (**not exceeding this page and the next page**) of the activity, including what is unusual, irregular, or suspicious about the transaction(s), using the checklist below as a guide as you prepare your account.

a. **Describe** the conduct that raised suspicion.
b. **Explain** whether the transaction(s) was completed or only attempted.
c. **Describe** supporting documentation and retain such documentation for your file for five years.
d. **Explain** who benefited, financially or otherwise, from the transaction(s), how much and how (if known).
e. **Describe and retain** any admission or explanation of the transaction(s) provided by the subject(s), witness(s), or other person(s). Indicate to whom and when it was given. Include witness or other person ID.
f. **Describe and retain** any evidence of cover-up or evidence of an attempt to deceive federal or state examiners, or others.
g. **Indicate** where the possible violation of law(s) took place (e.g., branch, cage, specific gaming pit, specific gaming area).
h. **Indicate** whether the suspicious activity is an isolated incident or relates to another transaction.
i. **Indicate** whether there is any related litigation. If so, specify the name of the litigation and the court where the action is pending.
j. **Recommend** any further investigation that might assist law enforcement authorities.
k. **Indicate** whether any information has been excluded from this report; if so, state reasons.
l. **Indicate** whether any U.S. or foreign currency and/or U.S. or foreign negotiable instrument(s) were involved. If foreign, provide the amount, name of currency, and country of origin.

m. **Indicate** whether funds or assets were recovered and, if so, enter the dollar value of the recovery in whole dollars only.
n. **Indicate** any additional account number(s), and any domestic or foreign bank(s) account numbers which may be involved.
o. **Indicate** for a foreign national any available information on subject's passport(s), visa(s), and/or identification card(s). Include date, country, city of issue, issuing authority, and nationality.
p. **Describe** any suspicious activities that involve transfer of funds to or from a foreign country, or any exchanges of a foreign currency. Identify the currency, country, sources and destinations of funds.
q. **Describe** subject(s) position if employed by the casino or card club (e.g., dealer, pit supervisor, cage cashier, host, etc.).
r. **Indicate** the type of casino or card club filing this report, if this is not clear from Part IV.
s. **Describe** the subject only if you do not have the identifying information in Part I or if multiple individuals use the same identification. Use descriptors such as male, female, age, etc.
t. **Indicate** any wire transfer in or out identifier numbers, including the transfer company's name.

u. **If correcting** a prior report, complete the form in its entirety and note the changes here in Part VI.

Information already provided in earlier parts of this form need not necessarily be repeated if the meaning is clear.
Supporting documentation should not be filed with this report. Maintain the information for your files.

Tips on SAR Form preparation and filing are available in the SAR Activity Review at www.fincen.gov/pub_reports.html

Enter explanation/description in the space below. Continue on the next page if necessary.

Figure 5.4 (b)   Suspicious Activity Report by Casinos and Card Clubs (SARC)

to cash received in a trade or business other than a defined financial institution (Form 8300; see Fig. 5.5).

Efforts to extend the Regulation 6A exemption began again in earnest toward the end of 2002. At the time of this writing in 2003, discussions were still under way, and a potential elimination of Regulation 6A and a resulting move to Title 31 was still a real possibility. A substantial change to Regulation 6A that had already resulted in 2003 was that the Suspicious Activity Reporting requirements were removed from Regulation 6A and compliance was required with the revised requirements of Title 31. Title 31 was modified, effective March 25, 2003, to apply directly to all casinos in the United States and to provide for the filing of a Suspicious Activity Report for Casinos (SARC) for any of the following transactions conducted by or attempted at a casino and involving funds totaling or aggregating to $5,000:

1. Involves funds derived from illegal activity or is intended or conducted in order to hide funds derived from illegal activity.
2. Is intended to avoid or prevent the filing of a Currency Transaction Report.
3. Has no business or apparent lawful purpose or is not the sort of transaction that the particular customer would normally be expected to conduct, and the casino knows of no reasonable explanation for the transaction after reviewing the available facts, including the possible purpose for the transaction.
4. Involves the use of a casino to facilitate criminal activity.

Compliance with the Suspicious Activity Reporting requirements for Nevada casinos is now monitored by the Department of the Treasury instead of the Nevada Gaming Control Board. SARCs are required to be filed by all casinos with a gross annual gaming revenue of $1 million in cases where the casino knows, suspects, or has reason to suspect transactions of the type listed previously. This threshold represents a significant change for smaller casinos in Nevada, as these casinos were previously exempted from the Suspicious Activity Reporting requirements of Title 31 by the "10 and 2 rule."

A casino is prohibited from telling a patron that an SARC form has been submitted on him or her and, as a result, must complete the SARC to the best of its ability based on casino records, if any, pertaining to the patron. In many cases, this will result in the filing of a partially completed SARC with the Financial Crimes Enforcement Network (FinCEN), which is an agency of the Department of the Treasury. Casinos have 30 calendar days after the date of the initial detection of the transaction to file the SARC, but may extend this by an additional 30 days to identify a suspect (maximum of 60 days to file). The SARC form was revised, effective April 1, 2003.

IRS Form 8300 (Rev. December 2001)
OMB No. 1545-0892
Department of the Treasury
Internal Revenue Service

Report of Cash Payments Over $10,000 Received in a Trade or Business
▶ See instructions for definition of cash.
▶ Use this form for transactions occurring after December 31, 2001. Do not use prior versions after this date.
For Privacy Act and Paperwork Reduction Act Notice, see page 4.

FinCEN Form 8300 (December 2001)
OMB No. 1506-0018
Department of the Treasury
Financial Crimes
Enforcement Network

1 Check appropriate box(es) if: **a** ☐ Amends prior report; **b** ☐ Suspicious transaction.

Part I — Identity of Individual From Whom the Cash Was Received

2 If more than one individual is involved, check here and see instructions . . . . ▶ ☐

3 Last name | **4** First name | **5** M.I. | **6** Taxpayer identification number

7 Address (number, street, and apt. or suite no.) | **8** Date of birth . ▶ (see instructions) | M M D D Y Y Y Y

9 City | **10** State | **11** ZIP code | **12** Country (if not U.S.) | **13** Occupation, profession, or business

14 Document used to verify identity: **a** Describe identification ▶
b Issued by | **c** Number

Part II — Person on Whose Behalf This Transaction Was Conducted

15 If this transaction was conducted on behalf of more than one person, check here and see instructions . . . . . ▶ ☐

16 Individual's last name or Organization's name | **17** First name | **18** M.I. | **19** Taxpayer identification number

20 Doing business as (DBA) name (see instructions) | Employer identification number

21 Address (number, street, and apt. or suite no.) | **22** Occupation, profession, or business

23 City | **24** State | **25** ZIP code | **26** Country (if not U.S.)

27 Alien identification: **a** Describe identification ▶
b Issued by | **c** Number

Part III — Description of Transaction and Method of Payment

28 Date cash received M M D D Y Y Y Y | **29** Total cash received $ .00 | **30** If cash was received in more than one payment, check here . . . ▶ ☐ | **31** Total price if different from item 29 $ .00

32 Amount of cash received (in U.S. dollar equivalent) (must equal item 29) (see instructions):

a U.S. currency $ _____.00 (Amount in $100 bills or higher $ _____.00)
b Foreign currency $ _____.00 (Country ▶ _____)
c Cashier's check(s) $ _____.00 } Issuer's name(s) and serial number(s) of the monetary instrument(s) ▶ ....
d Money order(s) $ _____.00
e Bank draft(s) $ _____.00
f Traveler's check(s) $ _____.00 }

33 Type of transaction
a ☐ Personal property purchased
b ☐ Real property purchased
c ☐ Personal services provided
d ☐ Business services provided
e ☐ Intangible property purchased
f ☐ Debt obligations paid
g ☐ Exchange of cash
h ☐ Escrow or trust funds
i ☐ Bail received by court clerks
j ☐ Other (specify) ▶

34 Specific description of property or service shown in 33. (Give serial or registration number, address, docket number, etc.) ▶ ....

Part IV — Business That Received Cash

35 Name of business that received cash | **36** Employer identification number

37 Address (number, street, and apt. or suite no.) | Social security number

38 City | **39** State | **40** ZIP code | **41** Nature of your business

42 Under penalties of perjury, I declare that to the best of my knowledge the information I have furnished above is true, correct, and complete.

Signature ▶ _____ Authorized official | Title ▶ _____

43 Date of signature M M D D Y Y Y Y | **44** Type or print name of contact person | **45** Contact telephone number ( )

IRS Form 8300 (Rev. 12-2001) | Cat. No. 62133S | **FinCEN Form 8300** (12-2001)

Figure 5.5 (a) Report of Cash Payments Over $10,000 Received in a Trade or Business (Form 8300)

IRS Form 8300 (Rev. 12-2001)   Page **2**   FinCEN Form 8300 (12-2001)

Multiple Parties
(Complete applicable parts below if box 2 or 15 on page 1 is checked)

Part I   Continued- Complete if box 2 on page 1 is checked

3 Last name	4 First name	5 M.I.	6 Taxpayer identification number

7 Address (number, street, and apt. or suite no.)   **8** Date of birth (see instructions) ▶ M M D D Y Y Y Y

9 City	10 State	11 ZIP code	12 Country (if not U.S.)	13 Occupation, profession, or business

14 Document used to verify identity: **a** Describe identification ▶
b Issued by   **c** Number

3 Last name	4 First name	5 M.I.	6 Taxpayer identification number

7 Address (number, street, and apt. or suite no.)   **8** Date of birth (see instructions) ▶ M M D D Y Y Y Y

9 City	10 State	11 ZIP code	12 Country (if not U.S.)	13 Occupation, profession, or business

14 Document used to verify identity: **a** Describe identification ▶
b Issued by   **c** Number

Part II   Continued- Complete if box 15 on page 1 is checked

16 Individual's last name or Organization's name	17 First name	18 M.I.	19 Taxpayer identification number

20 Doing business as (DBA) name (see instructions)   Employer identification number

21 Address (number, street, and apt. or suite no.)   **22** Occupation, profession, or business

23 City	24 State	25 ZIP code	26 Country (if not U.S.)

27 Alien identification: **a** Describe identification ▶
b Issued by   **c** Number

16 Individual's last name or Organization's name	17 First name	18 M.I.	19 Taxpayer identification number

20 Doing business as (DBA) name (see instructions)   Employer identification number

21 Address (number, street, and apt. or suite no.)   **22** Occupation, profession, or business

23 City	24 State	25 ZIP code	26 Country (if not U.S.)

27 Alien identification: **a** Describe identification ▶
b Issued by   **c** Number

IRS Form **8300** (Rev. 12-2001)   FinCEN Form **8300** (12-2001)

Figure 5.5 (b)   Report of Cash Payments Over $10,000 Received in a Trade or Business (Form 8300)

What constitutes a suspicious transaction is somewhat open to interpretation within the casino industry. Some guidance was previously provided by FinCEN in the form of possible scenarios that could be considered to be suspicious. FinCEN has indicated, in recent meetings held with the industry, that it will rely, at least to a point, on casinos to exercise reasonable judgment in determining what they consider to be suspicious for

a particular customer. Ultimately, a casino should have the best knowledge of its business and customers and, as a result, should be able to make the most informed determination of whether a transaction is truly suspicious. Consistency of filing within a particular casino company with multiple casino operations, as well as consistency of filing across similar unaffiliated casino operations, will likely be a factor in the evaluation and determination of the level of compliance.

Figure 5.6 presents a comparison of key areas for Title 31 and Regulation 6A.

CURRENCY TRANSACTION REPORTING IN NONGAMING AREAS

Casinos generally are very focused on currency transaction reporting requirements, as discussed previously, in the gaming areas of the operation. However, rarely is a similar focus maintained on the currency transaction reporting requirements that pertain to the nongaming areas within the operation. Title 26 applies to areas within the operation such as the hotel, catering, banquets, retail, and restaurants. The purpose of Title 26 is to identify and report large cash transactions on a Form 8300 (see Fig. 5.5) that occur outside of a financial institution that may have resulted from illegal activities. Money laundering is also a primary concern of the Department of the Treasury in regard to transactions in nongaming operations.

The primary ways in which the requirements of Title 26 differ from those of Title 31 are as follows:

1. The aggregation requirements of Title 26 pertain to a 12-month period instead of a gaming day. This means that either a lump-sum payment exceeding $10,000, or related payments within a 12-month period that together total more than $10,000, must be reported on Form 8300.
2. The definition of cash is broader under Title 26 than the definition used under Title 31. Cash under Title 26 includes coins and currency of the United States as well as cashier's checks, bank drafts, money orders, and traveler's checks if they have a face amount of $10,000 or less. Under Title 26, the filing of a Form 8300 would be required for a customer purchasing jewelry for $13,000 and paying with $6,000 in cash and a $7,000 cashier's check. Cash does not include a personal check under Title 26.
3. Title 26 requires the filing of a written statement to each person for whom a Form 8300 was filed during the year. The statement must identify the business and be filed by January 31 following the calendar year the report was completed.

Publication 1544, which is available from the Internal Revenue Service, provides guidance on the filing of Form 8300. It is important for a

Area	Title 31	Regulation 6A
Applicability	All casinos in the United States other than Nevada. Includes Puerto Rico.	Nevada only.
Aggregation of amounts less than $10,000.	Aggregate all cash amounts less than $10,000 (cash-ins combined with cash-ins, and cash-out combined with cash-outs) within a gaming day.	Generally, only aggregate same-type transactions within one defined area within the casino (e.g., one pit or one casino cage) in a gaming day. One exception to this is the "single visit rule."
		$3,000 threshold used for aggregating amounts less than $10,000. Multiple Transaction Log required.
Cash for Cash exchanges greater than $3,000	Not prohibited	Prohibited in excess of $3,000.
Suspicious Activity Reporting	Effective March 25, 2003, all casinos in United States including Nevada must comply with the same requirements.	Effective March 25, 2003, all casinos in United States including Nevada must comply with the same requirements.
Currency Transaction Report	Currency Transaction Report Casinos (Form 103).	Currency Transaction Report Casinos Nevada (Form 8852)
Compliance Oversight	Department of the Treasury	Nevada Gaming Control Board with the exception of Suspicious Activity Reporting, which is the Department of the Treasury.

Figure 5.6   Summary of Key Areas—Title 31 vs. Regulation 6A

casino operation to provide training to employees in areas likely to encounter the reporting requirements of Title 26. The cost of noncompliance with Title 26 may be the greater of $25,000 or the amount of cash the casino received that was required to be reported, up to a maximum fine of $100,000 for each unfiled Form 8300. Willfully failing to file a Form 8300 may also result in additional fines and criminal penalties.

CHAPTER SIX

CASINO CAGE, CREDIT, AND COLLECTIONS

CASINO CAGE

The casino cage is the financial center and an important component of the casino operation. The casino cage maintains an accountability of the cash, chips, and tokens that are used to fund the operations of the casino. When additional chips are needed for the table games, the cage is the source of these chips. The cage also provides the funds to conduct transactions with casino customers.

The casino cage is composed of customer windows, which are normally established on an imprest basis (i.e., funded at a predetermined dollar amount that remains constant, such as $25,000) and are operated by cage cashiers. The imprest amount for a window varies according to the size and needs of the operation. Windows may range in size from $25,000 to $100,000 or more and consist of cash, chips and, in many casinos, tokens. The number of windows in the cage depends on the relative size of the cage and the number of customers present in the casino during peak times.

The cage also contains a fill bank, which may also operate on an imprest basis and maintains a substantial inventory of chips and tokens used exclusively for conducting transactions with employees of the casino. Fill bank transactions consist primarily of chip exchanges with the table games, which are in the form of fills and credits. The fill bank also transfers chips to the cashier windows to replenish depleted inventories and accepts the excess chips cashiers receive through customer transactions such as chip redemptions. All exchanges of chips are documented by the fill bank cashier to enable the inventory of the fill bank to be reconciled at any point in time. The fill bank replenishes its inventory through exchanges with the main bank.

The casino cage in many casinos is also responsible for accounting for the inventories of the coin room and the slot cashier banks. If this is the case, the main bank may be the source of coins and tokens to replenish

slot cashier banks and slot machine hoppers. In this arrangement, cage personnel are responsible for verifying the accuracy of the coin room inventory on a shift-by-shift basis, since the coin room balance is a component of the cage accountability.

The marker bank is an additional area within the main bank and is responsible for maintaining inventories of issued markers transferred in from the table games, front money, safekeeping deposits, and other items such as returned checks and airfare disbursements. In smaller casinos, the fill bank and main bank functions may be combined into one area. The main bank may also serve as the cashier for the hotel (front desk, restaurants, bars, and retail outlets) by issuing banks to hotel cashiers coming on shift and accepting the deposit of excess funds received by hotel cashiers during the course of their shifts.

The cage operates on a 24-hour basis in the same manner as the casino. An inventory of all items comprising the cage accountability is performed for each shift. The windows, fill bank, and main bank are counted down and verified by both the outgoing shift and incoming shift personnel. The balances are carefully checked, since any differences (overages or shortages) may result in disciplinary action being taken against the employee responsible for the difference. The results of these procedures are documented on an accountability sheet, which shows all balances the cage is responsible for by respective area.

All transactions that result in increases or decreases in the cage accountability during the shift are recorded on a shift summary. Examples of these items include airfare disbursements, coin coupons, and paid-outs. Documents supporting these transactions are placed in an envelope and attached to the completed shift summary. The shift summary, supporting documentation, and the accountability sheet are sent to the accounting department daily to be audited.

Figures 6.1 and 6.2 are examples of typical accountability and shift summary sheets.

Most casinos today use computer systems designed to document cage transactions and facilitate the reconciliation of inventory balances at shift end. Receipts are produced for such common transactions as foreign currency exchanges, marker payments, and front money/safekeeping deposits, thus providing cashiers with an automated trail of transactions conducted during their shift.

CASINO CREDIT

Casino credit is a marketing tool that, when used appropriately, can result in significant casino revenues. Casinos such as the Bellagio, Caesars Palace, The Mirage, and Trump's Taj Mahal rely heavily on casino customers who gamble on credit. Unlike institutions offering consumer credit, casinos do not charge interest for the use of their funds; however, casino credit should not be considered interest-free.

MAIN BANK COUNT SHEET

TABLE INVENTORY			SAFE #1		
ACTIVE MARKERS			CURRENCY	VAULT	
INACTIVE MARKERS			100		
SUSPENSE MARKERS			50		
DOCUMENT TRANSFERS	(	)	20		
FRONT MONEY	(	)	10		
SAFEKEEPING	(	)	5		
RETURNED CHECKS			1		
CHECKS			CURRENCY	STRAPPED	
+ 2500 CHECKS			100		
HOLD CHECKS			50		
LATE CHECKS			20		
TRAVELER'S CHECKS			10		
ANNEX CAGE			5		
FILL BANK			1		
FRONT LINE BANKS			CURRENCY	LOOSE	
EMPLOYEE BANK			100		
SLOT INVENTORY			50		
RESERVE CHIPS			20		
SLOT JACKPOTS			10		
LATE CHECKS			5		
HOLD FOR CURRENCY			1		
FOREIGN CURRENCY			CHIPS	PACKED	
MUT. CURRENCY			1000		
MUT. COIN			500		
TOKEN CABINET			100		
FILLS: PIT/GYD			25		
DAY			5		
SWG			1		
			TOKENS	PARTIAL	
KENO			100		
LATE ITEMS			25		
			10		
			5		
			1		

COIN	PARTIAL			
1.00		SPORTS 5000	
.50		SPORTS 1000	
.25		FOREIGN CHIPS	
.10		MUTILATED CHIPS	
.05		OBSOLETE CHIPS	
.01		MGM FOREIGN CHIPS	
CHANGER TOTAL		FOREIGN CHIP CABINET	
COIN SORTER #1		ROLLER COASTER TOKENS	
COIN SORTER #2			
COIN SORTER #3			
COIN SORTER #4			
COIN SORTER #5			
BAGGED COIN			
JET SORT TICKETS		TOTAL COUNT	
		CASH SUMMARY	(	)
		DAILY VARIATION	
DUE BACK			

OUTGOING CASHIER	DATE	INCOMING CASHIER	SHIFT

Figure 6.1 Main Bank Count Sheet

DAILY CASH SUMMARY			Enter Date:	01-Apr-97	

Description	Grave	Day	Swing	Late Adjust	Total Balance
Opening Inventory		-	-	-	-
Table games: (+) Drop					
(-) Fills & Credits					
(+/-) Difference in table inventories					
(=) Win / (loss)	-	-	-	-	-
Slots: (+) Drop					
(-) Jackpots & Fills					
(=) Win / (loss)	-	-	-	-	-
Keno					-
Other Revenue:					-
Cigarette drop					-
Lady's room					-
Locker drop					-
Roller Coaster Drop					-
Hotel Revenue					-
Bar Revenue					-
Front Desk Revenue					-
Pool Retail					-
Retail Revenue					-
Showroom					-
Spa					-
Uniform reimbursement					-
Wedding Chapel					-
Other: (add)					-
Alien Withholding					-
Bank Cash Order					-
Cage Checks Issued					-
Foreign Currency Exchange					-
Returned Checks					-
Slot Hopper Return					-
Tips: Cage					-
Tips: Dealer					-
Tips: Slots					-
Write-off Recovery					-
					-
					-
Other: (subtract)					-
Accounts Receivable Write-off					-
Cigarette Coupons					-
Collection Fees					-
Coupons					-
Front Desk Duebacks					-
Incoming wire transfer					-
Initial Slot Fills					-
Petty Cash					-
Plane Fare Paid					-
Roller Coaster Comps					-
Roller Coaster Coupons					-
Roller Coaster Refunds					-
Script Redemption					-
					-
					-
Over / (short): Cage					-
Over / (short): Hotel					-
Over / (short): Roller Coaster					-
Over / (short): Slots					-
					-
Bank Deposits					-
Cash					-
Coin					-
Foreign Currency					-
Checks					-
					-
Closing Inventory	-	-	-	-	-
Explanation / Comments					
Date of report: 7/29/97 1:38 PM					

Figure 6.2 (a)   Daily Cash Summary

DAILY CASH SUMMARY

Description	Account Number	Debit	Credit
		For accounting use only	
Opening Inventory			
Table games: (+) Drop			
(-) Fills & Credits			
(+/-) Difference in table inventories			
(=) Win / (loss)	001-88-88-130-002	-	-
Slots: (+) Drop			
(-) Jackpots & Fills			
(=) Win / (loss)	001-88-88-130-003	-	-
Keno	001-88-88-130-004	-	-
Other Revenue:		-	-
Cigarette drop		-	-
Lady's room		-	-
Locker drop		-	-
Roller Coaster Drop		-	-
Hotel Revenue		-	-
Bar Revenue		-	-
Front Desk Revenue		-	-
Pool Retail		-	-
Retail Revenue		-	-
Showroom		-	-
Spa		-	-
Uniform reimbursement		-	-
Wedding Chapel		-	-
Other: (add)		-	-
Alien Withholding		-	-
Bank Cash Order		-	-
Cage Checks Issued		-	-
Foreign Currency Exchange		-	-
Returned Checks		-	-
Slot Hopper Return		-	-
Tips: Cage		-	-
Tips: Dealer		-	-
Tips: Slots		-	-
Write-off Recovery		-	-
0		-	-
0		-	-
Other: (subtract)		-	-
Accounts Receivable Write-off		-	-
Cigarette Coupons		-	-
Collection Fees		-	-
Coupons		-	-
Front Desk Duebacks		-	-
Incoming wire transfer		-	-
Initial Slot Fills		-	-
Petty Cash		-	-
Plane Fare Paid		-	-
Roller Coaster Comps		-	-
Roller Coaster Coupons		-	-
Roller Coaster Refunds		-	-
Script Redemption		-	-
0		-	-
0		-	-
Over / (short): Cage		-	-
Over / (short): Hotel		-	-
Over / (short): Roller Coaster		-	-
Over / (short): Slots		-	-
0		-	-
Bank Deposits		-	-
Cash		-	-
Coin		-	-
Foreign Currency		-	-
Checks		-	-
0		-	-
Bankroll adjustment		-	-
		-	-

Figure 6.2 (b)   Daily Cash Summary

Casino credit is granted only to players who will take full advantage of the credit line established by gambling with those funds. The credit authorized will be taken away by the casino if the player does not make use of it. In effect, the requirement that the credit be used for gambling serves the same purpose as charging interest: The casino does not require the player to lose, but the player must gamble.

Credit is granted to a player by the casino in order to increase play and, it is hoped, the amount won by the casino. The willingness to grant credit alone does not ensure that players of this caliber can be attracted to the casino. Casino customers who gamble on credit are normally upscale clientele who desire amenities such as gourmet restaurants and fine room accommodations. As a result, the physical facilities, as well as the marketing plan used to attract these customers, become crucial if the casino is to be successful in marketing to such individuals.

Types of Casino Credit

Credit is considered to be extended anytime the casino is at risk of losing any or all of the funds advanced to a particular player. One form of casino credit is check-cashing privileges. Check-cashing privileges permit the customer to cash either personal or business checks at the casino cage. The casino then deposits these checks in its bank account on the next business day. The primary risk to the casino from customer check cashing results from the acceptance of a check for which insufficient funds exist in the customer's account to cover the amount of that check.

In recent years, casinos have also experienced increasing numbers of forged and counterfeit checks. This has resulted in many casinos using check approval programs such as Telecheck to transfer much of the risk of loss to a third-party service.

One exception to standard check-cashing procedures is the situation in which the casino agrees to hold the customer's check or checks for a specified number of days before depositing them in the bank. This courtesy is generally limited to premium customers who are repaying credit previously extended; customarily, the casino, depending on policy, will hold the checks for 30 to 45 days before depositing them for collection. In some casinos, the customer's account may be considered clear for the amount of the check(s) received so that the patron may continue playing, which effectively results in a further extension of credit by the casino.

Credit Line   The total amount the casino is willing to extend is called a player's credit line. If for example a player's credit line is $10,000, then the casino will accept checks totaling $10,000 from the player and may agree to hold these checks until some date in the near future.

Front Money   Players often come to the casino and bring cash to deposit at the casino cage. Deposits of funds that the player intends to use for

gaming purposes are referred to as front money. The deposits are referred to as safekeeping if the player intends only for the funds to be held by the casino cage for security and convenience. Front money deposits enable the player to draw upon the funds by signing markers at the table games up to the amount of the deposit.

Credit Granting Procedures

A player wishing to establish casino credit must first fill out an application (Fig. 6.3). The credit application can be accepted by any cage cashier, credit executive, or casino marketing executive. The application can also be mailed, handled by telephone, or sent via facsimile to the casino. When taking an application over the phone, the casino employee simply takes the information and completes the application based on the information communicated. In this instance, the player must still appear at the casino to activate the credit line.

To be granted credit, the customer *must* (Fig. 6.4):

1. Have at least one bank reference (preferably a U.S. bank)
2. Have a checking account
3. Be the signer on the account

Credit applications vary slightly from casino to casino; however, every application contains at least the following information relevant to the customer:

1. Complete name
2. Address
3. Birth date
4. Social Security number (if U.S. citizen)
5. Name of business where employed, type of business, position with business, and address of business
6. Phone numbers for both residence and business
7. Amount of credit requested
8. Bank references with account numbers
9. Mail preferences

If the application is presented in person, the identification of the applicant is verified, photocopied (in most cases), and stapled to the application. If the application is not taken in person, the identification is verified and photocopied prior to any credit being issued. Photocopying a player's identification document may be of great value if it subsequently becomes necessary to prepare a CTRC in accordance with Title 31 or Regulation 6A requirements. If the player's identification is on file and is unexpired, there may be no need to interrupt, or even notify, the player if the $10,000 threshold for cash transactions is exceeded. In many casinos today, the

J I M S   C A S I N O
Las Vegas

Credit Application

Thank you for your interest in **Jims Casino**.
Please return the completed form by mail or fax; the postage is prepaid for your convenience.
Please contact us should you have any questions.

Name (Please print) _____ Date of Birth _____

Street Address _____

City _____ State _____ Zip Code _____

Residence Phone (___)_____ Social Security Number _____

Company Name _____ Type of Business _____

Position _____ Business Phone (___)_____

Company Street Address _____

City _____ State _____ Zip Code _____

Credit Requested $ _____ Direct All Correspondence to: ___ Business ___ Residence

Bank 1 Name (Checking account only) _____

Branch and Street Address _____

City _____ State _____ Zip Code _____

Account # (Business) _____ Account # (Personal) _____

Deposit Checks to: ___ Business   ____ Personal

Bank 2 Name (Checking account only)   _____

Branch and Street Address   _____

City _____ State _____ Zip Code _____

Account # (Business) _____ Account # (Personal) _____

Deposit Checks to: ___ Business   ____ Personal

Anticipated Arrival Date _____

My signature below is authorization for my financial institution to provide **Jims Casino**
with the requested information pertaining to my checking accounts in accordance with the
provisions of the Federal Fair Credit Reporting Acts. This authorization applies to both my
business and personal accounts. I will be responsible for any fees charged. The confidentiality
of the information provided will be maintained except when disclosure of this information is
required by applicable law.

Name (Please print) _____

Signature _____ Date _____

Figure 6.3   Credit Application, Jims Casino

Credit Authorization Process

1. Is credit application complete?[1]   Yes (go to #2)

2. Is credit application legible?   Yes (go to #3)

3. How much credit is requested? $ _____ (go to #4)

Deliver Application to Credit Department for Processing

4. Has identification/passport been photocopied?[2]   Yes (go to #5)

5. Has gaming report been obtained from Central?   Yes (go to #6)

6. Is customer reported as 4 in 14?   Yes (see credit mgr.)   No (go to #7)

7. Has consumer credit report been obtained?   Yes (go to #8)

8. Is consumer credit report clear?   Yes (go to #9)   No (see credit mgr.)

9. Does customer have credit elsewhere?   Yes (go to #10)   No (go to #23)

10. How long established with Central?   Date ___/___/___ (go to #11)

11. Has in-transit been requested?   Yes (go to #12)

12. Does customer owe?   Yes (see credit mgr.)   No (go to #13)

13. Is it after banking hours?   Yes (go to #21)   No (go to #14)

14. Has bank check been obtained?   Yes (go to #15)

15. Can customer sign alone?   Yes (go to #16)

16. Has account been open at least 6 months?   Yes (go to #17)   No (see credit mgr.)

17. Does average balance support the request?   Yes (go to #18)   No (see credit mgr.)

18. Does customer have any derogs at Central?   Yes (go to #19)   No (go to #21)

19. Are the derogs: Paid? (go to #20)   Owed? (do not issue credit)

20. How recent? _____   How much? _____

21. Is any bank info available through Central?   Yes (go to #22)   No (proceed w/caution)

22. Does customer's current limit equal request?   Yes (go to #27)   No (see credit mgr.)

23. Has bank check been obtained?   Yes (go to #24)

24. Can customer sign alone?   Yes (go to #25)

25. Has account been open at least 6 months?   Yes (go to #26)   No (see credit mgr.)

26. Does average balance support the request?   Yes (go to #27)   No (see credit mgr.)

27. It is time to make a decision.

Key Questions:
- ✔ Does customer have credit elsewhere?
- ✔ Does customer owe?
- ✔ Does customer's current limits equal request?
- ✔ Does average balance support the request?
- ✔ Does customer have and reported derogatories?

_____

[1] Application may be taken over the phone. Application is not complete until customer signs form.

[2] If customer is not present during application process, make sure I.D. is photocopied before issuing credit.

Figure 6.4   Credit Authorization Process

application and identification document are scanned into the casino system and retained in computer files.

The casino often requires the player to sign a "bank credit authorization form," which authorizes the customer's bank to release any credit information directly to the casino. Once the application is received by the casino, information on the customer's bank account is requested. Many casinos use credit agencies for obtaining credit and bank checks on a player.

National Cred-A-Chek is a company used by many Las Vegas casinos for bank verification. It is not unusual for a bank to refuse to provide any customer information, and the casino is very sensitive to the customer's desire for privacy. If a casino were to contact the bank directly, the request for information could create concerns for the officers of the bank. As a result, companies such as National Cred-A-Chek provide a valuable service to both the casino and the casino's prospective customer.

Regardless of who makes the contact or how the bank is contacted, certain information is requested:

1. Opening date of the account
2. Average and current balance
3. Signers on the account
4. Is the account "satisfactory"?

Opening Date   The opening date of the account is very important. A new account could indicate problems for the casino. A new account may not be a good indicator of the player's liquidity or, even worse, it could signal an attempt to defraud the casino. Typically, a casino desires an applicant's bank account to be open at least one year.

Average and Current Balance   The bank will be requested to provide the customer's average and current balance in each account given as a reference for both personal (P) and business (B) accounts. The average balance will be a range and, normally, is based on the last three to six months. Savings and loans occasionally use the last six months in computing the average.

# OF DIGITS	LOW	MED	HIGH
1	1	4	7
2	10	40	70
3	100	400	700
4	1,000	4,000	7,000
5	10,000	40,000	70,000
6	100,000	400,000	700,000
7	1,000,000	4,000,000	7,000,000

A person with a *Low 5 Personal* rating has, on average, a personal account balance ranging from $10,000 to $39,999. A *High 4 Business* rating indicates that the applicant's business account contains an average balance ranging from $7,000 to $9,999. The applicant may be approved for credit based on qualifying average balances in either a personal or business account.

The current balance is the amount in the applicant's account at the time of contact by the casino or credit agency. Between 5 and 10% of the banks throughout the United States will not release either the average balance or current balance. In these instances, the bank is asked if a check in the amount of the credit requested would clear today. The casino then knows a minimum amount in the account as well as the opening date of the account.

Signers on the Account   Since a signed marker is nothing more than a counter check, the casino must have the signatures necessary to cash the check. If two signatures are required, for example, a husband and wife or two business partners, the instrument is of no use to the casino.

Is the Account Satisfactory?   When a bank reports that an account is satisfactory, it means that no bad checks have been written during the past year. If the customer has a history of writing checks for which insufficient funds are on deposit in the account, the bank will report the account as being unsatisfactory.

Classes of Customers Applying for Casino Credit

Fortunately for the casinos, approximately 75% of the customers applying for credit have casino credit elsewhere. It is fortunate for the casinos because there is an agency that specializes in providing credit information on casino credit customers; however, 25% of those applying for credit have no prior history of gaming credit. The bank information is the primary source available to establish credit for someone who has no prior history of casino credit. The average balance, current balance, and the amount the customer requests are the key determinants.

For the 75% who have casino credit elsewhere, there is a reporting agency known as Central Credit, Inc. (Central Credit) that provides instant information on the applicant. Casinos around the world have the option of subscribing to the services offered by Central Credit. If the applicant is in Central Credit's files, the name of the applicant, birth date, address, Social Security number, and every casino where the customer has a credit history will be provided. Central Credit also reports any derogatory (derogs) information reported on the customer. The primary concerns of the casino are (1) outstanding balances at other casinos and (2) any derogatory information.

Gaming Report/Inquiry and Intransit   There are two primary types of reports provided by Central Credit: the gaming report (also known as an inquiry) and an intransit report. The gaming report (Fig. 6.5) is requested most often and is available immediately. In addition to payment and credit limit history, the gaming report will include any reported bank information. The shortcoming of the gaming report is that the information is not necessarily up-to-date.

The intransit report (Fig. 6.6) provides up-to-the-minute information because every casino where the applicant has credit is contacted to find the current amount owed to the casino. The shortcomings of the intransit report are that it takes time for Central Credit to contact each casino and that much of the derogatory information available in the gaming report is not included.

From the Central Credit sample reports, the inquiring casino can determine that Mr. Kilby established a line of credit at Treasure Island on January 16, 2002, in the amount of $5,000. The casino can further determine that Mr. Kilby's last action at Treasure Island was on August 2, 2002. At the time the Central Credit reports were requested (April 30, 2003), Mr. Kilby's account at Treasure Island indicated a balance outstanding of $19,500.

Central Credit will not provide any information until the customer is established at the casino requesting the information. A customer is considered established when credit is applied for or when a cashier's check or money order is deposited. Establishing an applicant puts Central Credit on notice that the inquiring casino is claiming the applicant as one of its customers. Central Credit will list all casinos where the applicant has a credit history, including credit limits and the date of the customer's highest and last credit issued.

Derogs   Derog is short for derogatory information. If any subscribing casino has had difficulty collecting from a credit customer, this derogatory information will be indicated in the Central Credit system. Derogs include insufficient funds (NSF), no account, slow pay, account closed, and stop payment.

4 in 14   Central Credit will also report whether an applicant is "4 in 14." Any customer who has applied for casino credit at four or more casinos during a two-week period is noted as "4 in 14." Research has shown that 80% of these applicants will write checks that go bad during the following six months. If a customer is classified 4 in 14, the casino will almost always turn down a request for credit.

Preferred Customers   Preferred customers are those whose credit information is treated as confidential or preferred by the casino. The casino in which the customer is treated as preferred will not release any credit in-

CENTRAL CREDIT, LLC
Gaming Report

Summary
Notify Terminal:

CCID: 00 123 103 790
Name: KILBY, JIM 07/08/1949 @ LAS VEGAS, NV
Resume: First Est: 08/24/1967 By V24   No. of Clubs: 27   Flags: D P
          Last Est: 07/06/2002 By V179   Last Updated: 04/30/2003 12:32p by V64

Gaming

V64	**PALACE STATION CASINO**			**D**		**#10042**
	REST	07/09/1990	10,000.00 LT	LA	06/27/2002	70,000.00
	LTDT	02/09/2002	50,000.00	UDA	04/30/2003	77,000.00
	TTO	06/26/2002	70,000.00	BAL	04/30/2003	77,000.00
	NOCR	11/19/2002				
	MEMO	NOCR DEROG				

5,000.00 NSF 07/31/2002 ORIG 07/16/2002

72,000.00 DCA 07/31/2002 ORIG 06/27/2002

V43	**BALLY'S/PARIS LAS VEGAS**			**D**		**#0141705**
	EST	01/23/1989	FM	LA	06/02/2002	20,000.00
				UDA	04/30/2003	17,720.00
				BAL	04/30/2003	17,720.00
				CCN	06/09/1994	

20,000.00 NSF 07/25/2002

V141	**TREASURE ISLAND**			**D P**		**#203**
	EST	01/16/2002	20,000.00 LT	LA	08/02/2002	10,000.00
	LTDT	06/14/2002	30,000.00	UDA	04/30/2003	19,500.00
	NOCR	08/21/2002		BAL	04/30/2003	19,500.00
	MEMO	NOCR-DEROG				

30,000.00 NSF 08/23/2002

V110	**RIO HOTEL & CASINO**					**#1425**
	EST	02/23/1990		UPD	04/30/2003	

Figure 6.5   Central Credit Gaming Report

CENTRAL CREDIT, LLC
Gaming Report

Full

CCID:	00 123 103 790
Name:	KILBY, JIM 07/08/1949 @ LAS VEGAS, NV
Resume:	First Est: 08/24/1967 By V24
	Last Est: 07/06/2002 By V179

No. of Clubs: 27   Flags: D P

Last Updated: 04/30/2003 12:32p by V64

Gaming

V64	**PALACE STATION CASINO**			**D**		**#10042**
	EST	04/11/1986		H&L	06/27/2002	70,000.00
	REST	07/09/1990	10,000.00 LT	UDA	04/30/2003	77,000.00
	LTDT	02/09/2002	50,000.00	BAL	04/30/2003	77,000.00
	TTO	06/26/2002	70,000.00			
	NOCR	11/19/2002				
	INQ	04/30/2003				
	INT	04/30/2003				
	MEMO	NOCR DEROG				

5,000.00 NSF 07/31/2002 ORIG 07/16/2002
72,000.00 DCA 07/31/2002 ORIG 06/27/2002

V8	**GOLDEN NUGGET**					**#203**
	EST	06/10/1984		HI	08/04/1984	17,000.00
	INQ	11/17/1992		LA	05/29/1989	5,000.00
	INT	05/26/1989		UPD	04/30/2003	

V43	**BALLY'S/PARIS LAS VEGAS**			**D**		**#0141705**
	EST	01/23/1989	FM	HI	01/24/1989	50,000.00
	INQ	07/08/2002		LA	06/02/2002	20,000.00
	INT	01/08/2002		UDA	04/30/2003	17,720.00
				BAL	04/30/2003	17,720.00
				CCN	06/09/1994	

20,000.00 NSF 07/25/2002

V40	**LAS VEGAS HILTON**					**#3375**
	EST	10/30/1991	15,000.00 LT	H&L	05/19/1992	38,000.00
	INQ	10/01/1993		UPD	04/30/2003	
	INT	02/17/1993				

V110	**RIO HOTEL & CASINO**					**#1425**
	REF	02/08/1990		UPD	04/30/2003	
	EST	02/23/1990				
	INQ	10/01/1993				
	RUND	05/13/1990				

Club Bank Reports

CITIBANK		**By: V194 on 07/01/2002**
40001689	PER ACCT: 10,000 GOOD CSA	Since:

CITIBANK		**By: V43 on 01/09/2002**
40001689	PER H1 4	Since: 09/01/1989

BK OF AMERICA		**By: V8 on 06/11/984**
038720	PER MED 5	Since: 12/1982
0387005	PER LO4	Since: 06/1975

Identification

Info	Customer	Spouse
Name	KILBY, JIM	
Dobs	07/08/1949	
Loc	LV, NV	
DL	NV444555666777	
ID	SSN 444-555-6666	
Res	2250 Fountain @ Las Vegas	
Occup	PROFESSOR	
	UNLV	
Rmrk	PER V8 06/10/1984, V19 05/29/1988	

End of Report.

Figure 6.6   Central Credit Intransit Report

formation to Central Credit. If a gaming or intransit report is requested, the only information provided is that the customer does have credit. No derogs or amounts owing are included in Central Credit's report for a preferred patron.

It is not unusual for one casino to consider a customer preferred while a second casino does not and releases pertinent credit information to Central Credit. The only way a casino can obtain information on a preferred customer is for an executive at the inquiring casino to directly contact an executive at the casino where the customer is a preferred customer. In this manner, the executive at the casino receiving the inquiry may decide on the amount of information, if any, to provide to the inquiring casino. The policy of many Las Vegas casinos is to treat any customer with a line of credit of $50,000 and above as preferred; however, the policy may vary from casino to casino and from player to player.

Disposition   When preparing an application for casino credit, the customer will be asked how she plans to "dispose" of any outstanding balances. Disposition refers to how the customer plans to pay any monies owed the casino. Disposition methods may vary from customer to customer. The following are examples of disposition methods:

- Check on departure.
- Customer will pay an outside (branch) office within 30 days.
- Statement sent to residence. Customer will pay within 30 days of last marker.
- Send no statement. Customer will pay within 30 days.

The card shown in Fig. 6.7 is provided by a typical casino to credit players.

The Credit Decision and Setting Limits

Applicants for consumer credit must prove that they are deserving of the loan. To be denied casino credit, applicants must have something in their report to indicate that the loan is not deserved. Generally, an applicant may be expected to be granted casino credit if there is nothing in the applicant's record to show that credit should not be granted.

Table 6.1 compares the information required by casino and consumer creditors before issuing credit. In the past, national consumer credit reporting agencies were not checked by casinos before issuing credit; however, it is becoming a policy at many of the larger casinos to contact agencies like TRW for a report on any applicant who does not have a record with Central Credit.

Marker Deposit Policy

The policy of the casino is for all markers issued to be paid prior to departure; however, management understands that this may not always be possible. Markers will be deposited unless the customer requests other arrangements, which must be reviewed and approved by credit, collection, or casino management personnel.

Unless otherwise requested and approved, markers that remain unpaid at the time of departure will be deposited in accordance with the following schedule:

$ 0 to 10,000	Deposited within fifteen days of the departure date
$ 10,001 to 50,000	Deposited within thirty days of the departure date
$ 50,001 and above	Deposited within forty-five days of the departure date

Any questions with regard to this policy should be referred to credit or collection personnel.

Figure 6.7   Marker Deposit Policy

Whether casino or consumer credit is being sought, the executive reviewing the application is ultimately looking for the "3Cs" of credit:

- Character
- Credit history
- Capacity to repay debt

Table 6.1   Consumer Credit Process versus Casino Credit Process

	Casino Credit	*Consumer Credit*
Consumer Credit Agency Check	Sometimes	Yes
Central Credit Check	Yes	No
Verify Employment	Sometimes	Yes
Verify Income	No	Yes
Check Bank Balance	Yes	No

In addition to the 3Cs of credit, the casino executive is also concerned with a player's ability/willingness to pay and her propensity to play (see Fig. 6.8).

Ability/Willingness to Pay   Since limited information is requested on the application, the ability/willingness to pay decision is based on the applicant's bank account balance (ability) and Central Credit record (willingness). The ability to pay will also be influenced by: (1) how long the applicant has been in business, (2) applicant's position with the company (employee or owner), and (3) age of the applicant. The information obtained is evaluated subjectively by the credit executive, and room exists for interpretation regarding the importance of the information. Although the applicant's length of time in business and position with the company influence the credit decision, few casinos verify this information.

Propensity to Play   In addition to a player's ability and willingness to pay, the casino is also concerned with the player's propensity to play. Since the player is expected to gamble, the casino will not grant credit in amounts not warranted by the player's action. The casino executive has two primary sources of information in determining the propensity to play: (1) history of play recorded by the casino prior to the credit application and (2) Central Credit.

The applicant is likely to have a record in the casino's computer system if he or she had previously been a frequent player. The computer system will list the player's previous average bets, time played, and amounts won or lost. The criteria used to determine this information, as well as the methodology used to capture the information into the computer system are discussed in detail in Chapter 12, on player rating systems. This information will give the casino executive enough information to determine the applicant's level of play.

If the applicant has a record in Central Credit's files, the gaming report often lists the highest and last action at every casino where the applicant has credit. Highest action indicates the largest amount the customer has ever left owing the casino. Last action merely indicates the last time the customer played. Highest action indicates how much the applicant left owing, not how much was bet. As a result, highest action is not a good indicator of a player's propensity to play; however, it is all the information the casino has available if the player has no in-house ratings available. High action is a better indicator of a player's propensity to borrow.

Setting Limits   The applicant is asked how much credit he or she is seeking at the time the application is prepared. After reviewing the application, the credit executive will either approve, reduce the amount requested, or deny the application altogether. The credit executive must

SF - REVOLVING CREDIT - CREDIT GUIDE SCORING FORM

DATE _____   ☐ ACQUIRED

NAME _____   ☐ WTD

MERCHANT CODE _____   ☐ TUD

<table>
<tr><td colspan="2" style="text-align:center">OFFICE STAMP</td></tr>
</table>

REVOLVING CREDIT (System Code R)   Scorer's Initials

STEP 1						POINTS
Years at Present Plus Former Job	4 Years or Less 10	49 Months to 9 Years 13	Over 9 Years 20			
Occupation	Pro/Semi-Pro Exec/Educ 27	Mgr/White Collar Police/Military 15	Trades/Clerical Sales/Domestic 15	Labor/Operators Drivers 5	Service/All Other 5	
Checking/Savings	No Bank or Bank Name Only 4	Checking or Savings 18	Both Checking and Savings 30			
Real Estate	Own 20	Rent 11	Other 11			
Bank, Bankcard, Major Department Store, or Credit Union References	None 10	1, 2 20	3 or More 25			
Competitor Finance Company References	None 25	1 or More 11				
TOTAL STEP 1 - INVESTIGATION						

STEP 2						POINTS
Number of Inquiries in Last 6 Months	No Credit Bureau Obtained (-9)	Credit Bureau: No Record on File (-9)	None 0	One (-9)	2 or More (-19)	
Rated Credit References	None (-2)	1 or More +38				
Continue Step 2 only if "1 or More" Rated Credit References are listed on Credit Investigation						
Oldest Credit Reference	2 Years or Less (-23)	25 Months to 6 Years (-13)	Over 6 Years 0			
Number of "New" Credit Ratings in Last 6 Months	None 0	One (-4)	2 or More (-8)			
Number of "A" Credit Ratings	None (-12)	1, 2, 3, 4 (-7)	5 or More 0			
Number of "B", "C", or "D" Credit Ratings	None 0	1, 2 (-16)	3 or More (-31)			
TOTAL STEP 2 - CREDIT INVESTIGATION						
TOTAL STEP 1 & 2 - ALL INFORMATION						

FORM 1882 (REV.1-86)

Figure 6.8   Consumer Credit Score Card

establish an appropriate limit after being satisfied as to the applicant's creditworthiness. The limit protects both the applicant and the casino.

Conventional thinking in the gaming industry dictates that the customer knows best how much she can afford to lose and repay. If credit limits are set only in amounts the player has the resources to repay, the casino is repaid for credit extended and, most likely, the player will return to gamble again in the future. If a player loses more than she can afford to repay, the casino will lose both the amount owed as well as any future business from the customer.

Front Money Losses   Often, players will come to the casino with front money, lose their front money deposit, and then ask for casino credit. These situations do not lend themselves to the routine bank check since the decision must be made immediately. If the applicant has a record with Central Credit, the decision becomes less difficult. If the applicant cannot be located in Central Credit, the general rule is to advance credit in the amount of the front money lost. This policy may vary widely from credit executive to credit executive even within the same casino.

Permanent and Temporary Lines of Credit   Permanent lines indicate that the player's established line will be available for each subsequent trip as long as the payment record is satisfactory. On the other hand, temporary lines are set on a trip-by-trip basis. Reasons for temporary lines include:

1. The customer has not been in the property for several months and the bank information is outdated.
2. The customer's past payment record is unsatisfactory (slow to pay or returned checks). A temporary line may be given to the player in order to provide an additional opportunity for improved performance.
3. An in-house credit executive may know the customer from prior experience and believe that he can get the customer to pay despite a negative Central Credit report.

Changing Credit Limits   Occasionally, a customer will request that her limit be increased. Unfortunately, this request most often occurs during a period of play when the customer is experiencing heavy losses and believes that the losses can be recovered by getting more credit to fund the additional play. Limit increases are a function of management philosophy.

If management wants to beat the customer for the maximum amount possible, the customer will be given as much additional credit as desired. This policy often results in the loss of both the money owed as well as the player's future business. In addition, the player may become angry with the casino for extending more credit than she could realistically hope to

repay. A few years back, a prominent casino in Las Vegas allowed a player with only a $5,000 limit to lose $500,000 in credit. Examples of this type have received increased attention from the media, gaming regulators, and, in some cases, the judicial system.

The most common approach adopted by casinos is to grant temporary line increases of no more than 20% to 25% of a customer's established line. For example, a player with a $10,000 line of credit would be granted a temporary line increase of up to $2,500, resulting in total credit of $12,500. Most casinos treat the player as having a credit limit equal to 20–25% more than the amount approved on the application. When the player does request more money, the credit executive is secure in temporarily extending the limit within these guidelines.

This is not to say that a player's limit should never be increased. Limit increases should occur either between trips or at the beginning of a trip when the player is thinking clearly and is not influenced by other considerations. Regardless of when a player's limit is increased, the increase should be justified either by the average bank balance or the current information in the Central Credit report.

TTO   "This trip only" credit limits are routine in today's casinos. A TTO occurs when a player's limit is increased on a temporary basis for a specific trip. Any temporary limit is a TTO.

Rim Credit   Since the player is expected to gamble with the credit granted, issuances are made only at the "rim of the game." All credit issued at the game is referred to as "rim credit." Issuances of credit at the game provide a convenience to the player and a means of control for the casino.

Unlike consumer credit limits such as those of credit cards, any amounts owed to the casino are expected to be paid by the due date of the disposition or before the player's next trip, whichever occurs first. Players often have difficulty understanding this concept. With credit card limits, the cardholder has access to any amounts of the authorized limit remaining as long as the payments are current. This is not the case with casino credit.

For instance, suppose a player who has been granted a credit limit of $10,000, with a required disposition of 30 days, loses $5,000. If the player returns to the casino before the 30-day due date, all outstanding balances are expected to be paid before the limit is reinstated and any additional credit is issued. A credit card customer who had used $5,000 of a $10,000 line of credit would still have the remaining $5,000 available to use for additional purchases as long as minimum payments are being made.

Cuff-on-Cuff   As with many rules, there are exceptions. "Cuff-on-cuff" refers to the situation where a player is extended additional credit before previously owed amounts are repaid to the casino.

Walks   Many players attempt to use casinos as a source of interest-free loans. A player will ask for a marker, make a few bets, and "walk" with the cheques. Credit executives need to be aware of these players. Generally, this information is entered into the player rating system and, when this does occur, a credit executive will confront the player and explain the casino credit policy and expectations to the player. In those cases, the casino may also deposit the player's markers at the time of departure and suspend the credit limit.

Credit Authorizers   The trend in casinos today is to restrict the number of individuals who can authorize credit. Table 6.2 presents an example of a typical policy that might exist for a large casino.

COLLECTIONS

Prior to 1983, even in Nevada, gambling debts were not legally collectible; however, a bill was introduced in Nevada's Senate legitimizing the collection of gambling debts. Senate Bill 335 became law on May 17, 1983.

Table 6.2   Credit Authorizing Policy

Credit Committee	**Credit Executives**
President/General Manager	Any Credit Committee Member
VP Finance	Shift Managers
Casino Manager	Hosts
Credit Manager	
Permanent Line (Signatures Required)	
$1–$50,000	2 signatures
	1 Credit Manager or VP Finance *and*
	1 from any other Credit Executive
$50,001–$100,000	3 signatures
	1 Credit Manager or VP Finance *and*
	1 from any other Credit Executive *and*
	1 from any Credit Committee member
$100,001 and above	Quorum
	Unanimous agreement of Credit Committee
Temporary Line (Signatures Required)	
$1–$10,000	1 signature
	Any Credit Executive
$10,001–$25,000	2 signatures
	2 from any two Credit Executives
$25,001–$50,000	3 signatures
	1 Credit Manager and
	2 from any two Credit Executives

The Collection Process

Casino management hopes that any amounts owed will be paid according to the disposition specified on the credit application. Unfortunately, some casino customers are not as quick to pay as they are to lose at the tables. Consequently, most large casinos maintain a staff of collectors who monitor all casino credit and, if necessary, attempt to collect any outstanding balances.

The collection department continually reviews credit customers who are in-house playing at the casino. Once it is determined that a player with an outstanding balance has ended her trip and departed the casino, the collection department goes to work. The first step involves reviewing any special instructions on the credit application.

For instance, the customer may have requested that no statement be sent. If this is the case, the collector would patiently wait until the deadline imposed by the application arrives. If the applicant has not specified otherwise, a statement (sometimes called a confirmation) is mailed to the customer at the location specified (home or business) within one week of departure from the casino. This statement typically includes a stamped return envelope, which the customer is expected to use to return either a personal or cashier's check in the amount of the outstanding markers.

Although a marker serves the same purpose as a counter check, the marker is deposited only 10% to 15% of the time. In most cases, the player sends a check to the casino as payment on the outstanding marker balance. The original marker will be returned to the player once the balance has been completely repaid.

If the marker is unpaid at the end of the agreed-upon period, the collector will attempt to phone the customer to determine why the balance has not been paid. Reasons for the delinquency in payment include the check is in the mail or the customer needs more time to arrange for additional funds to pay off the balance. After evaluating the reason for the delinquency, the collector will specify terms under which the remaining balance will be paid. Form letters are also typically used in the collection process to encourage timely payment and reinforce the player's obligation to the casino.

If the in-house collectors have exhausted all efforts and believe that an account is uncollectible, the account is often turned over to an outside collection bureau or attorney. Outside agencies typically charge between 25% and 50% of any amount collected. Casinos with good in-house collection programs can expect to collect about 95% of what an outside agency could accomplish.

Settlements and Write-Offs

In some situations, casinos will agree to a settlement with a player in order to induce payment of a portion of the outstanding balance. A settle-

ment is an agreement between the casino and the player resulting in the casino accepting an amount less than the full amount owed. Once the amount agreed to in the settlement is received by the casino, the remaining amount owed is written off and the customer's account is considered clear. Casino management will decide at this time whether or not the player's line of credit will be reestablished.

The casino will record the terms of the settlement in a written document, which requires the written approval of the Credit Committee. Terms recorded on the settlement form include:

1. Player's name
2. Date of settlement
3. Original amount owed
4. Amount owed at the date of settlement
5. Date the original amount was issued
6. Settlement/write-off amount
7. Reason for the settlement
8. Player's signature

Write-offs occur when the casino in unable to collect all or a portion of the amount owed. As indicated, the uncollected amount that exists as a result of a settlement is a write-off. A casino normally will only write off a player's outstanding balance after all attempts to collect the balance have proven unsuccessful.

The ability to approve write-offs is generally restricted and may include individuals in the following positions:

1. President/General Manager
2. Vice President of Finance
3. Credit Manager
4. Director of Casino Cage

The write-off is documented on a form that includes the signatures of two or more of the individuals in the positions indicated here and the same terms recorded on the settlement form. The original markers supporting the amount written off will normally be transferred to an area in the accounting department that is secured to prevent access.

CHAPTER SEVEN

SLOT MANAGEMENT

SLOTS

In the casinos of the past, table games were king. Not only were table games the most popular, but they were also the most profitable. On the Las Vegas Strip, where table games once ruled, slots now dominate. Nearly 50% of the total casino win comes from slots. Statewide in Nevada, slots generate over 67% of the total casino win. The comparison is even more dramatic if you were to look at the departmental profits.

In the early days of gaming, slots were merely a diversion and were usually placed around the perimeter of the casino. These machines were all pretty much the same: three-reel mechanical slots. With the exception of the cabinetry, denomination, and brand name, the workings of the "one-armed bandits" were essentially the same. You inserted a coin, pulled the handle, and awaited the outcome as mechanical reels spun and clicked into position.

Themed Slots

Yesterday's mechanical slots have been replaced by today's electronic versions. Apart from the major technological advancements of the past 30 years, one of the most fundamental changes is the proliferation of themed slot machines featuring a mind-boggling assortment of television personalities, cartoon characters, game shows, board games, and other icons of popular culture. This new generation of heavily themed video and reel-spinning slots underscores the highly competitive nature of today's slot floor where bank upon bank of imaginative slots compete for the player's attention.

Las Vegas–based Bally Gaming and Systems is one of the leading slot manufacturers, marketing an array of gaming devices that feature a variety of well-known personalities: Blondie and Dagwood (Fig. 7.1), Popeye the Sailor Man (Fig. 7.2), Betty Boop (Fig. 7.3), and the Lone Ranger, to name just a few. The number of licensed titles introduced by Bally and its competitors has grown to more than 100 in recent years.

Figure 7.1   Blondie Double Feature Game (themed slot).
Source: © 2000 Bally Gaming, Inc.

Bonus "Game within a Game"

One of the most innovative features of today's slots is the "game within a game" feature. If a player hits specific symbols, the player then plays the "game within a game." Bally Gaming's Blondie and Dagwood slots actually have a double bonus feature. In the first, Dagwood crashes into Mr. Beasley, the mailman, scattering the contents of his mailbag and awarding bonus credits. The second bonus feature is more involved. Players choose to go shopping with Blondie or to help Dagwood build one of his renowned sandwiches by using the game's interactive touch-screen display. In either bonus, the player continues to accrue bonus credits until he unveils a "stopper" symbol.

Figure 7.2   Popeye's Bonus Frenzy Game (themed slot).
Source: © 2000 Bally Gaming, Inc.

The bonus feature on the Lone Ranger slot involves a daring chase across the badlands and a chance to collect trading cards for bonus credit. The principle of providing the player with an entertaining animated bonus round in which the player physically interacts with the game by touching the video monitor remains the same across all of its various forms.

The Cashless Casino

The trend in slot operations is toward the "cashless casino." Cashless slots can be configured to return coins and/or bar-coded tickets. The

Figure 7.3 Betty's World Tour Game (themed slot).
Source: © 2000 Bally Gaming, Inc.

player can then take his ticket to another slot machine or cash it out at the change booth. Bally Gaming's technology also allows the player to deposit money with the casino cage, where the player is then given a magnetically imprinted card. Using a secure personal identification number (PIN), the player can then access his money by inserting his card into the slot machines.

Participation Games and Pricing Strategies

There are a variety of ways a casino can obtain slot machines. In the early 1990s, the "shelf life" of the typical slot machine was eight to ten years. Today the typical slot machine life is two to three years, with video reels

experiencing shelf lives as brief as six to nine months in certain markets. The shrinking shelf life is due to decreases in demand rather than mechanical issues. Consequently, casinos actively seek alternative pricing options.

In the traditional sense, casinos buy most machines outright directly from the manufacturer at prices ranging from $7,000 to $10,000 for a typical reel-spinning or video slot. Game conversion kits ranging in price from $250 to $2,000 can be used to turn an existing machine into a brand-new title (i.e., machine type).

Depending on the title, casinos can also lease and/or lease/purchase slot machines. With a lease/purchase, the amount of the lease/purchase payment is ultimately applied toward the purchase of the machine. There is also a daily-fee option on licensed titles whereby the operator pays the manufacturer a daily fee, say $25 per game per day, in addition to up-front charges for the machines.

An increasingly popular alternative is to enter into participation agreements with slot manufacturers. Under this arrangement, the slot manufacturer provides slot machines to the casino with no up-front costs. The casino and the manufacturer then share in the revenue generated by the machines, based on a predetermined percentage, such as an 80/20 split whereby 80% goes to the casino and 20% to the manufacturer. Many of the most popular titles are offered to casinos exclusively as participation games. For casinos, participation agreements can offer favorable acquisition terms for certain machines such as video reels, for which life cycles are sometimes measured in months instead of years. Casino operators may be able to offer the latest and most popular games without straining their capital budgets.

Types of Slots

There are three major categories of slot machines:

- Line Games
- Multipliers
- Buy-a-Pays

Line games allow the player to "activate" additional lines with each coin inserted. The player will see three symbols "in the glass" for each reel. A three-reel line game would look like the following:
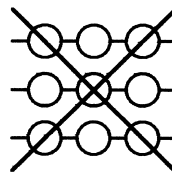
Figure 7.4 shows an example line game. As many as five different pay lines can be activated.

Multipliers are games that pay on the center horizontal line only. As additional coins are inserted, multipliers "multiply" the payout per coin. For example, one cherry on the pay line might pay two coins with one coin inserted and ten coins with five coins inserted. See Fig. 7.5 for an example.

Buy-a-pay games pay on the center horizontal line only, but the player is allowed to "buy" additional jackpot symbols. For example, the only symbols that pay with one coin inserted might be the single bars, double bars, triple bars, and any bars. With a second coin inserted, Red 7s and Sizzling 7s will pay in addition to the bars that were bought with the first coin. On a buy-a-pay, the player would receive nothing if the three Sizzling 7s were lined up on the center pay line with only one coin inserted. Figure 7.6 provides an example of the award glass for buy-a-pay games.

Figure 7.4 Line Game. *Source:* © 2000 Bally Gaming, Inc.
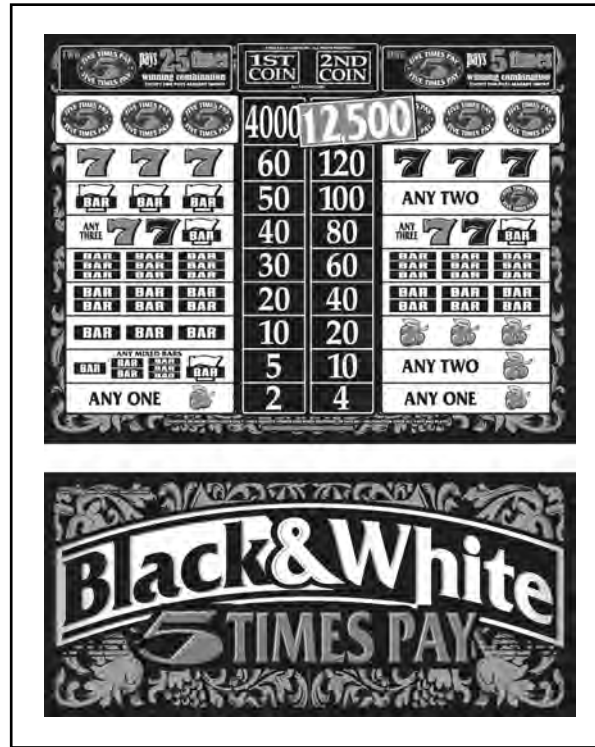
Figure 7.5   Multiplier Game. ***Source:*** © 2000 Bally Gaming, Inc.

Slot Terms

There are a myriad of terms that apply to the operation and management of a slot department. The following list discusses several of the most common terms encountered in the day-to-day operation of a slot department.

   1. *Coin-in*. Unlike the table games, in which the only information known to the casino is how much the player bought in at the table, slot machines include meters that indicate the total amount inserted into the machine. As each coin is inserted, the coin-in meter advances and maintains a cumulative total for all coins inserted into the machine. This coin-in feature allows management to monitor exactly what percentage the machine is winning and then compare that percentage with the game's theoretical win percentage. The coin-in feature also allows management to monitor the volume of play for a machine in order to evaluate the popularity of the machine with slot players.
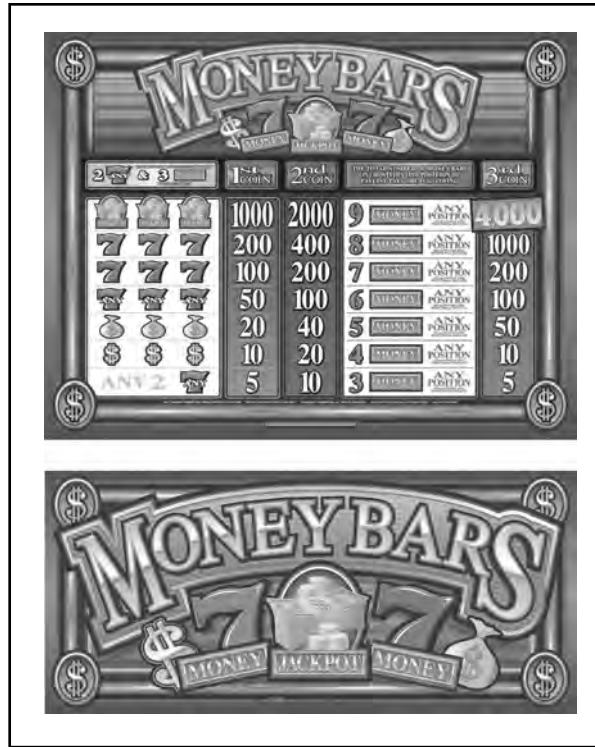
Figure 7.6   Buy-a-Pay Game. ***Source:*** © 2000 Bally Gaming, Inc.

2. *Hopper.* Each slot machine utilizing coin has an internal bank called a hopper. All machine pays are made through this hopper, which works much like the tank on a water closet or toilet. When the tank gets full, a float stops the water flow. Management determines the amount the hopper will hold, and once the predetermined amount is reached, any additional coin-in is diverted to the drop bucket located in the slot stand directly below the slot machine. Figure 7.7 shows an example of a typical slot machine.
3. *Drop.* Any coins inserted into the slot machine when the hopper is full are diverted to a bucket below the slot machine. The total amount of coin in this bucket is called the drop.
4. *Casino Advantage (par).* The percentage of each dollar wagered that the house wins is called the casino advantage. The casino advantage is a theoretical amount, but the actual percentage will approximate the theoretical advantage after a large number of games are played. The number of games that must be played for the actual percentage to approximate the theoretical varies, based on the slot machine type and configuration.

Figure 7.7   Slot Diagram. *Source:* © 2000 Bally Gaming, Inc.

5. *Hold (actual).* Since slot machines have the capability of providing total coin-in, management is able to calculate the percentage of the total wagered that is actually won by the slot. This calculation is called the hold.

6. *Progressive.* Progressive slots allow for what is called a "deferred" payout. For example, the progressive meter might advance four

cents for every dollar inserted into the machine. This four-cent advancement represents four cents the "public" has just won. The increments accumulated in the progressive amount displayed by the machine(s) will be held by the casino until some lucky player lines up the jackpot symbols that result in the progressive amount being paid.

MegaBucks, Nevada Nickels, and Quartermania are examples of progressive slot machines. Each casino will also have progressives of its own, and progressives of this type can be found in casinos around the world.

7. *Linked Progressive.* Linked slot machines all share the same progressive meter. As a coin is inserted into a single machine, the progressive meter on all of the machines increases. The largest linked progressive jackpot ever paid was on International Game Technology's (IGT's) MegaBucks. MegaBucks includes almost 1,000 machines located in various parts of Nevada that are all linked through a central computer system located in Reno. This type of linked progressive was developed as Nevada's answer to the California lottery, since Nevada does not have a state lottery. Linked progressives of the type represented by MegaBucks have now become common to many other gaming jurisdictions in the United States where slot machines are permitted.

8. *Progressive Accrual.* Until the progressive jackpot is won, the amount on the progressive meter is held in escrow by the casino for the player who wins the progressive jackpot. Any amount reflected on the progressive meter is recorded by the casino as a liability. Since progressive jackpots may vary substantially in the dollar amount and frequency of payout, casinos may establish a threshold below which they will not record the progressive amounts as a liability for financial accounting purposes.

9. *Machine Fill.* Like table games, slot machines will run out of money at times. When the hopper goes empty, it must be replenished. This replenishment is known as a fill.

10. *Handpay.* On large jackpots, the hopper in the slot machine does not contain enough coins to make the payout. As a result, slot machines are designed to require management participation to complete the payout on large jackpots. These payouts are known as handpays. For example, a player would receive the payout in the form of a handpay if she were to hit MegaBucks for $3.8 million.

11. *Hit Frequency.* The percentage of pulls that the machine pays at least one coin is known as the hit frequency and is expressed as a percentage. A machine with a 20% hit frequency will pay something 20 times out of 100 times the handle is pulled.

$$\text{Hit Frequency} = \frac{\text{Expected number of pulls resulting in a 1 or more coin payout in a cycle}}{\text{Number of pulls in a cycle}}$$

Slot mix is the term that describes the quantity, type, denomination, and strategic placement of machines that management has chosen to offer the public. The variables that constitute the slot mix are:

- Model mix
- Mechanical configuration
- Floor configuration

Model Mix

Slot machines come in line games, multipliers, and buy-a-pays. They are available in either video or mechanical types. Although video poker is not called a slot (it is actually called video poker), it does qualify as a model option. In addition, there are numerous specialty games, including blackjack, keno, bingo, dice, horse racing, and dog racing. Almost every game is available as a stand-alone or linked progressive.

Each reel game is available as an upright game or slant top. Video pokers are available as uprights, slant tops, or bar tops.

Slot machine popularity differs from casino to casino and target market to target market. For example, the casinos in Las Vegas that cater to local customers offer predominantly video poker machines, whereas the Strip casinos catering to tourists have primarily reel-type slots. One reason for the difference in preference seems to be the level of sophistication of the gambler. Local customers seem to be more astute gamblers, who know that video poker machines may have a lower casino advantage. In addition, video poker machines involve a thought process whereby the player must make certain decisions. With reel slot machines, the only decisions the player makes is which machine to play and how many coins to bet.

Mechanical Configuration

Elements of mechanical configuration include coin denomination, payoff schedule/reel strip combination, casino advantage, and hit frequency. The slot manager must decide the number of machines of each denomination to offer and where the different denominations should be placed. When planning to open a casino, in order to determine the initial slot mix, management would first identify the customer base to be targeted and then prepare an analysis of what competitors have chosen to offer their customers. If certain competitors are identified as being successful in reaching the customer base targeted, management may consider duplicating the competitor's mix initially. Once the casino is open, the slot data would be analyzed and used to modify the mix of machines.

What mix should be used for a new gaming market? New gaming markets present a special challenge for the casino operator, since historical information does not exist relevant to customers and competitor performance in the market.

In practice, where the market is developed, the games and denominations offered will vary significantly. Within a given market, the mix will vary from target market to target market. For example, the primary customer target market of the Mirage and Caesars Palace is the tourist, while Sam's Town and Palace Station target the local gambler.

Why the difference? As mentioned previously, local customers are generally more sophisticated players and video poker machines tend to be attractive to a higher level of gambling sophistication. Video poker machines provide a lower casino advantage, a hit frequency of about 50%, and require the player's interaction.

Locals do not start out as more sophisticated players. Their more frequent play leads to increased knowledge. When Colorado gaming was first introduced, the target market was primarily local customers (locals) from the Denver area, and Las Vegas's experience had shown that locals prefer video poker. However, the Denver locals were not as familiar with gaming or as sophisticated as the Las Vegas locals. Consequently, a mix with a high percentage of video poker machines was not successful in this market, as the locals showed a preference for reel-type slots. Over time, video poker machines will likely represent an increasing percentage of the total machine population.

Payoff Schedule/Reel Strip Combinations   There are two primary types of reel strips: ghost strips and fruit strips. The names are somewhat misleading, in that ghost strips can contain fruit symbols. Fruit strips contain a symbol for every possible stop on the reel. For example, a 20-stop fruit strip would contain 20 symbols.

On the other hand, ghost strips have fewer symbols than stops. A 20-stop ghost strip can have 11 symbols and 9 ghosts; ghosts allow the reel to stop between symbols. Ghost strips are by far the most popular in today's market. Over 95% of the total slot machines sold in the United States contain ghost strips. When the Gold Coast opened in Las Vegas, the casino included 900 machines. Six hundred of these machines were video poker and 300 were slot machines. Of the 300 slots, only 6 were fruit-strip machines.

Casino Advantage   Casino management must select games at house advantages that result in the most profit. Slot machine advantages range from as low as 0.5% to as much as 25%. However, higher house advantages do not necessarily result in the highest win. Many casino operators advertise low-advantage machines in the belief that the decrease in house advantage will be more than offset by the increase in volume.

Many gaming jurisdictions have established minimum levels at which slot machines must pay back in order to prevent casino operators from placing players at too great a disadvantage. Atlantic City gaming regulations require that slot machines must pay back at least 83%, which means a 17% advantage for the casino. Nevada Gaming Regulation 14.04 states that machines must theoretically pay out a mathematically demonstrable percentage, per coin wagered, of at least 75%.

Hit Frequency   The percentage of trials that the machine pays something to the player is referred to as its hit frequency. Conventional management philosophy is that high hit frequency machines stimulate play. When purchasing slot machines, management must first choose the particular model, then the desired casino advantage, and finally the hit frequency. Hit frequencies range anywhere from single digits to the high 30% range for multipliers and buy-a-pays. Hit frequencies for line games can exceed 100%.

Physical/Expanded Reel   The reels on today's slot machines appear to stop mechanically, much like their predecessors. In actuality, the reels stop and display the symbol according to what was chosen by the slot machine's internal computer chip, which is known as an EPROM (erasable, programable read-only memory). As a result of this advancement in technology, it is no longer necessary to physically place the same number of symbols on the reels as is possible on the "computer reel."

When computerized slot machines were first introduced, they were equipped with a video terminal that displayed a picture that was designed to give the appearance of slot machine reels. However, the playing public realized that the video reels could have hundreds or even thousands of symbols, since they could not see the actual size of the reels. As a result, customers believed that they had little chance of hitting the jackpot. Later, the slot machine manufacturers found they could incorporate the same technology in machines with actual spinning reels.

Today's machines have physical spinning reels, but the symbol where the reel stops is determined by computer. This new type of electronic machine with spinning reels is called a "stepper slot." There is little relation between the physical reel and the possibilities available to the computer. It is only necessary to put one of each symbol on the physical reel, but in this case the playing public would probably become suspicious.

The slot machines being supplied today offer the best of both worlds: (1) players feel that they have a good chance of hitting the jackpot and (2) the slot machine can have an infinite number of reel strip/payout combinations that provide large jackpots. If not for this technology, million-dollar slot jackpots would not be possible.

*PC Sheet (**game sheet, specification sheet, theoretical hold worksheet**)*
PC (par calculation) sheets are prepared by the manufacturer and are sup-

plied to the casino operator at the time the slot machines are purchased. Gaming regulations in Nevada and many other gaming jurisdictions require that a PC sheet be maintained for every slot machine or type of slot machine. The PC sheet lists the machine's model number, paytable number, each pay combination and hit frequency, reel strip listing, and theoretical hold percentage (i.e., casino advantage).

The reel strip listing includes both the physical listing that the player would see if the strip were taken off the reel, and the expanded listing that details what symbols are available for random selection by the machine's computer. Figure 7.8 depicts an example of a three-reel, two-coin multiplier's PC sheet and reel strip listing.

VIDEO POKERS

Table 7.1 lists the probabilities for video poker. The first game's lowest pay is a pair of Jacks or better, the Full House pays seven coins, and the Flush pays five coins. The "total" column assumes the best play possible. The correct way to play the hands is determined by the pay table. As the pay table changes, the way the hands are played must change in order for play to be optimized.

On the 7/5 pay schedule, the optimum player return is 96.1% at maximum coins-in and 94.73% at one coin-in. Naturally, every player will not play maximum coins or play the game perfectly. Consequently, the hold the casino should expect is between 2% and 4% more than optimum play. On the 7/5 schedule, the optimum return is 96.1%, but the actual expected casino payback to the player should be between 92.1% and 94.1%.

The slot manager has several different types of video pokers from which to choose. Video poker choices are

- Jacks or Better
- Tens or Better
- Deuces Wild
- Joker Poker (one joker serves as a wild card)
- Deuces-Joker Wild

Each type of video poker comes in a variety of pay tables that offer a choice of casino advantages. Figure 7.9 provides an example of a typical video poker machine.

Slot Volatility

Slot Machine Volatility Although each machine has a fixed casino advantage, the actual hold can vary drastically from the theoretical advantage. The PC sheet for the reel-type machine included previously in this

IN THE MONEY									2 COIN OPTION BUY			
ART–ITM									MAX COIN % = 91.99%			
SMI–9662									MIN COIN % = 91.03%			

SYMBOLS			FACTORS			TOTAL HITS	MINUS	ACTUAL HITS	1st COIN PAYS	2nd COIN PAYS	1st COIN OUT	2nd COIN OUT
R1	R2	R3	R1	R2	R3							
R7	R7	R7	1	1	1	1		1	1000	2000	1000	2000
G7	G7	G7	6	6	4	144		144	100	100	14400	14400
5X	5X	5X	3	1	1	3		3	1000	1000	3000	3000
3B	5X	5X	8	1	1	8		8	500	500	4000	4000
5X	3B	5X	3	7	1	21		21	500	500	10500	10500
5X	5X	3B	3	1	5	15		15	500	500	7500	7500
2B	5X	5X	8	1	1	8		8	375	375	3000	3000
5X	2B	5X	3	9	1	27		27	375	375	10125	10125
5X	5X	2B	3	1	8	24		24	375	375	9000	9000
1B	5X	5X	8	1	1	8		8	250	250	2000	2000
5X	1B	5X	3	11	1	33		33	250	250	8250	8250
5X	5X	1B	3	1	8	24		24	250	250	6000	6000
5X	3B	3B	3	7	5	105		105	100	100	10500	10500
3B	5X	3B	8	1	5	40		40	100	100	4000	4000
3B	3B	5X	8	7	1	56		56	100	100	5600	5600
5X	2B	2B	3	9	8	216		216	75	75	16200	16200
2B	5X	2B	8	1	8	64		64	75	75	4800	4800
2B	2B	5X	8	9	1	72		72	75	75	5400	5400
5X	1B	1B	3	11	8	264		264	50	50	13200	13200
1B	5X	1B	8	1	8	64		64	50	50	3200	3200
1B	1B	5X	8	11	1	88		88	50	50	4400	4400
*MU	*MU	*MU	18	18	17	5508		5508	0	62.81	0	345930
3B	3B	3B	8	7	5	280		280	20	20	5600	5600
A7	A7	A7	7	7	5	245	−145	100	20	20	2000	2000
2B	2B	2B	8	9	8	576		576	15	15	8640	8640
1B	1B	1B	8	11	8	704		704	10	10	7040	7040
5X	XB	XB	3	27	21	1701	−585	1116	25	25	27900	27900
XB	5X	XB	24	1	21	504	−168	336	25	25	8400	8400
XB	XB	5X	24	27	1	648	−216	432	25	25	10800	10800
XB	XB	XB	24	27	21	13608	−1560	12048	5	5	60240	60240
CH	CH	CH	2	2	2	8		8	10	10	80	80
CH	CH	NC	2	2	70	280		280	5	5	1400	1400
CH	NC	CH	2	70	2	280		280	5	5	1400	1400
NC	CH	CH	70	2	2	280		280	5	5	1400	1400
CH	NC	NC	2	70	70	9800		9800	2	2	19600	19600
NC	CH	NC	70	2	70	9800		9800	2	2	19600	19600
NC	NC	CH	70	70	2	9800		9800	2	2	19600	19600
Totals						55307	−2674	52633			339775	686705

Figure 7.8 (a) Par Sheet and Reel Strip Listing. **Source:** © 2000 Bally Gaming, Inc.

IN THE MONEY
ART–ITM
SMI–9662

2 COIN OPTION BUY
MAX COIN % = 91.99%
MIN COIN % = 91.03%

COINS	TOTAL HITS	TOTAL OUT	TOTAL IN	HIT %	PAY %
1	47125	339775	373248	12.63%	91.03%
2	52633	686705	746496	14.10%	91.99%

In The Money Feature	
Hits	5508
Avg. Pay	62.81
Pulls Per	67.76

MAX COIN PAYS	TOTAL HITS	% OF TOTAL HITS	% OF TOTAL OUT	PLAYS PERHIT	P/H AND HIGHER
2000	1	0.00%	0.29%	373248	373248
1000	11	0.02%	1.64%	33142	30439
500	61	0.11%	4.41%	6167	5128
400	22	0.04%	1.28%	16941	3936
375	59	0.11%	3.22%	6326	2427
350	17	0.03%	0.84%	22588	2191
300	8	0.02%	0.36%	45176	2090
280	22	0.04%	0.90%	16941	1860
260	25	0.05%	0.94%	15059	1656
250	65	0.12%	2.37%	5742	1285
240	22	0.04%	0.77%	16941	1195
220	22	0.04%	0.71%	16941	1116
200	22	0.04%	0.64%	16941	1047
180	25	0.05%	0.65%	15059	979
160	17	0.03%	0.39%	22588	938
140	17	0.03%	0.34%	22588	901
120	17	0.03%	0.29%	22588	866
110	11	0.02%	0.18%	33882	845
100	620	1.18%	9.03%	602	351
90	330	0.63%	4.33%	1129	268
80	303	0.58%	3.53%	1232	220
75	352	0.67%	3.84%	1060	182
70	551	1.05%	5.61%	678	144
60	661	1.26%	5.78%	565	115
50	1270	2.41%	9.25%	294	82
40	826	1.57%	4.81%	452	70
30	840	1.60%	3.67%	444	60
25	1884	3.58%	6.86%	198	46
20	972	1.85%	2.83%	384	41
15	576	1.09%	1.26%	648	39
10	718	1.36%	1.04%	520	36
5	12888	24.49%	9.38%	29	16
2	29400	55.86%	8.56%	13	7
		100.00%	100.00%		

Winfunctional will show a max of 91.40% due to an avg. pay of 62.00.

Winfunctional will show a 2 coin hit % of 15.47% due to anticipation sounds.

Figure 7.8 (b)   Par Sheet and Reel Strip Listing. **Source:** © 2000 Bally Gaming, Inc.

IN THE MONEY   **2 COIN OPTION BUY**
ART–ITM   **MAX COIN % = 91.99%**
SMI–9662   **MIN COIN % = 91.03%**

HANDLE PULLS		90% CONFIDENCE FACTOR	LOWER LIMIT	UPPER LIMIT
1000		38.589	53.40%	130.58%
10000	V.I. =	12.203	79.79%	104.19%
100000		3.859	88.13%	95.85%
1000000		1.220	90.77%	93.21%
10000000		0.386	91.60%	92.38%

	SYMBOLS	R1	R2	R3
R7	Red Seven	1	1	1
G7	Gold Seven	6	6	4
5X	Five Times Bar	3	1	1
MU	In The Money Feature	12	12	11
MB	In The Money Special Blank	6	6	6
3B	Triple Bar	8	7	5
2B	Double Bar	8	9	8
1B	Single Bar	8	11	8
CH	Cherry	2	2	2
BL	Blank	18	17	26
	Total	72	72	72
	Total Combinations		373248	

XB	Any Bar (3B,2B,1B)	
A7	Any Seven (R7,G7)	
NC	Any symbol or blank except a cherry	
	*denotes a scatter pay	

Figure 7.8 (c)   Par Sheet and Reel Strip Listing. ***Source:*** © 2000 Bally Gaming, Inc.

chapter has a return, at maximum coins bet, of 91.99%. However, the casino can expect to be returning between 53.40% and 130.58%[1] (holding between 46.60% and -30.58%) at 1,000 games played. As the number of games played increases, the actual hold will more closely approximate the machine's theoretical hold. At 10 million games played, the same machine will return between 91.60% and 92.38% (holding between 8.40% and 7.62%).

The amount the actual hold varies from the theoretical hold is a function of the machine's volatility index. Each machine has its own volatility

Table 7.1 Video Poker Game Sheet and Optimum Play Results

7/5 Schedule

	DEALT	ONE COIN PAYS	ONE COIN BUILT	ONE COIN TOTAL	ONE COIN COIN-OUT	5th COIN BONUS PAYS	5th COIN BONUS COIN-OUT
ROYAL FLUSH	4	250	60.7141	64.7141	16,178.5250	4000	258,856.4000
STRAIGHT FLUSH	36	50	244.1679	280.1679	14,008.3950	250	70,041.9750
FOUR-OF-A-KIND	624	25	5,515.0034	6,139.0034	153,475.0850	125	767,375.4250
FULL HOUSE	3,744	7	26,172.3687	29,916.3687	209,414.5809	35	1,047,072.9045
FLUSH	5,108	5	23,230.2802	28,338.2802	141,691.4010	25	708,457.0050
STRAIGHT	10,200	4	19,120.9469	29,320.9469	117,283.7876	20	586,418.9380
THREE-OF-A-KIND	54,912	3	138,532.4912	193,444.4912	580,333.4736	15	2,901,667.3680
TWO PAIR	123,552	2	211,745.0154	335,297.0154	670,594.0308	10	3,352,970.1540
JACKS OR BETTER	337,920	1	221,091.8658	559,011.8658	559,011.8658	5	2,795,059.3290
TENS OR BETTER	422,400						
Less than pair 10s	1,640,460						
TOTALS	2,598,960				2,461,991.1447		12,487,919.4985

	ONE COIN	5th COIN BONUS
COIN-IN	2,598,960.0000	12,994,800.0000
COIN-OUT	2,461,991.1447	12,487,919.4985
WIN	136,968.8553	506,880.5015
%ADV.	5.27%	3.90%
%RETURN	94.73%	96.10%

	10's or Better DEALT	10's or Better PAYS	10's or Better BUILT	10's or Better TOTAL	9/6 Schedule PAYS	9/6 Schedule BUILT	9/6 Schedule TOTAL	8/5 Schedule PAYS	8/5 Schedule BUILT	8/5 Schedule TOTAL
ROYAL FLUSH	4	300	70.8500	74.8500	250	60.4542	64.4542	250	60.7141	64.7141
STRAIGHT FLUSH	36	50	259.7616	295.7616	50	248.0663	284.0663	50	243.9080	279.9080
FOUR-OF-A-KIND	624	25	5,442.7523	6,066.7523	25	5,516.0430	6,140.0430	25	5,517.0826	6,141.0826
FULL HOUSE	3,744	9	25,894.2799	29,638.2799	**9**	**26,175.7473**	**29,919.7473**	**8**	**26,179.6458**	**29,923.6458**
FLUSH	5,108	6	23,559.0486	28,667.0486	**6**	**23,518.2449**	**28,626.2449**	**5**	**23,224.8223**	**28,332.8223**
STRAIGHT	10,200	4	24,213.3492	34,413.3492	4	18,984.7614	29,184.7614	4	18,999.5755	29,199.5755
THREE-OF-A-KIND	54,912	3	135,487.5497	190,399.5497	3	138,577.1934	193,489.1934	3	138,613.5788	193,525.5788
TWO PAIR	123,552	1	208,022.2772	331,574.2772	2	212,438.6899	335,990.6899	2	212,489.3697	336,041.3697
JACKS OR BETTER	337,920				1	219,777.8316	557,697.8316	1	221,039.8866	558,959.8866
TENS OR BETTER	422,400	1	232,260.3511	654,660.3511						

124

Figure 7.9 (a)   Video Poker. *Source:* © 2000 Bally Gaming, Inc.

index, which is influenced by the total number of pays, the size of the pays, and the machine's theoretical payback. Management must be familiar with the concept of slot volatility and must know exactly how unusual the results they are experiencing are prior to determining whether something is wrong with a particular machine's hold.

Figure 7.9 (b) Video Poker. **Source:** © 2000 Bally Gaming, Inc.

In practice, casino management should investigate a machine if the actual hold of the machine is outside a range of acceptability as determined by the number of games played and the machine's volatility index.

Calculating Slot Volatility The formula for the volatility index (V.I.) is

$$\text{V.I.} = k\sigma$$

where k equals the z score for the required confidence limit and σ equals the standard deviation for the game.

The game's standard deviation is calculated as follows:

$$\sigma = \sqrt{\sum_{i=0}^{N}[(\text{Net Pay}_i - \text{E.V.})^2 \times \text{probability}_i]}$$

Net Pay$_i$ = the amount of each individual pay divided by the number of coins wagered *minus* 1; e.g., a 25-coin pay with 2 coins wagered equals 12.5 *minus* 1 *equals* 11.5.

E.V. = player's theoretical disadvantage for "x" coins wagered; i.e., in the aforementioned machine, the player's disadvantage with one coin wagered is 8.97%, and 8.01% with two coins wagered.

probability = probability of each Net Pay

Given the reel strip listing and the pay table, the slot machine's volatility can be calculated. Assume the following reel strip listing and pay table:

Reel Strip Listing

Symbol	Reel 1	Reel 2	Reel 3
~	17	19	21
1B	9	7	6
5B	4	4	3
7B	1	1	1
JW	1	1	1

Legend:
"~" blank
"1B" single bar
"5B" 5 bar
"7B" 7 bar
"JW" Joker Wild

Pay Table

Pay Combination			Pays
JW	XX	XX	2
XX	JW	XX	2
XX	XX	JW	2
JW	JW	XX	5
JW	XX	JW	5
XX	JW	JW	5
AB	AB	AB	5
1J	1J	1J	10
5J	5J	5J	50
7J	7J	7J	200
JW	JW	JW	400

"AB" Any bar
"1J" single bar or Joker Wild
"5J" 5 bar or Joker Wild
"7J" 7 bar or Joker Wild

The preceding reel strip listing and pay table create a game with the following machine nets and frequencies of each:

Pay Combination			Pays	Machine Nets	# of Hits
JW	XX	XX	2	−1	841
XX	JW	XX	2	−1	821
XX	XX	JW	2	−1	793
JW	JW	XX	5	−4	21
JW	XX	JW	5	−4	19

Pay Combination			Pays	Machine Nets	# of Hits
XX	JW	JW	5	−4	17
AB	Ab	AB	5	−4	1,479
1J	1J	1J	10	−9	559
5J	5J	5J	50	−49	99
7J	7J	7J	200	−199	7
JW	JW	JW	400	−399	1
Losing combination			−1	+1	28,111
Total Hits					32,768

With one coin played, the machine has pays of minus 1 (when the player loses); two for 1; five for 1; ten for 1; fifty for 1; two hundred for 1; and four hundred for 1. There are a total of 28,111 minus one hits; 2,455 *two* for 1 hits (841 + 821 + 793); 1,536 *five* for 1 hits; 559 *ten* for 1 hits; 99 *fifty* for 1 hits; 7 *two hundred* for 1 hits; and 1 *four hundred* for 1 hits. The respective casino Net Pays are: –1; –4; –9; –49; –199; –399; and 1.

A	B	C	D	E	F	G
Net Pay	# of Hits	Probability[2]	Expected Value[3]	A–D	E[2]	CxF
1	28,111	0.85787964	0.2392	0.76080	0.578	0.496559
−1	2,455	0.0792065	0.2392	−1.23919	1.535	0.115049
−4	1,536	0.04687500	0.2392	−4.23919	17.970	0.842381
−9	559	0.1705933	0.2392	−9.23919	85.362	1.456231
−49	99	0.00302124	0.2392	−49.23919	2424.498	7.324992
−199	7	0.00021362	0.2392	−199.23917	39696.257	8.480035
−399	1	0.00003052	0.2392	−399.23917	159391.936	4.864256
Total Hits = 32,768					Variance =	23.579504

$$\sigma = \sqrt{\sum_{i=0}^{N}[(\text{Net Pay}_i - \text{E.V.})^2 \times \text{probability}_i]} = \sqrt{23.579504} = 4.8559$$

At a 90% confidence interval, the Volatility Index (with one coin-in) would equal

$$\text{V.I.} = k\sigma = 1.65 \times 4.8559 = 8.01219$$

The 1.65 corresponds to the *z* score that comprises 90% of the area under the normal curve, which produces a V.I. of 8.01219. A 95% confidence interval would require a *z* score of 1.96.

To determine the upper and lower limits for a given number of games played, use the following formula:

$$\text{Percent payback} \pm \frac{V.I.}{\sqrt{\text{games played}}}$$

FLOOR CONFIGURATION

Once the slot manager has determined the machines needed, the next task is to decide where the machines should be placed on the casino floor. The placement of the machines is known as the floor configuration. Floor configuration considers both general placement and specific placement.

General placement deals with where the slot banks and coin booths will be placed. Slot banks refer to groupings of slot machines, whereas coin booths and slot carousels are areas on the casino floor where players can purchase coins and tokens for use in the slot machines.

In considering general placement, each slot cabinet that will hold a slot machine must be viewed as an empty box. These "empty boxes" can be used to create traffic patterns or, conversely, to impede traffic patterns. The overriding consideration is to place the machines where the maximum number will be viewed by slot players. Enticements such as the showroom, bingo parlor, keno parlor, casino bars, race and sports books, and restaurants create traffic. These enticements (sometimes called anchors) influence slot placement. For example, slot machines should be placed at the entrance and exit of the bingo parlor or showroom in such a manner that customers exiting will be exposed to the maximum number of machines.

Aisle Width   Generally, slot aisles are between 5½ and 7 feet in width. Aisles that are too narrow cramp the customer and may have a negative impact on profit maximization. The extent of seating the slot manager decides to make available will determine the aisle width necessary. An additional consideration is that wider aisles provide less room for machines, since the area dedicated to slot machines within the casino floor is fixed.

From 1931 to the late 1970s, casino operators paid little attention to the slot player's desire to sit while playing. Today, the availability of seating is crucial to the success of a slot operation. In Atlantic City, regulations require all aisles to be at least 7 feet wide and only fixed seating can be provided. This fixed seating rule results from concerns that movable seats could impair the customer from exiting in the event of a fire. The fire marshals in this jurisdiction believe that the movable seats could topple over and trip exiting guests.

In Nevada, use of fixed or movable seating is left to the discretion of management. Surprisingly, fixed seating carries with it some liability and

safety issues. There have been several accidents resulting from the improper reattachment of fixed seats. For example, graveyard shift cleaning crews remove the seats to clean around the machine base and do not properly reattach them. Because of its single-stem construction, when a customer sits in the seat it becomes immediately unstable, causing the player and the seat to topple. Several patrons have been injured in such incidents in Nevada, causing casino operators to shy away from fixed seating. Movable seating provides the slot manager more flexibility and requires less aisle width, thereby increasing the room for slot machines on the casino floor. Movable seating also allows a player to stand if desired.

Specific placement deals with placement of the specific models and coin denominations. There are several general philosophies that influence specific slot placement:

1. Low hold (loose) machines should be placed in busy walkways to create an atmosphere of activity.
2. Loose machines are normally placed at the beginning and end of traffic patterns.
3. The most popular machines should be placed near entrances where they can easily be seen by someone trying to decide whether or not to enter the casino.
4. High hit frequency machines located around the casino pit area will create an atmosphere of slot activity.
5. Some slot managers believe that "garbage" machines should be placed in areas that are less attractive to players, such as the entrance to the rest rooms. Garbage machines refer to machines that are popular with the slot player but provide a low return to the casino.
6. Machines should be placed near compatible enticements. For example, keno machines should be placed next to keno, poker machines next to poker, etc.
7. High earners and test machines should be placed in heavy traffic areas.
8. Gimmick machines (machines in which the top award is a prize like a new car or a trip around the world) should be placed near entrances and in high traffic areas.
9. Dollar machines and above should be placed around the pit area, and nickel machines placed at the perimeter (placement by denomination).

These are only general philosophies governing slot placement. In application, the slot manager will continue to modify the slot floor configuration to best attract and retain customers through the use of available slot performance data.

Results from empirical studies indicate that machines with locations characterized by accessibility, visibility (i.e., located near major walkways), and close proximity to the pit areas, outperform like-kind counterparts (Lucas & Roehl, 2002; Lucas, Dunn, Roehl, & Wolcott, 2003). This stream of research is in its infancy, as the authors are aware of only two published studies related to the effects of machine location on unit-level performance. However, both of these studies produced statistically significant effects for categorical variables representing sections of the slot floor with substantial pit borders. These sections were also usually located in or near the core area of the casino floor.

A third, unpublished, proprietary study also empirically supported the results of the published research. Reel slots bordering major traffic aisles and pits were found to produce significantly greater amounts of coin-in than their less-accessible counterparts. Additionally, categorical variables representing end-units and ceiling height produced significant and positive model effects on coin-in levels. An end-unit was defined as any machine positioned at the end of a bank of machines. This variable did not represent end-caps, which are slots located perpendicular to a bank's general orientation. No end-cap units were present in the data set. Small carousels (circular configurations of slot machines) were also considered to be end-units as they too offered easier access by virtue of their design. A categorical variable representing slot signs failed to demonstrate a significant influence on coin-in levels in this study. As many Las Vegas strip properties have over $1 million invested in slot signs, this particular finding is cause for further research.

A related area of research, performance-potential modeling, has produced an abundance of similar findings supporting the notion of increased business volume resulting from retail store locations with superior accessibility and visibility to foot and/or vehicle traffic. Based on the results of slot location-effect studies coupled with the performance-potential findings, Figure 7.10 is offered as the basis of a floor design intended to maximize the number of desirable slot machine locations with regard to visibility, accessibility, and proximity to table games areas.

The major diagonal aisles are designed to accommodate foot traffic to and from anchors located at the corners of the casino floor. Possible anchors would include amenities such as hotel towers, parking garages, restaurants, and retail shopping centers. In essence, it is recommended that the slot floor be designed with respect to the entire property. As visibility and accessibility have been found to produce superior unit-level performance, considerable advantages may result from carefully engineering desirable gaming locations. Many Las Vegas casinos disregard this premise by offering vast expanses of slot machines with little or no apparent motivation for exploration. In markets such as Las Vegas, where slot occupancy is low, it may be more impor-
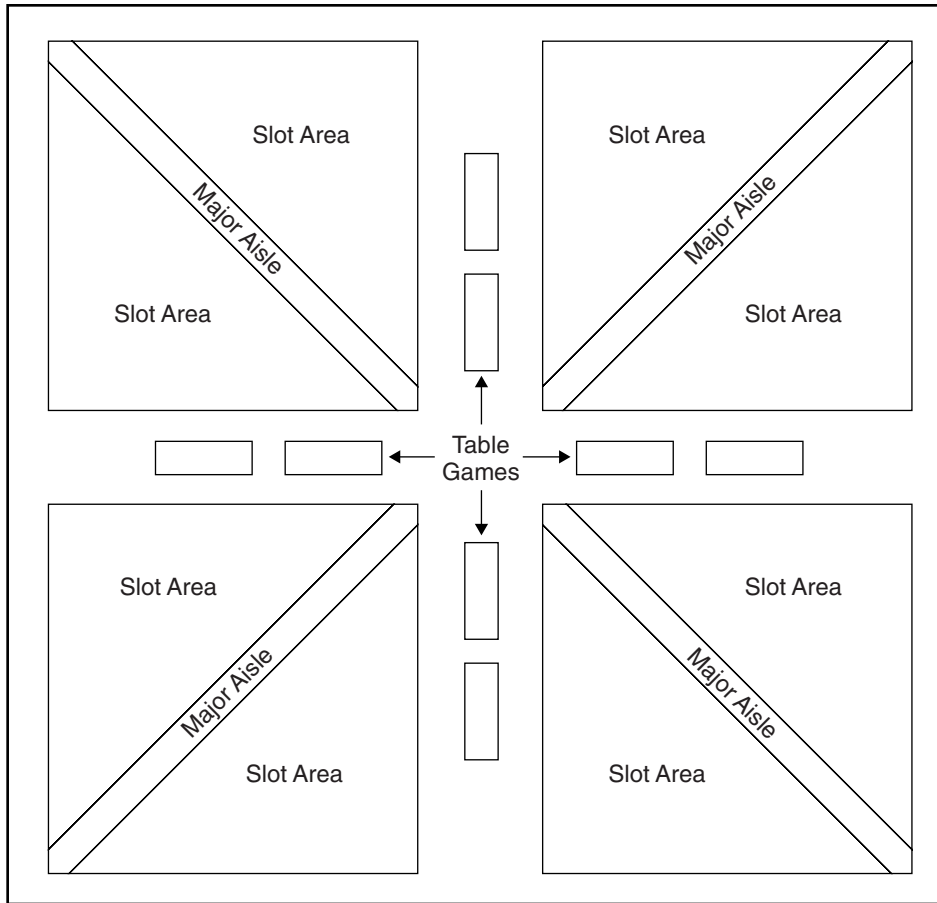
Figure 7.10 Hypothetical Casino Floor Layout

tant to produce a greater number of desirable locations than to simply increase overall capacity.

Although the design depicted in Figure 7.10 may appear regimented or rather uninteresting, it is important to note that adaptations such as winding pathways and generous use of pods[4] on the borders of the slot areas are easily accomplished. Adaptations such as these maintain the basic design, while further improving the visibility and accessibility of interior units. A careful review of the environmental psychology literature would yield many beneficial modifications to improve the ambience and functionality of any slot floor. One particular study includes a limited review of environmental psychology findings that apply to the casino floor layout (Lucas, 2000).

The two location-effect studies were conducted by examining performance data from $1.00 reel slots and $0.25 video poker machines, so the positive pit-border effect has been observed across two different samples. Both data sets were comprised of results from machines located in Las Vegas hotel casino properties. The $1.00 reel data was gathered from a Las Vegas Strip property, while the $0.25 video poker results were collected from a property catering to the Las Vegas locals' market. In order to account for competing sources of causation, the theoretical models tested the effects of the following game characteristics via simultaneous multiple regression analysis: par, standard deviation of the pay table, cabinet style (i.e., slant-top or bar-top), progressive feature, game-within-a-game feature, game tenure on the floor, and maximum coins allowed. Alternatively stated, the effects of these game characteristics on unit-level coin-in were considered before determining the effects associated with the various sections of the slot floor.

THE SLOT FLOOR LAYOUT AND CONSUMER BEHAVIOR

The results of a study conducted at a Las Vegas Strip casino found a construct describing the navigability of the slot floor to produce the greatest impact on consumer satisfaction ratings related to the overall slot environment (i.e., slot servicescape) (Lucas, 2003). Other factors found to influence servicescape satisfaction ratings were seating comfort, overall cleanliness, and interior décor. However, the ability to navigate the slot floor is of particular interest, as it is closely related to the discussion of slot floor layout.

The layout/navigation construct was comprised of scale items addressing consumer perceptions of sightlines, aisle width, signs and directional aids, overall ease of finding destinations, and the number of machines on the floor (i.e., the perceived level of crowding). Survey respondents were asked to rate each of these navigation-related items on a 9-point scale. The overall navigation score produced a positive impact on slot servicescape satisfaction, which in turn produced a positive impact on satisfaction with the overall slot experience. Finally, satisfaction with the overall slot experience was found to be positively correlated with important consumer behavior intentions such as willingness to return and recommend as well as desire to remain in the gaming environment. The results of this study support the notion that satisfaction with navigational aspects of the slot floor layout is part of an important process leading to vital consumer behavior intentions. A similar study conducted across three Reno, Nevada, casinos corroborates this basic result (Wakefield & Blodgett, 1996).

ELEMENTS OF A SUCCESSFUL SLOT SERVICESCAPE

A slot floor servicescape comprises the physical or built components of the environment as well as its ambient conditions. While architectural design and interior décor provide ready examples of the physical or tangible servicescape, ambient conditions are often more abstract, representing intangible background characteristics of an environment. In general, ambient variables are stimuli that affect the five senses, such as air temperature, lighting levels, and cigarette smoke levels. To further clarify the limits of the slot servicescape concept, the attractiveness of cocktail servers could be considered a component of the servicescape, but the promptness or accuracy of the cocktail service would not be considered servicescape components. For more on servicescapes, see Bitner (1992).

As no two casinos are alike, the design components of the ideal slot floor will vary by property. However, this section is intended to summarize the results of empirical research aimed at discovering environmental attributes important to the slot player. In a study conducted at a Las Vegas Strip hotel casino, the floor layout and décor theme were found to positively impact overall atmosphere ratings (Mayer & Johnson, 2003). Researchers found the following attributes of three Reno, Nevada, slot floors to positively influence slot servicescape quality ratings: navigability/accessibility, interior décor/design, and cleanliness. At a second Las Vegas Strip hotel casino, layout navigability, interior décor, cleanliness, seating comfort, and various ambient conditions all positively influenced slot servicescape satisfaction ratings. Ambient conditions were rated via scale items related to cigarette smoke levels, overall lighting levels, air temperature, and sounds of excitement (e.g., clanking sound of coins falling into the metal tray).

In summary, layout navigability and décor ratings have been found to influence player evaluations/responses related to the overall slot floor environment. This finding holds across three different studies comprised of data from five different Nevada casinos. However, any of several other environmental or atmospheric elements could influence slot servicescape satisfaction as well. For example, feelings of safety or the attractiveness of the employees/clientele might produce positive effects. Other possibilities range from ceiling height to environmental odors. Future research will be needed examine these potential effects on slot servicescape satisfaction ratings.

DETERMINING SLOT WIN

To determine how much a given slot machine has won, the following information is needed:

- The slot drop
- The total amount in jackpots

- The total amount in slot fills made
- For progressive slots, the amount of the progressive accrual

With this above information, the formula for slot win is:

$$\text{Slot win} = \text{drop} - \text{jackpots} - \text{fills} - \text{progressive accrual}$$

In addition, the actual hold of the machine can be compared with the theoretical hold by dividing the slot win by the coin-in. Since the casino has use of the amount of the progressive until the jackpot is hit, Nevada's regulations require that gaming taxes be paid pursuant to the following calculations:

$$\text{Slot win for tax purposes} = \text{drop} - \text{jackpots} - \text{fills}$$

With the use of this method, taxes are paid once the casino has access to the funds. The progressive becomes a jackpot at the time it is hit and, as a result, is deducted from slot win.

THE IMPORTANCE OF HIT FREQUENCY

The manufacturer often provides a catalog of the various machines it produces in order to assist in the selection of machines. This catalog includes graphics of the machine's top and belly glasses. Each machine available has a distinct payback and hit frequency. Typically, each model of machine comes in a variety of paybacks and hit frequencies. The payback and hit frequency of a machine is depicted in the PC sheet included earlier in this chapter. Table 7.2 shows the different paybacks and hit frequencies available for a typical two-coin multiplier.

Strip 3375 is available with a 95.058% maximum coin payback. The 1st coin payback is 94.372%. The machine's hit frequency is 12.777%, and it is a three-reel machine with 64 stops on each reel. The top award at maximum coins-in is $5,000, and the corresponding award is $2,000 at one coin-in. There is only one combination that yields the top award pay-

Table 7.2   Different Machine Paybacks and Hit Frequencies

Strip	Max Coin	1st Coin	Hit Freq.	Stops	Coins in one/two Top Award	JP Combos	Coins in one/two 2nd Award	JP Combos
SS3375	95.058	(94.372)	12.777	64ABC	2K/5K	(1)	200/500	(26)
SS3376	92.550	(91.864)	12.390	64ABC	2K/5K	(1)	200/500	(26)
SS3377	91.058	(89.422)	12.337	64ABC	2K/5K	(1)	200/500	(26)

out. The second-highest award at maximum coins-in is $500 and is $200 at one coin-in. If all possible combinations that earn a pay were listed, there would be 26 combinations.

As indicated by Table 7.2, the same model is available in paybacks as low as 91.058% and hit frequencies from 12.337%. Many models are available in over a dozen different payback and hit frequency combinations. All of the machines of a particular model have the same external appearance. From the customer's perspective, the machines all appear to be the same, because the player has no way of knowing the machine's particular configuration. The availability of different paybacks for the same model permits management to provide a mix that will yield the highest casino profit for the space available. The payback of a machine is easy enough to understand, but how the hit frequency affects an individual player lends itself to debate.

When a player plays slots, he will leave the game when one of the following happens:

1. He loses all money available.
2. He wins a specific amount (exit criteria).
3. He must leave because of time constraints.

The player is trying to receive as much play time as possible. Therefore, how do machines with essentially the same payback react to players who leave the machine only when they lose all available funds or they win a specific amount?

If slot players were surveyed, many would be able to identify their favorite machine. These favorite machines are often called "loose" by the player. What makes a machine loose? From management's perspective, a loose machine is one that pays back a significant portion of the amount of coin-in invested. For example, few would argue that a 99.9% payback machine is loose by management's standards, but what if the machine had the following configuration:

Symbols	Reel 1	Reel 2	Reel 3	Reel 4
~	254	254	254	254
7s	1	1	1	1
Total	255	255	255	255

This machine has 4,228,250,625 possibilities. Assume the following payout schedule:

Payout Schedule

7 7 7 7 $4,224,022,374

The jackpot has only one pay combination which is four 7s. When the 7s hit, the machine pays 99.9%. Is this a loose machine? By management's standards it would certainly be considered as such, but only one player will ever call this machine loose. The point is that something the player experiences results in the belief that the machine is loose. A primary factor influencing whether a player believes a machine is loose is the length of play that it affords. To prove this point, ten different machines with essentially the same payback (i.e., 90%) but with hit frequencies varying from a low of 6.7% to a high of 29.6% were selected. Play was then simulated for these machines with different player starting banks and exit criteria. Each machine was a two-coin multiplier.

The simulation was conducted to test the following hypothesis: As the hit frequency of a slot machine increases, pulls per losing player increase, given a fixed bankroll and exit criteria. The following three conditions were examined:

1. Each player started with $100 and quit when $200 ahead or bankrupt.
2. Each player started with $100 and quit when $300 ahead or bankrupt.
3. Each player started with $200 and quit when $400 ahead or bankrupt.

If the theory were correct, the graph in Figure 7.11 would depict an increase in the number of pulls per losing player that corresponds with an increase in hit frequency. However, Figure 7.11 clearly demonstrates a lack of support for this hypothesis. The numbers inside the graph represent the number of players who lost their starting bankroll. In the most favorable outcome, 86.2% of the players lost their starting bankroll (i.e., went bankrupt)! Given the high percentage of losing players, managment must address the process of player satisfaction. Winning players are likely to experience satisfaction, but losing players may expect a certain number of pulls, or time on device, to experience satisfaction.

Further, increasing the payback percentage will not necessarily increase the percentage of winning players. However, machines could be ranked on a "satisfaction index," based on the number of pulls per losing player over some period of time. Management may come to find that game advantages can actually be increased while maintaining the perception of a loose floor. Recent research has found the standard deviation of a game's pay table to be one of the most influential factors in the estimation of coin-in per device. The game's standard deviation is affected by its par, pay-out amounts, and frequency of each possible outcome. If a similar experiment were to be conducted, substituting the game's standard deviation for hit frequency, the result is likely to demonstrate that
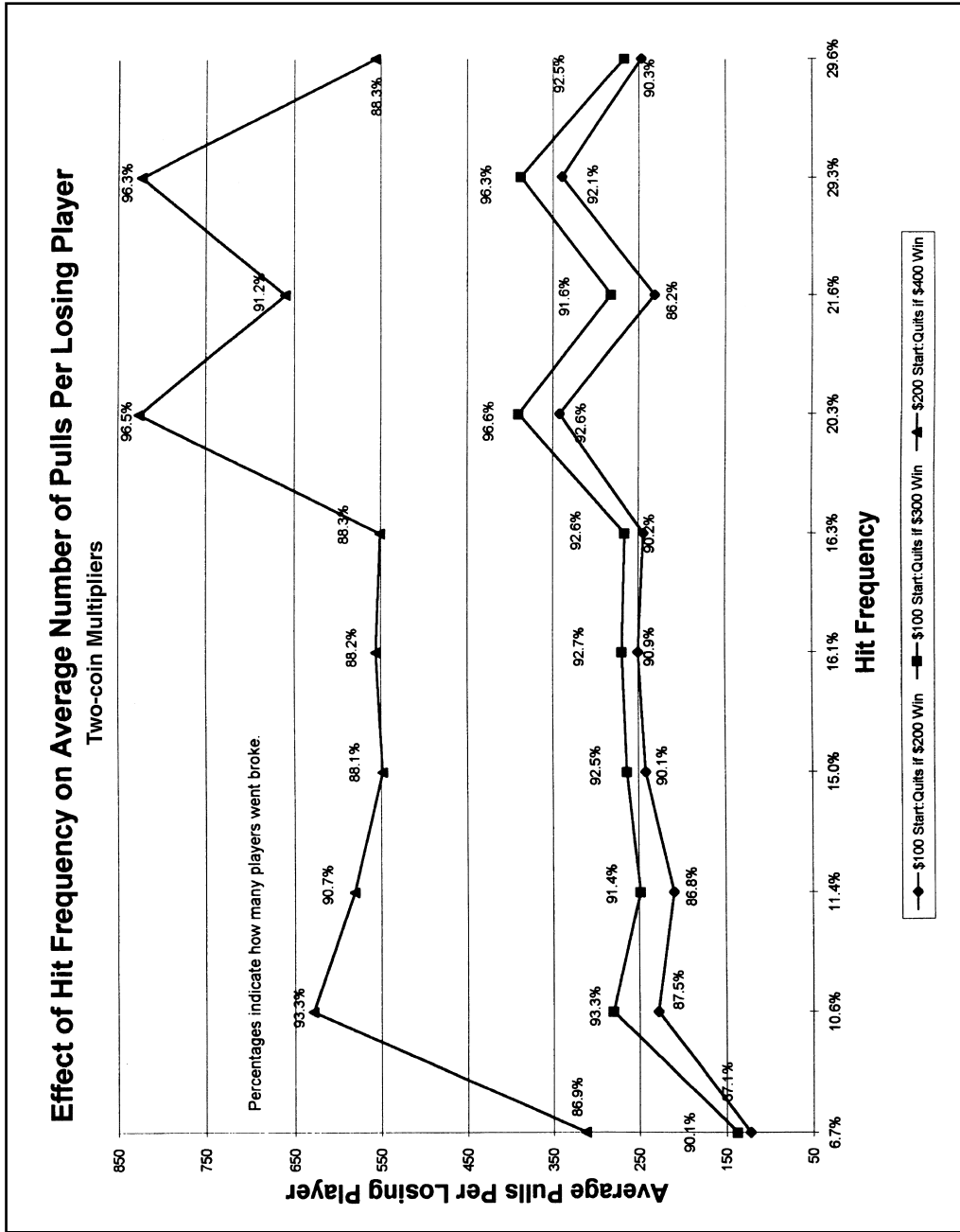
Figure 7.11   Effect of Hit Frequency on Average Number of Pulls per Losing Player

decreases in standard deviation will produce increases in pulls per losing player.

RANDOM OR PSEUDO-RANDOM?

As discussed previously in this chapter, today's slot machine technology allows the symbol to be selected by computer rather than by mechanical means as in the past. With modern stepper slots, motorized reels spin until they stop and display the symbols chosen by the computer. Is this selection by the computer a "random" selection? The answer to this question is no. The selection is not random since the computer must be programmed to choose the symbol to display.

Modern slots have an algorithm called a "random number generator" that selects a number, and the number selected corresponds to a particular symbol. This algorithm is built into the computer's memory. The following is an elementary random number generator:

$$6z \bmod 13$$

where z = 1st the seed and then the last number generated
        mod = the remainder of, in this case, $6z$ divided by 13

This random number generator will generate a series of 13 "pseudo-random" numbers before it repeats itself. The generator must first be "seeded." Typically, the seed is a number chosen by the computer's internal clock. In the preceding example, the seed will be the number 1.

$$6 \times 1 \bmod 13 = 13 \overline{)6} = 0 \text{ with a remainder of } 6$$

Therefore, the first pseudo-random number selected by this generator is 6. The six then becomes "z" for the selection of the next number.

$$6 \times 6 \bmod 13 = 13 \overline{)36} = 2 \text{ with a remainder of } 10$$

If the initial seed is 1, the aforementioned generator will select the following numbers:

1 initial seed

6	10	10
10	8	8
8	9	9
9	2	2
2	12	12
12	7	7
7	3	3
3	5	5
5	4	4
4	11	11
11	6	
1		
6		

The following random number generator (Park & Miller, 1988) will gener-
ate a series of 2.147 billion numbers before it repeats itself:

seed = 16807 × (seed mod 127,773) - 2,836 × (seed \ 127,773)
If (seed < 0), then seed = seed + 2,147,483,647

The random number = seed / 2,147,483,647
"\" denotes integer division (i.e., 6 ÷ 4 = 1)

NOTES

1. With a 90% level of confidence.
2. Probability is obtained by dividing # of hits by total hits.
3. Expected Value equals the machine's theoretical win.
4. Slot pods usually consist of three or more machines placed in a triangu-
lar (i.e., 3 units), circular (5+ units), or plus-sign (4 units) configuration as
opposed to the more space-efficient row or column configurations. Pods
are a smaller version of the more traditional carousel configuration.

INTRODUCTION TO TABLE GAMES

Before considering the mathematics and other aspects of table games, it is important to have a basic understanding of how the games are conducted. The goal of this chapter is to provide an overview of each of the table games most commonly found in casinos throughout the world. Most casinos offer scheduled instruction sessions on games such as dice in order to introduce new customers to the method of play. In addition, when requested by the customer, dealers and casino supervisory personnel will provide instructions on how to play the games.

DICE

To someone unfamiliar with the game, dice would appear to be a very disorganized table game. Dice, which is also known as craps, is actually extremely organized in operation (see Fig. 8.1). Each dice table is staffed by a *crew* of four dealers. One of the four dealers is always on break, since only three are needed to actually deal the game. The dealer returning from break, 20 minutes in duration, typically relieves the dealer responsible for calling each throw of the dice and returning the thrown dice back to the shooter or the next shooter.

The dealer controlling the thrown dice uses a stick made of hickory and is known as the *stickman*. The stickman who was relieved by the dealer returning from break will then move to, and relieve, one of the *base positions*. The two base positions, known as second and third base, are located across from the stickman at opposite ends of the table. The base position to the stickman's left is known as second base. The base position to the stickman's right is known as third base.

The dealers' (base positions) responsibilities are to collect all losing bets and pay all winning bets. Each dice game will have an executive seated at the game whose responsibilities are to ensure that the game is played honestly, that all payoffs on winning bets are correct, and that all cash from the players' buy-ins is deposited in the drop box. The seated executive is known as the *boxperson*. Extremely busy dice tables often have two boxpersons.
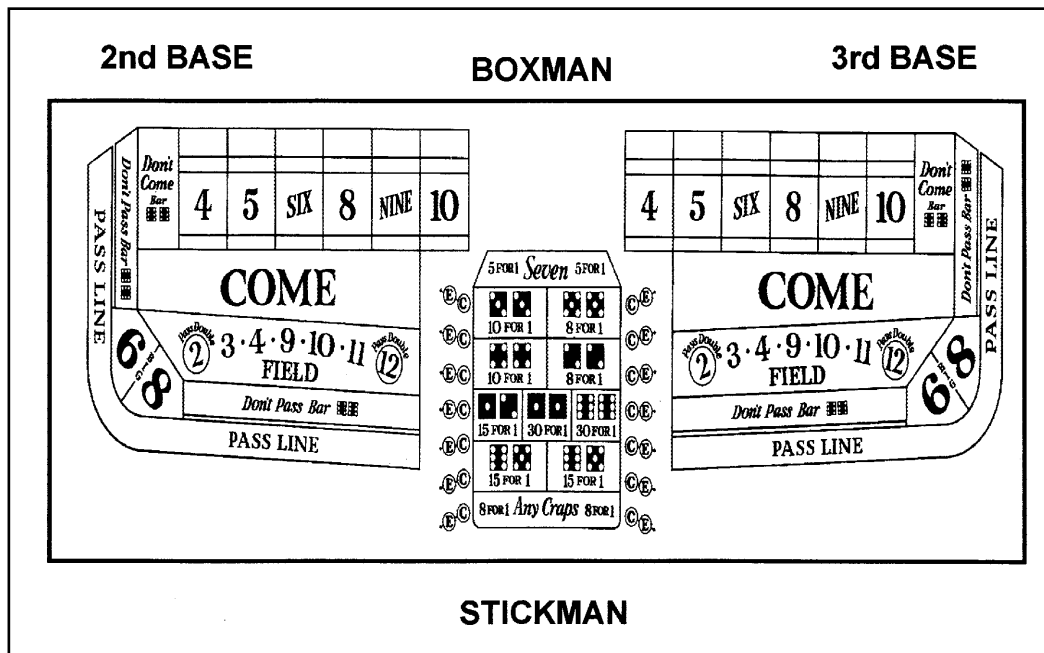
Figure 8.1   Dice Table Crew Positions and Layout

Each dice employee is responsible for one end of the table, and each end has double coverage. The base position dealers are responsible for their respective ends. The stickman is responsible for the area directly in front of his position, which contains all of the proposition bets, as well as the end where the dice are to be thrown. The dice are always thrown to the end farthest from the shooter. The boxperson is responsible for the end of the table where the shooter is located. For example, the second base dealer and the boxperson would be responsible for the second base end, and the stickman and third base dealer would be responsible for the third base end, if the shooter were to the left of the stickman.

Self-Service Bets   The dice table layout is divided into areas where the player can place the bet without assistance from the dealers and areas where the dealer must place the bets. The self-service areas are the Pass Line (A), Don't Pass (B), Big 6 & 8 (C), Field (D), Come (E), and Don't Come (F) (see Fig. 8.2).

A dice game involves one basic bet and over a dozen side bets. The basic bet is known as the *pass line* (A). In order to understand the pass line bet, it is important to have an understanding of the following dice terminology:
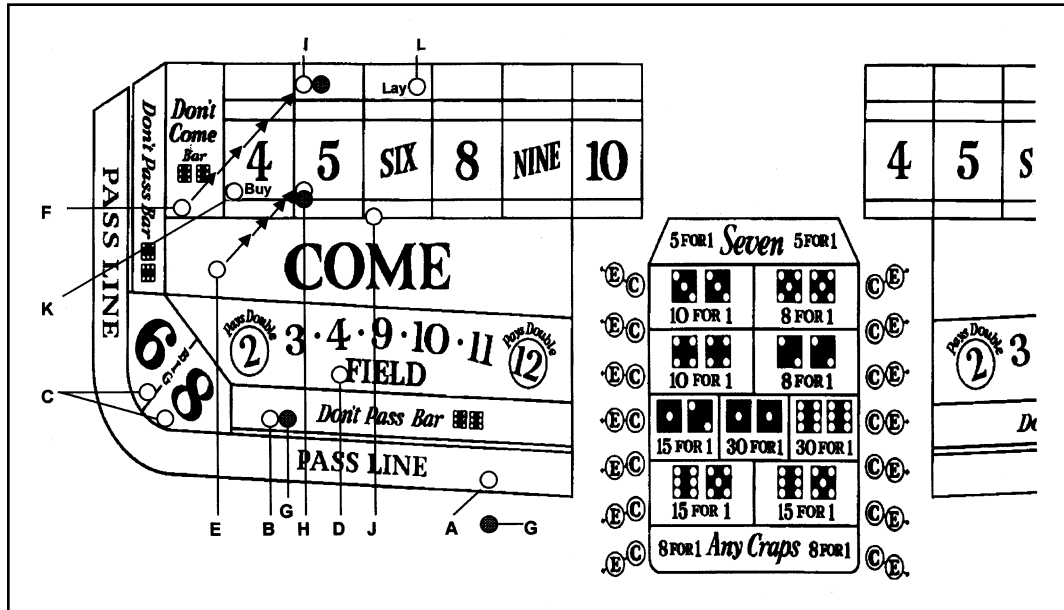
Figure 8.2 Dice Table and Betting Areas

- Throw—one throw of the dice
- Roll—the total number of times the dice are thrown between pass line decisions
- Hand—the total number of rolls before a player loses the dice to the next shooter (the dice are lost to the next shooter only when a thrown seven results in a pass line loss)
- Sequence—(a) those throws that make up the roll and (b) the throws between decisions
- Decision—a pass line win or loss, and can involve multiple throws. A decision occurs on the last throw of a roll.
- Come-out throw—the throw immediately following a decision
- Naturals—throws totaling seven or eleven
- Craps—throws totaling two, three, or twelve
- Points—any roll that is not a natural or craps (i.e., four, five, six, eight, nine, or ten)

When a player makes a pass line bet, it is assumed that he is doing so on the come-out throw. Most casinos allow a player to make a pass line bet in mid-sequence; however, any player making a bet in mid-sequence has increased his disadvantage significantly and, by this action, is announcing to the table that he is an inexperienced craps player. A pass line bet wins if the come-out throw is a natural and loses if the come-out throw is a craps

number. If the come-out throw is not a natural or craps, then the throw had to be a point.

For the pass line bet to win, the shooter must throw that same point again before she throws a seven. If the seven precedes the point, the seven thrown results in a pass line bet loss and the stickman will announce "loser seven." The stickman's announcement of the throw lets the players know what the results were and also notifies the base dealers of what to do. A "loser seven" tells the base dealers that the pass line lost and that they are to take all of the losing bets.

If the shooter's point precedes the seven, the stickman announces that the pass line bets win. The pass line is often referred to as the "front line," and those betting the pass line are referred to as "right bettors." The casino's advantage per pass line bet equals 1.414% per decision (not per throw).

The *don't pass* bet (B) is a side bet that plays almost exactly the opposite of the pass line bet. The don't pass bet is "almost" the opposite because if it were exactly the opposite, the player would enjoy a positive expectation and the player's advantage would be the same as the advantage the house enjoys over the pass line bets.

In order for the casino to allow the don't pass side bet and still maintain a house advantage, everything is exactly the opposite *except* when the pass line come-out throw is a twelve. The layout states, "Don't Pass, Bar 12,"[1] which means that when the come-out throw is a twelve the pass line will lose, but the don't pass bet ties. The barring of the twelve allows the house an advantage of 1.36% per decision.[2] A don't pass bet is known as a "back line bet," and the bettor is often referred to as a "wrong bettor."

Odds (G)   Decades ago, the *odds bet* was created as a marketing tool to encourage betting on the pass line. What the inventor of the odds bet did was create a bet where the house advantage was 0%, but where the player also had to bet the pass line in order to enjoy this 0% disadvantage. The odds bet can be made only if the first throw in the sequence is a point.

For example assume the come-out throw was a four. For the pass line bet to win, a four must precede a seven. Therefore, the only throws that mean anything to the player are fours and sevens. There are three ways a four can be thrown (1-3, 3-1 or 2-2), and six ways a seven can be thrown (1-6, 6-1, 4-3, 3-4, 5-2, 2-5). Consequently, nine total throws determine if the pass line wins or loses; 3/9 of the time the pass line will win with a throw of four, and 6/9 of the time the pass line will lose when a seven is thrown.

The inventor of the odds bet likely tried to determine, if one were to create a bet with no house advantage, how much must the bet pay and how could it be coupled with the pass line so as to encourage pass line bets? To encourage pass line bets, the amount bet in 0% disadvantage odds bets must be some multiple of the amount bet on the pass line. If the

point were four and the player wins 3/9 (or 1/3) of the time and loses 6/9 (or 2/3) of the time, the 1/3 of the time the player wins must equal the total amount lost 2/3 of the time.

If the player wins one time in three and loses two times in three, the odds payoff *must* equal two to one. The inventor of the odds bet was successful in creating a marketing tool that encourages pass line bets because the odds bet cannot be bet alone and the odds payout is determined by the difficulty of the point needed for the pass line to win. Competition dictates how much the player is allowed to bet in the odds position. A casino offering double odds provides the player with an opportunity to wager an amount equal to double the pass line bet in this 0% disadvantage position.

	Losing Throws	Winning Throws	Odds Pays
Point of 4 or 10	6	3	2 to 1
Point of 5 or 9	6	4	1.5 to 1
Point of 6 or 8	6	5	6 to 5

When a player places the odds bet that is a function of his pass line bet, it is known as "taking odds" because the payout is something more than the amount of the odds wager.

The same marketing tool is used to encourage don't pass bets; however, the payout must be something less than the odds wager if the player is to have a 0% disadvantage. If a point four odds bet pays two to one, then the odds wagered on the don't pass must pay one to two.

	Losing Throws	Winning Throws	Odds Pays
Point of 4 or 10	3	6	1 to 2
Point of 5 or 9	4	6	1 to 1.5
Point of 6 or 8	5	6	5 to 6

The odds bet wagered with don't pass bets is known as *laying odds* because the payout is less than the amount bet in odds (i.e., the player lays two to win one).

The amount a player can lay in don't pass odds is not the same multiple that the player can take in odds on the pass line. The amount a player can lay with a given don't pass bet equals the amount the player can win on the pass line odds bet at the same size pass line bet.

For example, assume a player's point is four and he has a pass line bet of $10 at a casino offering double odds. The player can place an odds bet of $20 (double the flat bet of $10) and, with a point of four, the $20 odds bet will win at a rate of two to one, or a payout of $40. Therefore, a don't pass bettor with a line bet of $10 and a point of four can lay $40 in odds, whereas the pass line bettor can only take $20 or double her pass line in the odds bet.

Casinos often increase this odds multiple in the heat of competing for the dice player. In late 1995, the Stratosphere in Las Vegas started offering 100 times odds on dice, which creates the opportunity for a player to combine a $1 pass line bet with a player disadvantage of only 1.414¢ with a $100 odds bet where the player has no disadvantage whatsoever. As is common in an industry that competes aggressively for customers, the same player, within weeks of this change, could also take 100 times his pass line bet in odds at the Horseshoe in downtown Las Vegas.

It is important to understand that the odds bet is not mandatory on the player's part. The player may choose to bet any multiple up to the maximum allowable or may choose not to make any odds bet at all.

3/4/5 Odds   The latest trend in odds is the 3/4/5 offering. In the past, if a casino offered 10 times odds, the player could always wager 10 times his original wager regardless of the point. With 3/4/5 odds, the multiple the bettor can wager in the odds position is dependent on the point. If the point is 4 or 10, the bettor can wager 3 times his plass line wager in the odds position; if the point is 5 or 9, the bettor can wager 4 times his pass line wager in the odds position; and if the point is 6 or 8, the bettor can wager 5 times his pass line wager in the odds position.

In the universe of the 36 dice combinations on the come-out throw, 24 times the first throw will be a point (4, 5, 6, 8, 9, or 10). The bettor can make an odds wager only if the come-out throw is a point. In these 24-point come-out throws, the bettor will wager an additional 100 units if playing in a casino offering 3/4/5 odds. Consequently, 3/4/5 odds are equivalent to offering 4.17 times odds (100 ÷ 24). The casino advantage with the 3/4/5 odds multiple is .3743%.

Field (D)   The *field* is a one-roll bet whereby the player wins if a field number is thrown and loses if any other number is thrown. The payout is one to one unless the field number thrown is a two or twelve where the payout is two to one and three to one, respectively.

Big 6 & Big 8 (C)   The *big 6* bettor wins if a six is thrown before a seven, and the *big 8* bettor wins if an eight is thrown before a seven. Each winning bet pays one to one. In Atlantic City's casinos, these bets are considered unfair to the bettor. New Jersey gaming regulations state that the big 6 and big 8 must pay off at place bet odds of seven to six.

Come (E)   The *come bet* works exactly like the pass line. It effectively allows the player to make multiple pass line bets during the same roll. For instance, there would have to be a pass line decision before another pass line bet can be made if there were no come bet. The following example best explains the mechanics of the come bet.

Assume the come-out throw is a four. For the pass line to win, a four must precede a seven. Prior to the next throw, the player places a bet on

the come and the subsequent throw is a five. This come bet is moved to the number five (H). Where the bet is positioned on the five tells the dealer that it is a come bet and, for the bet to win, the number the bet is resting on must be thrown before a seven is thrown in the same manner as the pass line.

The come bet will stay on the come area of the layout (E) for only one throw. If the first throw is a natural, the bet wins just like the pass line. If the first throw is a crap number, the bet loses just like the pass line. If the first throw is a point, the bet is moved to the point thrown and the dealer knows that the point the bet is resting on must be thrown before a seven.

Don't Come (F)   Just as the come allows multiple pass line bets, the don't come allows multiple don't pass bets. Assuming the come-out throw is a four, a seven must be thrown prior to a four in order for the don't pass to win. Prior to the next throw, the player places a bet on the don't come and the next throw is a five. The don't come bet is moved to the box behind the number five (I). The positioning of the bet behind the five tells the dealer that it is a don't come bet and, for the bet to win, a seven must be thrown before the number the bet is resting behind.

The don't come bet will stay on the don't come area of the layout (F) for only one throw. If the first throw is a natural, the bet loses just like the don't pass. If the first throw is a two or three, the don't come bet wins. If the first throw is a twelve, the don't come bet ties just like the don't pass. If the first throw is a point, the bet is moved to the box behind the point thrown and the dealer knows that a seven must be thrown before the point the bet is resting behind.

Come and Don't Come Odds   The come and don't come allow some multiple in odds as do the pass and don't pass line bets. Odds taken or laid on the come or don't come are given to the dealer, who places the odds on top of the come bet (H) or don't come bet (I). The odds portion of the stack of cheques (see Chapter 9, page 197) constituting the bet is offset so the dealer knows how much of the bet is paid even money and how much is paid odds.

Place Bets (J)   When a player makes a pass line bet, the wager is not made on a specific number. If the player believes the number six is his lucky number, a bet made on this number is placed on the line in front of the six. The placement of the bet in front of the six informs the dealer that the bet is a *place bet*, which wins if a six is thrown before a seven, and loses if a seven is thrown before a six.

Place bets allow a player to specifically bet any point. If a six is thrown before a seven, the place bet wins and is paid at a rate of seven to six. If the seven is thrown first, the place bet loses. All of the points can be placed. The payoff odds on place bets are:

Point Placed	Pay Rate
4 or 10	9 to 5
5 or 9	7 to 5
6 or 8	7 to 6

Buy Bets   If the player believes the point four was his lucky number, he could "buy" the point rather than place the number. When a player buys a point, he is buying a true odds payoff. The true odds of throwing a four before a seven are 2 to 1. A player buying the four wins 2 to 1 as compared with a place bet win of 9 to 5.

In order to receive the true odds pay rate, the casino charges 5% of the amount of the wager when the bet is made. If a player were to buy the four for $100, he must pay the dealer $5 in commission. If the four precedes the seven, the buy bet pays true odds or $200 to $100. All the numbers can be bought, so what should a player do, place or buy the four? The only difference is the player's disadvantage. The player disadvantage is addressed in Chapter 11, dealing with the mathematics of casino games.

A buy bet is placed on the point in the same position at which the come bet would be placed (K). The dealer will place a small plastic button called a lammer, which indicates the word "BUY" on the bet, signifying that the bet will be paid at the true odds rate if the number the bet is resting on is rolled before a seven.

Buy Bet Commissions   Commissions on buy bets have always been charged at the time the wager is placed. For example, if the player were to buy the four for $100, he would be required to pay the commision of 5% at the time the wager is made. If the commission is charged at the time the wager is placed, the casino's advantage on buy bets is 4.76% regardless of the point being placed. Casinos have discovered a way to decrease the player's disadvantage on buy bets. The latest trend is to charge the commission only if the wager is won. Take buying the four as an example. Buying the four, the player will win one-third of the time and lose two-thirds of the time, Historically, the commission was charged 100% of the time; win or lose. If it is charged only when the bet wins, then the 5% is paid only one-third of the time. This variation significantly decreases the casino's advantage and requires a substantial increase in bets for the casino to win the same, as shown here:

	Buy 4/10	**Buy 5/9**	**Buy 6/8**
Disadvantage if commission charged at time of bet	4.76%	4.76%	4.76%
Disadvantage if commission charged only for winning bets	1.67%	2.00%	2.27%
Increase in wagers required to equal win amount before rule change	186%	138%	110%

Lay Bets   The don't come is the opposite of the come and the *lay bet* is the opposite of the buy bet. The commission charged on lay bets is 5% of the amount a winning lay bet would pay. For example, the true odds pay rate would be five to six or $100 to $120 if the six was laid for $120. Therefore, the win would be $100 and the commission is 5% of the $100 win or $5. The commission is charged when the bet is made. The lay bet is placed in the same position as a don't come bet (L) and a "LAY" lammer is placed on top.

Proposition Box   The area directly in front of the stickman is called the *proposition box*. A player can bet that the next throw will be a two, three, seven, eleven, or twelve and will be paid according to the amount specified on the layout. The player can bet the next throw will be any craps number (i.e., two, three, or twelve) and pays according to the layout.

Hardways   Hardway bets are also found in the proposition box. The player can bet any or all of the individual hardway bets. For example, a four can be thrown as a 3-1, 1-3, or 2-2. There is only one way to throw a four as a 2-2 and there are two ways to throw a four as a three and a one. Consequently, the 2-2 is the hardest way to throw a four. A hard four wins only when a 2-2 is thrown and loses when any easy four or seven is thrown.

Figure 8.3 provides a breakdown of the player disadvantage per decision.
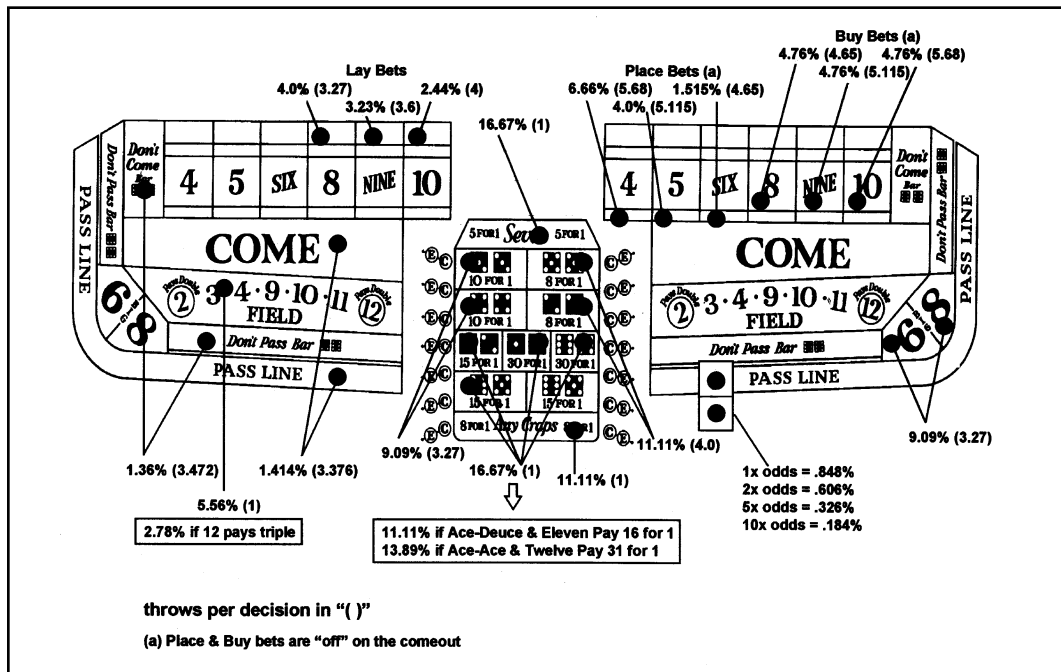
Figure 8.3   Player Disadvantage per Decision

ROULETTE

Roulette is the only casino game in which chips are used. The chips used on roulette are referred to as such because they have no monetary value and are not redeemable outside the roulette table where they were purchased. A roulette table will have between six and eight different colors of chips available for player purchase. Each color will typically have 15 stacks of 20 chips available for play on the game.

When a player enters a roulette game, he will designate the denomination of chips he wishes to bet. If a player wants to bet chips valued at $5 each, the dealer will assign to the player a chip color that is not in use by any of the other players. The dealer will mark the chips in a manner that indicates to management that the chip color assigned to the player is worth $5 for each chip. The reason each player is assigned a different chip color is so that the dealer will know which player placed the bet. If one player is assigned the color blue and a second player assigned the color red, both players can make the same bet and avoid any disagreement over who placed the wager.

A double zero roulette wheel contains the numbers 1 through 36 plus 0 (single zero) and 00 (double zero). A single zero roulette wheel contains the numbers 1 through 36 plus 0 (single zero). The wheel contains 18 red numbers, 18 black numbers and two green numbers (0 and 00) or one green number (0), depending on whether the wheel is a double or single zero wheel.

Eighteen of the 36 numbers are even and 18 are odd. A player makes a wager that the ball on the next spin will land in the pocket on the wheel corresponding to the designated number. The player can place his chips on a single number or a variety of combination bets. The bet wins if any of the numbers bet are chosen on the wheel's next spin. Figure 8.4 shows the layout of the roulette table.

Table 8.1 lists the types of bets that a player can make at a double zero roulette game. Each bet yields a player disadvantage of 5.26%, with the exception of bet J, which loses at a rate of 7.89%. A single zero (0) roulette wheel pays at the same rate as depicted; however, the player's disadvantage per bet is reduced to 2.7% since there are only 37 possibilities instead of 38.

When the player has finished, the chips remaining are exchanged at the table for negotiable cheques. Once all the individual chips are returned to the dealer, the color is then available for sale to another player who may wish to participate in the game.

Negotiable cheques can be wagered at the roulette table, but it is up to the dealer and player to know who the winning cheques belong to. When more than one player is betting cheques, disagreements as to the ownership of winning wagers may occur. Therefore, a dealer will usually encourage players to purchase chips.

Figure 8.5 provides a breakdown of the player disadvantage per spin.
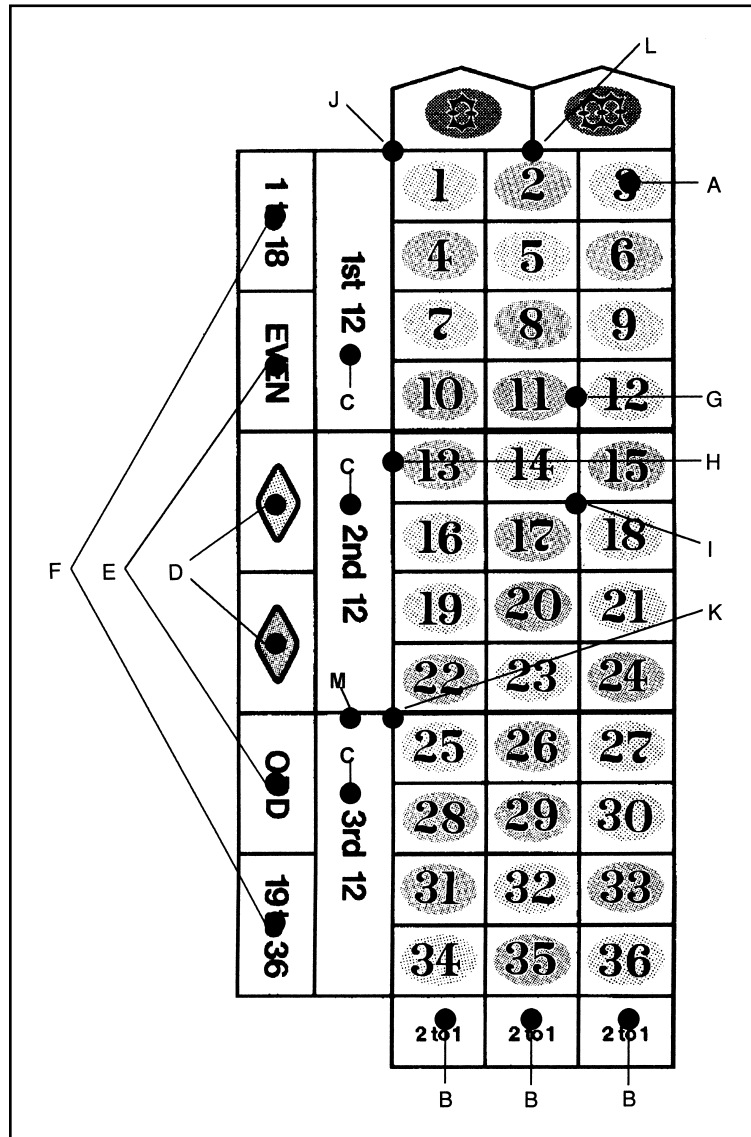
Figure 8.4   Roulette Table Layout

BLACKJACK

Ultimately, the object of the game of blackjack is to beat the dealer's hand. This process entails forming a hand total that is as close as possible to 21, without exceeding a total of 21. Once the player's or dealer's hand totals more than 21, the individual going over has busted and loses the

Table 8.1 Double Zero Roulette Game Bets

Chip Position	Called	Wins If	Pays
A	Straight-Up	ball drops in #3	35 to 1
B	Column	ball drops in any number contained in column chosen	2 to 1
C	Dozen	ball drops in any number contained in dozen chosen	2 to 1
D	Color	ball drops in a number colored as chosen	1 to 1
E	Odd or Even	ball drops in either odd or even number	1 to 1
F	1 to 18 or 19 to 36	ball drops in range of numbers chosen	1 to 1
G	Split	ball drops in #11 or #12	17 to 1
H	Street	ball drops in #13, #14, or #15	11 to 1
I	Corner	ball drops in #14, #15, #17, or #18	8 to 1
J	1st 5	ball drops in #0, #00, #1, #2, or #3	6 to 1
K	Alley	ball drops in #22, #23, #24, #25, #26, or #27	5 to 1
L	Basket	ball drops in #0, #00, or #2	11 to 1

hand, and the dealer or player hand closest to 21 wins. The game is played with a minimum of one deck, and as many as eight decks may be used. The number of decks management chooses to deal is governed by both marketing and game protection influences. See Fig. 8.6 for the layout used in playing blackjack.

The player makes an initial bet and both the player and the dealer receive two cards. One of the dealer's cards is dealt face-up for the player to see, and the dealer's second card is dealt face-down. The card that is dealt face-down is known as the "hole card." The player now has knowledge of his two cards plus one of the dealer's two cards to use as the basis for the subsequent draw or stand decision.

If the player wishes to draw a third card, a motion is made to the dealer for a "hit." The player can draw additional hits until he is satisfied with his hand or has busted. Once the player is satisfied, a motion is made to the dealer that the player will "stand" with his current non-busted hand. Each card is counted at face value, with the exception of the king, queen, jack, and ace. The king, queen, and jack are counted as a value of ten, and the ace is counted as a value of either 1 or 11.

When the dealer or player has a hand in which the ace is counted as 11, the hand is referred to as a "soft hand." For example, a hand consisting of an ace and a nine is known as a soft 20, while a hand consisting of an ace and two threes is referred to as a soft 17. If the first two cards drawn by the dealer or player contain an ace and a ten value card, the hand totals 21 and is called a "blackjack." Winning player hands are paid at a rate of one to one with the exception of a player blackjack, which pays 1.5 to 1.
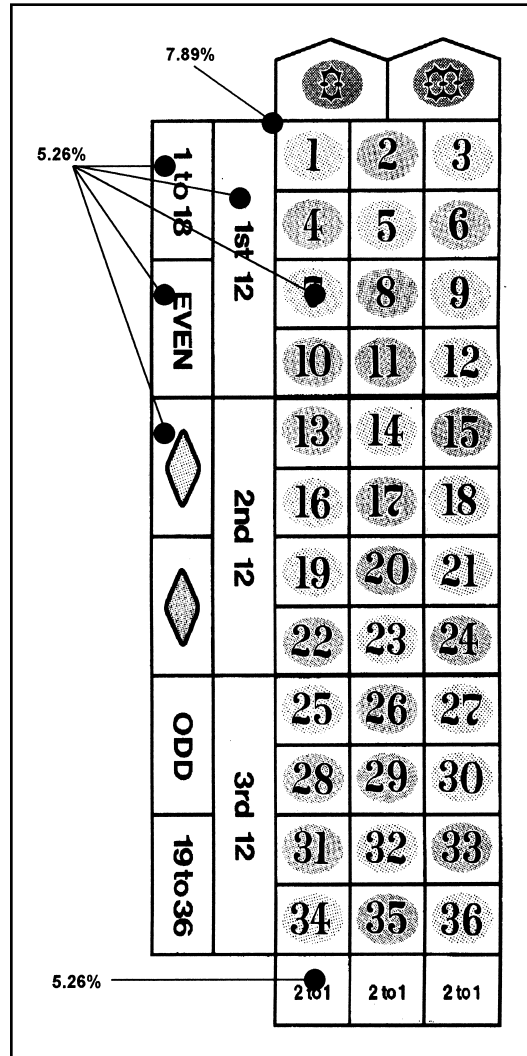
Figure 8.5   Player Disadvantage per Spin

Any time both the dealer and the player have hands totaling the same amount, the hands are said to have tied and the result is referred to as a "push." The exception to this is when both the player and dealer bust. In this case, whoever busts first loses, and this will always be the player since the outcome of the player hand is decided prior to the dealer's.

The dealer's decision as to whether to draw additional cards or stand is governed by the rules of the game. Most game rules state that the
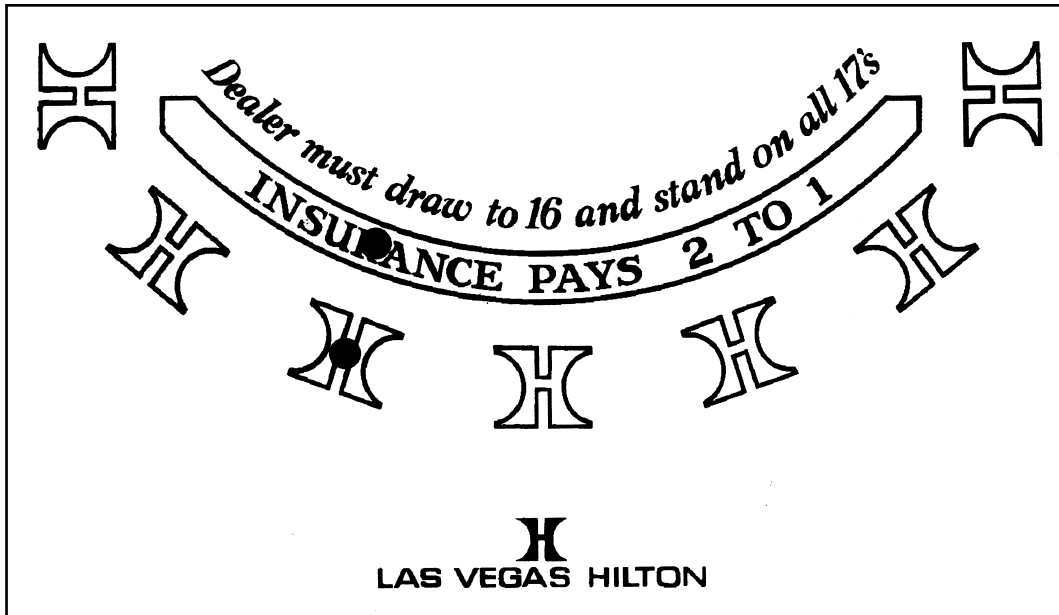
Figure 8.6 Blackjack Layout

dealer must draw cards until the hand totals 17. The dealer must stand once a hand totaling at least 17 is achieved. Some casinos offer house rules that state the dealer must draw an additional card to any hand totaling 16 or less and soft 17. A game in which the house hits a soft 17 has a higher casino advantage than a game in which the house stands on all 17. Consequently, the rules offered are determined by competition and the marketing philosophy of management.

Blackjack Rules

Double Down   The casino allows the player to double his bet under the condition that the player *must* take a third card and *only* a third card. To illustrate this, assume that the dealer's up-card is a five and the player's two-card total is 11. It would appear that the player has a good chance of winning the hand either by the dealer busting or by drawing a high value card. Consequently, under these circumstances the player may choose to double his bet.

The act of doubling the bet is known as "doubling down." If the player's initial bet was $50, an additional $50 can be wagered under the conditions described. However, what if the player's double down card was an ace? The ace combined with the player's initial two cards yields a total of only 12. The only way the player can win in this situation is if the

dealer busts. As indicated previously, the player cannot draw additional cards because of the double down conditions.

Generally, doubling down is advantageous to the player. Some casinos allow the player to double down on any initial two-card total, while other casinos restrict the two-card total that can be doubled.

Split   When a player's initial two cards are of the same value (e.g., two eights, two nines, or a ten and a queen), the player has the option of "splitting." The split option allows the player to take a bad hand and create two separate hands. If a player's initial hand contains two eights, he may wish to wager an additional amount equal to the initial wager and create two hands where the first card of each is an eight.

If the player splits the eights, he draws additional cards to each eight, thereby making two separate hands. The conditions for allowing splits are that the cards must be of equal value *and* an amount equal to the initial bet must be placed on each card split. If the first card drawn to the split is of the same value as the split card (i.e., in this example an eight), the player has the option of splitting that card as well, subject to the same conditions.

Insurance   When someone purchases automobile insurance, he is betting that he will have an accident. If during the year an accident does not occur, the premium is lost. If an accident does occur, the premium ensures that the auto is repaired. The same type of wager is permitted in blackjack.

The insurance bet is permitted when the dealer's up-card is an ace. When this occurs, the player knows the dealer has a good chance of having a blackjack. Continuing the preceding example, it is similar to seeing a truck about to hit your car and purchasing insurance just prior to the collision. If the truck avoids your car, you lose your premium. If the truck hits your car, the necessary repairs are made.

The amount a player can wager on the insurance bet is limited to an amount up to half of the initial wager. If the dealer does have a ten value card in the hole, the insurance bet wins, the player is paid at a rate of two to one, and the hand is over. If the dealer does not have a ten value card in the hole, the insurance bet is forfeited and the hand is played out. Therefore, an insurance bet should be viewed as a side bet that the dealer's hole card is a ten.

Surrender   Rules may permit the "surrender" option. When surrender is offered, the player is allowed to surrender half of the original bet after evaluating his initial two cards and the dealer's up-card. Surrender is usually offered only when the dealer does not have a blackjack. For example, assume the dealer's up-card is a ten, the player's initial hand totals 16, and the player has $50 wagered. The player can surrender $25 of the initial $50 bet, and the hand is over.

Figure 8.7 provides a breakdown of the player disadvantage per hand.

1 deck = 5.9%
2 decks = 6.8%
6 decks = 7.4%

Small bettors about 1.5% worse than basic strategy
$100 bettors and above about .5% worse than basic strategy
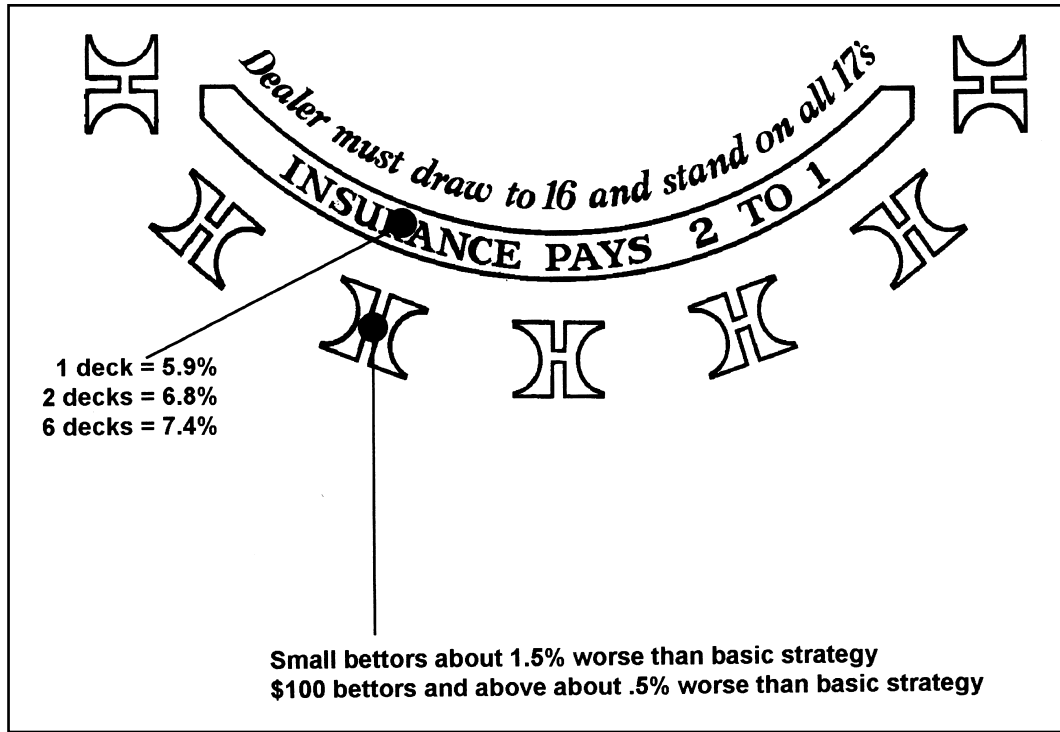
Figure 8.7   Player Disadvantage per Hand in Blackjack

BACCARAT

Whereas 21 is the magic number in blackjack, 9 is the equivalent in baccarat. The winning hand is the hand closest to 9. A baccarat game offers a choice of only three different bets. The bettor can bet that the player hand will win, that the banker hand will win, or that the player and banker hands will tie. The game is dealt with either six or eight decks. All cards are worth face value, with the exception of the ten, jack, queen, king, and ace. The ten, jack, queen, and king all equal zero, and the ace has a value of one.

The game begins by the bettor placing a wager in the player, banker, or tie areas of the betting layout. Two cards are dealt to the hand referred to as the player, and two cards are dealt to the banker hand. Each hand is evaluated to see if the two-card total of each equals either eight or nine. In blackjack, a two-card 21 is known as a blackjack and is sometimes called a "natural." In baccarat, a two-card eight or nine is known as a natural. If either hand totals eight or nine, the hand is over, and whichever hand had the natural or the highest natural wins. Figure 8.8 shows the layout of the game of baccarat.

If neither hand contains a natural, then strict draw and stand house rules apply. The player hand is evaluated first. If the player or banker two
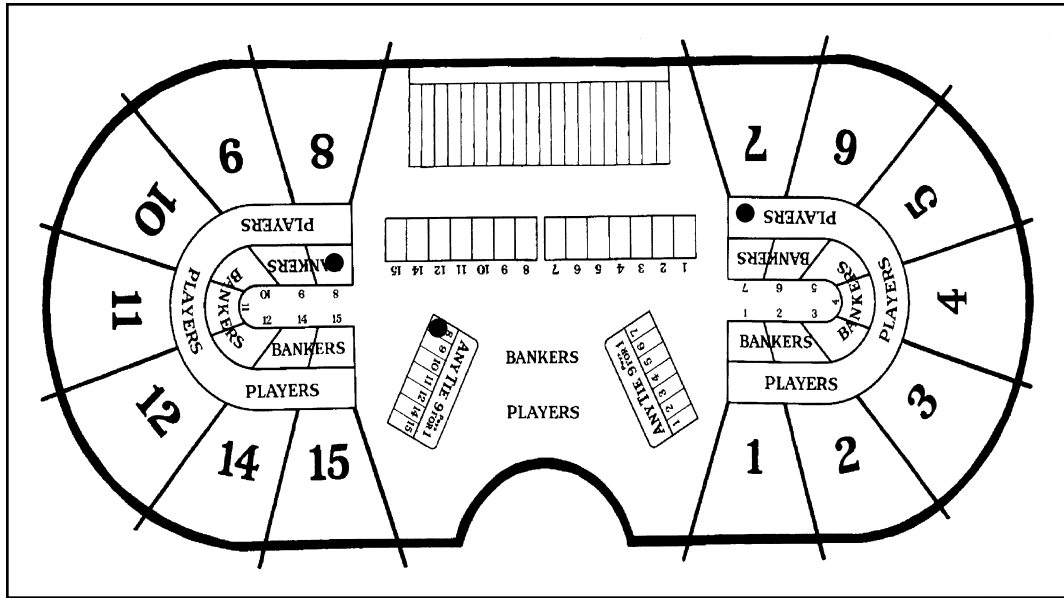
Figure 8.8 Baccarat Layout

cards total ten or more, the first digit is dropped to determine the hand total. For instance, a hand consisting of a nine and a seven has a value of six. The player hand must draw a third card to any two-card total less than six. If the three cards total ten or more, the first digit is dropped (e.g., a hand consisting of a three, two, and a nine has a value of four).

Neither the player hand nor the banker hand can draw more than three cards. The banker hand *must* draw a third card to any total less than three. If the banker's two cards total three or more, then the rule governing drawing or standing is dependent on the value of the third card drawn by the player hand.

Banker's Two-Card Total	Draws Third Card If Player's Third Card Is:	Stands If Player's Third Card Is:
3	1, 2, 3, 4, 5, 6, 7, 9, 0	8
4	2, 3, 4, 5, 6, 7	1, 8, 9, 0
5	4, 5, 6, 7	1, 2, 3, 8, 9, 0
6	6, 7	1, 2, 3, 4, 5, 8, 9, 0
7	Stands	Stands

Not included in the preceding table is the rule that the banker must draw a third card to any two-card total less than six when the player hand does not draw a third card.
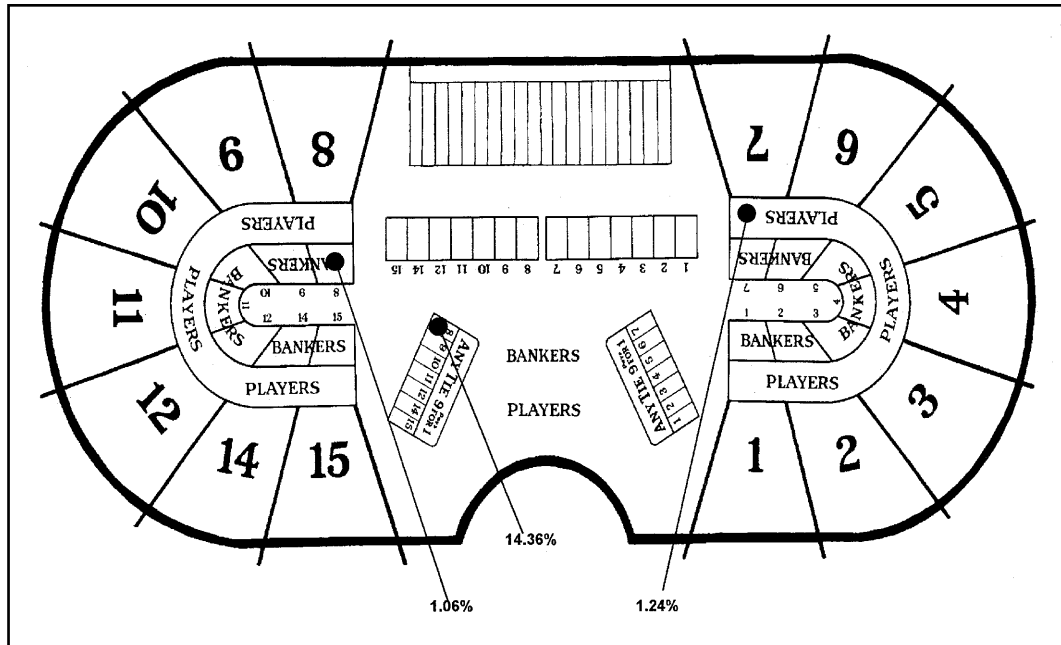
Figure 8.9   Player Disadvantage per Hand in Baccarat

Based on the baccarat rules just described, the banker hand will win more frequently than the player hand (see Chapter 11 on the mathematics of the games). As a result, the bettor must be paid at a rate of something less than one to one if the casino is to have a mathematical advantage. Typically, the casino pays the winning banker bettor at a rate of 0.95 to 1, although paying 0.96 to 1 can be found in a few casinos. If a player were to bet $100 on the banker and win, he would be paid $95, which would result in a banker bettor disadvantage of 1.06%. Winning player bets are paid at a rate of one to one.

Figure 8.9 provides a breakdown of the player disadvantage per hand.

KENO

Keno is a game in which Ping-Pong–like balls numbered 1 through 80 are contained in a device known as a squirrel cage or goose. Twenty balls are drawn at random. The player marks her chosen numbers on a ticket corresponding to the 80 possible draws (see Fig. 8.10). The player can bet on 1 number or as many as 15. Obviously, it is more difficult to correctly pick 15 of the 20 numbers chosen than 1 of the 20 chosen.

DATE	TIME	RATE	MULTI		TOTAL PRICE
Feb 3,1997	2:16 PM	PROGRESS			$2.00

REPLAY #	ACCOUNT #	1st GAME	LAST	WRITER		SERIAL #
		20B		9		4-79775

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40

1/8 2.00

KENO LIMIT $100,000.00   TO AGGREGATE PLAYERS EACH GAME

41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80

Figure 8.10 (a)   Keno Tickets

Therefore, the amount won by the player is a function of the difficulty of the pick. Each number chosen by the player that is one of the 20 drawn is known as a "catch." A payoff schedule is provided by the casino, indicating how much a marked ticket can win. The following is an example of what a ticket with four numbers chosen might pay. The payoffs are *for* the wager, which means that the player is paid $1 for his $1 wager if he catches two of four numbers.

DATE	TIME	RATE	MULTI		TOTAL PRICE
Feb 3, 1997	2:16 PM	SPECIAL			$2.00

REPLAY #	ACCOUNT #	1st GAME	LAST	WRITER	SERIAL #
		208		9	4-79773

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40

1/4 2.00

KENO LIMIT $100,000.00   TO AGGREGATE PLAYERS EACH GAME

41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80

Figure 8.10 (b)   Keno Tickets

Mark 4 Spots

Catch	Play $1 Pays	Play $5 Pays
2	$1.00	$5.00
3	$4.00	$20.00
4	$112.00	$560.00

The player's disadvantage in keno is usually between 25% and 30%, depending on the payoff schedule and the total numbers marked.

DATE	TIME	RATE	MULTI	TOTAL PRICE
Feb 3,1997	2:16 PM	SPECIAL		$2.00

REPLAY #	ACCOUNT #	1st GAME	LAST	WRITER	SERIAL #
		208		9	4-79774

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40

1/4 2.00

KENO LIMIT $**100,000.00**   TO AGGREGATE PLAYERS EACH GAME

41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80

Figure 8.10 (c)   Keno Tickets

CARIBBEAN STUD

Caribbean stud was first introduced at the Grand Holiday Inn Casino in Aruba and has shown impressive growth since its subsequent introduction in Nevada in the early 1990s. The game is played on a blackjack-size table and is dealt from a standard 52-card deck to as many as seven players. Unlike traditional poker, in which players play against each other, Caribbean stud players all play against the house.

DATE	TIME	RATE	MULTI	TOTAL PRICE
Feb 3,1997	2:17 PM	MIXED		$6.00

REPLAY #	ACCOUNT #	1st GAME	LAST	WRITER	SERIAL #
		208		9	4-79776

1	2	3	4	5	6	7	8 Ⓐ	9	10

REGULAR
  1/8 2.00

11	12	13	14	15	16	17	18 Ⓐ	19	20

SPECIAL
  2/4 2.00

21	22	23	24	25	26	27	28 Ⓐ	29	30

31	32	33	34	35	36	37	38 Ⓐ	39	40

KENO LIMIT $100,000.00   TO AGGREGATE PLAYERS EACH GAME

41	42	43	44	45	46	47	48 Ⓑ	49	50

51	52	53	54	55	56	57	58 Ⓑ	59	60

61	62	63	64	65	66	67	68 Ⓑ	69	70

71	72	73	74	75	76	77	78 Ⓑ	79	80

Figure 8.10 (d)   Keno Tickets

In front of each player are betting areas with "ANTE" and "BET" designations. The game begins with each player placing an amount in the "ANTE" rectangle. The dealer subsequently deals each player, and himself, five cards, which are placed face-down. The player then evaluates his hand and must decide whether to "fold" or "call."

The player folds if he believes his five-card poker hand cannot beat the dealer's five-card hand. The player calls if he believes his five-card poker hand can beat the dealer's five-card hand. Players deciding to call

must place an additional amount equal to double the initial ante in the "BET" area. Players who choose to fold lose their initial ante.

For the hand to continue, the dealer's hand must "qualify." The dealer's hand qualifies if it ranks an ace-king or higher. Should the dealer's hand not qualify, players who called are paid even money on their ante wagers and the hand is over. If the dealer's hand qualifies, each player's hand is evaluated against the dealer's five-card hand. If the dealer's hand is better, the dealer wins both the player's ante and the call wager. If the player's hand is better, the player wins and is paid even money on the ante and the call wager is paid according to the following schedule:

Ace-king or one pair	1 to 1
Two pair	2 to 1
Three of a kind	3 to 1
Straight	4 to 1
Flush	5 to 1
Full house	7 to 1
Four of a kind	20 to 1
Straight flush	50 to 1
Royal flush	100 to 1

Should the dealer and player have the same hand, the values of the remaining cards determine the winner. If the remaining cards are equal, the hands tie and no hand wins or loses.

In addition, Caribbean stud offers a $1 side bet option known as the "progressive bet." The table has a slot in front of the player nearest to the dealer, where the progressive bet is inserted. The progressive bet wins if the player's five cards rank a flush or better. The casino determines the amount of each dollar wagered that is contributed to the progressive jackpot; however, the following is typical of what hands win and how much they pay:

Royal flush	100% of progressive
Straight flush	10% of progressive
Four of a kind	$300
Full house	$100
Flush	$50

With best play, the player's disadvantage in Caribbean stud is over 5%. Without the attractiveness of the progressive side bet, it is debatable whether this game would have been accepted by players.

LET IT RIDE

A relative newcomer to the gaming industry is the game known as let it ride, which has gained considerably in popularity since its introduction

in 1993. Let it ride is dealt from a standard 52-card poker deck on a black-jack-size table that can accommodate up to seven players. The player tries to achieve the highest possible poker hand using his initially dealt three cards and two community dealt cards.

Each hand begins with the player placing three wagers of equal amounts in betting areas designated with a "$," a "2," and a "1" that appear left to right directly in front of each player. For instance, one $5 wager must be placed in each of the "$," "2," and "1" circles when the game's minimum wager is $5.

Once the bets are in place, the dealer deals each player three cards face-down, and two community cards are placed face-down in the middle of the table in a position nearest to the dealer. Each player then evaluates his three-card draw. The two community cards will eventually be exposed. The player evaluates his three cards and tries to anticipate what rank those three cards, combined with the two community cards, will equal.

After the player's three cards are dealt and before either community card is exposed, the player is given the opportunity to withdraw one of his initial three wagers. If the player doesn't like the prospect of the final five-card rank based on the three cards dealt, he may elect to withdraw the wager resting on the "1." If the player likes the prospect of his final hand, he may elect to let it ride, which is the source of the game's name.

The dealer then exposes one of the two community cards, and the player is again given the opportunity to decrease his wager by one. If the player doesn't like the prospect of the final five-card rank while knowing the value of four of the possible five cards, he may elect to withdraw the wager resting on the "2." If the player likes the prospect of his final hand based on the four cards known, he may once again elect to let it ride.

After the player's decision, the dealer will expose the second of the two community cards, at which point the winning hands are determined. Winning wagers are paid according to the following schedule:

Royal Flush	1,000 to 1
Straight Flush	200 to 1
Four of a Kind	50 to 1
Full House	11 to 1
Flush	8 to 1
Straight	5 to 1
Three of a Kind	3 to 1
Two Pair	2 to 1
Pair of 10s or Better	1 to 1

The final amount wagered by the player can be as little as one unit to as many as three, depending on how much the player decides to let ride. On average, a good player will have a final wager of 1.22 units and will lose between 2.8% and 3% (player disadvantage).

PAI GOW POKER

Pai gow poker is found in most Nevada and Atlantic City casinos. The game is dealt from a standard 52-card poker deck plus one joker. The game is dealt on a blackjack-size table and can typically accommodate up to seven players plus the casino dealer. Each participant, including the casino dealer, receives seven cards from a freshly shuffled pack. One of the players is designated as the "banker" and has an inherent advantage over the remaining "players."

The role of banker rotates from player to player. In pai gow poker, the casino dealer is considered a player in addition to dealing the game. For a player to serve as banker, he must have enough funds visible to pay all the winning bets. A player may refuse to function as the banker; however, the casino will never refuse the opportunity.

Rules of the game require that the seven cards dealt to each player be "set" into one five-card and one two-card poker hand. The five-card hand *must* have a higher poker ranking than the two-card hand. Should the player set his two-card hand at a higher poker rank than his five-card hand, the player is said to have "fouled" and automatically loses. The player serving as banker cannot foul his hand. If the banker sets his two cards stronger than his five-card hand, the casino dealer will reset the hand using the most reasonable rankings.

The joker can be used as an ace or to complete a straight flush, flush, or straight. The only difference between pai gow poker rankings and traditional poker rankings is the second-highest hand. In traditional poker, a hand consisting of a king, queen, jack, 10, and 9 is second in rank only to a hand consisting of an ace, king, queen, jack, and 10. In pai gow poker, the second-highest hand is composed of an ace, 2, 3, 4, and 5, followed in rank by a hand composed of a king, queen, jack, 10, and 9.

Determining the winner involves comparing the banker's five-card hand with the player's five-card hand and the banker's two-card hand to the player's two-card hand. A "copy" occurs when the banker and the player have hands of the same rank. For a player or the banker to win, the five-card hand and two-card hand must beat his opponent's five-card and two-card hand. If the five-card hand wins and the two-card hand loses, or vice versa, the hands tie and no money changes hands. The banker's advantage lies in the rule that says the bank wins a copy. Therefore, the banker wins four times to the player's one in the following possibilities:

5-Card Hand	2-Card Hand	Winner
Banker Highest	Banker Highest	Banker
Banker Highest	Player Highest	No Decision
Player Highest	Player Highest	Player
Player Highest	Banker Highest	No Decision
Banker/Player Same	Banker Highest	Banker

5-Card Hand	2-Card Hand	Winner
Banker Highest	Banker/Player Same	Banker
Banker/Player Same	Player Highest	No Decision
Player Highest	Banker/Player Same	No Decision
Banker/Player Same	Banker/Player Same	Banker

In order for the casino to offer the game, there must be the equivalent of a house advantage. The house advantage is achieved by the casino charging 5% of the net wins regardless of who banks. The net win is determined by subtracting the losing bets from the winning bets.

A smart player will bank at every opportunity. When there are only two players (i.e., one customer and the casino dealer), casino rules usually state that the customer cannot bet more than 10% more as banker than she bet on the previous hand as a player. Depending on the number of players at the game and whether the player takes advantage of banking, the casino can expect to earn from 1.12% to 2.84% of each player's wager.

NOTES

1. Some casinos in Northern Nevada will bar the 2, which has the same probability of being thrown as the 12.
2. See discussion in Chapter 19 about casino advantage on don't pass bet.

TABLE GAME OPERATIONS

TABLE GAME OPERATIONS

Each table game maintains an operating bankroll in order to pay the player on winning wagers. The bankroll is composed of chips in different denominations, and the amount of the bankroll is determined based on the limits established for the particular table. When a table is opened or a shift change occurs, the dealer assigned to the table along with the responsible floorperson will inventory the bankroll and reconcile the totals to the last inventory performed by a dealer and a floorperson.

Openers/Closers   The inventory counts by the oncoming personnel are recorded on a form known as an *opener*, while the counts performed by the outgoing personnel are recorded on a *closer*. The closing inventory form (closer) for the end of a shift serves as the opener for the next shift. After the opener or closer is completed, a copy of the form will be placed into the table drop box by the dealer.

During the course of the shift, the table bankroll may need to be replenished or excess chips may need to be removed. The transfer of chips from the casino cage to the table is known as a *fill*. The transfer of chips from the game to the cage is known as a *credit*.

As a point of clarification, casino employees refer to the chips used in table games as *cheques*. The only chips used in the casino are those used in roulette. The difference is that cheques have a face amount and can be redeemed at the cage for that amount, whereas roulette "chips" are assigned an amount for a given player and can be redeemed only at the roulette game where the chips were sold. For the purpose of discussion, the terms "chips" and "cheques" have been used interchangeably throughout.

Fill/Credit   Once the request is received by the cage, the fill or credit slip (Fig. 9.1) is prepared. For computerized systems, the fill or credit slip will automatically print in the cage after the order is input. In the absence of a computer system or in the event the computer system is down, a manual fill or credit slip is prepared by the cage cashier. Manual slips are stored in a locked dispensing machine known as a whiz machine.
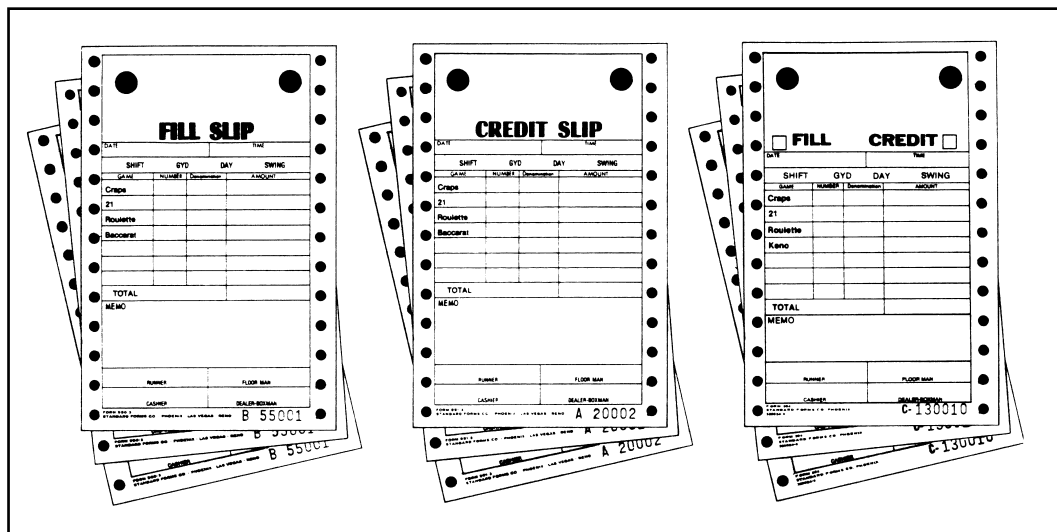
Figure 9.1 Fill Credit Slips

When a fill is required, a security guard acting as a runner independent of the transaction transports the fill to the table where it will be verified by the dealer and the floorperson responsible for the table. All of the casino personnel participating in the transaction (i.e., floorperson, dealer, security guard, and cage cashier) will sign the fill slip to document their participation in the transaction. A copy of the fill will be dropped into the table drop box by the dealer when the transaction is complete. The same procedures are followed for a credit except that the security guard transports the cheques from the table to the cage.

Cross-fills   Exchanges or transfers of cheques from one table to another constitute a cross-fill. Transactions of this type would necessitate the preparation of forms similar to a fill or credit slip; however, cross-fills are prohibited in most jurisdictions.

Cards and Dice   Most gaming jurisdictions have established minimum requirements for the control of unused cards and dice. In some jurisdictions, these requirements go as far as to specify procedures that should be in place for storing and disposing of used cards and dice. Nevada standards indicate only that cards and dice that have not been issued to the pit must be stored in a secure location to prevent unauthorized access and tampering. Whatever the requirements may be, cards and dice procedures are emphasized in most casinos since they have a direct impact on the integrity of the games and, by extension, on the ultimate profitability.

Security with regard to cards and dice is accomplished through a variety of means. Generally, cards and dice are verified upon receipt from the manufacturer by employees from several different departments, which may include security, casino, and accounting. The cards and dice are then placed into a secure storage area that requires the participation of two departments, usually security and the casino, to access the inventory. The storeroom should also be under observation by surveillance personnel, and accounting personnel should perform periodic unannounced inventories of the contents.

Inventory logs are maintained to account for the unissued cards and dice in the storeroom as well as any additional cards and dice stored in the pit podiums. These logs are updated as cards and dice are transferred to the pits to replenish their inventories. Used cards and dice removed from the tables will also be recorded on inventory logs and placed into secure storage while they are awaiting cancellation.

Prior to being placed into service on the tables, unused cards are visually inspected by the dealer at the table and the floorperson. The cards are spread on the table and inspected to ensure the deck is complete and that no manufacturing defects exist. The used cards removed from the table are canceled by the pit manager by marking them on the edge with a permanent marker. The used cards are then locked in the pit podium until they are subsequently transferred to secure storage where they will be further canceled by drilling a hole through, or removing a corner from, all of the cards in the deck.

Unused dice are inspected by the pit manager before being placed into service on the table. The inspection may consist of visually inspecting the dice for defects, checking the dice with a magnet, and using devices to ensure the dice are properly balanced and shaped. The used dice removed from the table are also inspected prior to being canceled by the pit manager through the use of a device ("T" bar canceler) that imprints a mark on each of the dice. The used dice are secured in the same manner as the used cards until they are transferred for cancellation.

Marker   The policies and procedures for the granting of casino credit are described in detail in Chapter 6. For the purpose of the following discussion, it is important to have a basic understanding of casino credit. When a player is granted credit, the casino has agreed to accept a predetermined amount of the player's checks with the understanding that these checks will not be deposited before a specified date, which is typically 30 to 45 days from the date the customer's trip ends.

Players draw upon credit by signing markers (Fig. 9.2). A marker is nothing more than a bank counter check that is provided by the casino. The marker resembles a regular bank check and, in some instances, even has the customer's bank and ABA numbers printed on it before the customer signs it.

JIMS CASINO
Las Vegas

ACCOUNT NO.   TIME   LIMIT
7654321   10:16 $10000

CASH _____   CHIPS $5000   INITIAL _____   CUSTOMER NAME: KILBY, JIM

To: _____   **Negotiable Check**   CHECK NO. **60086**

BANK OF AMERICA
BANK

_____   DATE

_____   _____
BRANCH   NEVADA
                          STATE

LAS VEGAS
CITY

**PAY TO THE
ORDER OF** _____ **Jims Casino** _____   U.S. $ 5,000

FIVE THOUSAND AND NO/100 _____   **U.S DOLLARS**

I have received cash and said amounts are on deposit with said bank or trust company in my name. That amount indicated is free of any claims and I waive any rights to stop payment. I acknowledge that said debt is incurred in Nevada and agree to submit to the jurisdiction of any Nevada court. I hereby authorize **Jims Casino** to complete this instrument as necessary for presentation for payment.

Jim Kilby
SIGNATURE

KILBY, JIM
PRINT NAME

86512
ACCOUNT NO.

Figure 9.2 (a)   Marker, Jims Casino

JIMS CASINO
Las Vegas

60086

_____   _____
PIT NO.   SHIFT 1, 2, 3

_____
TABLE NO.

_____   _____
FLOORPERSON   PIT CLERK

TABLE ISSUE SLIP

$ _____

Jims Casino

60086

Figure 9.2 (b)   Marker Issue Slip, Jims Casino

Marker System versus a Name Credit System   Nevada gaming regulations permit casinos to choose how they will allow for the issuance and redemption of markers. A casino can implement the use of a marker system or a name credit system. With a marker system, markers can be both issued and redeemed at the table. Under a name credit system, markers can be issued at the game, but can be redeemed only at the cage.

In Atlantic City, the only system casinos are permitted to use is a name credit system. In Nevada, approximately 95% of the major casinos operate under a marker system. When markers are redeemed in the pit, they can be redeemed either with cheques or cash. In practice, over 90% of pit redemptions are in cheques.

Markers at most casinos are printed in the pit through the use of a computerized system that allows the pit personnel to review the amount of credit that is available to be issued to the player. When the marker is printed, the marker amount will reduce the customer's available credit. Once the marker form has been signed by the player, one part of the marker (issue slip) will be placed by the dealer into the drop box at the table where the marker was issued. The remaining parts of the marker

(i.e., the original marker and the payment slip) will be retained in the pit until they are transferred to the casino cage for payment.

Under a marker system, the payment slip will be placed into the drop box when a payment is received prior to the marker being transferred to the cage. Casinos employing a marker system normally transfer markers to the cage once a day, and a reconciliation is performed to ensure that all markers are accounted for.

Drop   The amount of cash, cheques, and markers in each game's drop box is called drop. Although original markers are never deposited directly into the table drop box, the amount of markers written for a given table are theoretically in the drop box and are evidenced by the marker issue slips. For the purpose of computing win for each table, markers are treated as if they were included in the drop.

Nevada gaming regulations require that statistics be maintained for each table and type of game, by shift, by day, cumulatively month-to-date, and cumulatively year-to-date. To provide this data, the casino must remove the drop boxes and tabulate the results for each shift. If a shift is to determine how much was either won or lost, the amount of cheques the shift started with and the amount of cheques the shift ended with must be determined (see Fig. 9.3). Information relevant to changes in the cheques maintained on each table is obtained through the use of the opening and closing inventory forms.

Many casinos have begun changing their drop boxes once a day instead of every eight hours. Daily removal of drop boxes provides for increased efficiency since the labor committed to removing, transporting, and storing drop boxes, as well as the time spent counting the contents, is reduced. In addition, casino personnel are required to complete opening and closing inventory forms only at the end of the shift once a day, as opposed to three times a day. In the case of the daily drop, the statistics for a shift become the same as the statistics for a day.

Determining Win   Win is determined by subtracting the cheques missing from the game from the table's drop. In order to calculate the total cheques missing from a table, the amount of cheques the table started with, the cheques the table ended with, the fills to the table, and the credits from the table must be known. The formula for determining win is as follows:

$$
\begin{array}{l}
\text{currency in drop box} \\
+ \text{ cheques in drop box} \\
+ \text{ markers issued in pit} \\
\underline{- \text{markers redeemed in pit}} \\
\text{drop}
\end{array}
$$

SUMMARY GAME INVENTORY SHEET
BLACKJACK PIT

N⁰ 3301

T I M E

ENDING SHIFT:

☐ DAY
☑ SWING
☐ GRAVEYARD

FOR OFFICE USE ONLY			
TYPE	DATE	SHIFT	BATCH NO
10 00			

TABLE	CHIP COUNT						Total Chips	Closing I.O.U.	TABLE
21 23	1000's	500's	100's	25's	5's	1's			21 23
201		34000	4700	2500	700	200			201
202		15600	3100	3200	600	100		500	202
203		49000	6000	2700	600	100		1000	203
204		38500	6600	2800	700	100		12500	204
205		16500	6900	2700	500	100			205
206		22000	5400	2500	600	100			206
207		28500	6400	2400	800	100			207
208		46500	11800	2300	400	100		500	208
209		41500	7800	3000	700	100		3000	209
210		27500	3400	2600	900	100		7000	210
211		18000	4900	3300	900	100			211
212		11500	6200	3100	800	100		1000	212
213		12000	5800	3000	1000	100			213
214		45500	3600	3000	700	100			214
215		28500	4500	2500	1000	100			215
216		12500	6900	3400	1000	100			216
217			4100	3800	1000	100			217
218		1000	1700	3000	700	100			218
219		2500	4100	2800	600	100			219
220		9000	4300	2900	1000	100			220
221		23500	3300	3200	900	100			221
222			2500	3300	800	100			222
223		13500	3900	3000	600	100			223
224		19000	5400	2700	800	100			224
225									225
226									226
227									227
228									228
229									229
230									230
231									231
232									232
233									233
234									234
235									235
236									236
237									237
238									238
239									239
240									240
241									241
242									242
	TOTALS								

Floormen's Signature X_____ X_____

2

PIT 25

NEXT IOU NUMBERS:

Under 2000   1 - [26 ____ 31]

500   2 - [32 ____ 37]

1000   3 - [38 ____ 43]

2000   4 - [44 ____ 49]

Over 2000   5 - [50 ____ 55]

WHITE: Cage Copy   YELLOW: Pit Copy   PINK: Fill Slip- Beginning Shift(102/002)   GOLDENROD: Credit Slip- Ending Shift(101/001)   DF 332A (6/85)

Figure 9.3 Game Count Sheet

beginning inventory of cheques
+ fills
−credits
−ending inventory of cheques
cheques missing

drop
−cheques missing
table win

Using the win formula, the following example computes table win under the marker system. For comparative purposes, table win is also computed using the name credit system. Although the table win remains constant, notice the difference in the drop and ending chip inventories between the two methods.

	Marker System		Name Credit System
Currency plus cheques in drop box	$ 60,000		$ 60,000
+ Total markers issued on game	100,000		100,000
− Total markers redeemed in pit	70,000		0
drop	$ 90,000		$160,000
Beginning cheque inventory	$140,000	$140,000	
+ Fills	50,000	50,000	
− Credits	10,000	10,000	
− Ending cheque inventory	110,000	40,000	
Cheques missing from game	$ 70,000		$140,000
TABLE WIN	$ 20,000		$ 20,000

Note: Under the marker system, markers can be redeemed in the pit (on a game), which increases that game's ending cheque inventory. Consequently, the difference between these two systems appears in two lines, (1) total markers redeemed in the pit and (2) ending cheque inventory.

Hold   The percentage of drop that is won by the casino is referred to as hold. Hold represents the percentage of chips purchased by the customer that is won back by the casino.

Statistical Drop   As discussed earlier in this chapter, a marker system allows the player to "buy back" (redeem) previously signed markers in the pit. The buyback of drop results in a much higher hold percentage for a casino than if a name credit system were in use. Consequently, Nevada regulations require each casino to determine statistical drop in order to maintain a more accurate hold percentage (see Fig. 9.4).

     Statistical drop results from adding currency and cheques in the drop box to markers transferred to the cage and markers repaid in the pit with

NEVADA GAMING COMMISSION — MONTHLY GROSS REVENUE STATISTICAL REPORT

NGC-31
(3-82)

FILING DEADLINE FOR THIS REPORT: February 24

FOR GAMING OPERATIONS DURING THE MONTH OF ___January___ , 19___

(For Commission Use Only)

SECTION A

CODE	SLOT MACHINES	NO. OF UNITS	COINS IN ($)	DROP ($)	GROSS REVENUE ($)
010	1 Cent				
011	5 Cent	82	1,551,715	231,885	185,114
012	10 Cent				
013	25 Cent	842	31,581,147	3,089,748	2,248,858
014	50 Cent	40	2,569,183	268,749	193,697
015	$1.00	573	68,771,803	8,359,285	3,384,628
016	Megabucks	11	966,537	131,171	79,967
017	$5.00	50	10,380,995	1,676,460	409,925
018	$25.00	5	1,058,151	217,400	54,863
020	$100.00	2	635,650	95,350	12,000
021	$500.00				
024	Other Denominations	3	217,430	23,305	7,020
053	Adjustments				
	TOTALS	1,608	117,732,611	14,093,353	6,576,072

SECTION B

CODE	TABLE GAMES	NO OF UNITS	PIT CREDIT ISSUED ($)	PIT CREDIT PAYMENTS (CHIPS) ($)	PIT CREDIT PAYMENTS (CASH) ($)	DROP ($)	WIN ($)	GROSS REVENUE ($)
002	Craps	6	741,090	320,670	32,655	4,311,215	663,242	210,167
003	Roulette	7	40,845	525		1,278,949	336,785	296,465
001	Twenty-One	31	1,087,790	260,221	13,303	8,449,921	1,295,159	454,287
005	Wheel of Fortune	1				41,571	20,361	20,361
007	Mini-Baccarat	4	248,535	66,150		1,587,800	222,191	39,806
006	Baccarat	2	1,897,350	456,225	12,600	378,359	138,458	(1,315,267)
037	Pai Gow							
038	Dai-Shu							
028	Double Middles							
039	Sic-Bo							
029	Chuck-A-Luck							
040	Crapless Craps							
049	Over/Under 13							
041	Over/Under 7							
044	Red Dog	1				20,443	9,208	9,208
042	Pell							
045	Faro							
043	Pai Gow Poker	4	48,825	12,999	120	434,082	97,720	61,774
046	Super Pan Nine							
047	Nines Up							
009	Other Games							
050	Adjustments							
	TOTALS	56	4,064,435	1,116,790	58,678	16,502,330	2,783,124	(223,199)

PROGRESSIVE KENO? ☒ Yes ☐ No
(Please Check One)

ACCOUNTING METHOD USED FOR RECORDING RACE AND SPORTS BOOK REVENUE:
(Please Check One)

☐ CASH: All cash wagers received for the day less all cash paid out for the day.

☒ MODIFIED ACCRUAL: All wagers for the events completed for the day less all cash paid out.

The HASH TOTAL is a number comprised of the following subtotals added together:

SECTION A: ("NO. OF UNITS" TOTAL)
("COINS IN" TOTAL)
("DROP" TOTAL)

SECTION B: ("NO. OF UNITS" TOTAL)
("PIT CREDIT ISSUES" TOTAL)
("PIT CREDIT PAYMENTS" (CHIPS) TOTAL
("PIT CREDIT PAYMENTS" (CASH) TOTAL
("DROP" TOTAL)
("WIN" TOTAL)

SECTION C: (NO. OF UNITS" TOTAL)
("WRITE" TOTAL)

SECTION D: ("NO. OF UNITS" TOTAL)

I, ___JOE CASINO___ , certify and declare, under the penalties of perjury that I am the ___PRESIDENT___ of the business named
Owner, Partner, President, Treasurer, Other
above; that this is a true, correct and complete report to the best of my knowledge, information, and belief, and that this application and report is made with the knowledge and consent of all other individuals licensed.

Dated ___2-15___ , 19 _95_

Signed ___Joe Casino___

SECTION C

CODE	COUNTER GAMES	NO. OF UNITS	WRITE ($)	GROSS REVENUE ($)
025	Keno	2	677,849	224,151
026	Bingo	1	352,784	135,708
035	Race Book	1	895,275	126,480
048	Race Parlay Cards			
052	Race Pari-Mutuel			
034	Sports Parlay Cards		70,338	28,481
036	Sports Pool	1		
004	Football		1,423,724	129,387
008	Basketball		1,439	1,346
033	Baseball		316,656	2,380
	Other Counter Games			
051	Adjustments			
	TOTALS	5	3,738,065	647,933

PERSON TO CONTACT REGARDING THIS REPORT

NAME _____

PHONE NUMBER _____

SECTION D

CODE	CARD GAMES	NO. OF UNITS	GROSS REVENUE ($)
030	Poker	7	121,628
031	Pan		
	Other Card Games		
054	Adjustments		
	TOTALS	7	121,628

HASH TOTAL

TOTAL GROSS REVENUE
(Add Sections A, B, C, D)

7,122,434

ENTER ON LINE 1 OF FORM NGC-1

Figure 9.4 Statistical Report

cheques. If the drop included only markers transferred to the cage, using the preceding example, the table's hold would be 20,000/160,000 = 12.5%. If the markers repaid in the pit with cheques are included in drop, the hold would be 20,000/90,000 = 22.2%. The formula used to determine drop has a substantial impact on the hold percentage as well as the comparability of hold statistics for casinos in different gaming jurisdictions (e.g., Nevada and New Jersey).

Table Card   If the casino is to know which markers were repaid in the pit in cash and which markers were repaid in cheques, a record must be maintained of each marker redemption and how that marker was repaid (i.e., cash or cheques). This information is recorded on a table card (Fig. 9.5). Each table has a table card that is updated by the floorperson to indicate who received the marker and the marker amount at the time it is issued. If the marker is repaid at the table, the floorperson indicates this on the table card by circling the amount and recording the method of repayment.

Auxiliary Table Card   On occasion, well-known premium casino customers are allowed to sign a marker(s) after the play is over. An auxiliary table card (Fig. 9.6) is a numerically controlled form used to keep track of the amount of cheques owed to the casino. Sometimes referred to as rim sheets, player cards, or pre-marker tallies, auxiliary table cards are most often used in baccarat, but may be used at other table games.

Whenever a player receives cheques, the player's name and amount of cheques provided is entered on the auxiliary table card. Both the floorperson and dealer initial the card to verify the transaction. At the end of the play, the cumulative amount owed to the casino is either repaid or transferred to a marker, which is signed by the customer. Many of Nevada's biggest gamblers have grown accustomed to using auxiliary table cards. In Atlantic City as well as other gaming jurisdictions, the use of auxiliary table cards is not permitted.

Call Bets   Auxiliary table cards may also be used to record call bets, which are wagers made by premium players in which the amount of the wager is verbalized rather than indicated through the use of currency or cheques. The procedures for completion of the cards are the same as those for wagers made using cheques. Nevada gaming regulations indicate that call bets must be evidenced by the placement of lammer buttons on the table to indicate the wager amount and that call bets extending beyond one hand of play are prohibited. Call bets are also not permitted in most gaming jurisdictions.

MARCEL CHOW	VIL	(2000) CKS					
		Bʒ KE	LP ᗪᴎ				
PETER WILLIAMS	R	(500) CKS					
		ᗪᴎ KR	RᗪP KB				
MONA HOLLAND	TAM	1000					
		Bʒ ᴎ					
HELEN CHOI	R	2000	3000	5000	10000		
		ᗪᴎ ᴎ	RᗪP KB	LP ᗪᴎ	Bʒ RB		
J.L. CATALFMO	R	1000	1500				
		Bʒ ᴎ	Bʒ ᴎ				

Figure 9.5 Table Card

AUXILIARY TABLE MARKER TRANSACTION LOG

GAME _204_ DATE _____

NAME	AMOUNT	FLOOR PERSON	DEALER / BOXMAN
JONES	10000		CC
	20000		CC
BOB	10000		SE
	30000		CR
	40000		PR

DF 526-C (9/88)

Figure 9.6 Auxiliary Table Card

REVENUE AND PROFIT PER SQUARE FOOT

In managing a casino, there are many options to consider in deciding how best to utilize the available casino floor space. For instance, the entire casino floor might be covered only with roulette tables, or only with penny slots. Obviously, neither of these options would maximize profit for the casino. The casino manager must determine which configuration of games and slots to offer the public.

In real estate, the concept of highest and best use means "that reasonable and probable use that will support the highest present value. . . ." (Shenkel, 1977, p. 213). In casino operations, the highest and best use of the casino floor space is that which generates the maximum profit. It is essential to emphasize that profit, as opposed to revenue, should be maximized.

Departmental profit margins will vary from casino to casino; however, the following list is a reasonable representation of the profit margins a typical large casino might experience.

Department	Margin %	
Slots	60–70	
Table games	15–20	(excluding baccarat)
Keno	25–30	
Race and sports	15–25	
Poker	20–30	

Revenue per Unit per Day   The following chart shows the win per unit per year and per day reported by the 19 largest casinos ($72 million and over in revenue) on the Las Vegas Strip for this 12-month period ending January 31, 2003.

Game	Total Units	Total Win (000)	Win Per Unit/Yr.	Win Per Unit/Day
Twenty-One	1,155	649,906	562,689	1,542
Craps	174	276,027	1,586,362	4,346
Roulette	192	187,342	975,740	2,673
Slots	47,036	2,112,799	44,919	123

Revenue and Profit   Figure 9.7 details the amount of square footage required to provide a slot machine, blackjack, roulette, dice, or baccarat game. The casino manager should utilize the available space to his best advantage. The highest and best use yields the highest profit per square foot.

Profit per Square Foot   The following chart is an extension of the preceding one, but with two important differences indicated: (1) the daily revenue per square foot per game and (2) the daily profit per square foot per game, based on the example departmental margins indicated earlier.
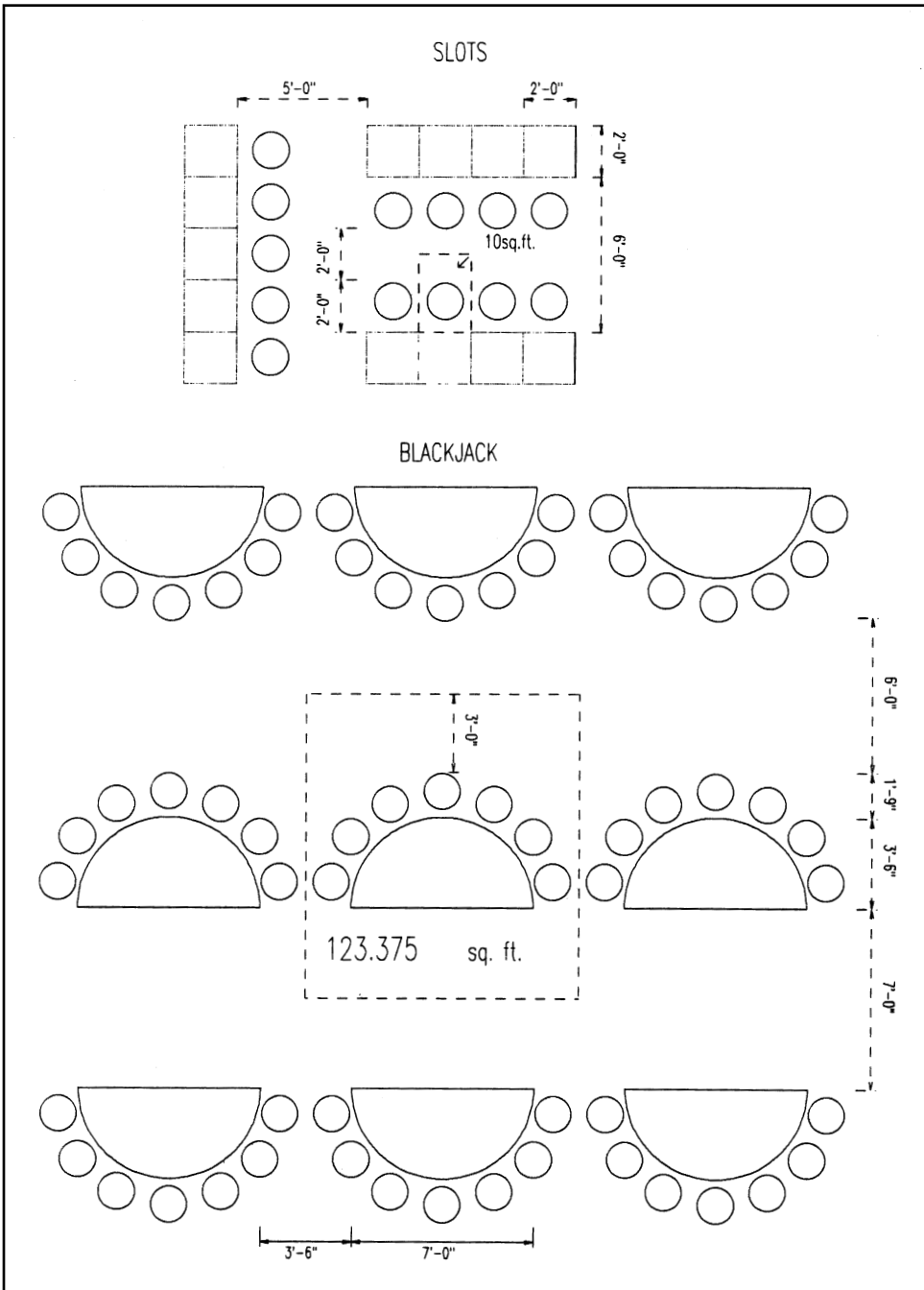
Figure 9.7 (a) Square Footage Requirements
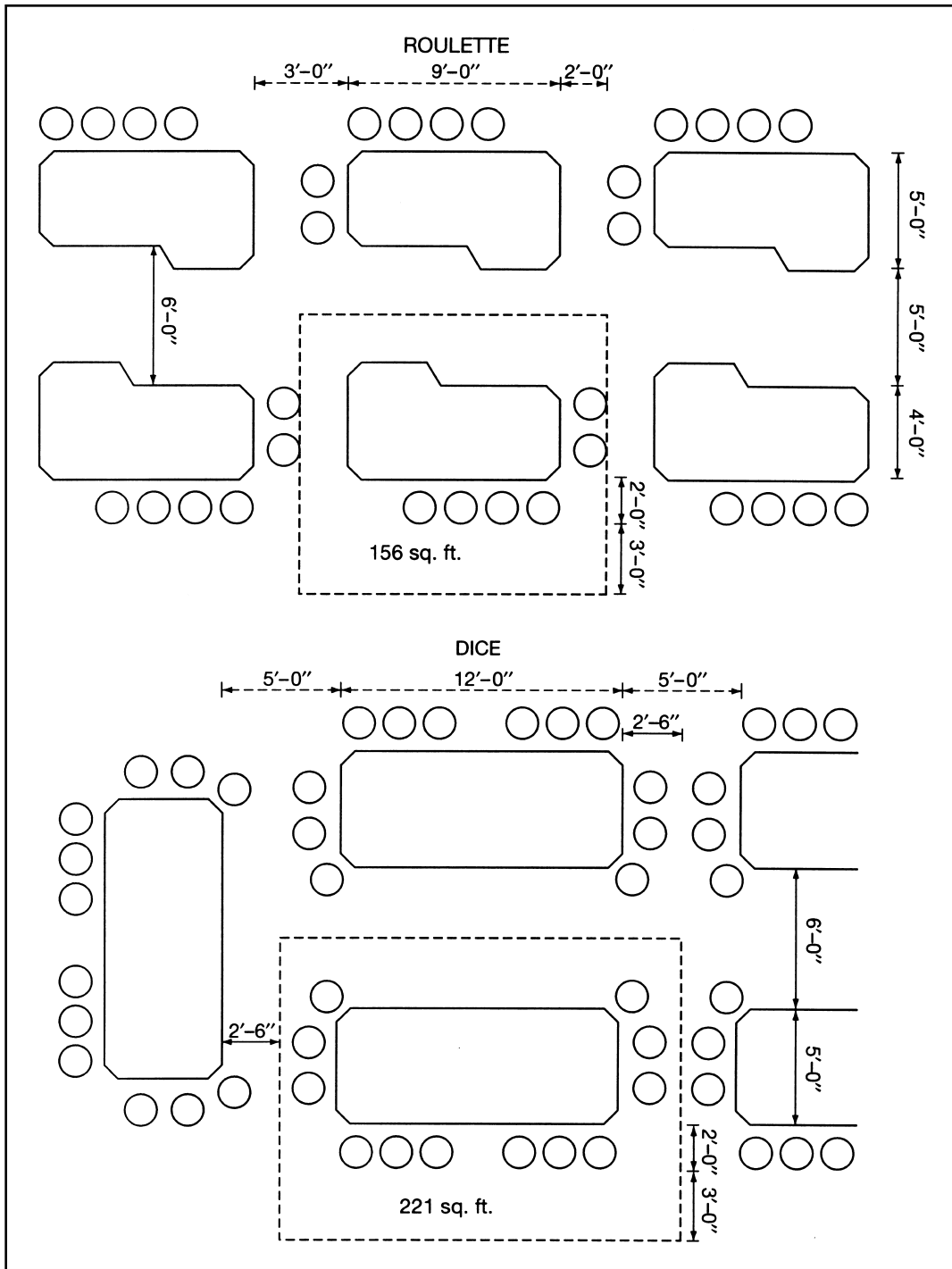
Figure 9.7 (b) Square Footage Requirements

BACCARAT
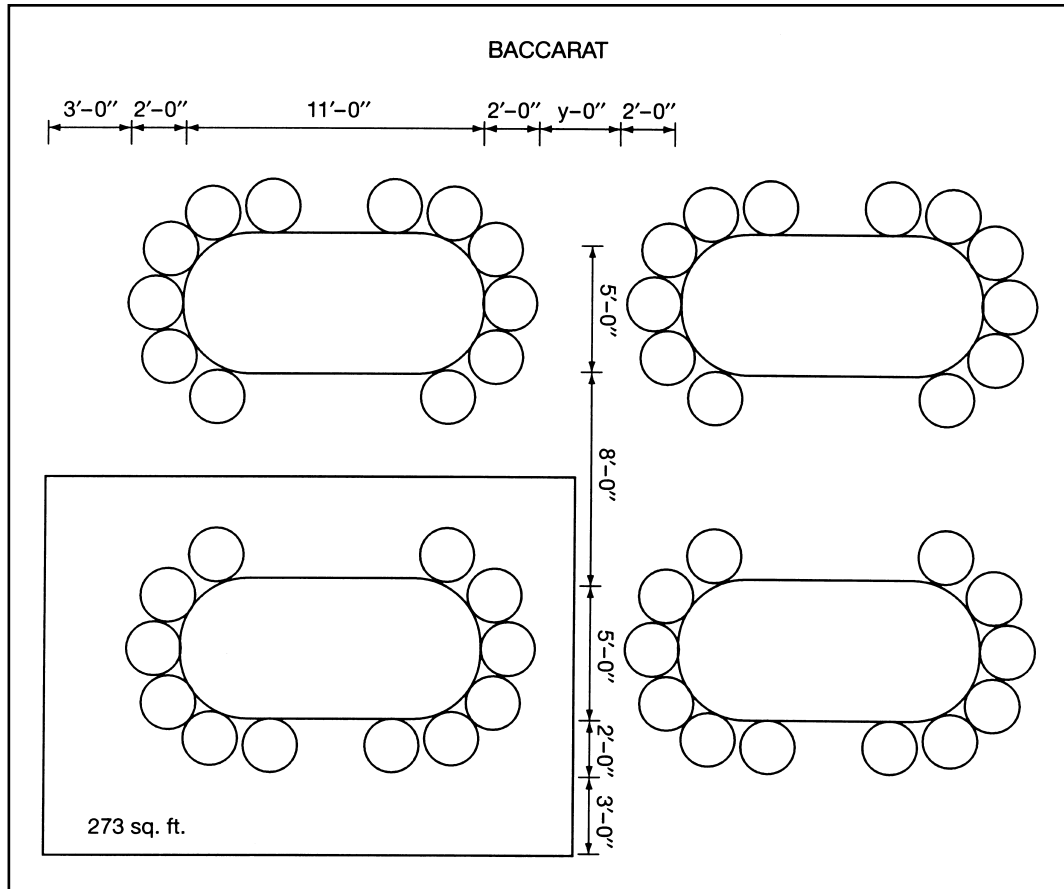
Figure 9.7 (c)   Square Footage Requirements

Although departmental margins were used to construct the following chart, an even more accurate indicator of profit per square foot would be to use the actual game direct cost and win. For example, a $2 minimum blackjack game will have a higher cost to operate as a percentage of the game win. This type of analysis can be used in considering alternate uses of available casino space.

Game	Total Units	Total Win (000)	Win Per Unit/Year	Win Per Unit/ Day	Revenue Per Unit/ Day/Sq. Ft.	Profit Per Unit/Day/ Sq. Ft.
Twenty-One	1,155	649,906	562,689	1,542	12.50	1.88 to 2.5
Craps	174	276,027	1,586,362	4,346	19.67	2.95 to 3.93
Roulette	192	187,342	975,740	2,673	17.13	2.73 to 3.43
Slots	47,036	2,112,799	44,919	123	12.30	7.38 to 8.61

Incremental versus Displaced Revenue   Often, the success of a special event, new game, or different floor configuration is judged by the amount of total revenue it generates. Management must also consider the incremental revenue gain versus the total revenue before any final decisions are rendered regarding the success of the event. When evaluating different games, an attempt should be made to quantify the revenue gained.

New games are being introduced almost monthly, and many carry a license fee. In addition, these games require floor space. The previous or "old" use of the floor space represents displaced revenue. The difference between total revenue generated with the new configuration and the revenue that is displaced should be quantified by management. Therefore, a new game should be judged by the incremental gain or loss generated and not merely by its total revenue.

Maximizing Profit per Available Room

In addition to considering profit per square foot of casino floor space and slot mix decisions, hotel casino operators must also concern themselves with the task of maximizing the profit per available room night. In the hotel casino business, profit can come from many places. To appropriately value a particular occupancy segment, it is necessary to know or estimate profit contributions from activities such as retail shopping, casino gaming, dining, and entertainment activities. These contributions can be classified as either direct or indirect. Direct contributions refer to purchasing behavior that is tracked or recorded automatically (e.g., room charges or carded slot play). Of course, the room rate is also known. Indirect contributions refer to purchasing activities that occur outside tracking system capabilities.

For example, it is likely that some hotel guests will engage in gaming activity without using the player tracking cards assigned to them upon check-in. Many casino executives believe that a substantial amount of untracked spending occurs in hotel segments such as Group Business, Wholesale, and Free Independent Travelers (FIT). Many of these travelers stay in the hotel for a few days and do not perceive the potential benefits of using a player tracking card to be worthwhile. As a result, management is often faced with estimating much of a hotel guest's total consumption, as purchases in all areas of the property can occur without a traceable record.

Working with proprietary data, we have experienced some encouraging results related to the estimation of untracked gaming volumes across Group, Wholesale, and FIT hotel segments. However, it is likely for the results of such analysis to vary by property and market. Although reliable statistical methods were employed to estimate the contributions of these segments, the analysis was complex. Yet the value of the information is great. Industry executives must rank the overall contributions of these segments when making decisions related to the hotel occupancy mix. Any information that can be used to this end is most helpful.

Executives must consider the joint value of purchasing behavior across several profit centers, including showrooms, bars and lounges, casino-run and leased restaurant outlets, slots, table games, and retail outlets. An informed decision regarding the overall contribution of these hotel segments relies heavily on estimating the indirect contributions from such profit centers. Using actual performance data produced by these profit centers (i.e., daily untracked coin-in, retail sales, unrated table drop, restaurant sales, etc.), statistical techniques are capable of deriving estimates of consumption activity by hotel segment. Using these estimates, executives can begin to better understand and rank the value of hotel segments. Once segment value is estimated, occupancy priority can be assigned accordingly. It is important to remember that this process is designed to maximize the profit per available room, not the revenue per available room. For example, a dollar of slot win is worth more than a dollar of table games win, as the profit margin in the slot department is likely to be substantially greater than that of the table games department.

A word of caution is in order for those interested in the measurement of indirect contributions produced by the various occupancy segments. Most properties with an extensive group sales business are likely to cater to a diverse sample of groups with substantially different consumption patterns. This reality can cause analytical problems, in that the spending behavior of Group A is often significantly different from the consumption patterns associated with Group B. Therefore, in most cases, one cannot treat group sales room nights as a commodity. Unlike the more homogenous FIT and Wholesale segments, the contributions of the group sales segment may be better analyzed on a group-by-group basis.

BETTING LIMITS

Management understands that theoretical win—and, ultimately, actual win—is a function of the total dollars wagered multiplied by the casino advantage.

$$\text{Total dollars wagered} \times \text{casino advantage} = \text{theoretical win}$$

If you consider the total amount wagered as the product of the average bet multiplied by the hands played, you see the benefit of increasing the average bet.

$$\text{Total dollars wagered} = \text{average bet} \times \text{hands played}$$

Raising the Minimum Bet

So how does management increase the average bet? First, it can "push" the average bet. This is accomplished by increasing the minimum bet.

Whenever there is more demand than supply, it is easy to increase the price of entering the game. If you have ever visited a casino on a Saturday night, you realize the price of the product has increased (i.e., the table limits are increased to match the greater demand for the product being offered). If the player wants to play, she must bet more. Matching the price of the product with the anticipated demand is typically an unscientific process. The casino executive in charge simply surveys the business levels and decides to raise the minimum bet. This process should be more scientific, but objective guidelines are virtually nonexistent.

Raising the Maximum Bet

The casino can "pull" the average bet by raising the limit. This process is risky in that it merely "encourages" the player to bet more. With increased betting limits comes volatility. If the casino is publicly owned, the investment community frowns upon volatility. As a result, casino management must determine whether it has access to enough premium bets so as to minimize the volatility when increasing the maximum bet. The probability of the property experiencing a loss can be calculated by using baccarat bank bets of $100,000 as an example and estimating the number of premium bets that will be placed during the next quarter. See Chapter 19, "Casino Statistics," for a more detailed explanation.

Bets Placed	Prob. of Casino Loss	Theo. Win	Std. Deviation
500	0.399300	528,954	2,073,667
1,500	0.329312	1,586,861	3,591,696
2,500	0.284210	2,644,768	4,636,860
3,500	0.249875	3,702,675	5,486,407
4,500	0.222063	4,760,582	6,221,001
5,500	0.198774	5,818,489	6,877,575
6,500	0.178863	6,876,396	7,476,712
7,500	0.161595	7,934,303	8,031,277
8,500	0.146462	8,992,210	8,549,947
9,500	0.133096	10,050,117	9,038,904
10,500	0.121216	11,108,024	9,502,735
11,500	0.110603	12,165,931	9,944,957
15,000	0.081186	15,868,605	11,357,951
20,000	0.053342	21,158,140	13,115,021
25,000	0.035639	26,447,675	14,663,039
30,000	0.024086	31,737,210	16,062,554
35,000	0.016415	37,026,745	17,349,542

As the preceding table illustrates, the possibility of loss diminishes as the casino receives enough bets. If you knew that during the next quarter you

were going to have at least 35,000 big bets of the same size, you would know the players have little chance of winning, as a group, and your exposure is minimized. The goal should be to have as many big bets as possible so as to minimize the probability of loss.

Betting Systems

Some executives believe that the maximum bet protects the casino from "betting systems." Nothing could be further from the truth. In fact, no betting system can overcome what is called an "unfair game." An unfair game is any game in which the casino has an advantage. For demonstration purposes, assume a double zero roulette game. The player bets on a color (i.e., red or black) and has a 0.526316 probability of losing,

$$\frac{20}{38} = 0.526316$$

and a 0.473684 probability of winning.

$$\frac{18}{38} = 0.473684$$

With the Small Martingale system, the player's initial bet is the minimum bet (i.e., $1). If the player wins, she bets $1 again, otherwise she doubles her last bet until she wins or reaches the limit. Betting until the player wins or can no longer bet is defined as a "trial." The best the player can hope for, per trial, is winning the initial wager (i.e., $1). The sequence of the player's bets is shown in Fig. 9.8.

As you can see, after 20 consecutive losses, the player must bet over $1,000,000 on the 21st hand. Therefore, if the player loses 20 consecutive hands, she is out of the game. What is the probability of losing 20 consecutive hands? The formula is:

$$\text{Probability of loss}^{\text{Hands played}}$$

or

$$0.52316^{20} = 00000266028386832834, \text{ or once in every}$$
375,899.74 trials

With a minimum bet of $1 and a maximum bet of $1,000,000, the player must lose 20 hands in succession to actually lose. If the player loses once in every 375,899.74 trials, then she must win every other time, or 375,898.74 times (375,899.74 minus 1). Remember, a trial is defined as a player betting until she wins or can no longer bet. Each winning trial represents a $1 win, for a total win of $375,898.74. However, if the player reaches 20 consecutive losses, she has lost a total of $1,048,575. Assume

Consecutive																				
Losses =	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Next Bet =	$2	$4	$8	$16	$32	$64	$128	$256	$512	$1,024	$2,048	$4,096	$8,192	$16,384	$32,768	$65,536	$131,072	$262,144	$524,288	$1,048,576

Figure 9.8 Sequence of Player's Bets

the player lost on the last trial of 375,899.74 trials. She loses $1,048,575, but had previously won $375,898.74, so her net loss is $672,676.27.

The player obviously has not beaten the game, but is she any better off? To answer this question, we must calculate the total hands played and see how the player's actual loss compares with her theoretical loss. The player could have won the first hand, or lost the first and won the second, or lost the first two and won the third, and so on. We must calculate the probability of each of these possible outcomes (see Fig. 9.9).

The probability times the number of hands played yields the weighted number of hands played per trial:

Probability	Hands Played	Wtd. Hands Played
0.4736842105263160000	1	0.473684
0.2493074792243770000	2	0.498615
0.1312144627496720000	3	0.393643
0.0690602435524590000	4	0.276241
0.0363474966065574000	5	0.181737
0.0191302613718723000	6	0.114782
0.0100685586167749000	7	0.070480
0.0052992413772499400	8	0.042394
0.0027890744090789200	9	0.025102
0.0014679338995152200	10	0.014679
0.0007725967892185370	11	0.008499
0.0004066298890623880	12	0.004880
0.0002140157310854670	13	0.002782
0.0001126398584660350	14	0.001577
0.0000592841360347555	15	0.000889
0.0000312021768603977	16	0.000499
0.0000164221983475777	17	0.000279
0.0000086432622881988	18	0.000156
0.0000045490854148415	19	0.000086
0.0000023942554814955	20	0.000048
0.0000026602838683284	20	0.000053
1.0000000000000000000		2.1111055

On average, each "trial" will last 2.111105 hands. The correct terminology is spins, since we are trying this on roulette. Each trial lasts 2.111105 spins and we have a total of 375,899 trials, so the player plays a total of 793,561 spins.

How much did the player wager in those 375,899 trials? We need to calculate the average wager. We know the wager and the probability of that wager; consequently, we can calculate the average wager.

Figure 9.9 Player's Possible Outcomes

Hands Played =	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Probability
Wager =	$1	$2	$4	$8	$16	$32	$64	$128	$256	$512	$1,024	$2,048	$4,096	$8,192	$16,384	$32,768	$65,536	$131,072	$262,144	$524,288	
Tot Lost =	$1	$3	$7	$15	$31	$63	$127	$255	$511	$1,023	$2,047	$4,095	$8,191	$16,383	$32,767	$65,535	$131,071	$262,143	$524,287	$1,048,575	
	W																				0.4736842105263160000
	L	W																			0.2493074792243770000
	L	L	W																		0.1312144627496720000
	L	L	L	W																	0.0690602435524589000
	L	L	L	L	W																0.0363474966065573000
	L	L	L	L	L	W															0.0191302613718723000
	L	L	L	L	L	L	W														0.0100685586167749000
	L	L	L	L	L	L	L	W													0.0052992413772499400
	L	L	L	L	L	L	L	L	W												0.0027890744090789100
	L	L	L	L	L	L	L	L	L	W											0.0014679338995152200
	L	L	L	L	L	L	L	L	L	L	W										0.0007725967892185360
	L	L	L	L	L	L	L	L	L	L	L	W									0.0004066298890623870
	L	L	L	L	L	L	L	L	L	L	L	L	W								0.0002140157310854670
	L	L	L	L	L	L	L	L	L	L	L	L	L	W							0.0001126398584660350
	L	L	L	L	L	L	L	L	L	L	L	L	L	L	W						0.0000592841360347550
	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	W					0.0000312021768603980
	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	W				0.0000164221983475780
	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	W			0.0000086432622881990
	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	W		0.0000045490854148410
	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	W	0.0000023942554814955
	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	0.0000026602838683283
																					1.0000000000000000000

Total Wager	Probability	Wtd. Wager Per Trial
$1	0.4736842105263160000	0.473684
$3	0.2493074792243770000	0.747922
$7	0.1312144627496720000	0.918501
$15	0.0690602435524590000	1.035904
$31	0.0363474966065574000	1.126772
$63	0.0191302613718723000	1.205206
$127	0.0100685586167749000	1.278707
$255	0.0052992413772499400	1.351307
$511	0.0027890744090789200	1.425217
$1,023	0.0014679338995152200	1.501696
$2,047	0.0007725967892185370	1.581506
$4,095	0.0004066298890623880	1.665149
$8,191	0.0002140157310854670	1.753003
$16,383	0.0001126398584660350	1.845379
$32,767	0.0000592841360347555	1.942563
$65,535	0.0000312021768603977	2.044835
$131,071	0.0000164221983475777	2.152474
$262,143	0.0000086432622881988	2.265771
$524,287	0.0000045490854148415	2.385026
$1,048,575	0.0000023942554814955	2.510556
$1,048,575	0.0000026602838683284	2.789507
	1.0000000000000000000	$34.000687

If the player bets an average of $34 for each trial of an average 375,899 trials, she bets a total of $12,780,849. Her theoretical disadvantage is 5.26%. Her actual loss is $672,676, and her theoretical loss is $672,676.

Furthermore, how great a threat is this player? If the player plays 24 hours per day and plays 60 spins per hour, she will play on average 13,226 hours, or 551 days. For the 13,266 hours she plays before that fatal trial, her average win per hour is $28.40 ($375,898 ÷ 13,226). Under the best of conditions the player has a bankroll of $1,048,575 dollars, and on average will lose $672,676 per year. You might compare this to a slot machine that requires $1,048,575 per pull. If you win, you win $1. If you lose, you lose it all.

Special Betting Limits

Allowing special limits is a practice employed by many casinos that does not make a lot of sense. Somehow casino management will evaluate the player, her bankroll or credit limit, and decide how much she can bet. In this case it is almost as though the casino knows whom it can "beat." A common practice is to allow the player to bet as much as 5% of her credit limit. If you ask why this rule, you most likely will be told that casino

management knows it can "beat the player" out of 20 times her average bet. If the player has a $1,000,000 credit line, her special betting limit might be $50,000 per hand, whereas the player sitting next to her might only be able to bet $25,000 because his credit line is only $500,000.

Unfortunately, the game does not have any idea of what we are talking about. The game needs many bets at *every* bet size to perform as designed. The rule should be:

Everybody can bet what *anybody* can bet.

The belief that the casino can "beat a player" out of a desired amount is absurd. If we do lend credence to this belief, the casino is much more likely to beat a player out of her line if she makes bets totaling 10% of her line versus 5% of her line.

Another common justification for granting a special betting limit is that "the player always loses." This justification is also incorrect. A game that is designed to earn 5.26% *must* do what it was designed to do if given enough bets. You will never see an asterisk after a game's advantage like this:

Roulette advantage 5.26%[1]

Raising Limits

Everyone knows that the more a player bets, the more the casino wins, theoretically. How does the casino prudently raise the betting limits? First, the casino must have a facility that is attractive to premium bettors. Second, the casino must have the personnel capable of "touching" these players. Finally, the casino must venture where it has never gone before and have patience, with the understanding that premium betting grows slowly. From the time it is decided to accept larger bets to the time when volatility is minimized through a large volume of players, the casino will experience significant volatility. With a sound plan and patience, the casino can develop a premium player clientele and reap the larger profits.

NOTE

1. Unless the player always loses.

CASINO ACCOUNTING

TABLE DROP AND COUNT

Drop boxes are removed from the casino table games either at the end of each shift or once a day, depending on the preference of management and the requirements of the particular gaming jurisdiction. The control procedures surrounding the removal of drop boxes and the subsequent count of the box contents are integral to the success of the casino operation. Casinos are unique in that transactions with customers conducted at the table games are not recorded at the point of sale, as is common with most businesses today. The proceeds of the gaming activity for the shift or day are not known until the count is completed.

As a result, the integrity of the drop and count process must be maintained to ensure that the casino captures and records all the revenues contained in the drop boxes. In order to help ensure the integrity of this process, procedures are designed and, in most jurisdictions, mandated to provide for the involvement of employees from several different departments, as well as physical control over access to the boxes, box contents, and count room. The drop and count process is an area of focus for gaming regulators in all jurisdictions since the results of the count have a direct bearing on the amount of taxes paid by the casino.

The level of regulator involvement varies from periodic unannounced observations to a daily presence in the count room, depending on the jurisdiction. In Peru, for example, regulators seal the drop boxes when they are removed from the tables and they, rather than casino management, maintain the key to the box contents. The representative of the regulatory agency will verify the count, sign the count sheet, and retain a copy for its records.

The procedures described in this chapter will pertain to a casino that drops its boxes on a daily basis. The table drop begins with the removal from the count room by security officers of the trolleys containing the second set of drop boxes. The trolleys are taken to the casino floor, and the boxes are placed under the tables to which they correspond. All drop boxes are marked with the game type and table number for a particular table.

After the second set of boxes has been set out, security officers use a controlled key to remove the existing boxes from the prior day, place the new boxes on each table, and place the boxes that were removed from the tables into the trolleys. Once all boxes have been removed and replaced, the full trolleys are locked with padlocks and are transported to the count room by security officers.

It is important to note that the key to access the contents of the boxes is controlled separately from the key that is used to remove the boxes from the tables. The only individuals allowed to access the contents key are the count team members, and this access is permitted only during the time the count is taking place. Key controls and custody are discussed in detail later in this chapter.

After the trolleys containing the full drop boxes are stored in the count room, the count team members will assemble outside the count room, where they will be let in with the participation of a security officer. The count team verifies that all boxes are accounted for, and the count begins. The count team normally consists of at least three employees, including a lead or supervisor who oversees the count. The count team organizationally reports to the finance department so that the employees are independent of the revenues being counted. All count team members wear pocketless jumpsuits or smocks throughout the count process and must follow prescribed procedures for the handling of currency.

The drop boxes are opened one at a time and the contents are placed on a table, where they are sorted and counted by another member of the team. The empty drop box is shown to at least one other member of the count team and to the surveillance cameras. After the contents of the box are counted, an additional member of the team recounts the currency and compares his count with the initial count. Once both employees counting the currency have reached agreement on the total for the table, the currency breakdown is recorded either manually or through the use of a computer terminal on a master game report.

Today, the counting and recounting of currency for most casino operations is performed through the use of currency counting machines, which determine the number of bills for each denomination and the total for each table. These currency counters may be interfaced directly to the computer system so that they transfer the results of the count for each table directly to the master game report without requiring manual input by the count team. Regardless of the methodology used, the master game report documents the currency removed from all tables counted and, once the count is complete, is signed by all members of the count team as verification of the amounts recorded and indication of their participation in the count process.

After the count is complete, a representative of the casino cage comes to the count room and does a complete recount of the currency, which has been strapped and bundled by the count team. The count by the cage rep-

resentative is done without the benefit of the count team totals and is performed as a prerequisite to the cage accepting responsibility for the drop proceeds. The cage representative will reach agreement with the count team totals and will sign the master game report or a supplemental transfer form documenting the amount of currency accepted.

The cage representative is escorted to the cage by a security officer, and the count is complete. The master game report, along with the documentation removed from the drop boxes, is then transported directly to accounting by the count team.

Throughout the count process, all activities that take place in the count room are recorded by surveillance cameras, which are positioned to provide coverage of all areas within the room. Most count rooms also contain audio capability so that surveillance officers may listen to the count team. The count is usually taped so that any discrepancies that occur may be researched and investigated after the count has been completed, if necessary. In several gaming jurisdictions, a security officer is required to be present in the count room while the count is taking place.

SLOT DROP AND COUNT

The slot drop and count consists of two different components comprising similar processes. The coins and tokens (hard drop) as well as the bills contained in the currency acceptors (currency acceptor drop) must be removed from the slot machines and counted. The drop from slot machines differs from the table games drop in that the amount removed from the slot machines is known. Each slot machine contains a series of mechanical and, in most cases, computerized meters that record the quantity of coins or bills that should be contained in the drop container.

Hard Drop and Count   Each slot machine contains a hopper, which contains the coins or tokens used by the slot machine to handle jackpot payouts below a predetermined number of coins. When the hopper is full, all coins that are accepted by the machine are diverted to the drop bucket, which is stored in a locked cabinet underneath the slot machine. The frequency of drop bucket removal is determined by the number of machines and the amount of slot play that the casino receives. Some busy casinos will remove the drop buckets on a daily basis for some or all of their slot machines.

The removal of the drop buckets is performed by the hard drop team while under the observation of security officers, who are responsible for maintaining security for the drop process. The drop buckets are systematically removed from each slot machine and are placed in a large metal cart. As each drop bucket is removed, it is replaced with an empty bucket. The drop buckets are associated with particular machines for accountability purposes, either through the use of preprinted slips that are stored in

the cabinet with the drop bucket and contain the number of the particular machine, or by labeling the drop bucket so it must be used with the slot machine to which it is assigned.

When the cart containing the drop buckets removed from the slot machines is full, it is transported to the hard count room for weighing and wrapping. The security officers will stay with the drop team until all carts have been transported to the count room and the count process has begun. The drop team is generally composed of the same individuals who function as the hard count team. The hard count team, like the soft count team, organizationally reports to the finance department and is independent of the slot revenues being counted. All count team members wear pocketless jumpsuits throughout the count process and must follow prescribed procedures for handling of the coins and tokens.

The contents of each bucket are weighed through the use of a weigh scale that records the number of coins or tokens and converts them to an equivalent dollar amount. Prior to the start of the count, the weigh scale is tested by the count team to ensure that it is calibrated properly for each denomination in order to avoid variances between the amount weighed and the amount subsequently wrapped. The amount weighed for each machine is recorded on a tape generated by the weigh scale. Many count rooms today are utilizing technology that provides for the weigh scale data to be transferred to computer media or to be interfaced directly to the slot computer system, which, in either case, eliminates the need for casino accounting to manually input the weigh scale data.

After the coin from each bucket has been weighed, it is transported down a conveyor belt where it is fed into wrapping machines, which place a set amount of the coin into paper-wrapped rolls. If enough rolled coin already exists for sale by the casino to customers, the coin may be placed in set quantities into bags for subsequent wrapping or use in performing slot hopper fills. When the coins and tokens from all machines dropped have been weighed and wrapped, the count team performs a physical count of all coins and tokens in order to determine the totals by denomination.

The results of the physical count are then reconciled to the weigh totals for each denomination to determine whether variances exist that must be investigated and resolved. A representative of the casino cage performs an independent count of the wrapped and bagged coins/tokens and reconciles her counts to the counts performed by the count team members. At this point, the wrapped and bagged coins/tokens are transferred to a coin vault, which is normally adjacent to or in the same location as the count room, and the count is complete. The coin vault is a secure storage area, which, in most casinos, is part of the casino cage accountability.

The count room is monitored by surveillance through a number of cameras that are positioned to provide an unobstructed view of all areas within the count room. The hard count is usually taped so that any dis-

crepancies that occur may be researched and investigated after the count has been completed, if necessary. Access to the count room is restricted to the hard count team members through dual locks that require the participation of security officers. Any count team member who leaves the count room during or at the conclusion of the count is wanded (i.e., metal detector) by a security officer to ensure that he is not carrying any coin or tokens out of the count room.

Currency Acceptor Drop and Count   The advent of currency acceptors has seen a rapid decline in the amount of coin and tokens that must be removed from the slot machines. It is common for 70% or more of the total slot drop to be received through currency acceptors. Although many in the industry were skeptical when currency acceptors were initially proposed, they have become the preferred method of play for most slot customers and have resulted in labor savings to casinos, since the currency acceptors can be dropped with greater efficiency than the hard drop.

The removal of the currency acceptor drop containers is performed in a manner similar to the drop bucket removal. Security officers escort the drop team throughout the process until it is time to begin the count. Currency acceptors are attached to the outside of the slot machine or they are contained within the slot machine. In either case, the bills are accumulated in a locked container that is affixed to the acceptor. The containers are removed and replaced with empty containers by the drop team. The containers are generally bar-coded so that they can be associated with a particular slot machine.

Once all of the currency acceptors designated for removal are dropped, the containers are transported to the soft count room in a locked trolley. The currency acceptor containers will be removed by the hard drop team, but will be counted by the soft count team. The count of the bills in the containers is conducted using the same basic procedures as those described previously for the table games count. One difference is that, in most casinos, the computerized slot system compares the count for a particular slot machine with the number of bills recorded by the currency acceptor in-meter, which maintains a count for all bills inserted into the acceptor. Variances will be reviewed and investigated by the count team or an accounting representative.

KEY CONTROL

As described in the previous sections, key controls are an integral part of the controls over the drop and count process. Key custody and access should be structured in a manner that precludes any one individual or department from having access to stored full drop containers, which would include table drop boxes and slot currency acceptor drop contain-

ers. Keys are issued through the use of a list indicating which individuals are authorized to access specific keys, and a key control log that documents the following:

- Number and description of the key issued
- Time and date the key was issued
- Name and signature of the individual issuing the key
- Name and signature of the individual receiving the key
- Reason the key was issued
- Time and date the key was returned
- Name and signature of the individual accepting the key when it is returned
- Name and signature of the individual returning the key

The following summarizes the recommended custody and access controls over sensitive keys.

Table Games
- Drop box release key. This key is used to remove the drop box from the table. Generally, it is controlled by security, and access to the key is provided only to security officers accompanied by pit personnel during the drop and to count team members during the count, so it may also be used to reset the drop boxes. Security personnel are precluded from having access to the drop box contents key.
- Drop box storage trolley key. The storage trolleys used to transport and store the table drop boxes are secured through two padlocks, which are separately keyed. One padlock key is controlled by security, and the second is controlled by a department independent of security. The second key is usually controlled by the cage with access provided to pit personnel or to the soft count team, depending on the assignment of responsibilities for the other sensitive keys. This key may also be controlled by pit personnel under certain circumstances.
- Drop box contents key. Only count team members during the performance of the count are permitted to access the contents key. This key must be maintained in a manner that provides for the proper separation of departmental responsibilities and participation to access the stored full drop boxes. The contents key is commonly controlled by the cage, and the issuance at some casinos requires the participation of security officers. The key will be issued only when the entire soft count team is assembled and ready to enter the count room.
- Count room door key. The count room door contains two locks which are separately keyed. One key is controlled by security, and the second key is controlled by the cage. The second key is issued only to the count team.

Slots

- Slot machine drop keys. The keys used to access the cabinets containing the slot drop buckets (hard drop) must be controlled by a department independent of the slot department. The cabinet keys are usually controlled by the cage and are issued to the drop team, who are required to be accompanied by a security officer. Security will observe the key until it is returned.
- Currency acceptor release (retriever) keys. The keys are controlled by a department independent of the slot department. They are controlled in the same manner described for the slot machine drop keys.
- Currency acceptor storage rack keys. The storage trolleys used to transport and store the currency acceptor drop containers are secured through two padlocks, which are separately keyed. The procedures are the same as those described for the drop box storage trolley keys.
- Currency acceptor contents key. Only count team members during the performance of the count are permitted access to the contents key. The contents key must be maintained in a manner that provides for the proper separation of departmental responsibilities and participation to access the stored full drop boxes. The key is controlled in the same manner as the drop box contents key.
- Count room door keys. The count room door contains two locks, which are separately keyed. One key is controlled by security, and the second key is controlled by the cage. The second key is issued only to the count team.

Duplicate keys require at least the same degree of control as the controls specified in the preceding lists. Duplicate keys are commonly maintained in a key box that can be accessed only through the participation of three different departments.

Sensitive gaming keys are typically ordered from an outside vendor specializing in high-security gaming keys and locks. Keys are normally ordered, received, and physically controlled until they are placed in service by management personnel within the finance function (e.g., the casino controller). In addition, computerized key control systems providing for the use of password or hand scan technology are gradually becoming more prevalent within the gaming industry as a method of providing further security over the issuance and accountability of sensitive gaming keys.

INTERNAL AUDIT

Many gaming jurisdictions have established requirements for the performance of procedures by an internal audit function. In some of these jurisdictions, the responsibilities of the internal audit function have been per-

mitted to be performed by independent accountants. The extent of the procedures required to be performed varies across jurisdictions, so the procedures discussed in this section will mirror those of Nevada.

The Nevada Gaming Control Board established Minimum Internal Control Standards (MICS) for internal audit functions. The MICS specify that the internal audit function must be independent of the departments that are subject to audit. Independence is obtained through the organizational reporting relationship of the internal audit function. In most organizations, internal audit reports to management or owner representatives who are separate from management of the casino operation. This reporting relationship is important to help ensure that internal audit activities are conducted in a manner that permits the objective evaluation of compliance in the required areas. Internal audit functions as an important component of the overall control environment that must exist within the casino operation.

The MICS also specify that the procedures performed by the internal audit function must be documented and retained for five years. The results of the procedures performed are required to be communicated to management, and any material exceptions resulting from the procedures performed must be investigated and resolved. Follow-up is required to be performed relevant to instances of noncompliance noted by internal audit, the Gaming Control Board, or the independent accountants.

The MICS require that internal audit perform reviews of the following areas:

- Table games. The review must be performed semiannually. The scope of the review must include procedures relevant to fills and credits, credit play, soft count, control of sensitive keys, and tracing of documentation.
- Slot department. The review must be performed semiannually, and the scope of the review must include procedures relevant to the slot drop, slot count, testing of the weigh scale, slot machine access, tracing of source documents, control over sensitive keys and EPROM duplication.
- Keno. The review is to be performed annually, and the scope must include procedures relevant to write (i.e., total amount wagered), payouts, sensitive key control, and keno audit.
- Card games. The review is to be performed annually, and the scope must include procedures relevant to card game operation, monetary exchange, shill transactions, and the count of game proceeds.
- Bingo. The review is to be performed annually, and the scope must include procedures relevant to bingo card control, payouts, and cash reconciliation.
- Entertainment. The review is to be performed annually, and the scope must include procedures relevant to recording of entertainment revenue, cash turn-in, accounting, and package program allocations.

- Race and sports book. The review is to be performed annually, and the scope must include procedures relevant to write, payouts, sensitive key control, race and sports book audit, and compliance with Regulation 22.
- Cage and credit. The review is to be performed annually, and the scope must include procedures relevant to the cage, credit, collections, and reconciliation of trial balances to credit instruments on a sample basis.
- Cage accountability. Must be reconciled to the general ledger on an annual basis. In addition, an annual count of the items comprising the cage accountability must be performed.
- Electronic data processing (EDP) functions. A review for compliance with the new EDP MICS is to be performed annually.
- Pari-mutuel wagering. The review is to be performed annually, and the scope must include procedures relevant to write, payouts, pari-mutuel auditing, and compliance with Regulations 26A and 26B.
- Reconciliation of gross revenue. At least annually, gross revenue is reconciled from the accounting records to the monthly Nevada Gaming Commission tax returns.
- Selected regulations. The review is to be performed annually and the scope must include procedures relevant to compliance with Regulations 3.100 (employee report), 5.160 (surveillance systems), 6.040 (accounting records), 6.050 (records of ownership), 6.115 (Uncollected Baccarat Commission), 6.130 (mandatory count procedures), 6.150 (minimum bankroll requirements), and 8.130 (transaction reports).
- Junket/branch offices. Branch offices having average total balances of original credit instruments on hand of $200,000 or more must be visited by internal audit at least once every two years. The review includes procedures relevant to credit, collections, and reconciliation of original credit instruments on hand to records of instruments transferred to the offices.

The MICS also specify procedures to be performed by internal audit with regard to currency reporting requirements. These requirements are addressed in Chapter 5.

CASINO AUDIT

Casino audit reports to the finance department and functions to verify the integrity of control and compliance procedures performed in gaming operations and the casino cage. Areas reviewed by casino audit typically include table games, slots, keno, bingo, poker, race and sports book, pari-mutuel, and the casino cage. A casino audit function is staffed with a supervisor or lead and a number of clerical staff.

The procedures performed by casino audit are centered on performing a daily review of documentation prepared in the areas indicated earlier. Performance of these procedures is documented through the completion of a checklist, which indicates the specific steps performed for the given area. The auditor responsible for performing the procedures indicates the date of the audit and signs or initials the checklist. Any exceptions to the procedures performed by casino audit are documented and communicated to the department head responsible for the respective area for follow-up.

The following is an overview of the casino audit procedures typically performed for each of the areas.

Table Games
- Soft count activity. Depending on the extent of procedures performed by the soft count team, casino audit will verify all documentation in the drop box for each table to the amounts indicated on the master game report. Documentation in the drop box includes fill and credit slips, requests for fills and credits, markers, table inventory forms, and coupons.

Slots
- Jackpots/hopper fills. For computerized slot systems, periodic procedures are performed to verify the accuracy of the system totals, usually by footing jackpot and fill slips for selected booth cashiers and comparing the totals to those derived by the computer system. The continuity of the slips is also checked by reviewing reports showing the restricted copy (copy retained by the computer) of all slips for a given period. For manual systems, slot audit procedures include the agreement of the jackpot and fill slips with the copy retained by the dispensing (whiz) machine.
- Meter readings. Testing is performed on a periodic basis to ensure the accuracy of the meter readings recorded by the computerized system. Procedures performed may consist of taking a manual meter reading for selected machines on a periodic basis and agreeing these to the meter readings recorded by the system. The review of statistical reports of slot machine performance may also identify problems with meter readings recorded by the system.
- Weigh scale interface. For casinos using an interface to transfer data from the weigh scale to the computerized slot system, procedures are performed on a periodic basis to verify the accuracy of the data being transferred. This verification is accomplished by observing the weigh scale totals for selected machines during the count and then agreeing these totals to the amounts transferred to the slot system.
- Currency acceptor meter readings. On a periodic basis, casino audit compares the currency amounts removed from the currency acceptor

containers with the corresponding amounts recorded by the currency acceptor bill in-meters to identify any variances beyond preestablished levels.

Cage and Credit

*   Cage activity. Casino audit personnel perform a daily review of the documentation submitted by the casino cage supporting all increases and decreases to the cage accountability.
*   Credit and collections. Procedures are performed on a periodic basis to review compliance with policies established for the issuance of credit, reconcile selected casino receivables to the corresponding amount indicated on the aging of casino receivables, and review documentation of collection efforts and partial payments on outstanding receivable balances.

Keno

*   Write and payouts. Procedures are performed on a periodic basis to verify write and payout amounts in order to determine a win or loss for a given shift. With the advent of computerized systems, these procedures are basically a check on the accuracy and integrity of the computer system. These procedures may have had greater value in the past when manual systems were common.
*   Banks and cash turn-in. Procedures are performed to audit individual cashiers and the turn-in for a shift in comparison to the audited win or loss in order to identify cashier over and short amounts.
*   Keno tickets. On a test basis, winning tickets are regraded and compared with the restricted copy to verify the propriety of payout amounts. In addition, procedures for voiding of tickets and sequential numbering of tickets are reviewed.
*   Draw tickets. On a test basis, draw tickets (reflecting the balls selected and other relevant information for a given game) are compared with the surveillance tape of the empty and full "rabbit ears" or "goose neck" in order to ensure the balls reflected on the draw ticket are accurate and that the game was properly cleared prior to the balls being reselected.

Race and Sports

*   Winning tickets. Procedures are performed to audit large winning tickets. The tickets are regraded, the starting time of the event is verified as to the time the ticket was purchased, and the terms of the wager (e.g., the point spread) are reviewed for propriety against an independent source.
*   Voided tickets. Void tickets are reviewed to ensure that they were properly voided, and computer reports showing void tickets for a given period are reviewed to ensure that the tickets were voided prior to the start of the event.

- Unpaid winners and future wagers. Procedures are performed periodically to review the handling of future wagers and unclaimed winners. Unclaimed winners or "sleepers" are winning tickets for which the payout has not been made. Unclaimed winners represent a liability to the casino, and procedures must be established to ensure that payouts are made correctly.

In addition to the procedures summarized in the preceding lists, casino audit personnel also set up new employees and assign passwords in order to control access for computerized systems including slots, table games, race and sports, and keno. Audit personnel must also maintain physical and accounting control over sensitive documents used in the casino operation such as markers, fill and credit slips, jackpot, and hopper fill slips.

Generally, the forms used for computerized systems have the required information printed on them by the computer. In these cases, the computer tracks forms that have not been accounted for and generates a listing that can be used by casino audit for research purposes. The control of computerized forms does not require the same level of physical control as is required for manual forms.

Manual forms are prenumbered and numerically controlled through the use of issuance and usage logs. They are stored in a locked area that is controlled by casino audit, a perpetual inventory is maintained for each type of form, and the forms are inventoried periodically. Where the forms are dispensed from a whiz machine, casino audit is responsible for loading a supply of forms into the whiz machine, controlling access to the machine, and picking up the restricted copies of the forms, which are used for verification purposes. For sensitive forms that have been placed into service, casino audit personnel perform a check-off of the forms as they are used in order to identify forms that cannot be accounted for.

STATISTICAL REPORTS

Reports indicating key performance statistics are prepared and maintained for various areas within casino operations. These reports are prepared and presented to casino management on a daily basis and are used to identify areas requiring attention as well as to evaluate the effectiveness of programs implemented to generate incremental revenue. In many jurisdictions, statistical reports are required to be prepared and maintained with specific information required to be included.

Many jurisdictions also require that the statistical information for the current year be compared with the prior year's information in order to determine whether unusual variances or fluctuations are occurring. An example of this is the Nevada requirement that any fluctuations of plus or minus 3% from the base level—which is defined as the statistical win

to statistical drop percentage for the previous business year—must be investigated, and the results of the investigation must be documented and retained.

The following are examples of statistical reports that are required in Nevada as well as other jurisdictions:

- Table games. Reports must include statistical drop, statistical win, and statistical win to drop hold percentage by table and type of game. The report must indicate this information by shift (if applicable), by day, cumulatively month-to-date, and cumulatively year-to-date.
- Slots. Reports must be generated monthly indicating month-to-date and year-to-date hold percentages for each slot machine and a comparison of the actual hold percentage with the theoretical hold percentage for each machine.
- Bingo. Reports are prepared that indicate win, write (i.e., card sales), and the win-to-write hold percentage for each shift, day, month-to-date, and year-to-date.
- Keno. Reports are prepared that indicate win, write, and the win-to-write hold percentage for each shift, day, month-to-date, and year-to-date.
- Race and sports book. A wide variety of reports are required, which provide information on all activity conducted in the book. The specific requirements are extensive and are included in the MICS for race and sports books.

Generally, statistical reports are required to be maintained in accordance with the record retention requirements specified by the particular jurisdiction.

MATHEMATICS OF CASINO GAMES

It is important to understand not only how the different casino games are played, but also how the wagers available on each of the games impact the overall game theoretical house advantage. Casino operators must be able to determine the effect that player betting strategies, as well as rule variations, may have on the game advantage. This chapter provides a description of the mathematics associated with the wagers corresponding to dice, roulette, blackjack, baccarat, and keno.

DICE

Table 11.1 illustrates the permutations and the number of ways that each number can be rolled in dice.

Figure 11.1 presents typical dice table layouts. There are differences between the two layouts in the odds offered on several of the available wagers.

Table 11.1 Possible Number Rolls in Dice

	Dice Roll Permutations					Number of Ways
2 can be rolled 1 way	1-1					1
3 can be rolled in 2 ways	1-2	2-1				2
4 can be rolled in 3 ways	1-3	3-1	2-2			3
5 can be rolled in 4 ways	1-4	4-1	2-3	3-2		4
6 can be rolled in 5 ways	1-5	5-1	2-4	4-2	3-3	5
7 can be rolled in 6 ways	1-6	6-1	2-5	5-2	3-4	4-3	6
8 can be rolled in 5 ways	2-6	6-2	3-5	5-3	4-4	5
9 can be rolled in 4 ways	3-6	6-3	4-5	5-4		4
10 can be rolled in 3 ways	4-6	6-4	5-5			3
11 can be rolled in 2 ways	5-6	6-5				2
12 can be rolled 1 way	6-6					1
	Total Possibilities					36
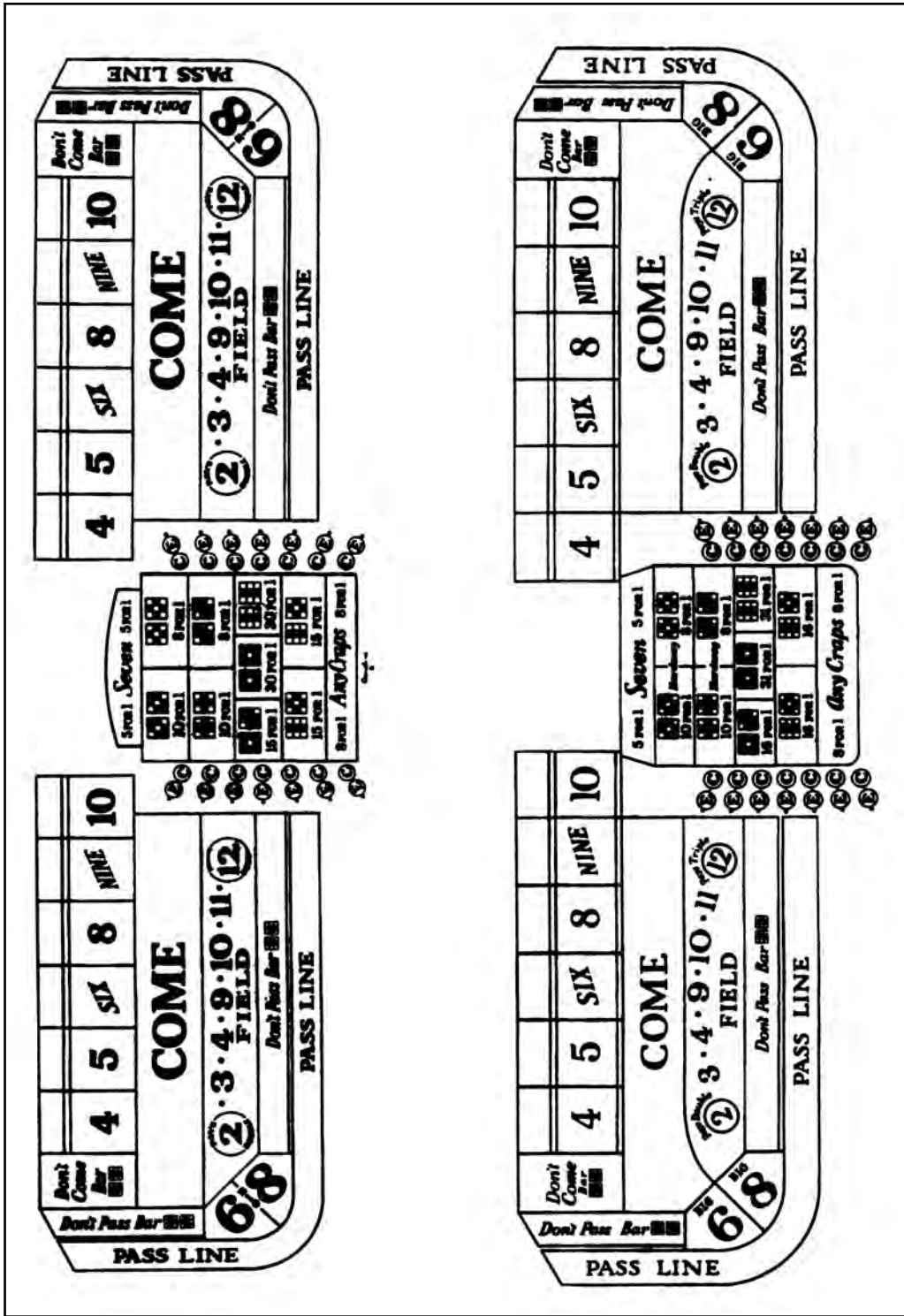
Figure 11.1 Dice Layouts

Dice Mathematics

The mathematics of pass and don't pass wagers are analyzed by type in Tables 11.2 and 11.3.

It is important to note that the disadvantage on the don't pass/don't come bet quoted in most information published on dice is –1.402%; however, this disadvantage accounts for the 12, which results in a tie outcome, as if it were never rolled. Only 35 possible combinations exist if it is assumed that the 12 was never rolled. Consequently, the denominator used in the equations in Table 11.3 all use 35 possibilities instead of 36.

Table 11.2 Pass Line/Come

Come-out Roll	Standard Craps (Pass Line)
2	$\left(\frac{1}{36} \times -1\right) = -0.0277778$
3	$\left(\frac{2}{36} \times -1\right) = -0.0555556$
11	$\left(\frac{2}{36} \times +1\right) = +0.0555556$
12	$\left(\frac{1}{36} \times -1\right) = -0.0277778$
7	$\left(\frac{6}{36} \times +1\right) = +0.1666667$

Point Numbers

4	$\left(\left(\frac{3}{36} \times \frac{1}{3}\right) \times +1\right) + \left(\left(\frac{3}{36} \times \frac{2}{3}\right) \times -1\right) = -0.0277778$
5	$\left(\left(\frac{4}{36} \times \frac{4}{10}\right) \times +1\right) + \left(\left(\frac{4}{36} \times \frac{6}{10}\right) \times -1\right) = -0.0222222$
6	$\left(\left(\frac{5}{36} \times \frac{5}{11}\right) \times +1\right) + \left(\left(\frac{5}{36} \times \frac{6}{11}\right) \times -1\right) = -0.0126263$
8	$\left(\left(\frac{5}{36} \times \frac{5}{11}\right) \times +1\right) + \left(\left(\frac{5}{36} \times \frac{6}{11}\right) \times -1\right) = -0.0126263$
9	$\left(\left(\frac{4}{36} \times \frac{4}{10}\right) \times +1\right) + \left(\left(\frac{4}{36} \times \frac{6}{10}\right) \times -1\right) = -0.0222222$
10	$\left(\left(\frac{3}{36} \times \frac{1}{3}\right) \times +1\right) + \left(\left(\frac{3}{36} \times \frac{2}{3}\right) \times -1\right) = \underline{-0.0277778}$

Player Disadvantage = –0.0141414

In Percent = –1.414%

Net Units Lost per 36 wagers (–1.414% × 36) = –0.5090909

Table 11.3 Don't Pass Line/Don't Come

Come-out Roll	Standard Craps (Don't Pass)	
2	$\left(\dfrac{1}{35} \times +1\right)$ =	+0.0285714
3	$\left(\dfrac{2}{35} \times +1\right)$ =	+0.0571429
11	$\left(\dfrac{2}{35} \times -1\right)$ =	−0.0571429
12	$\left(\dfrac{1}{35} \times 0\right)$ =	0.0000000
7	$\left(\dfrac{2}{35} \times -1\right)$ =	−0.1714286
Point Numbers		
4	$\left(\left(\dfrac{3}{35} \times \dfrac{1}{3}\right) \times +1\right) + \left(\left(\dfrac{3}{35} \times \dfrac{1}{3}\right) \times -1\right)$ =	+0.0285714
5	$\left(\left(\dfrac{4}{35} \times \dfrac{6}{10}\right) \times +1\right) + \left(\left(\dfrac{4}{35} \times \dfrac{4}{10}\right) \times -1\right)$ =	+0.0228571
6	$\left(\left(\dfrac{5}{35} \times \dfrac{6}{11}\right) \times +1\right) + \left(\left(\dfrac{5}{35} \times \dfrac{5}{11}\right) \times -1\right)$ =	+0.0129870
8	$\left(\left(\dfrac{5}{35} \times \dfrac{6}{11}\right) \times +1\right) + \left(\left(\dfrac{5}{35} \times \dfrac{5}{11}\right) \times -1\right)$ =	+0.129870
9	$\left(\left(\dfrac{4}{35} \times \dfrac{6}{10}\right) \times +1\right) + \left(\left(\dfrac{4}{35} \times \dfrac{4}{10}\right) \times -1\right)$ =	+0.0228571
10	$\left(\left(\dfrac{3}{35} \times \dfrac{2}{3}\right) \times +1\right) + \left(\left(\dfrac{3}{35} \times \dfrac{1}{3}\right) \times -1\right)$ =	+0.0285714

Player Disadvantage = −0.0140260

In Percent = −1.40260%

Casino management tracks the player's average bet without taking into consideration the impact on the average bet of not accounting for the possibility of throwing a 12. As a result, the throws per hour need to be reduced by 2.78%, or −1.36364% should be used as the house advantage since this percentage times 36 (−0.4909) equals the larger −1.40260% times 35 (−0.4909).

Odds (the only free bet in the casino)   Most casinos allow the player to place a multiple of his pass line bet in the odds bet position. As the amount of the player's wagers on the pass line increases, the amount that the player can bet in the odds or free bet position also increases. The following is the player's overall disadvantage with the indicated odds maximum multiple bet:

$$1\times -0.8485\%$$
$$2\times -0.6061\%$$
$$3\times -0.4714\%$$
$$5\times -0.3263\%$$
$$10\times -0.1845\%$$

How do you calculate the player's disadvantage if the casino were to offer 4 times odds? The player loses 0.5090909 per every 36 units bet on the pass line. As a result, the disadvantage would be calculated by dividing 0.5090909 by the sum of 36 plus the product of 24 multiplied by 4 (96). The 36 represents the number of total outcomes, the 24 represents the number of point outcomes, and the 4 represents the odds offered by the casino. The player's disadvantage at 4 times odds equals

$$\left(\frac{-0.5090909}{36 + 24(\times)} \text{ where } \times = \text{odds multiple} \right) = -0.3857\%$$

Big 6/Big 8

$$\left(\left(\frac{5}{11} \right) \times 1 \right) + \left(\left(\frac{6}{11} \right) \times -1 \right) = -9.09\%$$

Field   2, 3, 4, 9, 10, 11, 12 (2 and 12 pay double)

$$\left(\left(\frac{14}{36} \right) \times +1 \right) + \left(\left(\frac{2}{36} \right) \times +2 \right) + \left(\left(\frac{20}{36} \right) \times -1 \right) = -5.56\%$$

Printed information on casino games often places the player disadvantage on the field bet at –5.26%; however, this disadvantage is incorrect. The player disadvantage, expressed as a percentage, is the quotient of the amount of the player's net loss divided by the total wagered. If the player were to bet one unit for each of the 36 possibilities, he would have a net loss of two units per 36 wagered, or –5.56%.

However, the casino wagers 38 units to the player's 36 units since the casino pays double on the 2 and 12. Although the casino has a net win of 2 units (the same 2 lost by the player), this net win represents only 5.26% of the total 38 units the casino wagered.

Casino management is concerned with the percentage the house wins of the player's total wager. Therefore, the casino advantage is considered in the gaming industry to be the same as the player's *dis*advantage. Actually, as discussed earlier, the player's *disadvantage* is –5.56% and the casino's *advantage* is +5.26% on the same game.

Place Bets   4 and 10 pays 9 to 5

$$\left(\left(\frac{1}{3}\right) \times +9\right) + \left(\left(\frac{2}{3}\right) \times -5\right) = 0.33 \text{ of every \$5 wagered, or } -6.67\%$$

An alternate method of calculating the player's disadvantage on the 4 and 10 at 9 to 5 would be the following:

9 to 5 = 1.8 to 1

$$\left(\left(\frac{1}{3}\right) \times +1.8\right) + \left(\left(\frac{2}{3}\right) \times -1\right) = -6.67\%$$

5 and 9 pays 7 to 5 (i.e., 1.4 to 1)

$$\left(\left(\frac{4}{10}\right) \times +1.4\right) + \left(\left(\frac{6}{10}\right) \times -1\right) = -4.0\%$$

6 and 8 pays 7 to 6 (i.e., 1.167 to 1)

$$\left(\left(\frac{5}{11}\right) \times +1.167\right) + \left(\left(\frac{6}{11}\right) \times -1\right) = -1.515\%$$

Buy Bets   (player is charged 5% of the amount wagered)   4 and 10 pays 2 to 1 (true odds), but the player must bet 1.05 units. When the player wins, he wins 1.95 units.

$$\left(\left(\frac{1}{3}\right) \times +1.95\right) + \left(\left(\frac{2}{3}\right) \times -1.05\right) = 0.05 \text{ of every \$1.05 wagered,}$$
$$\text{or } -4.76\%$$

An alternate method of calculating the player's disadvantage on the buy bets would be the following:

1.95 to 1.05 = 1.8571 to 1

$$\left(\left(\frac{1}{3}\right) \times +1.8571\right) + \left(\left(\frac{2}{3}\right) \times -1\right) = -4.76\%$$

Many casinos now offer buy bets that charge a 5% commission on win-

ning wagers only. This condition dramatically affects the casino advantage, as illustrated in Table 11.4.

Table 11.4 provides a summary of the casino's advantages for the various dice wagers.

Table 11.4 Casino Advantages for Dice Wagers

Bets	*Advantage %*
Pass/Come	1.414
Single odds	0.8485
Double odds	0.6061
Ten times odds	0.1845
Don't Pass/Don't Come	1.402
Single odds	0.6914
Double odds	0.4688
Ten times odds	0.1243
Big 6/Big 8	9.09
Field 2, 3, 4, 9, 10, 11, 12	5.56 (2 and 12 pays double)
Place Bets	
4 and 10	6.66
5 and 9	4.0
6 and 8	1.515
Buy Bets	
4 and 10	4.76
5 and 9	4.76
6 and 8	4.76
Buy Bets ⟨commision paid on winning wages only⟩	
4 and 10	1.67%
5 and 9	2.00%
6 and 8	2.27%
Lay Bets	
4 and 10	2.439
5 and 9	3.225
6 and 8	4.00
Proposition Bets	
Hardways	
4 and 10	11.11
6 and 8	9.09
Craps	
Ace-Deuce (15 for 1)	16.67
Eleven (15 for 1)	16.67
Aces (30 for 1)	16.67
Twelve (30 for 1)	16.67
Any Crap	11.11
Any Seven	16.67
Easy Way Hop (15 to 1)	11.11
Hard Way Hop (30 to 1)	13.89

ROULETTE

In roulette, the player can bet an individual number or a combination of numbers. The mathematics are determined as follows:

$$\left(\frac{number\ of\ ways\ to\ win}{total\ possibilities} \times amount\ won \right) + \left(\frac{number\ of\ ways\ to\ lose}{total\ possibilities} \times -1 \right)$$

If the player were to bet a single number, a win is paid 35 to 1. If the player loses, he loses one unit.

$$\left(\frac{1}{38} \times 35 \right) + \left(\frac{37}{38} \times -1 \right) = -5.26\%$$

If a player were to bet a color, he wins 18 times out of 38 and loses if the opposite color or a green number is rolled.

$$\left(\frac{18}{38} \times 35 \right) + \left(\frac{20}{38} \times -1 \right) = -5.26\%$$

BLACKJACK

The mathematics of blackjack are influenced directly by the number of decks used in the game by the casino and the rules of the game established by casino management. The following analysis and Table 11.5 take into account the impact on the players advantage/disadvantage resulting from each of these factors.

Casino starting advantage by number of decks, assuming strip rules:

Number of Decks	Advantage (%)
1	−0.01
2	+0.32
3	+0.43
4	+0.49
5	+0.52
6	+0.54
7	+0.56
8	+0.57

BACCARAT

As compared with dice, the possible wagers available on baccarat are far more limited.

The following probabilities exist in baccarat, with tie hands excluded:

Bank hand wins	50.6825%
Player hand wins	49.3175%

Table 11.5 Casino Advantage Against a Basic Strategy Blackjack Player by Number of Decks[1]

Decks	1	2	3	4	5	6	7	8
Strip rules[2]	−0.01%	0.32%	0.43%	0.49%	0.52%	0.54%	0.56%	0.57%
Add applicable rule variations[3]								
No double on 11	0.78%	0.70%	0.67%	0.65%	0.64%	0.64%	0.63%	0.63%
No double on 10	0.52%	0.49%	0.48%	0.47%	0.46%	0.46%	0.46%	0.46%
No double on 9	0.12%	0.09%	0.08%	0.08%	0.08%	0.08%	0.07%	0.07%
No double on 8	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
No soft doubling	0.13%	0.11%	0.10%	0.09%	0.09%	0.09%	0.09%	0.09%
Double on 11 only	0.77%	1.02%	1.10%	1.14%	1.16%	1.18%	1.19%	1.20%
Double on 10, 11 only	0.25%	0.53%	0.62%	0.67%	0.70%	0.72%	0.73%	0.74%
Double on 9, 10, 11 only	0.13%	0.44%	0.54%	0.59%	0.62%	0.64%	0.66%	0.67%
Double on 8, 9, 10, 11 only	0.12%	0.43%	0.53%	0.58%	0.61%	0.63%	0.65%	0.66%
Dealer hits soft 17	0.19%	0.21%	0.22%	0.22%	0.22%	0.22%	0.22%	0.22%
BJ pays 1:1	2.32%	2.29%	2.28%	2.27%	2.27%	2.27%	2.26%	2.26%
BJ pays 6:5	1.45%	1.43%	1.43%	1.43%	1.43%	1.42%	1.42%	1.42%
No Hole Card[4]	0.11%	0.11%	0.11%	0.11%	0.11%	0.11%	0.11%	0.11%
BJ pays 6:5	1.395%	1.373%	1.367%	1.363%	1.361%	1.360%	1.359%	1.358%
Double on any number of cards	−0.24%	−0.23%	−0.23%	−0.23%	−0.23%	−0.22%	−0.22%	−0.22%
Resplit aces	−0.03%	−0.05%	−0.06%	−0.07%	−0.07%	−0.07%	−0.08%	−0.08%
Double after splitting	−0.12%	−0.13%	−0.14%	−0.14%	−0.14%	−0.14%	−0.14%	−0.14%
Double after splitting 11 only	−0.06%	−0.07%	−0.07%	−0.07%	−0.07%	−0.07%	−0.07%	−0.07%
Double after splitting 10, 11 only	−0.11%	−0.12%	−0.12%	−0.12%	−0.12%	−0.12%	−0.12%	−0.12%
Early surrender	−0.62%	−0.63%	−0.63%	−0.64%	−0.63%	−0.63%	−0.64%	−0.63%
Early surrender (dealer hits s/17)	−0.51%	−0.50%	−0.50%	−0.50%	−0.50%	−0.50%	−0.50%	−0.50%
Late surrender	−0.02%	−0.05%	−0.06%	−0.07%	−0.07%	−0.07%	−0.07%	−0.07%
Late surrender (dealer hits s/17)	−0.15%	−0.14%	−0.13%	−0.13%	−0.13%	−0.13%	−0.12%	−0.12%
6 card auto winner	−0.04%	−0.11%	−0.13%	−0.15%	−0.15%	−0.16%	−0.16%	−0.16%
BJ pays 2 to 1	−2.32%	−2.29%	−2.28%	−2.28%	−2.27%	−2.27%	−2.27%	−2.27%
Dealer BJ ties w/player built 21	−0.17%	−0.17%	−0.17%	−0.17%	−0.17%	−0.17%	−0.17%	−0.17%

1 This table was calculated using Stanford Wong's BJedge software available from Pi Yee Press, La Jolla, California.
2 Strip rules assume: House stands on soft 17, player may double on any two cards, no doubling after splitting, any pair can be split up to four times (except aces), split aces receive only one card, no surrender.
3 Add any variation from strip rules to find casino advantage. Example: Add 0.22% to 0.54% to obtain a casino advantage of 0.76% if house hitting soft 17 is the only variation from strip rules in a six-deck game.
4 Player loses all doubles and splits to dealer blackjack.

Baccarat Mathematics

Betting the Bank (winning bets are charged a 5% commission):

$$(0.506825 \times +0.95) + (0.493175 \times -1) = -1.1692\%$$

Betting the Player

$$(0.493175 \times +1) + (0.506825 \times -1) = -1.365\%$$

The following probabilities exist in baccarat with tie hands included:

Bank hand wins   45.85974%
Player hand wins   44.62466%
Ties occur   9.5156%

Betting the Bank (winning bets are charged a 5% commission):

$$(0.4585974 \times +0.95) + (0.4462466 \times -1) = -1.057907\%$$

Betting the Player

$$(0.4462466 \times +1) + (0.4585974 \times -1) = -1.23508\%$$

As with the don't pass/don't come bet in dice, printed information available often indicates the bettor's disadvantage for the player and bank bets in baccarat at −1.37% and −1.17%, respectively (Scarne, 1974, p. 473, presents a bank bettor disadvantage of 1.34% and player bettor disadvantage of 1.19%). These percentages apply only to the non-tie hands. For the purpose of casino marketing, casino management tracks the player's average bet, and not the non-tie average bet. Consequently, the player disadvantage percentages that take into consideration tie wagers should be used.

KENO

In keno, 20 Ping-Pong balls from a total of 80 (numbered 1 through 80) are selected at random. The player prepares a "ticket," whereby he chooses between 1 and 15 numbers of the 80 possible choices that he believes will be part of the 20 balls or numbers selected. Each number chosen by the player that corresponds to one of the group of 20 selected is called a *catch*. The amount of the payoff increases as the total numbers correctly chosen by the player increase.

For the purpose of analysis, a ticket with four numbers chosen (also known as a four-spot ticket) with the following payout schedule will be used:

Mark 4 Numbers

Catch	Bet $1
2 pays	1.00
3 pays	4.00
4 pays	112.00

First, the total number of ways four numbers can be chosen from a total of 80 numbers must be determined.

$$\frac{80 \times 79 \times 78 \times 77}{4 \times 3 \times 2 \times 1} = 1{,}581{,}580$$

The number of ways four numbers can be chosen from the 20 numbers selected must then be calculated.

$$\frac{20 \times 19 \times 18 \times 17}{4 \times 3 \times 2 \times 1} = 4{,}845$$

This indicates that of the 1,581,580 total tickets played (total number of four-spot ticket possibilities available with 80 numbers), 4,845 tickets will have correctly chosen four out of four.

The player also wins on three out of four and two out of four. As a result, the probabilities associated with these outcomes must also be determined. The following formula yields the odds of the player catching three of the 20 selected numbers and one of the 60 numbers not selected.

$$\frac{20 \times 19 \times 18 \times 60}{3 \times 2 \times 1 \times 1} = 68{,}400$$

The odds of the player catching two of the 20 selected numbers and two of the 60 numbers not selected are as follows:

$$\frac{20 \times 19 \times 60 \times 59}{2 \times 1 \times 2 \times 1} = 336{,}300$$

To determine the house advantage, the net win is divided by the total wagered. The net win is the amount wagered by the players less the amount paid out to winning tickets.

Amount wagered $1 × 1,581,580 = $1,581,580
Less amount paid to winning tickets:
    4 of 4 (4,845 × $112)   = −542,640
    3 of 4 (68,400 × $4)   = −273,600
    2 of 4 (336,300 × $1)   = −336,300
Casino net win   = $429,040
In percent   = 27.13%

CHAPTER TWELVE

ELEMENTS OF AN EFFECTIVE PLAYER RATING SYSTEM

Casino customers may choose from a variety of table games when deciding what to play. Once the customer has selected a particular type of game, there are additional decisions that normally must be made. Each type of game allows for different bets from which the customer will select in placing a wager. For instance, a customer playing dice (craps) can select from almost two dozen bets, with each bet having a different house (casino) advantage.

One of the most perplexing challenges facing casino management today is quantifying a particular player's overall disadvantage. Consequently, the profitability of an individual customer is a function of the game played, bets placed, player's skill level, total amount wagered, and the speed of the game.

In Nevada, over 100 different types of table games or versions of existing tables games are licensed. New games are being invented almost weekly, but few of these new games are ever successful enough to become standards in the casino industry. In recent years, the new game that has made the most significant impact has been Caribbean stud, which has become a standard in many casinos around the world.

For casinos in the United States, the following games are most common:

- Blackjack
- Craps
- Roulette
- Baccarat
- Pai Gow
- Pai Gow Poker
- Mini Baccarat
- Caribbean Stud

IMPORTANCE OF PLAYER RATING SYSTEMS

One of the most effective tools available for marketing casinos is the complimentary. If management is to effectively use complimentaries to maximize casino profits, a system must be developed that awards complimentaries at levels that encourage continued customer patronage while still ensuring an acceptable level of casino profit.

Casino profit is derived from revenues and expenses. If a casino is to maximize its return on complimentaries issued, management must be able to calculate the player's theoretical value to the casino. The expenses are easily identified, but quantifying the revenues is extremely difficult. The difficulty in quantifying revenues is partly due to the fact that the casino often calculates two separate revenue—or win—figures: theoretical win and actual win. The actual win is much easier to quantify; however, the theoretical win is a better representation of the ultimate value of the player.

In today's gaming industry, player rating systems are the only viable way that customer databases containing hundreds of thousands of customer names and histories can be organized and tracked. Player rating systems are used to award complimentaries and to identify customers for casino marketing purposes such as direct mailing of promotional materials and invitations to special events. Casinos with the most effective player rating systems have an advantage over their industry competitors.

ACTUAL VERSUS THEORETICAL WIN

The casino industry is unique in that two win figures are used to represent how much the casino won: the amount the casino theoretically won and the amount it actually won, or lost. A roulette player who places a $100 wager on the color black actually loses the $100 wager when the outcome of the game is red, but the game earns a theoretical win of only $5.26. The balance of the player's losing wager ($94.74) is essentially held in escrow by the casino and will eventually be returned to the public during subsequent periods of play. If the roulette player had won the wager described previously, the casino still earns a theoretical win of $5.26. In this instance, the public is holding $105.26 in escrow in the same manner, which will be returned to the casino during subsequent periods of play.

The use of two win figures, actual and theoretical, makes awarding complimentaries extremely difficult. Which of the two win figures more accurately reflects a potential player's profitability? Theoretical win provides the best indication of the amount ultimately realized by the casino, a gauge by which to evaluate casino promotions, and the ability to award complimentaries to individual customers. Actual casino win is important as it may indicate future player revenues.

The formula for theoretical win is:

Average bet × hours played × decisions per hour × house advantage

The estimated average bet and hours played are documented on a player rating card by casino supervisory personnel observing the play and are entered into the player rating system for each individual player. The remaining factors, decisions per hour and house advantage, are part of a formula within the computer software.

The process can be adjusted for individual entries, but typically is applied consistently to all entries. If the house advantage in roulette is 5.26%, this percentage will be used in all ratings for roulette players. The casino executive should be able to enter the proper house advantage where variations of the game exist, such as if both single and double zero roulette are offered.

For example, assume the player rating system contains values of 60 decisions per hour and a house advantage of 5.26% for roulette. If the casino supervisor estimates the average bet to be $150 and the play lasted 2 hours and 15 minutes, then the system will calculate a theoretical win of $1,065.15.

$$\$150 \times 2.25 \text{ hours} \times 60 \times 5.26\% = \$1,065.15$$

ESTIMATION OF AVERAGE BET AND TIME PLAYED

In order to obtain an accurate theoretical win, the casino supervisor rating the play must provide an accurate estimate of the player's average bet and time played. If either of these estimates is in error, the resulting system computations become inaccurate. The judgment of the casino supervisor may also be required in determining the player's decisions per hour, depending on the rating system used by the casino. This in turn may affect the accuracy of the theoretical win calculation. Unfortunately, few casinos have written guidelines or provide training to help ensure the accuracy and consistency of player ratings prepared by casino personnel.

THE PLAYER RATING SYSTEM

Popular player rating software systems in use today require the following inputs:

- Game played
- Player's average bet
- Player's skill level
- Speed of the game

| ACCOUNT NUMBER | | NAME | | GAME | TABLE | SEAT | DATE | PIT CLERK |

Figure 12.1 rating card layout:

ACCOUNT NUMBER | NAME | GAME | TABLE | SEAT | DATE | PIT CLERK

AVAIL CREDIT | SHIFT | GAME SPEED
| GRAVE DAYS SWING | SLOW MEDIUM FAST

CREDIT   CHIPS   CASH | PLAYER TYPE/ AVERAGE BET
| HARD   AVERAGE   SOFT
| FIRST BET | WIN | LOSS
| TIME-IN   A   P | TIME-OUT   A   P | WALK
| CASH | CHIPS | CREDIT
| SUPV 1 | SUPV 2 | CLERK

Figure 12.1   A Typical Rating Card

These inputs are typical of any effective player rating system and will be used in further discussion of that system. Throughout this chapter, it is important to remember that incorrect input results in incorrect output (i.e., garbage in–garbage out). Consequently, the casino must emphasize the importance of correct data input, develop a system that captures data as accurately as possible, and periodically audit the accuracy of the data input and resulting output.

In rating the player, the casino supervisor indicates the game played, player type (Hard, Average, or Soft), game speed (Slow, Medium, or Fast), estimated average bet, and the total time played. The player type provides a multiplier for the house advantage, and the game speed should indicate the hands per hour in card games, spins per hour in roulette, or decisions per hour in dice to use in the theoretical win calculation. Figure 12.1 shows a typical rating card.

An Example of the Rating System Factors

Assume the following factors are used by the rating system to calculate theoretical win:

Game	House Adv.	Player Type Multipliers			Game Speed		
		Soft	Avg.	Hard	Slow	Med.	Fast
Blackjack	2.5%	1.00	0.60	0.20	60	80	120

If casino supervisory personnel estimated an average-type blackjack player's average bet at \$150 at a medium speed game lasting a total of 4 hours, the player rating system would use the following factors to calculate the theoretical win:

$$\$150 \times 2.5\% \times 0.60 \times 80 \times 4 = \$720$$

In the preceding calculation, the blackjack advantage of 2.5% is multiplied by a player type factor of 0.60, which results in the casino estimated house advantage being reduced from 2.5% to 1.5%. At a medium game speed, the player is dealt 80 hands per hour for a total of 4 hours of play.

Estimating the Casino Advantage

The following sections discuss factors to be considered for different table games when establishing player rating system criteria and recommended house advantages for each game.

Blackjack   A casino in Las Vegas offered blackjack subject to the following rules:

- 6 decks
- House stands on soft 17
- Doubling down after splitting is permitted
- Player may split any two cards
- Aces can be resplit up to a total of four splits
- Surrender is allowed

Under these game conditions, the casino's starting advantage, using "basic strategy," is calculated as follows:

Casino's advantage with Las Vegas Strip rules:	+0.54%
plus:	
Late Surrender	−0.07%
Double After Splitting	−0.14%
Resplit Aces	−0.07%
Casino's starting advantage	+0.26%

Blackjack is the only casino game that can be beaten by the player. A player skilled in card counting can actually play with an advantage. This is accomplished through a system that lets the player know when there is a surplus, or shortage, of large cards in the deck. When a surplus exists, the player has an advantage and will bet more. When a shortage exists, the player has a disadvantage and will bet less.

Players who are not card counters can minimize their disadvantage by playing according to what is known as "basic strategy." Basic strategy

is defined as the correct way to play when the player has no knowledge of the remaining cards. With the example rules, a basic strategy player's disadvantage per hand of 0.26% will result in the player losing $2.60 per thousand dollars wagered.

The typical player does not play perfect basic strategy. Research on the play of the general public was published by Peter Griffin of California State University at Sacramento. In his book, Griffin states that the typical player in the study played with a disadvantage of about 1.5% worse than basic strategy. Unfortunately, the majority of his study was composed of $2 and $5 bettors, a level of blackjack play deserving little, if any, complimentaries. Griffin does make the following statement (Griffin, 1991, pp. 135–156) concerning larger bet sizes:

> To confirm the intuition that big bettors were generally better educated players than the table minimum fleas, a separate sample was kept (for the rest of the project) of the performance of players who wagered at least $100. It must be emphasized that no special effort was made to locate $100 bettors, but rather, their random appearances were noted for inclusion in a subsample from the overall study. The following statistics, already a part of the entire sample in section V, describe their performance.

n	f	ΣE	ΣE^2	$\overline{E}$	s
292	23	137	1271	0.47(±0.23)	2.0

> Clearly this group is better than the rest of the public of which it makes up only a small part per capita (somewhat less than 3%) but probably a significant part per dollar (conceivably 50%). It is also likely that $50 and $75 bettors are above average, although perhaps not by as much as this group.

The group of larger bettors played 0.47% worse than basic strategy. With the example rules, this would indicate that the typical player receiving complimentaries has a disadvantage of 0.73% (0.26 + 0.47).

Only through statistical analysis can an individual player's skill level be determined. A casino floorperson (supervisor) may be able to determine if a player deviated from basic strategy, but the floorperson would not know the impact that the player's error had on the house advantage. For example, it would be against basic strategy for a player to stand on sixteen versus a ten, but the cost of the error is minimal (0.6%). Alternatively, a player's decision to stand on fifteen versus a seven would cost about 10% of his wager versus hitting the hand.

Blackjack Recommendations Casino marketing focuses primarily on players betting at least $50 per hand. Therefore, the recommended house advantage, given the rules stated earlier, should be 0.73% and casino su-

pervisory personnel should not be asked to determine the player's skill level for the reasons previously discussed. However, the speed of the game is also very important. A customer playing alone at a table will receive about four times as many hands per hour as the same customer playing at a full table. Consequently, the customer playing alone is worth four times as much to the casino as the same customer at a full table with the same average bet! This assumes, of course, that time played is held constant.

The recommended house advantage is a function of the player's initial bet and does not include any extra amounts wagered for double downs and splits. Approximately 10% of the hands dealt are either doubling or splitting hands. The floorperson should be instructed to use only the initial bet when estimating the average bet. Often, a floorperson will observe a $100 initial bet plus an additional $100 for the double down. If not trained otherwise, the floorperson will take into account the additional wagers, which will seriously impact the average bet estimate.

Game	House Adv.	Player Type Multipliers		
		Soft	Avg.	Hard
Blackjack	0.73%	1.0	1.0	1.0

Craps   Craps is the most difficult game in which to determine a player's average bet and percent disadvantage. Individual bet disadvantages for craps range from less than 1% to over 16%. Unlike that of the other table games, the advantage is earned per decision instead of being earned per toss of the dice. For example, a player placing the point six is betting that a six will be tossed before a seven. The only numbers that will impact the bet are sixes and sevens. If any other number is tossed, no decision occurs and the bet remains. It will take 4.65 tosses on average before the casino earns its advantage of 1.515%. The field bet, any crap, ace-deuce, and eleven are exceptions to this and result in a decision occurring with each toss.

Table 12.1 presents the player's disadvantages per dice bet at a typical casino based on the rules offered. The number of rolls required before the advantage is earned is included.

All printed material addressing the don't pass and don't come lists the player's disadvantage at 1.402%; however, this assumes the twelve is never tossed since it is barred (i.e., the player pushes). If the times the twelve appears is considered a toss, the player disadvantage is actually 1.36%. For the purpose of player rating, all player disadvantages are the net amount lost divided by the total amount wagered. If 1.402% is to be used, the player average bet should be decreased by 1/36 to compensate for the twelve. The decrease does not represent a material number in dice, but this concept becomes significant when baccarat is discussed later in this chapter.

Table 12.1   Player's Disadvantage per Dice Bet

Bet	Payoff Odds	Disadvantage (%)	Throws per Decision
Pass & Come	1 to 1	1.414	3.376
with single odds		0.848	
with double odds		0.606	
with triple odds		0.471	
Don't Pass & Don't Come	1 to 1	1.402[1]	3.472
with single odds		0.680	
with double odds		0.453	
with triple odds		0.340	
Big 6 & 8	1 to 1	9.09	3.27
Field	2 pays double & 12 pays triple	2.78	1.0
4 & 10 Place Bets	9 to 5	6.66	5.68
5 & 9 Place Bets	7 to 5	4.00	5.115
6 & 8 Place Bets	7 to 6	1.515	4.65
4 & 10 Buy Bets	2 to 1	4.76	5.68
5 & 9 Buy Bets	3 to 2	4.76	5.115
6 & 8 Buy Bets	6 to 5	4.76	4.65
4 & 10 Lay Bets	1 to 2	2.439	4.0
5 & 9 Lay Bets	2 to 3	3.225	3.6
6 & 8 Lay Bets	5 to 6	4.00	3.27
4 & 10 Hardways	Pays 7 to 1	11.11	4.0
6 & 8 Hardways	Pays 9 to 1	9.09	3.27
Any Crap	2, 3, or 12 pays 7 to 1	11.11	1.0
Aces & Crap 12	Pays 30 to 1	13.89	1.0
Ace-Deuce & Eleven	Pays 15 to 1	11.11	1.0
Any Seven	Pays 4 to 1	16.67	1.0
Hop Bet	Hardways pay	11.11	1.0
	30 to 1	11.11	
	All others pay 15 to 1		

[1]The way the casino tracks the player's average bet, 1.36% should be used.

If the casino offers double odds, the player disadvantage on the total wagered (pass line plus odds) is reduced to 0.606%. Some casinos do not include the odds bet in the average bet and use the 1.414% player disadvantage on the flat bet only. This method is not recommended because money lost on the odds bet is included when the player's actual loss is

considered. In addition, players given action (rating) criteria by the casino have a difficult time understanding why money bet in the odds position is not considered a wager.

Taking the previous discussion under consideration, a hard craps player has a disadvantage per decision of 0.606%. Note that the disadvantage is per decision and is not per toss. Pass/come and don't pass/don't come bettors will have one decision in every 3.47 tosses.

The average craps player is more difficult to handicap because the bets that he will place must be determined along with the amount that he will bet on the proposition wagers. Assuming the craps player places bets on the five and nine and six and eight, the average disadvantage on the place bets will be 2.76% (the simple average of 4% and 1.515%). Next, an estimate of how much of the total wagered will be in place bets and line/odds bets must be determined. Assuming that half the total wagered will be line/odds and the other half will be place bets, the player disadvantage would be 1.68%.

The average player also makes some proposition bets. As with the place bets, estimates must be made of when he bets, how much he bets, and on what propositions he bets. Since categorizing the player will not be exact, it is recommended that the proposition bets be included in the average bet, but that the player's disadvantage not be increased. As a result, errors in determining the estimates would have a decreased impact on the casino.

The final category of craps player, the soft player, places bets on the numbers and bets the propositions. It is more conservative to assume that the player buys the four and ten and places the rest. On the place and buy bets, the player's average disadvantage is 3.4%. Assuming the player has a line bet equal to one of his place or buy bets, the 1.414% line bet will equal 14% of his total wager. The average disadvantage is reduced to 3.12% with this factored in.

If the player doesn't place or buy all the numbers or if he takes odds on his line bet, the 3.14% is reduced and the proposition or field bets should not be factored in. The proposition bets should benefit the house advantage. This player category should include only those who do not take odds, and players taking odds should be classified as average.

Table 12.2 presents recommendations by player types. For the rating system to use the correct house advantage, a house advantage of 1% is recommended to be entered into the computer with the following player type multipliers:

Game	House Adv.	**Player Type Multipliers**		
		Soft	Avg.	Hard
Craps	1.0%	0.63	0.37	0.178

Table 12.2 Craps Recommendations

Soft Edge = 3.14%	*Average Edge = 1.68%*	*Hard Edge = 0.606%*
Places all the numbers across. Bets proposition. Bets hardways. Line without odds. Consistent come bets without odds.	Line bet with odds. Consistent come bets with odds and makes at least 3 place bets. Makes some proposition bets. Bets an occasional hard way.	Line bets with full odds. One to two come bets with odds. Same for the don't player.
0.63% per throw	**0.37% per throw**	**0.178% per throw**

Roulette   With a zero and double zero roulette wheel, the player disadvantage on every bet, except one, is 5.26%. The bet with a larger disadvantage (7.89%) is the six to one payoff (zero, double zero, one, two, and three). The house advantage is 5.26% regardless of whether the bet is placed inside or outside. A single zero roulette wheel yields a 2.7% house advantage.

*Roulette Recommendation*s   A player disadvantage of 5.26% on double zero wheels and 2.7% on single zero wheels is recommended. An average player is one who plays at double zero games and the hard player plays single zero.

| | House | Player Type Multipliers | | |
Game	Adv.	Soft	Avg.	Hard
Roulette	5.26%	n./a.	1.0	0.51

Baccarat and Mini Baccarat   There are only three possible bets in baccarat: the player bet, the bank bet, and the tie bet. Most information available on baccarat identifies the house advantage as 1.36% for player wagers and 1.17% for the bank. These advantage numbers are accurate only if the number of hands dealt per hour is reduced by the number of hands that result in a tie, because these numbers assume no tie hands occur. Tie hands will occur approximately 9.5% of the time.

If ties are included, the house advantages are 1.24% for player wagers, 1.06% for bank, and 14.5% for tie. If the 1.37% and 1.17% numbers were to be used, the estimate of hands dealt per hour would have to be reduced to adjust for the tie hands. For example, a game dealing 80 hands per hour would have to use 72 hands per hour. Using the accurate theoretical house advantage numbers is much less complicated.

The customer betting the player side will lose about 18% more than the bank bettor. Assuming that, for every other hand, the tie bettor will

bet 5% of his flat wager ($5 if the flat wager is $100) on the tie and always bets the player side, the soft bettor will lose at a rate of 1.6%.

Baccarat Recommendations   A hard player type bets the bank side the majority of the time and rarely bets the tie (plays with a disadvantage of 1.06%). An average player type bets the player side the majority of the time and rarely bets the tie (plays with a disadvantage of 1.24%). A soft player type bets *either* the player or bank side and *frequently* bets the tie (plays with a disadvantage of 1.6%).

Game	House Adv.	Player Type Multipliers		
		Soft	Avg.	Hard
Baccarat	1.24%	1.29	1.0	0.85

As a general rule, select the most conservative skill level for any game when any doubt exists. The most conservative skill level will provide the lowest house advantage for player rating purposes.

Pai Gow   When a customer plays one-on-one versus the casino, the player's disadvantage will average 2.39% when the house banks and 0.62% when the player banks. Both scenarios assume the player uses the equivalent of "basic strategy" (Gwynn, 1984; Zender, 1989).

Most pai gow games allow the player to bet—when the player banks—no more than a 10% increase over the player's last bet versus the house bank. If the player bets $100 against a house bank, the player can bet no more than $110 if the player banks the following hand.

Under the same conditions described here, except at a full table consisting of seven players and a dealer (eight total), the house will win at a rate of 2.17% per decision. The reason for the difference between the player and the house advantages on a full table is that the player must wait seven hands at a 2.39% disadvantage for only one hand at a 0.62% disadvantage.

With only one player at the game, the player could bank every other hand. If this were the case, the player's average disadvantage would be 1.5%. With three other players and the dealer (five total), the best case for the player would be 2.04%.

Pai Gow Recommendations   A soft player rarely banks, so the recommended house advantage is 2.39%. An average player playing with between two and five other players plus the dealer will bank at every opportunity and a house advantage of 2.04% should be used. A hard player plays one-on-one and banks every other hand, so 1.5% should be used as the house advantage.

	House	Player Type Multipliers		
Game	Adv.	Soft	Avg.	Hard
Pai Gow	2.04%	1.17	1.00	0.74

Pai Gow Poker   Much as in traditional pai gow, in pai gow poker the player is allowed to bank against the other players at the table. With the exception of *Optimal Strategy for Pai Gow Poker* by Stanford Wong, little has been written about correct play or mathematics of the game. Wong estimates that a nonbanking player will lose at a rate of approximately 2.84%. A skillful player will lose at a rate of approximately 2.54% (Wong, 1992).

When the player is the banker, he has an advantage of between 0.2% and 0.4%. If the player and dealer are playing one-on-one, the player can bank every other hand, which will result in the player losing at a rate of 2.54% one hand and winning at 0.2% the next. Typical casino pai gow rules allow the player only when acting as the bank to bet as much as his last nonbanker bet. For example, a player betting $100 as a nonbanker will lose $2.54 and then on the next hand win about $0.30 (assumes 0.3% of wager) for a net loss of $2.24 or 1.12%. If there were four players at the table plus the dealer (five total) and the player were to bank every fifth hand, his disadvantage would be 2.032%.

A player not familiar with the benefits of banking the hand would certainly be considered a soft player. It is reasonable to assume that the soft player's disadvantage would be the 2.84% indicated by Wong.

Pai Gow Poker Recommendations   A soft player rarely banks, so the recommended house advantage is 2.84%. An average player playing with between two and five other players plus the dealer will bank at every opportunity, and a house advantage of 2.032% should be used. A hard player plays one-on-one and banks every other hand, so 1.12% should be used for the house advantage.

	House	Player Type Multipliers		
Game	Adv.	Soft	Avg.	Hard
Pai Gow Poker	2.032%	1.4	1.00	0.55

Caribbean Stud   A paper presented by John M. Gwynn Jr. and Peter Griffin at the 9th International Conference on Gambling and Risktaking found that the skilled player loses at a rate of 5.4%. In Caribbean stud, the player is allowed to challenge the dealer's hand if the player believes that he has a chance of winning. This challenge is known as a "call bet."

A soft player is one who never makes a call bet if his hand is worse than a pair of fours, and this player will lose at a rate of 7.14%. An aver-

age player is one who never makes a call bet if his hand is worse than a pair of twos, and this player will lose at a rate of 5.47%. Basic strategy yields the player the lowest disadvantage, which is 5.224%; however, experts who have analyzed the game feel it would be extremely difficult for any player to memorize perfect strategy. Consequently, it is recommended that the player be classified only as a soft or average type player.

Caribbean stud offers a separate bet that allows the player a chance to win a progressive jackpot. Winning bets are paid according to a schedule much like a video poker payoff schedule:

- Royal flush wins 100% of progressive meter amount
- Straight flush wins 10% of progressive meter amount
- Four of a kind pays $300
- Full house pays $100
- Flush pays $50

The casino also earns a percentage from the amount wagered on this progressive jackpot bet. Growing competition is forcing casinos to contribute more and more of this bet to the progressive jackpot and, as a result, earn a decreased percentage of the amount wagered. Some casinos have gone so far as to have a zero advantage on the progressive bet. This approach would seem to make sense from a marketing standpoint because of the game's advantage of at least 5%. For this reason, it is recommended that any progressive wagers be excluded from the average bet estimate.

Caribbean Stud Recommendations As discussed earlier, only two player types should be determined for Caribbean stud. The house advantage recommended for soft players is 7.14%, and 5.4% should be used for average players.

Game	House Adv.	Player Type Multipliers		
		Soft	Avg.	Hard
Caribbean Stud	5.47%	1.30	1.00	1.00

Game Speed

The last element to be considered in determining the player rating is the floorperson's estimate of the game speed. The rating system should allow for entry of a game speed of slow, medium, or fast. The determination of game speed is important since a player who plays one-on-one with the casino in blackjack is worth four times as much in revenue as the same bettor at a full table.

To some degree, the occupancy-game speed relationship affects the player valuation process on all table games. There are no industry stan-

dards concerning game speed, so management should conduct in-house research to ascertain proper slow, medium, and fast criteria to be used by floorpersons in making this determination.

It is also important to study comping situations when determining game speed factors. Management might elect to define four or five players per table as a slow game, three players as a medium-speed game, and one or two players as a fast game.

When research is conducted on dice, with regard to game speed, it is important that the tosses per hour be determined by the number of players on the busiest end of the game. Since a game can move only as fast as its slowest end, a game with six players on only one end of the table moves the same as if there were six players on each end. If the total players in the game is used to determine game speed, it will appear that six players at one end will generate the same pace as three players on each end. The floorperson should base the game speed estimate on the number of players on the busiest end.

For a casino to maintain an accurate and effective player rating system, the following should be implemented:

- In-house research should be conducted to determine appropriate game speed factors.
- Recommended game house advantages should be compared against current factors and necessary adjustments should be made.
- Rating cards should be modified so that slow, medium, and fast are replaced with the number of players as an indication of the game speed (i.e., 1–2, 3–4, 5–6). The floorperson should circle the average number of players at the game while preparing the rating.
- Written guidelines should be established for determining average bet, player type, and game speed.
- The guidelines should be communicated to casino floorpersons through formal training.
- Periodic refresher courses should be scheduled on proper rating procedures.
- An ongoing system should be established to periodically audit the accuracy of player ratings.
- Feedback should be provided to casino personnel on the accuracy of their ratings. Historically only negative feedback has been provided. Consideration should be given to providing a financial incentive and recognition for those floorpersons achieving a high level of rating accuracy.

Few floorpersons ever see the end result of their ratings, which result in the issuance of complimentaries, reimbursement of airfares, and granting or extending credit. To the floorpersons, the rating is simply a piece of

paper that they are required to complete and give to the rating clerk for input into the rating system. If the importance of these ratings was communicated to floorpersons, the quality of the ratings might improve significantly.

Many casinos emphasize quantity of ratings over quality. Large numbers of inaccurate ratings can never replace a lower volume of more accurate ratings. Management should first emphasize the quality of the ratings and should only address the issue of quantity once the accuracy of the player ratings has been proven.

ESTABLISHING GUIDELINES

Complimentary policies should be created with the two primary objectives in mind: (1) to ensure that the casino realizes an acceptable profit margin and (2) to maximize customer satisfaction. Policies that award complimentaries based exclusively on theoretical win ensure the casino an acceptable profit margin, but may fail to maximize customer satisfaction. As a result, customers who could later prove to be profitable may be lost to the casino.

The individual player views her actual loss to be of great importance; however, the player's actual loss may not represent the actual win of the casino. As discussed, revenues in the casino are continually in escrow, with either the public owing the casino or the casino owing the public. The player's actual loss must still be addressed by the casino, but the extent to which the actual loss should be considered has long been debated in the casino industry.

If a casino is to award complimentaries profitably and still encourage customer patronage, casino personnel must be provided with guidelines that have been developed with the participation and approval of management. These guidelines must encompass both the profit objectives of the casino and customer expectations.

PLAYER RATING SYSTEMS

Slot Systems

Player rating systems for slots are capable of tracking individual play, storing demographic player data, summarizing gaming activity at the player level, and much more. Casinos often employ two separate systems to manage the data collection and management processes. The first system gathers the data from the machines on the floor and interfaces with the second system comprising an accounting module and a separate marketing module. The accounting module stores and allows for the analysis of performance data at the individual machine and aggregate levels. The

marketing module allows management to view and sort data related to individual player performance, demographics, visitation, and gaming history. All or part of the marketing module is often a proprietary system designed to address the unique and sometimes complex needs of a particular property. Such software is often necessary for operators that offer one-card technology, which is discussed in a subsequent section. As all of these systems gather substantial amounts of detailed information and are capable of nearly limitless functions, an entire book could be devoted to this subject. This section merely attempts to familiarize readers with the basic functions and limitations of current player tracking system technology.

How do casinos obtain all this information? Players must enroll in the casino's slot club or player tracking program. Most casinos have enrollment centers located somewhere on the casino floor. For those properties operating hotels, guests can be preenrolled and presented with a usable card upon registration. Regardless of the manner in which the player tracking cards are distributed, the challenge of convincing players to use the cards remains substantial. On the marketing side, the slot system is dependent on carded play. If players don't insert their tracking cards, the data necessary to evaluate and reward individual play are not in the system.

So how does management encourage players to use their tracking cards? The most common incentive is based on a reward system, in which the magnitude of the reward is a function of the player's gaming volume. There are many differences related to reward computations. However, there are some basic similarities as well. Most casinos employ a point system whereby points are accumulated as a function of the amount of money wagered (i.e., coin-in). Alternatively, one major hotel casino company computes rewards as a function of coin-out. Others have chosen to compute incentives as a function of theoretical win. Specifically, these properties refund a percentage of the casino's expected value or theoretical win. Despite these and other differences, rewards are usually based on a function of some gaming volume.

The points awarded to the players are converted into various forms of rewards. Some casinos have converted points into shopping dollars, which are used to purchase merchandise offered by the casino. The merchandise catalog for this program is extensive, offering many name-brand items. Other casinos have converted points to dollars for use in the in-house dining, retail, and entertainment outlets. In essence, players earn comp dollars redeemable in their choice of outlets. Some properties do not employ point systems per se, but compute a cash-back refund. The refund is also a predetermined function of either a gaming activity or a gaming value measure. Many casinos now offer the simultaneous accumulation of points to be redeemed in retail outlets (including restaurants) and some form of a cash-back reward.

There are other differences in the reward systems. For instance, incentives based on theoretical win guard against certain program inequities stemming from the difference in game advantage across machines. For example, casinos that use coin-in as a reward basis encourage players to patronize low-house-advantage games. On average, these games will allow a greater portion of a fixed bankroll to survive, per iteration, resulting in increased coin-in levels. A $20 buy-in is expected to generate $500 in coin-in on a 4.0% game ($20/.04) and $400 on a 5.0% game ($20/.05). However, programs based on coin-in are less abstract to the player. These programs are easily communicated, making it easy for players to understand the process and perceive the benefit. For the user, simple is usually better. Alternatively, reward systems based on theoretical win may appear more abstract, as a crucial component of the formula is unknown to the player (i.e., par). Despite its increased accuracy, this veiled calculation may raise trust issues with the club members and reduce the perceived benefits.

Point accumulation schemes can also vary by denomination. For example, $1.00-and-up players can accumulate benefits at a greater rate, as $1.00+ slot play is coveted by most casinos. Benefit rates also vary by type (i.e., video poker vs. reels), with reel slot players accruing benefits at a greater rate. This increased accrual rate is based on the assumption that the house advantage is greater on reel games than on video poker games. These differences are most common in casinos that communicate benefit rates to customers as a function of coin-in.

Card Use Issues

Encouraging players to use the tracking cards is often challenging. But for systems predicated on card use, nothing is more crucial to the management of the customer relationship process. Although benefit rates continue to reach new highs and executives diligently stress card benefits through many mediums, most properties still suffer from low card use. For example, it would not be unusual for a Las Vegas Strip casino to experience a usage rate as low as 30% to 35% of total play. Low usage rates decrease the number of opportunities for customer relationship management (CRM). One casino expressed the value of CRM opportunities by stating that a 1% increase in its share of wallet (for existing customers) equated to a $20M increase in annual EBITDA (Earnings before Interest, Taxes, Depreciation, and Amortization).

So how can slot play be more effectively tracked? Technology may provide some of the answers. For example, at least one slot system offers a random bonus capability. In the Las Vegas Strip market, much of the untracked play originates with infrequent visitors with low-level perception of benefits. These players may not wish to be inconvenienced with the

onus of remembering to use their cards, or they simply do not believe that the length of their stay is sufficient to produce a valued benefit. The random bonus feature addresses these challenges by not requiring extended or frequent play. The only requirement is that a card must be inserted in the machine. The system allows management to control the amount, frequency, and timing of the rewards. Once these variables are determined, winners are randomly selected from the population of players with cards inserted. If a player has engaged a machine without his card inserted, that machine is not eligible for bonus selection. The random bonus awards also offer opportunities to publicly celebrate winners, provide visible evidence of winning, and create feelings of excitement and anticipation on the casino floor. Most important, random bonuses may increase card use by offering instant reward eligibility to player segments that otherwise suffer from a lack of incentive.

There are other technology-based methods for increasing the amount of tracked play. One such method incorporates biometric facial recognition technology. This system employs a tiny camera mounted within each machine. Once the player's image has been captured and stored in the system, a card is no longer necessary to identify the player. However, an original record must be created by taking a player's picture at some point. These images may be captured during the slot club enrollment process or at hotel registration, whenever the club card is presented and explained to the guest.

Issues surrounding this technology include privacy concerns and the general intrusiveness of being filmed. However, surveillance cameras have existed in casinos for many years, and customers can be offered an option to turn a camera off by entering a code on a keypad located on the machine. As with any new technology, it is likely that there will be challenges related to implementation and consumer acceptance. There will also be the cost of acquiring the technology. However, the benefits of increased CRM opportunities are likely to be substantial.

What about approaches that do not rely solely on technology? During the research process, it was discovered that many slot club marketers could improve their explanation of membership benefits to potential enrollees. It is the job of the slot promoter to effectively communicate the club benefits to the potential member. The perception of value motivates the player to carry and use the card. Attempts such as "Would you like to sign up for a club card?" fall well short of effective communication of benefits. This selling process takes on increased importance when engaging "hot" players. Many slot systems are capable of tracking the magnitude of play occurring on machines without cards inserted. This "hot player" function provides quality leads for slot hosts or those responsible for enrolling new members. It is crucial that these and other potential club members understand the benefits available to them. For example, if they are infrequent visitors, tell them about the random bonus rewards. If

they are frequent or repeat visitors, stress the value of the cash-back, point accumulation, and nonmonetary privileges associated with club membership. Enrollment personnel must know the benefit structure so thoroughly that they are capable of effectively responding to common objections such as "I don't play enough." Players need a reason to carry and use a club card.

Tracking System Limitations

The emergence and increasing popularity of video-based slot machines (as opposed to mechanical reels) has created new challenges for player tracking systems, in that they allow a single machine to run multiple programs and/or multiple denominations. Most, if not all, systems encounter difficulties in accurately recording and reporting play on multigame and multidenomination slot machines. A multigame slot machine is defined as a single unit that houses several different programs. A multidenomination unit typically runs one program but is capable of accepting wagers of varying magnitudes. For example, a multidenomination game would be capable of accommodating $0.05, $0.25, and $1.00 bettors.

Problems with the multigame units arise because the systems are designed to accept one par entry for each machine. However, multigame units may house six programs on a single machine, each with a different par. Most casinos select and enter the lowest par (house advantage) of all the programs on a multigame unit. This is the par the system will use to calculate theoretical win for the casino. Consequently, the system will underestimate the theoretical win generated by slot patrons who play the programs with house advantages greater than the lowest par program. Multidenomination games are plagued with similar issues related to the inability of the system to accurately compute theoretical win for wagers of varying denominations. This occurs when casino management chooses to offer the same program, across different pars in different denominations, in the same machine. For example, a multidenomination video poker machine with pay tables that vary by denomination will most likely underestimate the theoretical win generated by the lower-denomination players. This occurs because the house advantage produced by a program will nearly always decrease as the denomination increases. That is, a nickel game is likely to have a house advantage more than four times as great as the same game offered in the dollar denomination. This notion is akin to the volume discount commonly offered by wholesalers or retailers. The casino retains a smaller percentage of each wager in exchange for a greater amount wagered per spin.

The inflexibility of slot tracking systems affects theoretical win calculations in other ways. For example, most systems do not accommodate the entry of multiple pars for a single game and do not track the dollar amount of coin-in for one-coin wagers versus maximum-coin wagers.

The par for slot machines differs from one-coin play to maximum-coin play. For nearly all games, maximum-coin players realize less of a disadvantage than players wagering anything less than the maximum bet. Therefore, when casinos use the par for maximum coin play to compute the theoretical win for play composed of less-than-maximum-coin wagers, that play is undervalued. Hence, the value of players who do not play maximum coins is underestimated.

One-Card Systems

Casino companies that operate multiple properties offer programs in which the player is issued a club card that is valid at any of the company's casinos. These programs may help increase benefit perceptions and card use, as the multisite capability offers certain customers increased opportunities for benefit accumulation. One-card systems are certainly more convenient than those requiring customers to carry multiple cards for use in casinos operated by the same company. In general, these programs are also likely to strengthen brand and image profiles by offering brand-loyal consumers increased convenience, while simultaneously increasing their value to the casino.

Tiered Slot Clubs

Many clubs offer multiple levels of membership, with some casinos offering access to lavishly appointed premium player lounges for those who obtain the required membership status. Nonmonetary benefits may also be offered, such as reserved or preferred parking places. These tiered systems are designed to clearly delineate incentive levels and structures. This provides players with a clear benefit road map and, it is hoped, encourages them to ascend through the membership hierarchy. For example, many Las Vegas Strip properties offer substantial increases in the percentage of cash-back rebates as players ascend the tiered hierarchy. The widespread employment of this practice, combined with intense competition surrounding the rebate magnitude, suggests that many casino executives believe it to be a powerful incentive.

Data Flow

So far, the marketing aspects of the slot player rating process have been addressed, but how do the performance data travel from the individual machine to the manager? There are different ways to accomplish this task. A fairly common method is addressed in this section to give the reader a basic idea of the process. Initially, each slot machine sends its performance data to a gearbox. This electronic signal is usually sent to the gearbox every 45 to 60 seconds. For example, 400 machines from one area of the slot floor are grouped together and send individual machine-level

data to a designated gearbox. The machines are wired together, forming a daisy chain, which is then wired to a designated gear box. There may be five gearboxes on a slot floor, each with 400 to 500 machines reporting to them. From the gearbox, the data travel to a host access server (HAS), which serves as an intermediary to the property's operating system. Once the data travel from the HAS to the operating system, they can be read and accessed by the accounting and marketing modules of the slot system. Most managers who routinely work with slot performance data are trained to use either the accounting or marketing system, depending on their individual responsibilities.

Card Use in the Pit

Typically, the player tracking card is also used in the table games pit to identify players. This allows the data from any resulting rating cards to be appropriately credited to the player's account. Unfortunately, nearly all casinos still require the floorperson to physically observe, estimate, and record an individual's gaming activity. This process is not automated and allows for the possibility of error regarding the estimation of data such as hands played, average amount(s) wagered, and the nature of the wagers (e.g., pass line bets vs. proposition wagers). The use of the card substantially improves the chances of successfully identifying and crediting a customer for his combined slot and pit play. That is, the table games action and slot play are recorded and assigned to the correct name in the database. This is due to the fact that the card is automatically read by slot machines and by devices located in the pits, ensuring that the play is credited to the same record in the database.

Some casinos have automated pit tracking systems that record data such as the amounts of wagers and buy-ins. These systems are also capable of reading the same club card that is used in slot machines. The tracking devices are primarily installed on blackjack games and games similar in structure to a blackjack game. We are unaware of dice games currently outfitted with this technology. A crucial limitation of pit tracking systems is the inability of the technology to compute a blackjack player's disadvantage (i.e., the house advantage). Without this piece of information, the casino cannot accurately calculate the theoretical win garnered from a table games player. As blackjack is a game of skill, it would not be uncommon for one player to produce a disadvantage twice as great as another player's. This phenomenon has obvious casino marketing repercussions related to comp decisions and play incentive awards. However, knowing exactly how much a player has wagered is a monumental advance in the process of improving the integrity of pit player data. Systems are under development that will be capable of estimating a player disadvantage, based on a minimum amount of observed hands. To accomplish this, each card dealt must be read and recorded by the system so that a player's skill level can be imputed by the software.

TABLE GAME HOLD AS A MANAGEMENT TOOL

USES OF TABLE GAME HOLD

Table game hold is probably one of the least understood and historically most misused tools available to casino management. In the past, table game hold had two primary uses: (1) to identify good or bad casino management and (2) to identify theft. It was not so long ago that the integrity of an individual dealer, or even an entire shift of casino personnel, was determined by the hold percentage maintained by the dealer or shift.

Even today, hold is often used by management in making decisions on whether employees are honest and productive. In 1983, the Las Vegas Hilton fired 37 longtime casino employees because the shifts on which they worked were experiencing what management felt was an abnormally low hold percentage. The terminated dealers subsequently filed a wrongful termination suit and were awarded over $37 million in actual and punitive damages. Fortunately for Hilton, the punitive damages, which represented the largest portion of the award, were thrown out on appeal. This example highlights the importance placed on table game hold by management.

In its simplest form, table game hold represents the percentage of chips purchased at the table by the customer that is won back by the house. Mathematically, the formula for hold is:

$$\frac{\text{win}}{\text{drop}} = \text{hold}$$

If hold is to be used as a viable management tool, management must thoroughly understand its determinants and limitations.

DETERMINANTS OF HOLD

Rim Sheets   If permitted internally by casino management, Nevada casinos may use rim sheets (also referred to as auxiliary table cards or pre-

marker tally sheets) in lieu of preparing markers at the time credit is issued to the patron. Rim sheets are available to only the casino's biggest players and are most often used in baccarat; however, rim sheets may also be found in craps, blackjack, and roulette.

The average customer who wishes to play the table games must first purchase chips and then proceed to play. When rim sheets are in use, the player plays first and then purchases his chips, which is the reverse of what the average customer experiences. A floorperson records the total amount of credit a rim sheet player has received during a session of play.

At the termination of play, the player signs a marker for the total amount of credit outstanding. Since the marker signed usually represents only the amount owed, the casino will hold 100% of the rim sheet play. With this privilege afforded to only the biggest players, the baccarat hold and the overall hold in general can be dramatically affected.

Graveyard Shift and Hold   The shift that generally has the highest hold percentage is graveyard. Why does this occur? The higher table hold percentage is not primarily attributable to the quality of employees working during graveyard shift, but rather to the timing of when the games are counted.

The graveyard shift will generally relieve the swing shift between 2:00 and 4:00 A.M. When the table inventory count is performed, the games will have a large number of customers still playing. When the table drop boxes are removed following the inventory count, graveyard employees start their shift with the largest number of customers they will entertain all shift, and these players already have chips in their possession that they purchased during the prior shift. In the hours following the arrival of the graveyard shift, the number of customers playing in the casino usually declines dramatically. The graveyard shift hold percentage benefits directly from the inheritance of the chips held by the swing shift customers while not being impacted by their chip purchases.

The effect on the hold percentage is much the same as sending the players to the cage to purchase their chips. The graveyard shift benefits on the numerator side of the hold formula (win), while the denominator (drop) is not proportionately influenced. If management wanted to decrease the hold percentage for the graveyard shift, the start and count times could be changed to the hours of the morning with the least customer activity.

Foreign Gaming Chips   Foreign gaming chips are chips received from other casinos. The procedure for treating foreign gaming chips can affect hold if the casino policy is such that foreign chips are not allowed to be placed in the table drop box, but are instead placed into the chip tray (float). The table hold percentage can be expected to be greater if the for-

eign chips are placed into the float since under the alternate policy they would become drop once placed into the drop box.

Some casinos have special cheques in baccarat and the race and sports book. The same rule applies to these cheques. If the cheques are allowed to be dropped, the table hold percentage will decrease. Maintaining the cheques in the float increases the hold percentage.

Marketing Programs   Casinos today offer a myriad of marketing programs. The nature of programs offered can impact the table hold percentage. For instance, the use of match play coupons, nonnegotiable gaming chips, and chip warrants will affect hold. These programs, which are discussed in greater detail in Chapter 14, have the same effect as taking money out of the chip tray and handing it to the player. Coupons or chips placed into the table drop box in these programs result in decreases to win.

Some casinos award thousands of dollars daily in these types of giveaways. In addition, many casinos now offer $5 table game programs whereby a player must play a minimum number of hours at a required minimum bet to receive a complimentary room and food discounts. Players whose intent is to merely qualify for the promised discounts will generate chip purchases (buy-ins) more approximate to their play; consequently, the table hold percentage will be greater than for players at the same level whose play is unrelated to any giveaways.

Marker Collection Policy   The casino's policy relating to the collection of marker payments at the tables can affect hold. A casino with a policy that provides for any amounts owed to be aggressively collected prior to the player's leaving the game will hold more than a casino where the policy is the opposite. Players allowed to walk away from the table without paying may choose to obtain more markers than necessary, resulting, in some cases, in the casino's providing the player with an interest-free loan.

In many gaming jurisdictions outside Nevada, marker payments can be made only at the casino cage. The marker is transferred from the table to the cage, and the customer pays the amount owed at the casino cage. Some other jurisdictions, such as Nova Scotia, Canada, do not permit the issuance of gaming credit to customers. These and other differences in the operation of the casino must be taken into account when comparing table hold percentages for casinos in different jurisdictions.

Table Utilization   Table utilization relates to the number of customers occupying the seats at a gaming table. Higher table utilization rates result in lower table hold percentages. To illustrate this, assume that eight players walk into a casino at the same time with the same amount of money ($100 each) and all plan on betting $10 per hand for one hour. One player sits alone and the other seven players sit together.

Table 1	Table 2	
Players per table	1	7
Drop per player	$100	$100
Total drop	$100	$700
Bet per hand per player	$10	$10
Total bet per hand	$10	$70
House advantage	1%	1%
Hands per hour	209	52
Win per hour	$20.90	$36.40
Hold per hour	20.9%	5.2%

The casino's payroll decreases as demand more closely matches supply; however, the end result could be a lower hold percentage. If all of the players in this example were betting $100 per hand, management would prefer to provide one dealer for each player. Unfortunately, the majority of casino customers fit into the lower end of the betting spectrum and require a higher utilization to justify the opening of the game. Maximizing dealer productivity yields the lowest hold percentage.

As the average bet increases, the optimum table utilization decreases. A casino trying to maximize the average number of players at all games, regardless of the average bet, is generating the highest profit margins, but less net profit, than if fewer players were at each game.

Cash Wagers   The policy toward the betting of cash on the table can also influence the hold percentage. In Atlantic City and many casinos throughout the world, cash wagers are not accepted. In these jurisdictions, all cash must be exchanged for chips before placing the wager. Other jurisdictions such as Nevada allow wagers to be made using cash.

For casinos allowing cash wagers, the money is dropped in the table drop box only if the wager is lost. Consequently, casinos that allow the wagering of cash hold a higher percentage than those casinos where cash wagers are not permitted. Consider a game with a 2% house advantage—the casino wins 51% of the wagers and loses 49%. At the end of 100 cash wagers, only 51 of the wagers become drop. If cash is not allowed to be wagered, all 100 wagers become drop, resulting in the same win, a larger drop, and a lower hold percentage.

Even in casinos permitting money-play wagers, the policy for handling these wagers can impact the hold percentage. If the policy is to exchange any money-play wager from cash to chips prior to the payoff, the casino can expect to hold a lower percentage than a casino where the policy is to leave the cash on the layout. The policy of converting the cash to chips prior to the outcome of the hand should result in greater play for the casino than the alternate policy since the customer is given chips to

continue her play instead of returning her cash in the event of a winning wager. Management in many casinos continues to focus on maintaining a higher hold percentage even if it may result in a lower net win.

THEORETICAL WIN AND HOLD

Next, the impact that total win has on the hold percentage is considered.

Win = average bet × hours played × hands per hour × house advantage

The average bet can affect hold percentage primarily through the player's bet-to-buy-in ratio, which is derived by dividing the average bet by the amount of the initial chip purchase (buy-in). With all the variables remaining equal, the player who buys in for $100 and has an average bet of $1 will lose one-fifth the amount of the player with the same buy-in, but with an average bet of $5. In the latter case, the casino's hold percentage will be five times greater. Management refers to the situation where a player's average bet is extremely small in comparison to the accompanying drop as false drop.

Management can also increase or decrease the hold percentage through any policy that affects the total hands or time played. For example, assume that a casino has decided to change its shuffling and dealing procedures such that each six-deck shoe in blackjack is shuffled after only one hand is dealt. If this were the case, management would find that it still receives the drop, but that the total win will decrease markedly because the players will become disillusioned as a result of the game's slow pace. With the win decreasing and the drop remaining basically unchanged, the hold percentage will be extremely small.

Just as frequent shuffling can affect the hold percentage, increasing the shuffling time can also affect hold. In the past few years, a method of blackjack play known as *ace location* has generated much concern by casino operators. An ace locator is a player who tracks the aces in a less than thoroughly shuffled shoe. Once the player knows when an ace is likely to be dealt, he increases his bet substantially in an attempt to catch this ace.

If successful, the player has an advantage exceeding 50% on the hand where the ace appears. Many ace locators have developed considerable expertise; however, casino management has instituted shuffling methods that involve very complex and lengthy shuffles. Any shuffling after the cards are thoroughly mixed results in lost revenue and a decrease in the hold percentage. Management should pay particular attention to the shuffling procedure and the time required to accomplish the shuffle.

Even the type of seating selected by casino management can affect hold percentage by increasing or decreasing the time played. It is possible to hold 100% if a player were to sit at the table long enough. A few years ago, a major casino in Las Vegas had chairs at its blackjack tables that were, undoubtedly, the most uncomfortable and difficult in which to sit in Las Vegas. The chairs fit the decor, but failed to provide an acceptable comfort level to the customer. It was not uncommon to walk through this casino and find as many as one-third of the blackjack players standing. Anything the casino does to shorten the playing time will decrease the total win without substantially affecting drop, thereby decreasing the overall hold percentage.

House Advantage   Probably the most significant determinant of hold percentage is the house advantage or player skill level. The house advantage will affect win and ultimately impact the hold percentage. Anytime management increases or decreases the house advantage, the total win can be expected to change accordingly if the other variables in the win formula remain constant.

What would be the effect on hold percentage if a casino were to decrease its blackjack advantage by changing from a six-deck shoe to a one-deck game or to decrease its craps advantage by offering triple odds as opposed to single odds? It could be argued, but not empirically supported, that decreasing the advantage will result in the average player either playing longer or increasing the average bet to the point that the prior win total will equal or exceed the win total after the change. If this argument were true, the hold percentage would remain unchanged.

The relationship of advantage-per-hand to hold percentage is linear (i.e., as one increases, so does the other), and Fig. 13.1 demonstrates this relationship. The 1986 Atlantic City statistics for the games of baccarat, roulette, and big-six are used to illustrate this linear relationship (see Figs. 13.2 to 13.6). Baccarat, roulette, and big-six are the games least affected by player skill level, and all three games had the same number of decks, odds, and rules in 1986. It is generally accepted that the average house advantage-per-hand in these games approximated 1.15%, 5.26%, and 18.8%, respectively.

If management increases the house advantage, hold percentage can be expected to follow. The amount of increase or decrease cannot be predetermined; however, the hold percentage moves in the same direction as the game advantage.

Hold Objective   If a game with a house advantage of 1% is to hold 20%, the total amount wagered must equal 20 times the buy-in. If the buy-in is $100 and the house earns 1% of the total wagered, a win of $20 would require the total wagered to equal 20 times the $100 buy-in ($100 × 20 =
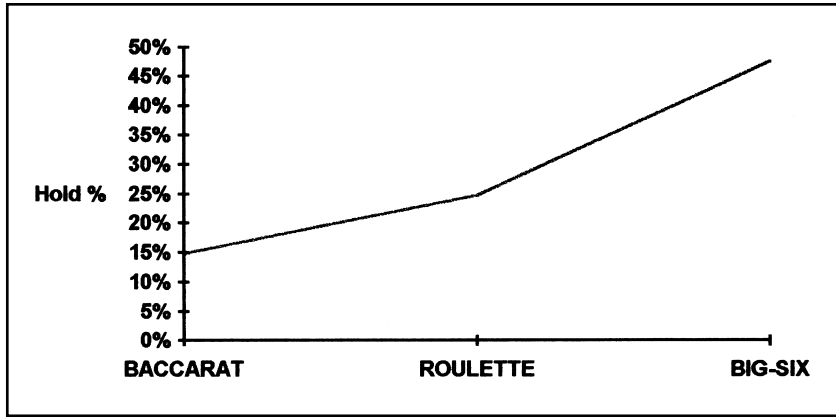
Figure 13.1 Relationship of Advantage-per-Hand to Hold Percentage
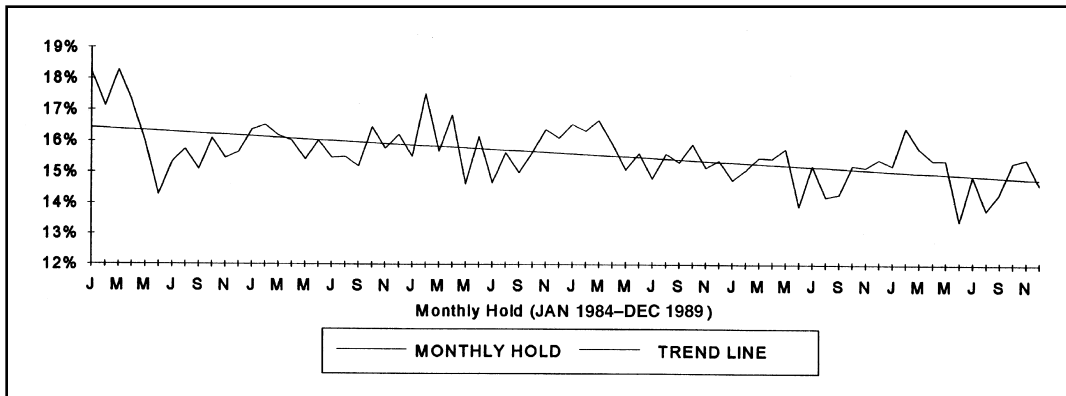
Figure 13.2 Atlantic City Blackjack Hold Trend Analysis, All Casinos
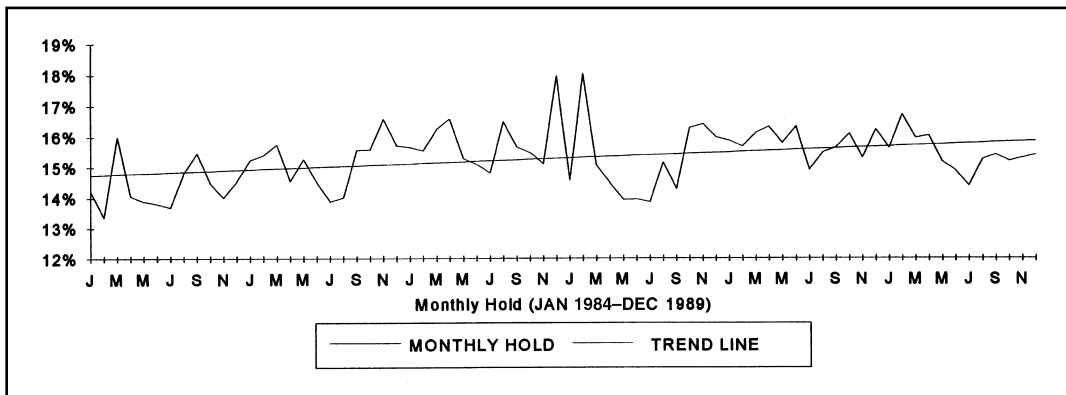
Figure 13.3 Atlantic City Dice Hold Trend Analysis, All Casinos
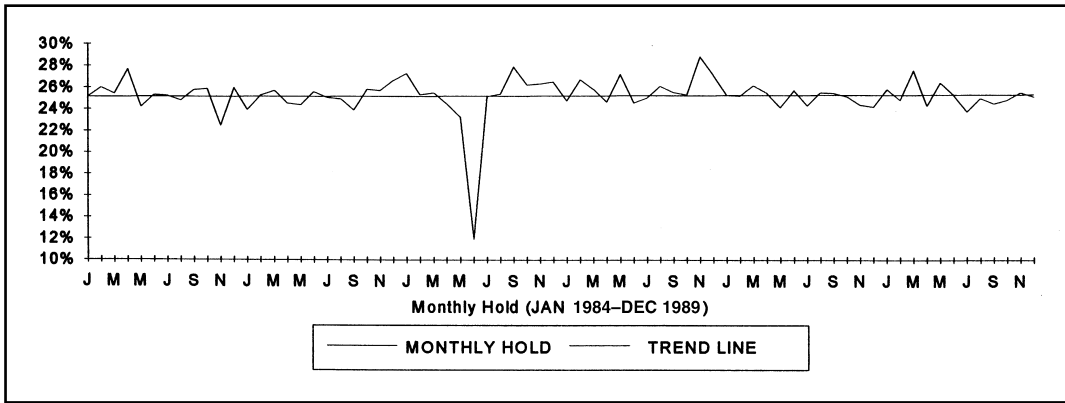
Figure 13.4   Atlantic City Roulette Hold Trend Analysis, All Casinos
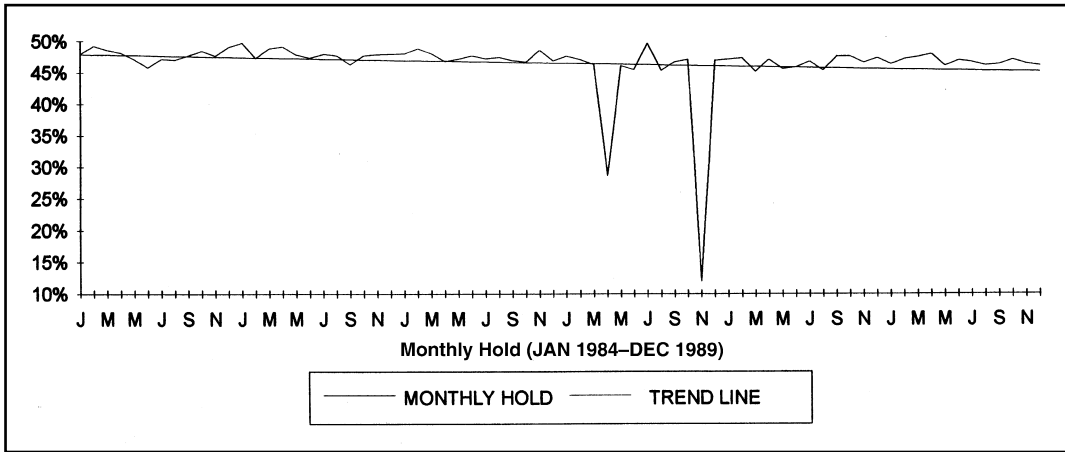
Figure 13.5   Atlantic City Big-6 Hold Trend Analysis, All Casinos
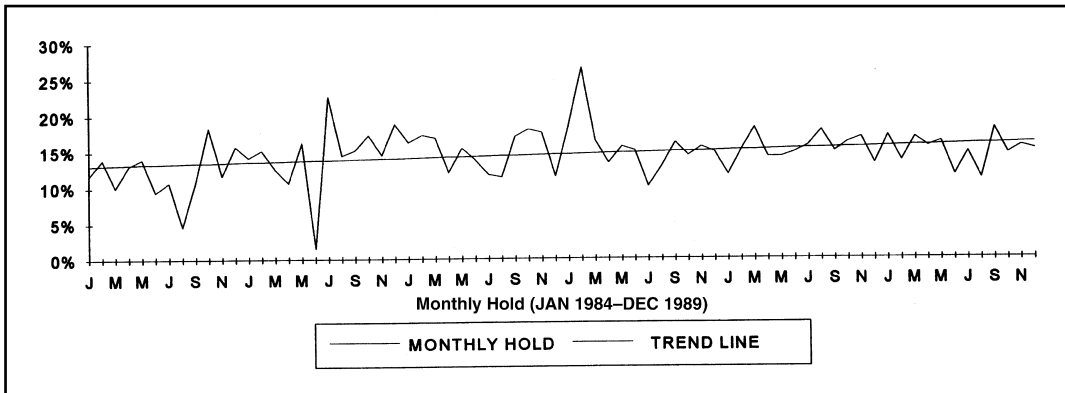
Figure 13.6   Atlantic City Baccarat Hold Trend Analysis, All Casinos

$2,000 and $2,000 × 1% = $20). The formula for determining the buy-in and total wagers required to achieve a desired hold objective follows:

$$\frac{\text{hold objective in percent}}{\text{house advantage per hand}}$$

Using this formula, a game holding 25% and with a house advantage of 5.26% (as in roulette) would require wagers totaling 4.75 times the buy-in to generate the actual hold percentage (e.g., a $25 win is the result of a $100 buy-in and $475 in wagers).

Effect of "Hits" on Hold   Almost every casino keeps in each gaming pit a record of large player wins or losses. The Mirage might use $10,000 as the threshold for recording large wins and losses, while the Sahara might record only "hits" of $2,500 or more. These documented hits represent play that several casino executives and, in many cases, surveillance personnel observed. As a result, management is confident that the hits were derived from "clean" player transactions and serve only to skew the casino data since they represent player wins and losses outside the norm.

Exceptionally large player losses make the hold percentage look unusually good, while exceptionally large player wins make the hold look unusually bad. If management is to use hold as a tool, these large hits should be removed from the casino results. To accomplish this, the drop for a player who won a large amount should be subtracted from the total drop and the amount the player won should be added back into the casino win. If a player loses a large amount, the player's drop should be subtracted from the total drop and the amount of the loss should be subtracted from the casino win. Note that the drop is subtracted regardless of the player outcome.

Some factors are less significant than others, but can still seriously distort the hold percentage and its usefulness as a management tool when they are considered in the aggregate. The determinants addressed here should be carefully considered before any final determination is made concerning hold. Hold can be calculated from

$$\text{hold} = \frac{\text{win}}{\text{drop}} = \frac{\text{average bet} \times \text{hours played} \times \text{hands per hour} \times \text{house advantage}}{\text{drop}}$$

where

Average bet is a factor of the bet to buy-in.
Hours played is a factor of customer service and player comfort.

Hands per hour is a factor of dealer efficiency, the speed of the game (which is a factor of the shuffling procedure and sweat card location), and table utilization.

House advantage is a factor of the player skill level and rules in place.

Drop is a factor of the foreign chip policy, betting of cash policy, false drop, marketing programs, and the use of rim sheets.

HIGH TABLE OCCUPANCY MAY BE HAZARDOUS TO PROFIT

Casino management is under constant pressure to increase profits, and casino profits equal *win* less *expenses*. As a result, emphasis is often placed on decreasing expenses in order to create additional profit. The table games department payroll represents 25–50% of the game's win and is the largest line item on the casino's Profit & Loss statements (P&L). When it comes to decreasing expenses, payroll appears to be the most obvious place to begin cutting.

The casino has two primary types of expenses: (1) expenses directly related to the number of customers (i.e., complimentary beverages, gaming taxes, etc.) and (2) payroll expense, which is indirectly related to the number of customers, but directly related to the number of games open. Each open game must have a dealer(s), floorperson, and boxperson (dice only) whether the table is full or empty.

How does the number of players at a table affect the decisions per hour? Table 13.1 shows the correlation between players per table and decisions per hour.

As discussed previously in this chapter, shuffling procedures, the sweat card (a plastic card used to indicate when the cards are to be reshuffled) placement, and the number of decks used can change these productivity figures, but any procedure that affects a full table also affects heads-up (one-on-one) play. Consequently, the same linear correlation applies for all levels of table utilization.

Imagine that the president of the company walks through the casino and observes 28 blackjack tables open, but each table has only one player wagering $100 per hand. What conclusion will likely be drawn based on this observation? It is not difficult to deduce that a directive will soon be issued from the president's office to reduce the number of blackjack tables that are open. Instinctively, this reaction appears sound since salaries and wages represent a relatively high portion of the table game department's expenses. Is this the correct response by the president? Will fewer games open with the same total number of players lead to maximum profit?

To analyze this question, some assumptions regarding staffing and payroll costs must be made. The assumptions follow:

- One dealer per table working 60 minutes on and 20 minutes off.
- One floorperson per four games (0.25 floorperson per game), receiving one 60-minute and two 20-minute breaks each shift.

Table 13.1   Correlation between Players per Table and Decisions per Hour

No. of Players	Avg. Blackjack Dealer Hands per Hour[1]
1	209
2	139
3	105
4	84
5	70
6	60
7	52

No. of Players	Avg. Dice Tosses per Hour[2]
1	249
3	216
5	144
7	135
9	123
11	102

No. of Players	Avg. Roulette Spins per Hour[3]
1	112
2	76
3	60
4	55
5	48
6	35

[1] From a study conducted in an Australian casino where seven decks of an 8-deck shoe were dealt before shuffling
[2] From a 1990 study conducted in an Atlantic City casino
[3] Ibid.

- Each dealer is paid $50 per eight-hour shift.
- Each floorperson is paid $150 per shift.
- Taxes and benefits equal an additional 30% of actual labor costs.

The payroll costs vary with the number of games open, and costs such as complimentary beverages and gaming taxes are a function of the total number of actual players.

Using these assumptions, the following demonstrates the cost to staff each table for eight hours.

$$\text{Dealer} \qquad \frac{80}{60} \times 50 \times 1.30 = 86.67$$

$$\text{Floorperson} \; \frac{480}{380} \times 0.25 \times 150 \times 1.30 = 61.58$$

Total Labor per Table   **$148.25**

Table 13.2 compares two scenarios: one player per table at 28 tables, and seven players per table at four tables. First, an average bet and house advantage must be assumed. An average bet of $100 per hand and a 1% house advantage will be used. The house advantage does not affect the conclusions derived from the scenarios.

In the comparison given in Table 13.2, margin increases as occupancy (utilization) increases, but profit decreases. Consequently, the following shows the correlation between occupancy, hold, margin, and profit.

$$\text{Occupancy} \Uparrow \qquad \text{Hold} \Downarrow \qquad \text{Margin} \Uparrow \qquad \text{Profit} \Downarrow$$

When management attempts to put the same number of players at fewer games (i.e., to increase occupancy), the return on labor is successfully increased, but the primary objective of maximizing profit is not achieved. As the preceding comparison illustrates, efforts to increase game occupancy will result in the reduction of profit.

Management is often in the position of determining reasons for declines in the hold percentage. If average occupancy has increased from 3 to 3.8 players per game, the increase in occupancy will, in itself, decrease the hold percentage. The increase in the average occupancy will result in an increase in the margin of the table games department, but decreases in profit will also be experienced.

The casino must have a high table occupancy at certain average bet levels in order for the resulting win to cover the associated labor cost. In the preceding example, it cost $148.25 in labor to keep a game open for eight hours, which equates to $18.53 per hour. At a tax rate of 6.25% and a 1% house advantage, the casino's gross win will be 93.75% of 1% (0.9375%). At 52 hands per hour at a full table, the following shows that

Table 13.2   Costs of Staffing Tables

	Scenario 1	*Scenario 2*
Tables open	28	4
Players per table	1	7
House advantage	1%	1%
Bet per hand per player	$100	$100
Hands per hour	209	52
Win per hour per table	$209	$364
Win per table per shift	$1,672	$2,912
Gross win (all tables)	$46,816	$11,648
Labor cost per table	$148.25	$148.25
Total labor cost all tables	$4,151	$593
Contribution	$42,665	$11,055
Margin (%)	91%	95%

each player must have an average bet of $5.43 for the game to cover the cost of labor and taxes. The following equation solves for Y, where Y represents the required break-even average bet for each player on the game.

$$52 \times 7 \times 0.9375\% \times Y = \$18.53$$
$$3.4125Y = \$18.53$$
$$Y = \$5.43$$

Table 13.3 shows the number of players and average bet needed to achieve the same break-even.

At smaller average bets, the table must be near maximum occupancy if the game is to break even. As the average bet increases, fewer players per game will generate the most profit. Although the preceding analysis deals with blackjack, the same principles apply to all table games.

The blackjack hands per hour indicated earlier assumes seven decks dealt from an eight-deck shoe before reshuffling occurs. The hands per hour is acutely sensitive to the number of decks used, shuffle time, and the number of decks dealt before shuffling. For instance, the casino will deal fewer hands per hour if only six of eight decks are dealt before reshuffling. Each player at a full table will receive approximately one-fourth the hands per hour they would receive at a heads-up game regardless of the casino's dealing procedure.

How does the casino go about decreasing occupancy? One method is to open more games; however, this may not decrease per game occupancy because the casino cannot control where the players choose to play. In blackjack, a second method is to decrease the number of spots on the layout. In the past few years, many casinos have modified their tables, originally built for six players, in order to accommodate seven players. A different course of action would be to *decrease* the number of spots on the

Table 13.3 Minimum Break-Even Bets

No. of Players	Avg. Blackjack Hands per Hour	Minimum Bet Necessary to Break Even
1	209	9.46
2	139	7.11
3	105	6.27
4	84	5.88
5	70	5.65
6	60	5.49
7	52	5.43

higher minimum bet games (a higher minimum bet is relative to the particular casino).

Why would casino management increase the number of player spots offered on the table? For two reasons: (1) The relationships presented here may not have been fully considered, and (2) emphasis has always been placed on maximizing the return on labor dollars spent. When every game is open and full, the only way to increase profit is to increase the minimum bet, but it rarely happens that every game is both open and full.

The principles discussed in this chapter have been presented at various seminars throughout the world. A major casino in Australia decreased the spots offered on the blackjack tables in its international room (premium player area) from seven to five. Management of this casino has realized an increase in the blackjack hold of 4% for this room since making the change, but, most important, profit has gone up with the decreased occupancy. Management has also received many customer comments indicating that the games are more comfortable with the increased room at the table. This casino provides an example of where a change solely intended to increase profits also resulted in players perceiving an improved gaming experience.

CASINO MARKETING I

Given the growth in the number of gaming jurisdictions, as well as the number of casinos in these jurisdictions, casino marketing has become an area of increased emphasis and spending. Marketing costs have continued to rise as competition has grown. Management has continuously searched for new and innovative ways to differentiate its operation from that of its competitors. As these changes have occurred, effective marketing has become even more critical to the overall success of the casino operation.

Although the number and types of programs offered in the casino industry is far too great to be covered comprehensively, several types of programs are included in this and the following chapter to reflect the factors that management must consider in evaluating the implementation and continuation of different program types. Casino marketing programs addressed in these chapters include match plays and nonnegotiables, the gambler's spree, and rebates on loss.

THE COST OF MATCH PLAYS AND NONNEGOTIABLES

Over the last few years, the use of match play coupons and nonnegotiable chips (a.k.a. promotional chips) in marketing to the table games player has grown enormously in many casinos in Nevada and throughout the world. When first introduced, match play coupons were typically given in $1 and $2 face values and only to those customers who were willing to cash their paychecks in the casino. At that time match play coupons were referred to as *game starters.*

Today, many casino marketing programs give individual players hundreds of dollars in match play coupons (match plays) or nonnegotiables (nonnegotiable chips). What was once a nominal cost can now total thousands of dollars daily. Management must closely review these programs and the substantial costs incurred to determine if the programs are achieving the overall objectives in a cost-effective manner.

The basic difference between a match play and a nonnegotiable is that the match play requires a cash "match," whereas the nonnegotiable can be bet by itself. The match play does not necessarily require the

matching component to be an even money amount. For instance, casinos may require a $2 cash bet to go along with a $1 match play where the winning bets are paid a total of $3. Another example would provide for a $10 cash bet to go along with a $5 match play, with the winning bets receiving a $15 payout.

The match play or nonnegotiable offer can also be styled so that it is forfeited only when the player loses the bet or so that it is forfeited when the player wins the bet by exchanging it for a live chip of equal value. Coupons that are placed into the table drop box by the dealer on winning bets as well as on losses are referred to as "with exchange," and those coupons that are forfeited only on losing bets are referred to as "without exchange." It is not uncommon for the same casino to offer several different types of nonnegotiables/match plays at the same time. The restrictions that apply to the coupons are limited only by the imagination of management at the individual casino.

The best way to understand how match plays or nonnegotiables work is to ask, "How much would the player have to bet in order to create the same effect?" For example, a player betting a $5 with exchange match play along with $5 in cash leaves the game with a total of $15 if the bet is won (the $5 bet plus the $10 payoff). For a player to leave the game with $15 on an even money bet, the player must have bet $7.50. In this example, the match play has a betting value equivalent to $2.50 since the player bet only $5 of his own money. If a with exchange nonnegotiable with a $5 face value was bet, the winning player would leave with $5, resulting in the nonnegotiable having an equivalent betting value of $2.50.

In order to further evaluate the true cost of the match play or nonnegotiable, the $2.50 betting value must be reduced by the house advantage of the game. Assuming a 1.5% advantage in blackjack, the aforementioned match play portion would have a cost of $2.4625 ($2.50 minus 1.5%). The house also earns 1.5% on the cash wager portion. In this example, the cash wager will result in a 7.5 cent[1] casino win and the $5 match play will have a cost to the casino of $2.3875 ($2.4625 minus .075).

A 1.5% house advantage is equivalent to a player winning 49.25% of the hands and losing 50.75% of the hands.[2] If the match play was styled so that it was forfeited only when the player loses the bet (without exchange), then each nonnegotiable chip must be bet an average of 1.9704 times before being lost (1/0.5075). A $5 face value chip bet 1.97 times represents $9.8522 in total bets. At a 1.5% advantage, the house theoretical win on $9.8522 in bets is 14.78 cents. Therefore, a nonnegotiable chip with a $5 face value that is forfeited *only* when the player loses has a $5 betting value and ultimately costs the casino $4.8522 ($5 minus 14.78 cents).

The casino also earns on the cash bet required for the match play. In the preceding match play example without exchange, the casino would earn 14.78 cents on the cash wagered, thereby effectively reducing the cost of the match to $4.7044 ($4.8522 minus 0.1478).

Many executives believe that there is no cost associated with match plays since the player has to bet cash of an equal value. In order for there to be no cost to the casino, a with-exchange match play with a $5 face value ($2.46 cost) would require an accompanying $164 cash bet. A without-exchange match play would require an accompanying cash bet of $313.67.

Given the assumptions discussed here, each $100 in match play costs the casino $47.75. If the coupons constituting the $100 are issued in $5 increments, it will take 20 hands to "wash," or turn the match plays into cash. At an average bet of $5 on 1.5% house advantage games where the player is dealt 75 hands per hour, it will take only a quarter of an hour for the casino to incur the cost and then an additional 8.5 hours of play to recover the cost associated with the match play. If the player was betting the pass line, it would take 17 hours for the house to recover its cost.

As illustrated, the cost of the match play or nonnegotiable is a function of the house advantage; the cost of the match plays to the casino is less on games where the house has a greater advantage. It is difficult to understand why many casinos have chosen to limit the use of these coupons on dice to the even money bets where the house typically has the lowest advantage. Common sense would seem to indicate that the use of these types of coupons, where believed to be beneficial, should be encouraged in all casino bets and games.

The costs of a $5 match play and a $5 nonnegotiable at a 1.5% house advantage using either the with-exchange or the without-exchange feature are shown here:

	$5 Match Play	$5 Nonnegotiable
With exchange	$2.3875	$2.4625
Without exchange	$4.7044	$4.8522

The nonnegotiables had an even higher cost in Nevada because the Gaming Control Board required the casino to pay the 6.25% tax as if the money were taken directly out of the drop. The Board's position was that the casino is giving away money on which taxes should have been paid.

As a result, the Board required 6.25% to be paid in addition to the cost associated with the player. If cash was bet along with the coupon, the Board did not require the tax payment. The following table includes (in parentheses) the total cost of the nonnegotiable when taking into consideration both the cost associated with the player and the amount required by the Board:

	$5 Match Play	$5 Nonnegotiable
With exchange	$2.3875	$2.4625 ($2.6164)
Without exchange	$4.7051	$4.8522 ($5.1555)

Other jurisdictions have taken similar positions on the taxability of match plays and other related programs. The taxability of these programs should be determined by the casino, along with the associated cost prior to the programs' being implemented. Programs of these types should also receive authorization from appropriate levels of management prior to implementation.

A casino marketing director must be able to identify and maintain those programs that are profitable, as well as identify and eliminate those programs that are not. It cannot be assumed that all marketing programs are successful even though the casino is profitable. All programs must be constantly scrutinized to ensure that they are achieving the established objectives. Systems should be established to track the performance of a program in order to continually reevaluate the contribution of the program to the casino both on an individual basis and in comparison to other programs.

In marketing to the everyday player, match play coupons are one of the most common forms of monetary incentive. Given the substantial cost of the match play coupons and the assumption that these offers serve as effective game starters, evidence in support of a positive relationship between coupon redemptions and table games drop would be helpful. Specifically, it would help justify the continued use of this widely employed leap-of-faith marketing tactic.

There are those who believe that the mode behavior of match play users is to play as long as the coupon is in effect. Thus, one hand and out is a frequently occurring phenomenon. Given the number of same-size wagers required to recover the offer cost of a match play coupon, behavior similar to that just described would indicate a strong possibility of a negative cash flow effect. The very threat of this possibility warrants further analysis of the overall match play effect. However, it will not be easy.

When it comes to measuring the effect of a play incentive such as match play coupons, the following approach is recommended. First, conduct an observation study to gain a better understanding of the number of hands played after the coupon is redeemed. It would be best if the subjects were not aware of the observation study, so as not to bias their behavior. Second, employ a technique such as simultaneous multiple regression analysis to estimate the dollar amount of drop per coupon-dollar redeemed. Model specification is the key to success in this approach. That is, many variables affect volume and it is important to have as many of those influences as possible represented in the model. It is a complex form of analysis. For more on estimating the match play effect on table games drop, see Lucas and Kilby (2002, pp. 18–21).

In a study conducted using proprietary data from a Las Vegas hotel casino, the results failed to support the notion of a positive relationship between match play coupon-dollars redeemed and blackjack cash drop. This study employed the use of simultaneous multiple regression analy-

sis. The 15-variable model explained more than 90% of the variation in daily blackjack cash drop across a 250-day period. Despite the success of the overall model, the match play variable failed to produce a statistically significant and positive effect on the blackjack cash drop variable. Further, match play redemptions and blackjack cash drop failed to demonstrate a significant and positive correlation coefficient at the .05 alpha level. These results do not prove that match play coupons are ineffective, as more research is required to determine the validity of these findings. However, the results should not be discounted, as the rigor of the analysis far exceeds conventional methods such as cross-tabulation.

MATCH PLAY: PROBLEMS AND SOLUTIONS

The following problems and solutions are included to further illustrate the methodology for evaluating the cost and recovery associated with match-play–type programs. As discussed, match play programs are common throughout the gaming industry and may represent a significant cost to an operation. Understanding the cost of the match play programs will continue to grow in importance as these programs become even more prevalent.

Problem: Calculate the cost to the casino of giving a player a $5 face value, with-exchange match play coupon that requires a one-to-one cash match.

1. Calculate the cost of the match play portion of the wager.

   (Prob. (player win) × face value) + (prob. (player loss) × 0)

   Note: Zero is used because the player loses nothing of value.

   (0.4925 × $5) + (0.5075 × 0) = $2.4625

2. Calculate the net gain to the casino on the cash portion of the wager.

   Cash wagered × house advantage × (1 − tax rate)

   With a tax rate of 6.25%, the preceding formula yields:

   $5 × 1.5% × 0.9375 = $0.070313

3. Subtract the net gain resulting from the cash wagered from the cost of the match play coupon:

   $2.4625
   −0.0703
   ───────
   $2.3922

Problem: If the house advantage is 1.5%, how much in additional wagers is needed to recover the total cost of the match play?

$$0.015 \, X = 2.3922$$
$$X = 159.48$$

The amount reflected is in before-tax wagers. After tax is deducted, the casino will realize $159.48 times 1.5%, less taxes, or $2.2427. The amount won is less than the cost of the match play. Consequently, since the casino realizes only 93.75% of the amount actually won, the formula should actually be:

$$(0.9375 \times 0.015) \, X = 2.3922$$
$$0.014063 \, X = 2.3922$$
$$X = 170.112$$

Therefore, the preceding match play will require $170.112 in total wagers for the casino to net, after taxes, the $2.3922 cost of the match play.

Problem: At an average bet of $5, how many hands will be required for the player to bet the needed $170.112?

$$\frac{170.112}{5} = 34.02 \text{ hands}$$

Problem: At 50 hands per hour, how many hours of playing time are necessary to generate 34.02 hands?

$$\frac{34.02}{50} = 0.6804 \text{ hours or } 40.83 \text{ minutes}$$

GAMBLER'S SPREE

In the marketing of today's casinos, the major justification for implementing a policy or program may be that a competing casino is offering or adopting the same program. If a well-known casino is offering the same policy or program, that policy may be favored for adoption regardless of its individual merits. This is exemplified by the proliferation of $5 table game programs known as "gambler's spree."

Gambler's spree programs are designed by independent casino representatives to attract table game players to the casinos with which they are affiliated. The programs themselves are styled in about as many different ways as there are representatives; however, the basic program works as follows:

1. The representative negotiates with the casino-hotel for a discounted room rate, food and beverage credit or discount, and

some form of match play or nonnegotiable chip bonus to be given to the player if a minimum bet and time requirement is met.

2. The representative then assembles these items, along with airfare and transfers to and from the casino, and sells the package to players at a price that typically allows for the representative to receive a profit of $60 to $100 per player.

The following is an example of a gambler's spree program offered by a major Las Vegas casino:

1. The package offered to the player includes hotel room, airfare, free drinks, and a 50% discount on all coffee shop charges for a two-night, three-day stay.
2. Upon arrival at the casino-hotel, the player is given $50 in match play, with-exchange nonnegotiable chips. If the player places bets of at least $5 for eight hours during the stay, he then receives $100 cash and an additional $150 in match play chips.
3. The player is given a score card to present to the table games floorperson at the beginning of each session of play. At the conclusion of each session, the floorperson records the average bet and time played and returns the card to the player.

Before management allows the establishment of a gambler's spree program similar to the one described here, four questions should be asked and the corresponding answers carefully considered.

1. What is the profit or loss if only the minimum requirements of the program are met?
2. What minimum action is required for the program to break even?
3. Is it reasonable to expect play in excess of that required to break even, enabling the casino to be assured a profit?
4. Are there any reasons that justify the program even if management believes it is unlikely to receive the action necessary for the program to break even?

Table 14.1 provides answers to the first two questions.

The following assumptions were made to derive the program profitability:

- Player's per hand disadvantage is 1.5%.
- Player stays for two nights.
- Hotel room could have been rented to the public for $5 more per night
- House wins *one* average bet per hour.
- Player will eat $60 in meals during the two-night stay and receive $30 in discounts.

Table 14.1   Gambler's Spree Program Profit/Loss at Minimum Requirements

	Player Action			
Hours played	8	8	10	12
Average bet	$5	$25	$25	$25
	Casino Loss (−) or Gain (+)			
$ 50 match play cost	−24.63	−24.63	−24.63	−24.63
Win at above hours & bet	+40.00	+200.00	+250.00	+300.00
$ 100 cash award	−100.00	−100.00	−100.00	−100.00
$ 150 addl. match play	−73.88	−73.88	−73.88	−73.88
Discount on meals	−30.00	−30.00	−30.00	−30.00
Loss on room discount	−10.00	−10.00	−10.00	−10.00
Loss/gain before taxes	−198.50	−38.50	+11.50	+61.50
Gaming tax (6.25%)	−2.50	−12.50	−15.63	−18.75
Loss/gain before labor	−201.00	−51.00	−4.13	+42.75
Operations labor @ $3.53 per hour[1]	−28.27	−28.27	−35.34	−42.41
Net Loss/Gain	**−229.24**	**−79.24**	**−39.43**	**+0.39**

[1] Assumes: 4 dealers for every 3 games or positions earning $50 per 8-hour day plus 33% taxes and benefits; 1.18 floorpersons for every 4 games earning $130 per 8-hour day plus 33% taxes and benefits; 5 players per game average density.

The answer to the first question is that a loss of $229.24 per player results from only the minimum requirements being met under the assumptions indicated. The answer to the second question is that a $25 average bet for 12 hours of play during a two-night stay is required for the casino to break even on the program.

The answer to the third question regarding whether it is reasonable to expect play in excess of that required to break even is quite subjective. Although opinions may vary regarding this question, it may appear unreasonable to believe that most players attracted to a $5 program would have bets five times the minimum required and play 50% longer than the minimum.

Keep in mind that the increased level of play represents *only* breakeven to the casino. For the casino to make the same profit as the representative ($60 to $100), the average bet would have to be approximately $35 per person for 12 hours of play. This level of play would still only provide the casino with a profit of $112.88.

It would require *two* players betting $35 for 12 hours ($225.76 profit) to offset *one* player betting at the minimum program levels ($229.24 loss) in order for the casino-hotel to break even. Is it reasonable for the casino-hotel to expect this situation to occur? Another way to view this is that it would require *588* players betting $25 for 12 hours ($229.32 profit) to offset *one* minimum action player.

The answer to the fourth question, concerning whether there are other reasons that may justify the program even though break-even is not being achieved, is also subjective. A common argument is that the program provides players with an initial introduction to the casino and, as a result, they are likely to return on their own at no cost to the casino-hotel. The other side of this argument is that players who are bargain hunters tend not to be brand loyal. Another argument frequently presented is that it is worth "taking a shot" with the program. The information presented previously, relevant to the first three questions, should be carefully considered by management prior to implementing a program based on the philosophy of "taking a shot."

Programs of this type may also have certain inherent problems, one of which is the accurate determination of the average bet by casino personnel. Accurately determining the average bet for large wagers may be difficult enough, but floorpersons will invariably overestimate the bet size of small wagers. The vast majority of all floorpersons will, understandably, round up to the next $5 increment when $5 chips are being wagered. This practice could easily result in earning potential being overestimated by 50% or even more.

The use of score cards carried by the player may also be an invitation to trouble. The player has a vested interest in obtaining a high average bet rating. When the card is returned to the player and he is allowed to see his score, it is not uncommon for the player to take issue with the floorperson's estimate of the average bet. The course of least resistance for the floorperson when challenged by a player would be to enter an average bet that the player finds more agreeable.

Anyone with any experience with this type of program knows that the player will bet something larger than the minimum required; however, a substantial increase is necessary for the casino just to break even. Even in a best-case scenario, could the casino-hotel reasonably expect more than a few dollars profit per person? Is the program worth the time and effort? Any casino-hotel evaluating whether to implement this type of program should consider styling the program so that break-even is achieved if everyone plays the minimum.

Gambler's Spree: Common Questions and Answers

Because of the controversial nature of the gambler's spree programs and the great deal of debate the programs have generated within the industry, we believe that it is necessary to present additional information concerning some of the most commonly asked questions and corresponding answers. The discussion that follows provides the reader with an expanded ability to evaluate the value of the program to the hotel-casino and provides the additional perspective of the independent representatives who offer these programs.

Question 1: If the discounted room rate is $44 per night and the customer stays four nights, shouldn't $88 (assuming 50% profit per night) of gross profit per person be recognized for the room?

Answer: The loss or gain on room revenue is the difference between the price at which the room could have been rented to the general public and the rate the customer was given on the gambler's spree. Typically, customers participating in the program are given a room rate considerably less than fair market value. If for any reason the customer were to pay more than fair market value, then a gain on room revenue would have to be recognized for analytical purposes.

Question 2: Would the casino-hotel have sold all of its available rooms without the program?

Answer: As discussed in the prior section, management should determine whether there are any reasons that justify establishing the program if it is unlikely that the program will break even. If the casino-hotel does have rooms available, then management must be satisfied that the gambler's spree is the best or only way the hotel can realize any revenue. It is important to remember that the players are normally given a considerable number of match play chips and, in many cases, a cash award as part of the program.

    If the rate paid for the room was $44 and the entire amount was treated as incremental profit, the minimum play would still result in a net loss per player of $122.24 (loss of $229.24 reduced by $88 for two nights and the $10 room discount). Even at a $25 average bet for eight hours and crediting the entire room revenue as profit, the program would contribute only $18.76 (loss of $79.24 reduced by $88 for two nights and the $10 room discount) in profit, and would require 6.5 of these players to offset 1 minimum player.

Question 3: How much money is spent by the customer in the various hotel outlets, including the gift shop, room service, long distance phone calls, gourmet restaurants, and so forth?

Answer: This question is usually raised by the independent representative as a selling point during the initial presentation of the program to management, and deserves consideration. Of course revenue will be generated in the various outlets by players participating in the program, but management must consider how much revenue will be generated. Also to be considered is whether this revenue is greater than that which would be generated from nonparticipating hotel guests occupying the same rooms.

    These associated player expenditures can be classified as breakage. The breakage should benefit the casino in terms of profit and should not

be relied upon to provide the difference between a losing program and one that only breaks even.

> *Question 4: How much is wagered by gambler's spree customers in the sports book?*

Answer: During a recent fiscal year, the gross win percentage of Nevada's sports books, before expenses, was 2.73%. Given this percentage, how much sports profit will realistically be realized from a person attracted to a program in which only $5 minimum bets are required? Again, any positive contribution that may result from this area should be considered as breakage.

> *Question 5: What is the impact if we assume that 35% of the gambler's spree customers come from the gambler's spree slot program?*

Answer: Future casino growth and profit will certainly come from the slot area. Any program that is successful in bringing in slot players at a profit is certainly valuable, but management must be concerned with profit, not merely revenue. Just because a program delivers slot players by no means ensures that the players are generating a profit to the casino-hotel.

> *Question 6: How many $10,000 and $25,000 credit line players come in who might not, ordinarily, because they can now bring their parents or friends who are smaller players?*

Answer: This may occur, but with what frequency? Even though it may be an infrequent occurrence, this situation may be routinely presented as a supporting argument to help justify the implementation or the retention of a gambler's spree program. The danger is that the argument may be presented so often that the situation appears to be the rule rather than the exception. The program should be evaluated based on the analysis presented previously in this chapter and not solely on situations such as the one described in this question.

An analogy is the story of a player who loses $100,000 playing craps while his wife is playing poker. Should this story be used as an argument for management to retain poker even though it has consistently provided a negative contribution to the casino's profit?

> *Question 7: Is the theory that the house wins one bet per hour accurate when evaluating the gambler's spree program? Is the dice shooter a wrong bettor or a right bettor? Does he take proper odds?*

Answer: First, the questions pertaining to dice will be discussed. If the player bets the pass or don't pass, the disadvantage is 1.414% and 1.402%,

respectively. A decision occurs about one time in every 3.5 rolls; therefore, the player will receive 46 decisions if the dice are rolled 160 times per hour. At a $5 flat bet, this means the player will lose $3.23 per hour.

The pass and don't pass, and come and don't come, bets will not lose one bet per hour; they will lose *only* 65% of one bet per hour. If the odds bet where the house has no advantage is considered, a $5 flat bet with $10 odds will lose the same $3.23, but the total bet is $15. Instead of the house winning 65% of one bet per hour, it becomes 22% of one bet per hour in this situation. Assuming 2 times odds, a "wrong"[3] bettor, depending on the point, can lay in odds as much as four times the flat bet. If the point was *four* with a $5 flat bet, the player will have $25 in action and the casino will win only 13% of one bet per hour. Do many players take odds? The answer is that many players will take odds.

As for blackjack, the number of bets the house wins per hour is a function of the number of decks, the rules in place, the speed of the game, and the player skill level. A basic strategy player loses just under one-half of 1% per hand. It is generally accepted that the average player's disadvantage is between 1% and $1\frac{1}{2}$% per hand, assuming six decks and Las Vegas Strip rules. For the benefit of the argument, a $1\frac{1}{2}$% house advantage will be assumed.

Customers betting in $5 increments will play on the busiest and, consequently, the slowest games. Most casinos assume, with four- or five-player game utilization, the player will be dealt approximately 80 hands per hour. At this rate, a $5 bettor will lose $6 per hour or 1.2 average bets.

The casino expects to win 3.7 bets per hour from roulette with double zero (house advantage of 5.26%) and 70 spins per hour.

Considering the preceding discussion, the one bet per hour is grossly understated if the gambler's spree program brought in only roulette players. Of the amount won by the Big-4 (blackjack, dice, baccarat, and roulette) in Nevada during a recent year, only 6.8% of the total came from roulette. If the other table games are included (i.e., sic bo, pai gow, big-6, Red Dog, etc.), then the roulette win is probably closer to 5.5% of the total. It is likely that the demographics of gambler's spree players more closely approximate the percentages for the industry.

If the gambler's spree delivered only "right" dice players who play double odds, then the one bet per hour would overestimate revenue by a multiple of five (21.3% of the total Big-4 win came from dice).

If the gambler's spree delivered only blackjack players, then the one bet per hour is understated by 20% (48.6% of the total Big-4 win came from blackjack). What if the skill level is greater than $1\frac{1}{2}$%, or fewer than six decks are used by the casino? Again, any errors in the one-bet-per-hour estimate should benefit the casino.

In summary, the preceding questions are a good representation of the many arguments for the gambler's spree; however, all of the questions dealing with associated play and expenditures apply not only to gam-

bler's spree customers, but to any hotel room guest. Are casino operators willing to consider giving away free hotel rooms? How about giving away a free hotel room and $100 cash? Either of these programs will fill the hotel rooms, but do they represent the best ways for the casino to maximize profit?

In evaluating these or any other type of casino marketing programs, management must consider the following:

1. Don't accept a program simply because a competitor is doing it.
2. Don't accept a program unless the anticipated results can be quantified.
3. Separate the hyperbole from the facts.
4. Beware of any program for which doubts are put to rest only by someone saying, "Trust me, you'll make a profit."

DEAD CHIPS AND CHIP WARRANTS

Chip Warrants   Many Asian casinos and a few in Australia offer marketing programs involving "chip warrants." A chip warrant is a casino-generated and -controlled voucher. The player presents it at a gaming table and receives an equal amount of nonnegotiable chips, also called dead chips.

For example, a player might present $100,000 at the casino cage for the purchase of a chip warrant. The casino will agree to rebate the player a percentage, usually between 1% and 3% percent of the purchase, once the nonnegotiables are lost. The nonnegotiable chips are then wagered just like normal chips; however, winning bets are paid in regular chips instead of nonnegotiable chips. Once the player has used all of the nonnegotiable chips, the regular chips in the player's possession represent winning bets and can be redeemed at the casino cage for cash. One program currently being offered at a casino in Malaysia rebates in cash to the player 1.2% of the amount of the voucher.

A version of the chip warrant program has appeared in Las Vegas under the name of *dead chip* program. In the dead chip program, a player representative, usually from an Asian country, promises to deliver players who will each bring $100,000 cash to the casino. The player agrees to make $1,000-per-hand wagers in baccarat, and the casino agrees to pick up the player's room, food, and beverage (RFB) expenses and reimburse the airfare.

In addition, the player representative expects to receive a commission from the casino as compensation for delivering the players. When the player presents the $100,000 in cash, he receives $103,000 in nonnegotiable chips. Once the $103,000 in nonnegotiable chips is gone, the player receives $102,000 in nonnegotiable chips for his second purchase of $100,000 in cash. For the third and all subsequent purchases of $100,000 in cash, the player is given $101,000 in nonnegotiables.

To effectively determine the merits of this program, management must calculate: (1) how much the program will cost and (2) how long it will take to "wash" (exchange the nonnegotiable chips for regular chips) the chips. The time necessary to wash the chips is important because management must have an idea of the hours involved to generate the necessary profits. Some of these programs require so much play time that it is unreasonable to expect any casino profits at all.

The following is an analysis of this program:

Given:

Probability of player win in baccarat	0.4462466
Probability of bank win in baccarat	0.4585974
House advantage over player bets	1.24%
House advantage over bank bets	1.06%
Probability of tie	0.095156
Nevada gaming tax rate	6.25%
Game speed	60 hands per hour
Airfare costs	$3,000
RFB costs	$500 per day

Assuming the player bets the player side, the chips are washed only when they are lost, which occurs when the "other side" wins (in this case the bank). First, determine how much in wagers is necessary before the nonnegotiables are washed:

$$0.4585974 \ X \ = \ 103,000$$
$$X \ = \ 224,598$$

If a player betting the player side loses at a rate of 0.4585974, then after $224,598 in wagers the $103,000 in nonnegotiable chips will be lost. Since the player has a disadvantage of 1.24% on player bets, the cost of the wash is calculated as follows:

$$224,598 \ \times \ 1.24\% \ = \ 2,785$$

The player's cost equals the house win. The player started with $103,000 in nonnegotiables. After wagering $224,598, only $100,215 remains, but this cost the player only $100,000 so the player has actually realized a gain of $215 on the wash transaction.

Player's initial buy-in		$100,000
Player's start in nonnegotiables	$103,000	
Player's cost of washing chips	$2,785	
Player's remaining negotiables after wash		$100,215
Net win (loss) to casino		($215)

Next, how much of this win must the casino pay in taxes?

$$\$2,785 \times 6.25\% = \$174$$

How long did it take to wash the $103,000? At a rate of 60 hands per hour and a bet size of $1,000, it takes 224.598 hands or 3.7 hours for the wash to be completed. At this point, the player has been given $103,000 in dead chips at a cost of $100,000. After the wash, the player has $100,215 remaining of his $100,000 investment, but now the chips are negotiable. So far, the casino has lost $215 but the casino must still pay the gaming tax, resulting in the casino cost being increased by an additional $174. After the first turnover, the casino has experienced:

Casino win (loss) on chip wash	($215)
Gaming tax	($174)
Casino revenue after first wash	($389)
Time necessary for chip wash	3.7 hours

The player receives $102,000 in dead chips for his second purchase of $100,000. This purchase and all subsequent purchases are calculated in the same manner. The second turnover yields the following:

Player's initial buy-in		$100,000
Player's start in nonnegotiables	$102,000	
Player's cost of washing chips	($2,758)	
Player's remaining negotiables after wash		$99,242
Net win (loss) to casino		$758

Casino win (loss) on chip wash	$758
Gaming tax	($172)
Casino revenue on second wash	$586
Time necessary for second chip wash	3.7 hours

Casino cumulative after first and second washes:

Casino win (loss) on chip wash	$543
Gaming tax	($346)
Casino revenue after *two* washes	$197
Total time for two chip washes	7.4 hours

The third and all subsequent buy-ins yield:

Player's initial buy-in		$100,000
Player's start in nonnegotiables	$101,000	
Player's cost of washing chips	($2,731)	
Player's remaining negotiables after wash		$98,269
Net win (loss) to casino		$1,731

Casino win (loss) on chip wash	$1,731
Gaming tax	($171)
Casino revenue on third wash	$1,560
Time necessary for third chip wash	3.7 hours

Casino cumulative after first, second, and third washes:

Casino win (loss) on chip wash	$2,274
Gaming tax	($517)
Casino revenue after *three* washes	$1,757
Total time for three chip washes	11.1 hours

Assuming the player's stay is for three nights and the player will play for six hours per night, it will take another two washes to equal 18.5 total hours of play time. The additional two washes of $101,000 in non-negotiables for $100,000 in cash will earn the casino another $3,120 ($1,560 × 2) in after-gaming-tax revenue. Now, the remaining costs must be addressed:

After-tax revenue through 18.5 hours of play	$4,877
Less: RFB at $500 per night	$1,500
Less: Airfare reimbursement	$3,000
Contribution before labor and departmental profit	$377

What if the player doesn't play for 18.5 hours total? In addition, the cost of the player representative's commission has not been considered. After the commission and labor costs associated with the program are calculated, the program may have a negative contribution to the casino. A program similar to this was being offered by one of the major strip casinos.

Programs such as the "dead chip" program are precarious and may result in substantial casino losses if not managed and structured properly. Programs of this type may also provide casino marketing with a viable tool to attract the premium casino customer. The rest of this section outlines the procedure for creating a successful dead chip program.

Winning banker wagers in baccarat are charged a 5% commission. Often, casinos will reduce this commission to 4% to attract premium players. This reduction in commission effectively decreases the bettor's disadvantage on banker wagers from 1.06% to 0.6% or about 43%. Unfortunately for the bettor, this decrease in house advantage applies only if he is betting the banker.

Casinos frequently provide single zero roulette games versus the more traditional double zero games. This decreases the player's disadvantage from 5.263% (double zero) to 2.703% (single zero) or about 48.65%.

A dead chip program can exceed the benefits of 4% commission baccarat by having the decrease in house advantage apply to both the banker and player bettor. In the same manner single zero roulette decreases the house advantage, a dead chip program can be structured to decrease the house advantage by as much or as little as necessary. A comparison also

exists between dead chips and rebates on loss (discussed in Chapter 15). Rebates on loss result in a reduction in the actual loss, whereas the dead chip program results in a reduction in theoretical loss.

Mathematics of the Dead Chip

The game of baccarat has the following probabilities:

Wager	Probability	Casino Advantage
Banker	0.4585974	1.0579%
Player	0.4462466	1.2351%
Tie	0.0951560	

In 4% commission baccarat, the reduction in house advantage occurs at the end of play when the total commission owed is decreased 20% (from 5% to 4%). With a dead chip program, the reduction in house advantage occurs at the beginning of play when x in dead chips is purchased for y amount in cash. On face value, y is always something less than x. For example, a player could purchase $102,000 in dead chips for $100,000 in cash, which equals a 2% dead chip bonus.

It is important to remember that the player receives all buy-ins at the cage in dead chips. This assures management that all of the chips must be lost or "washed." Some casinos that may not have completely understood dead chip mechanics have awarded only the bonus in dead chips. For instance, a $100,000 cash buy-in purchases $100,000 in negotiable chips plus $2,000 in dead chips. Structuring the program in this manner results in a player bonanza.

Using baccarat probabilities, consider how many times a $1 banker wager chip must be wagered before it is lost to the casino. The banker wager chip is lost when the player hand wins, or 44.62466% of the time.

$$0.4462466 \, X = \$1$$
$$X = 2.24091$$

Therefore, a $1 banker wager chip must be wagered 2.24091 times before being lost. In the process of making $2.24091 in wagers, the house enjoys an advantage of 1.0579% per dollar wagered, or 2.371¢ in total theoretical win (1.0579% × $2.24091).

What if the casino wanted to decrease its advantage over the player by 50%? In order to achieve this decrease, the player would have to have lost one-half the 2.371¢, or 1.185¢. The casino could return half the theoretical loss (1.185¢) after the chip is lost, or half the theoretical loss could be returned when the chip is purchased by having the player pay only 98.815¢ for a $1 dead chip ($1–1.185¢ = 98.815¢). If a 98.815¢ buy-in

purchases a $1 dead chip, the casino is awarding a 1.2% dead chip bonus ($1/0.98815 = 101.2%).

After the dead chip bonus of 1.2%, any bettor betting the banker wager is making wagers at a game in which the house advantage has been decreased 50%. Every $1 in dead chip purchases at 98.815¢ will generate 1.185¢ or 1.2% in casino theoretical win after the dead chip bonus. Since the player and banker probabilities are not the same, the same 1.2% dead chip bonus does not result in a 50% decrease in the player wager advantage.

$$0.4585974 \, X = \$1$$
$$X = 2.18056$$

A $1 dead chip wagered on the player results in $2.18056 in wagers and 2.693¢ in theoretical casino win. A 50% reduction in house advantage is achieved by returning 1.347¢ (half the 2.693¢ theoretical) once the chip is lost or at the beginning through a dead chip bonus. To realize the 50% reduction in house advantage, the $1 dead chip purchase should cost only 98.653¢ ($1 − 1.347 = 98.653¢). This equates to a 1.365% dead chip bonus ($1/0.98653 = 101.365%).

Now compare a 1.2% dead chip bonus where the bettor is betting the player hand instead of the banker hand, and a 1.365% dead chip bonus where the bettor is betting the banker hand instead of the player hand.

For the 1.2% program with the bettor wagering on the player hand

$$0.4585974 \, X = \$1$$
$$X = 2.18056$$

A $1 dead chip wagered on the player results in $2.18056 in wagers and 2.693¢ in theoretical casino win. If the bettor receives a 1.2% dead chip bonus, the dead chip would cost only 98.814¢ (1.012 X = $1, X = 0.98814) for a casino theoretical win reduction of 1.186¢ ($1 − 98.814¢). This reduces the casino theoretical win of 2.693¢ by 44%. With a 1.2% dead chip bonus, the house advantage decrease ranges from 44% to 50%, depending on the side wagered.

For the 1.365% program with the bettor wagering on the banker hand

$$0.4462466 \, X = \$1$$
$$X = 2.24091$$

A $1 banker wager chip must be wagered 2.24091 times before being lost. In the process of making $2.24091 in wagers, the house enjoys an advantage of 1.0579% per dollar wagered or 2.371¢ in total theoretical win. If the bettor received a 1.365% dead chip bonus, he received a $1 dead chip for a purchase of 98.653¢ (1.01365 X = $1, X = 0.98653). This equates to a

1.347¢ decrease in theoretical casino win for a net casino advantage reduction of 1.347/2.371 = 56.8%. With a 1.365% dead chip bonus, the house advantage decrease ranges from 50% to 56.8%, depending on the side wagered.

The following table gives examples of several dead chip bonuses and their resulting effects on banker and player wagers, given non-dead chip advantages of 1.058% banker and 1.235% player:

	Effective Casino Advantage	
Dead Chip Bonus	**Banker**	**Player**
1.50%	0.40%	0.56%
1.25%	0.51%	0.67%
1.00%	0.62%	0.78%
0.75%	0.73%	0.89%

In structuring any program, the effective casino advantages indicated in the preceding table can be used in evaluating the program. However, the amount of time necessary to generate the casino win is also a function of the bet-to-buy-in ratio. The following table lists dead chip wagers with bonuses of 1.50%, 1.25%, 1.00%, and 0.75%, and the equivalent wagers without the dead chip bonus. For example, a $500 bet on the banker with a 1.5% dead chip bonus is equivalent to a $188 banker wager or a $225 player wager without the dead chip bonus.

Bet Size	1.50%	1.25%	1.00%	0.75%	
$ 500	188.31	239.62	291.18	342.99	**Banker**
	225.63	270.80	316.18	361.79	**Player**
1,000	376.62	479.23	582.36	685.99	**Banker**
	451.27	541.59	632.37	723.59	**Player**
5,000	1,883.10	2,396.17	2,911.78	3,429.95	**Banker**
	2,256.33	2,707.96	3,161.83	3,617.95	**Player**
10,000	3,766.20	4,792.34	5,823.56	6,859.90	**Banker**
	4,512.66	5,415.91	6,323.67	7,235.91	**Player**

The casino should not issue chips less in value than 1% of the dead chip purchase. For example, $100,000 in dead chips should be issued in denominations of no less than $1,000. If each dead chip were wagered on the banker, it would be necessary to make 224.091 total wagers (100 x 2.24091) to lose 100 dead chips. If the bettor were to receive 50 hands per hour, it would take 4.48 hours for the casino to win one half what it nor-

mally would win if the bettor received a 1.2% dead chip bonus.

When structuring the program, casino management should think in terms of how much the casino advantage needs to be decreased to attract the premium customer. Once this is determined, a dead chip bonus can be constructed that results in the decreased house advantage. All expenses associated with the program, including complimentaries, airfare, and gaming taxes, can then be addressed using the lower casino advantage to ensure an acceptable profit margin. It is important that the 5% commission owed the casino from the winning banker wagers be paid *only* with negotiable chips. The preceding analysis assumes the only way a dead chip is washed is if it is lost.

Table 14.2 indicates how much in wagers will be generated with a given cash buy-in along with the indicated dead chip bonus. For example, a $1,000,000 cash buy-in with an additional 1.5% in dead chip bonus will require $2,274,527 in banker wagers before the dead chips are lost.

Dead Chip Commission

Some casinos may elect to award the dead chip bonus *after* the termination of play rather than at the time of the buy-in. The player will pay 100% of the face value of the dead chips and, when the dead chips are lost, will receive a cash refund equal to the dead chip bonus. For example, the player buys in for $3,000,000 and receives $3,000,000 in dead chips. Once the dead chips are lost, the player will be refunded an amount equal to the dead chip bonus in cash.

The previous analysis assumed the bonus was awarded in dead chips. If the bonus was awarded in cash, the analysis is much the same and the expected theoretical win changes little. For example, a player purchases $3,000,000 in dead chips with the understanding that once the dead chips are gone he will receive a refund equal to 1.25% of the original purchase in cash (assumes player wagers).

$$X = \$3,000,000$$
$$0.4585974\, X = \$6,541,686$$

On average, the player must make wagers totaling $6,541,686 before his dead chips are lost. The house advantage on each dollar wagered is 1.2351%. Therefore, the casino's theoretical win before the refund equals:

$$\$6,541,686 \times 1.2351\% = \$80,796$$

Once the dead chips are gone, the player is refunded $37,500 and the casino's net win is reduced to $43,296 ($80,796 − $37,500). Notice that Table 14.2 lists the casino's net win at $44,305. The difference between the

Table 14.2 Wagers and Wins Given Varying Buy-ins and Dead Chip Bonuses

Total Cash Buy-In	Total in Banker Wagers Before Dead Chips Lost with Bonus of:					
	1.50%	1.25%	1.00%	0.75%	0.50%	0.0%
$ 500,000	1,137,264	1,134,462	1,131,661	1,128,860	1,126,059	1,120,457
$1,000,000	2,274,527	2,268,925	2,263,323	2,257,720	2,252,118	2,240,913
$1,500,000	3,411,791	3,403,387	3,394,984	3,386,580	3,378,177	3,361,370
$2,000,000	4,549,054	4,537,850	4,526,645	4,515,441	4,504,236	4,481,827
$2,500,000	5,686,318	5,672,312	5,658,306	5,644,301	5,630,295	5,602,284
$3,000,000	6,823,581	6,806,775	6,789,968	6,773,161	6,756,354	6,722,740

The above total in wagers will generate the following in theoretical win after the effect of the dead chip bonus (banker bets).

Total Cash Buy-In	Net Casino Win Betting Banker After Dead Chip Bonus of:					
	1.50%	1.25%	1.00%	0.75%	0.50%	0.0%
$ 500,000	4,531	5,752	6,972	8,192	9,413	11,853
$1,000,000	9,062	11,503	13,944	16,385	18,825	23,707
$1,500,000	13,594	17,255	20,916	24,577	28,238	35,560
$2,000,000	18,125	23,006	27,888	32,769	37,651	47,414
$2,500,000	22,656	28,758	34,860	40,961	47,063	59,267
$3,000,000	27,187	34,509	41,832	49,154	56,476	71,120

Total Cash Buy-In	Total in Player Wagers Before Dead Chips Lost with Bonus of:					
	1.50%	1.25%	1.00%	0.75%	0.50%	0.0%
$ 500,000	1,106,635	1,103,909	1,101,184	1,098,458	1,095,732	1,090,281
$1,000,000	2,213,270	2,207,819	2,202,367	2,196,916	2,191,465	2,180,562
$1,500,000	3,319,905	3,311,728	3,303,551	3,295,374	3,287,197	3,270,843
$2,000,000	4,426,541	4,415,638	4,404,735	4,393,832	4,382,929	4,361,124
$2,500,000	5,533,176	5,519,547	5,505,919	5,492,290	5,478,662	5,451,405
$3,000,000	6,639,811	6,623,457	6,607,102	6,590,748	6,574,394	6,541,686

Total Cash Buy-In	Net Casino Win Betting Player After Dead Chip Bonus of:					
	1.50%	1.25%	1.00%	0.75%	0.50%	0.0%
$ 500,000	6,168	7,384	8,601	9,817	11,033	13,466
$1,000,000	12,336	14,768	17,201	19,634	22,066	26,932
$1,500,000	18,503	22,152	25,802	29,451	33,100	40,398
$2,000,000	24,671	29,537	34,402	39,267	44,133	53,863
$2,500,000	30,839	36,921	43,003	49,084	55,166	67,329
$3,000,000	37,007	44,305	51,603	58,901	66,199	80,795

two amounts is the result of a cash refund at the end of play versus a dead chip bonus at the beginning of play.

GENERAL SLOT MARKETING

Most slot marketing is database driven, but casinos also offer promotions designed to increase the overall business level and, it is hoped, increase slot club enrollment in the process. The database is composed of entries stemming from slot club enrollment. Upon enrollment the payer is issued a card to be placed in the machine while gaming. Most casinos award club points based on a formula derived from coin-in. The accumulation of points results in cash-back awards, comp dollars earned, or some other form of benefit to the customer. There are many variations of the basic point accumulation and redemption process. A more important issue is the effectiveness of the clubs in establishing relationships and building loyalty. Do slot clubs build loyalty or merely serve as elaborate discount vehicles? Is the traditional form of slot club appropriate for all properties? These questions are crucial to the success of the programs, but difficult to answer.

Slot clubs are generally effective as information-gathering tools. Most casinos have developed extensive information-gathering infrastructure and processes. However, if the charge of the club is to learn more about the customer with the intention of building loyalty or strengthening customer relationships, the overall process should be further examined. For instance, the marketing literature is replete with examples of the negative relationship between loyalty behavior and coupon-, price-, or deal-prone customers. Do slot clubs attract price-sensitive members loyal to the most attractive cash-back offer but not to the property itself? This question is important in markets such as Las Vegas where customers may be members of several slot clubs. The intense competition to grow club membership may result in *revenue buying* in these competitive markets, which can ultimately lead to profit erosion. Great care should be taken in the measurement of the incremental effects associated with all offers, as examples of negative cash flow promotions are far from rare.

For example, researchers have produced results supporting the inability of drawing-based promotions to generate sufficient incremental cash flow to offset the amount of cash prizes awarded to the participants (Lucas & Bowen, 2002). With respect to cash mail or direct mail programs, results vary according to the market, the promotional activity of the competitors, and the offers. Researchers have produced results that support the existence of both successful and unsuccessful direct mail campaigns (Lucas & Brewer, 2001; Lucas & Santos, 2003). In light of these mixed results, and given that no two casinos are alike, it is recommended that casino executives rigorously examine the effects of direct mail offers with data generated from the property sponsoring the offer. A thorough analy-

sis of promotional efforts can save millions of dollars annually and possibly prevent future losses by identifying the offer limits of disloyal slot club segments.

Cash Mail

Cash mail or direct mail promotions consist of tiered offers in the form of cash incentives. Databases are usually segmented according to a player's average daily theoretical (ADT). This ADT is used by slot marketers to assign value to players. The value of the direct mail or cash mail offer is often a function of the ADT. As these offers are more popular in markets featuring a repeater clientele, the promotional goal may be to generate an additional trip. However, extended use of these offers has lead some slot marketers to believe that club members now perceive the offers as entitlements or a modified form of a cash-back program. Some Las Vegas casinos have modified these programs using technology that requires players to wager any promotional bonus at least one time. At a minimum, this reduces the cost of the offer by an amount equal to the bonus multiplied by the theoretical advantage of the game on which it was redeemed. The bonus play-off requirement also prevents "walkouts," defined as members who redeem offers without gaming on the same day. Although this technology eliminates the walkout problem, it may damage customer relations in the short term by conflicting with their perceptions of entitlement.

Restaurants and Slots

A popular notion in the gaming industry holds that restaurant operations can be effectively utilized to generate slot play. This view is particularly popular in markets characterized by a repeater clientele, such as the Las Vegas locals' market and many riverboat markets. Studies have both supported (Lucas and Santos, 2003) and refuted (Lucas and Brewer, 2001) this hypothesis. Just as the success of cash mail programs varies by market and property, so too does the relationship between restaurant and slot volume. Therefore, it is once again recommended that casino executives test related theories using data generated at the property in question. Further, it is recommended that future analysis focus on the relationship between cash covers (restaurant head counts) and coin-in, as the inclusion of covers resulting from complimentary awards is likely to cause artificial correlation with gaming volume measures.

Food Loss Leaders

Some casinos are capable of losing millions of dollars annually in the operation of food outlets. The likelihood of incurring substantial food department losses increases when the restaurants are casino-operated. The justification for these losses is the aforementioned theory that restaurant

volume drives casino volume. Given this position, it would be beneficial to know how much casino volume is generated by a restaurant cover. Further, how much casino volume is necessary to offset food losses? If meal prices are decreased far enough, is it not possible that the deep discounts will begin to attract value-conscious meal shoppers with no interest in gaming? Given the potential magnitude of food losses, these are difficult but important questions to address for those subscribing to the theory that food outlets drive casino volume. Any further empirical research in this area would be of extreme practical value.

Many Las Vegas Strip properties have decided to contract outside restaurant companies to operate all or some of the restaurants. One successful Las Vegas Strip property does not operate any of its food outlets, including the employee cafeteria. This strategy eliminates substantial losses from food operations and creates lease income. However, this strategy is not without limitations, as the casinos forfeit some degree of control over the quality of the food operations under the typical lease arrangement. Other limitations include the flexibility of operating hours, as most hotel casinos require 24-hour room service and a 24-hour coffee shop or buffet. It can be difficult to find a suitable restaurant operator willing and able to successfully manage 24-hour operations. Leased restaurant outlets can also impact the marketing tactics of those casinos that cater to premium players or operators that freely issue food comps. Although a discount for comp meals is usually negotiated with the restaurant company, once the operations are transferred to an outside vendor, food comps will no longer be soft costs. A hotel casino should carefully weigh the benefits and limitations of outsourcing restaurant operations. It is likely that a hybrid approach will be the best solution for most hotel casinos.

Drawing-based Promotions

Drawing-based promotions are also popular in repeater markets, as the duration often exceeds three weeks and the chances of winning increase with the amount of play during qualifying periods. There are an infinite number of variations on this theme, so this discussion is limited to the basic form. Customers earn tickets for drawings by hitting top award jackpots on slot machines during the qualifying period of a promotion. One part of these numbered, two-part tickets is placed in a drawing drum, with the matching part retained by the customer. On selected days, drawings are held featuring guaranteed cash prizes of varying amounts. In the Las Vegas locals' market the guaranteed cash prize pools for a month-long promotion often exceed $200,000, with some approaching $1 million. Despite the magnitude of the prize pools, little is known about the incremental effect of these promotions on property cash flows. Only one published study has addressed this concern. The results failed to support a positive contribution to property cash flows at a Las Vegas hotel casino (Lucas & Bowen, 2002).

Acquire, Retain, and Recover

Most slot marketing efforts can be classified in three categories: customer acquisition, customer retention, and customer recovery. Customer acquisition involves activities such as mass mailings and appending databases in search of new sources of quality customers. General drawing-based promotions and general advertising may also be considered as acquisition efforts. Customer retention efforts are usually composed of direct mail campaigns involving cash gaming incentives or food offers. Other forms include random bonus promotions, for those with the necessary technology, and special events, which are usually directed at premium customers. A slot tournament is an example of an event-based promotion. Slot club member appreciation parties are also a popular customer-retention tool. Finally, players discontinue patronage for various reasons. Casinos that wish to recover the valued business of lost customers engage in any of several ploys to regain a player's patronage. Typically, the value of cash gaming incentives is increased to lure lost customers back to the property. When possible, recovery efforts may include customer interviews designed to discover or better understand any service delivery issues related to a lapse in patronage or dissatisfaction.

CONSUMER CHOICE FACTORS

Another crucial issue for casino developers and executives is the identification of consumer choice factors, in other words, the discovery of property attributes deemed important to customers regarding the choice of one casino over others. This question has gained the attention of researchers, especially within competitive markets characterized by a repeat clientele. The answer to the choice factor question is likely to vary by market, as certain competitive and operating parameters are unique. For example, there are bound to be differences between the competitive, economic, and regulatory landscapes of the Chicago riverboat market and the Las Vegas locals' market.

The results of consumer surveys across three different repeater markets (i.e., Chicago-area riverboats, Las Vegas locals, and Mississippi locals) have indicated general convenience of the casino location as the only common factor (Lucas & Bowen, 2002; Lucas & Brewer, 2001; Lucas & Santos, 2003). In the Las Vegas sample, an item described as "It is an easy drive from where I live" received the highest percentage of top-box ratings (i.e., a rating of 9 or 10) on a 10-point Likert-type scale. The Mississippi market survey included very similar language in a general location construct, found to significantly influence repeat purchase intentions of casino patrons. In terms of response frequency, "closest location" was second only to "favorite place to play" in a survey designed to discover attributes important to the casino patronage decision of Chicago-area riverboat customers.

Choice Factor Results Summary

Chicago-Area Riverboat Patrons   The following table (adapted from Turco & Riley, 1996, pp. 24–29) lists the four most frequently identified factors in the decision to patronize one casino over another. Immediately following each item is the percentage of the sample that identified that factor as important in their choice process.

Survey Item	Response Frequency
Favorite place to play	31.3%
Closest location	25.7%
Recommended by friend/relative	14.0%
Lucky/won there before	13.8%

Las Vegas Locals' Sample   The following table (adapted from Shoemaker & Zemke, 2003) lists the property attributes receiving the greatest number of top-box ratings with regard to their importance in the consumer choice process. In total, the study included ratings for 24 attributes. Immediately following each listed item is the percentage of the sample that ranked that item as a 9 or 10 (i.e., a top-box rating) on the 10-point Likert-type scale.

Survey Item	Top-Box Ratings
It is an easy drive from where I live.	59.5%
You feel safe there.	57.9%
Employees are friendly and courteous.	52.1%
A good place to take out-of-town guests.	48.7%
Convenient parking always available.	47.4%
I want to eat at one of the restaurants.	45.5%
The restaurant I eat at offers great value.	41.9%

Mississippi Sample   The following table (adapted from Richard & Adrian, 1996, pp. 25–39) lists the results of a data reduction technique known as factor analysis. The listed factor names are intended to represent the core meaning of the individual survey items from which they are derived. Originally, the survey included 27 items, but the factor analysis indicated those items could be more economically expressed in a 6-factor solution. The listed factors all produced a positive and statistically significant effect on repeat purchase intentions. Immediately following each factor is its regression coefficient, representing the estimated increase in the repeat purchase intention score resulting from a one-unit increase in the factor score. For example, a one-unit increase in the Amenities factor

score would produce a 0.55-unit increase in the Repeat Purchase Intention score. Respondents rated their repatronage intentions on a 7-point Likert-type scale.

Factor Name	Regression Coefficient
Availability of games	1.83
Location of the casino	1.34
Hospitality	0.85
Attitude of employees	0.59
Building attractiveness/cleanliness	0.57
Amenities	0.55

The coefficients associated with the Amenities and Hospitality factors should be interpreted with caution, as this portion of the solution demonstrated questionable interpretability. It is our opinion that the items loading on these factors lacked a common foundation. The Hospitality factor was composed of three items related to the quality of the food outlets, but also included items related to beverage service, entertainment quality, and the availability of hotel rooms. The Amenities factor included items designed to measure the availability of valet parking and miscellaneous attributes such as check-cashing service and ATM machines. Also included in the Amenities factor was an item addressing the level of security provided. Because of the diverse nature of the items loading on these two factors, it is difficult to determine their managerial utility.

The results indicate the aforementioned diversity of gaming markets. It is not likely that the general availability of games would ever be the highest-rated repatronage factor in the Las Vegas locals' market. However, additional research would have to be conducted before formal comparisons could be made across markets, as each of the studies reviewed here employed a different survey instrument. With regard to the consumer choice process, the existing studies provide a start position, but it is recommended that casino executives conduct original research within their respective markets.

It is important to remember that these studies addressed casinos that rely on a customer base largely composed of frequent repeat visitors and/or day-trippers. It is likely that attributes such as shows and attractions would be more important to Las Vegas Strip visitors, as the competitive landscape of that market is substantially different from a locals' or day-tripper market. In general, the results of the previously reviewed studies are more applicable to Native American, riverboat, or locals' market casinos than to casinos operating in destination markets such as the Las Vegas Strip.

1. This 7.5-cent casino win assumes the casino keeps 100%. This is not the case, since the win is shared with the state through gaming taxes. In Nevada, a 6.25% tax rate means that the casino keeps only 93.75% of the total win. Consequently, of the 7.5-cent casino win, the casino nets only 7.03 cents after gaming tax.

2. $1.5\%/2 = 0.75\%$, $50\% - 0.75\% = 49.25\%$, and $50\% + 0.75\% = 50.75\%$.

3. A "wrong" bettor is one who bets the dice will seven out. For example, he will bet: don't pass, don't come, and lays the point numbers. The opposite or "right" bettor bets the pass, come, places the numbers, and buys the numbers.

CASINO MARKETING II

REBATES ON LOSS

Faced with growing competition for premium players, many casinos have begun offering rebates to premium players who incur a loss. Typically, the player is told that she will receive a discount of x percent when incurring a loss. If a player is given a 10% discount, the player is required to repay the casino only 90% of her losses while still receiving 100% of the amounts won from the casino.

It is rumored that one of the larger strip casinos offered discounts of up to 25% to a few of its biggest bettors. If casino management has a thorough understanding of the implications and costs associated with offering discounts on losses, it is conceivable that this type of marketing program can be successful. The casino may be courting disaster, however, if the program is not properly structured.

Rebates on loss can cost the casino several times the amount actually earned. *Only* when the theoretical casino win equals the player's actual loss does a 10% loss rebate actually cost the casino 10%. The costs are greater at any point prior to this level of equilibrium being attained. If the total hands played by the player are small, the cost is much greater than the amount the casino will win. Since casino management has no idea of what will happen in the short term, a program must be adopted that is certain to be profitable in the long term.

Rebates on loss are most common in baccarat. For the purpose of the following analysis, baccarat probabilities will be used.

Player hand wins	44.62466%
Bank hand wins	45.85974%
Tie hands	9.5156%
	100%

To illustrate how rebates work, a simple one-hand scenario with the player betting the player side (the preceding probabilities will be rounded to two decimal points) will be examined. The player will win 44.62% of

the time and lose 45.86% of the time. On average, the house will earn 1.24% of the total amount wagered.

Assume 10,000 players each placed a single $1 bet on the player side. The players who lose receive a 10% rebate, and winning players are paid 100%. Approximately 4,586 players lose (45.86% times 10,000) and 4,462 players win (44.62% times 10,000), resulting in the casino netting a total of $124 (1.24% times $10,000).

If the players who lost were returned 10% of the amount they lost, the total rebate would equal $458.60 (10% times $4,586). As the example illustrates, the casino nets only $124 while returning $458.60 to the players through rebates. The cost on a per-hand basis is 370% ($458.60 divided by $124) of what the casino wins.

The example will now be expanded to one player playing N number of hands. In Chapter 19, a probability distribution is created for one player playing 100 hands. This same distribution can be used to calculate the cost of a rebate on loss at $N = 100$. In order to accomplish this, the probability of the casino winning between zero and the mean casino win of $617.50 must be calculated. The $617.50 represents the casino's expected value.

Now, refer to the normal curve in Chapter 19 (Fig. 19.1). To calculate the cost of a rebate on loss, the following must be determined: (1) the expected value (i.e., the mean) and (2) the standard deviation for the entire play in dollars. In the previous example, the player bets the player side in baccarat with probabilities of 0.4462466 and 0.4585974, respectively, for the player and bank.

	−3σ	−2σ	−1σ	μ	+1σ	+2σ	+3σ
Casino:							
$ Net:	−13,650.50	−8,894.50	−4,138.50	+617.50	+5,373.50	+10,129.50	+14,885.50
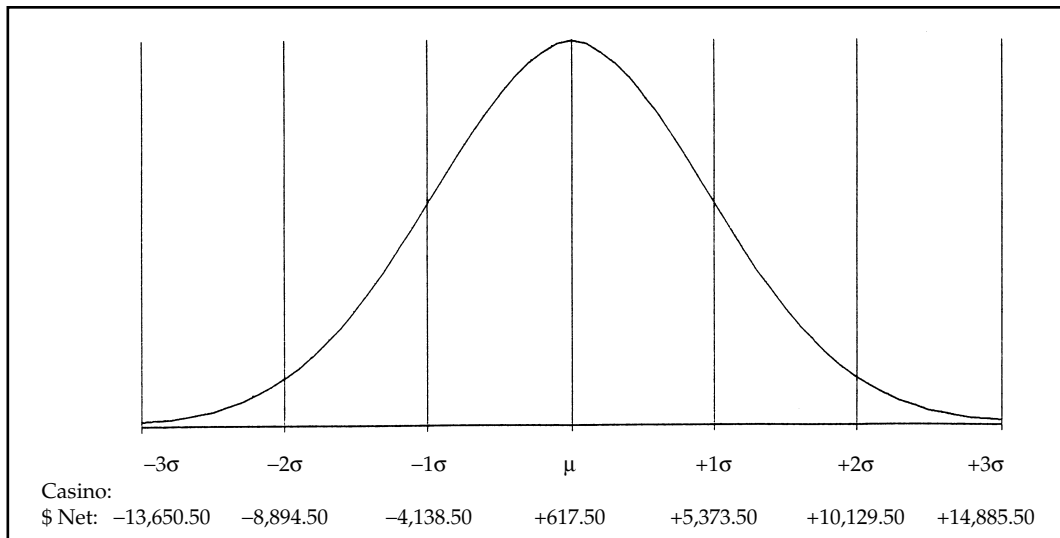
Figure 15.1   Probability Distribution of 100 Bets of $500 on Player Side in Baccarat

The expected value per hand is calculated as follows:

(amount of win $\times$ probability of win) + (amount of loss $\times$ probability of loss) $=$ expected value

When the player wins on the player bet, the win is one unit (in this example assume $500 is one unit), and this occurs 44.62% of the time. When the player loses, the loss is also one unit and a loss occurs 45.86% of the time.

As a result, the *expected value per hand* equals:

$$(+500 \times 0.4462466) + (-500 \times 0.4585974) = 6.175$$

The player is playing 100 hands, so $6.175 is then multiplied by the total number of hands played. The resulting expected value (mean) for the entire 100 hands equals $617.50 ($6.175 $\times$ 100).

The standard deviation formula is:

$$\sqrt{\text{bet size}^2 \times \text{number times bet is made}} \times \text{standard deviation per dollar wagered}$$

The standard deviation of the entire play for a player who makes 100 bets of $500 each with a per dollar standard deviation of 0.9512 is calculated as follows:

$$\sqrt{\$500^2 \times 100} \times 0.9512 = \$4,756$$

Figure 15.1 demonstrates that the casino will win at least $617.50 (mean or expected value) 50% of the time, because one-half of the graph lies on each side of the mean. The casino winning $0 (zero) lies somewhere (on the horizontal axis) to the left of the mean. The total area of the graph lying to the right of the casino winning $0 must be determined since *any* casino win is subject to the rebate.

To determine the percentage of the curve between zero and $617.50, the "z score" must be calculated and then a "z" table must be used to find what percentage of the normal curve the z score represents (see Appendix). The z score specifies how far a raw score is from the mean in standard deviation units. In this case, zero is the raw score and $617.50 is the mean.

If X equals the raw score and $\overline{X}$ the expected value (mean), then the formula for the z score is:

$$z = \frac{X - \overline{X}}{\text{standard deviation}}$$

Since the objective is to find the area between zero and $617.50, the formula reads:

$$z = \frac{0 - 617.50}{4{,}756}$$

$$z = -0.13$$

Next, the z tables must be used to determine the percentage of the normal curve the z score represents. The following is a section from the z table:

z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.1	03.98	04.38	04.78	05.17	05.57	05.96	06.36	06.75	07.14	07.53
0.2	07.93	08.32	08.71	09.10	09.48	09.87	10.26	10.64	11.03	11.41

The negative sign on the z score indicates that the raw score is left of the mean. To locate the proper z score, first go to the row represented by the tenth-place decimal in the z score. In the example -0.13, the row 0.1 represents the tenth-place decimal (0.1). Then go to the column that represents the hundreth-place decimal in the z score, which is 0.03. Where the row (0.1) and column (0.03) intersect is the correct z score (5.17%).

   This intersection point tells us that 5.17% of the curve is between zero and the mean. Consequently, 5.17% of the time, the house will net between zero and $617.50. Since we know that 34.135% of the time the house will net between $617.50 and $5,373.50, 39.3% of the time (34.135% plus 5.17%) the house will net between zero and $5,373.50, as shown in Fig. 15.2. (See Chapter 19 for more information.)

   Since the casino earns only $617.50 and the rebate returns $237.70 to the player, this program, where 10% of a player's loss is returned, costs the casino 38.49% (237.70/617.50) of the amount won.

   A more accurate calculation of the cost of a rebate program can be obtained by creating smaller divisions, as shown in Fig. 15.3.

   As the number of divisions is increased, the accuracy of the cost estimate improves. Now with more divisions, the estimated cost is 35.01.% (216.19/617.50), as compared with 38.49% (237.70/617.50).

   Consider a 25% rebate program at 100 hands.

Area Between Points (i.e., frequency of rebate)	5.17%	19.15%	14.98%	9.19%	4.4%	1.66%	0.48%
Average player loss between points	308.75	1,652.13	4,030.13	6,408.13	8,786.13	11,164.13	13,542.13
25% rebate	77.19	413.03	1,007.53	1,602.03	2,196.53	2,791.03	3,385.53
Frequency times 25% rebate	3.99	+79.10	+150.93	+147.23	+96.65	+46.33	+16.25 = 540.48

2.14%   13.59%   ↑5.17%↑ 34.135%   ↑ 13.59% ↑ 2.14% ↑

↑ **39.305%** ↑

Casino:

$ Net	-13,650.50	-8,894.50	-4,138.50	+0	+5,373.50	+10,129.50	+14,885.50

Average Player Loss	**2,686.75**	**7,751.50**	**12,507.50**
10% Rebate	268.68	775.15	1,250.75
Frequency of Rebate	39.305%	13.59%	2.14%
Frequency times Rebate	**105.59 +**	**105.34 +**	**26.77 = 237.70**
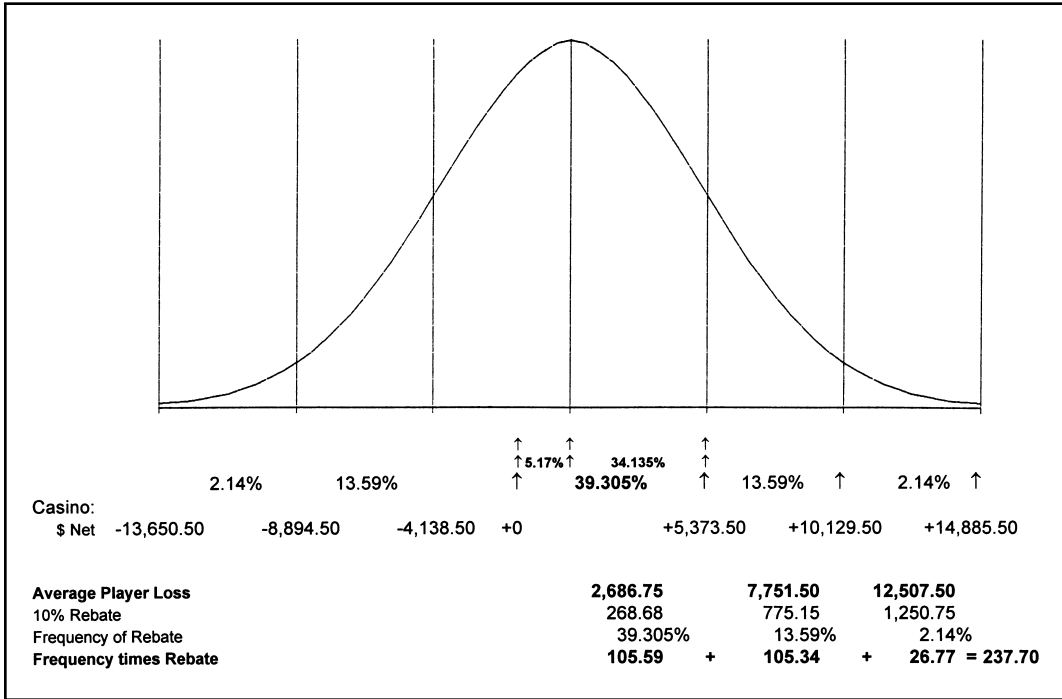
Figure 15.2   Cost of a Rebate Program

$ Net	0	617.50	2,686.75	5,373.50	7,442.75	10,129.50	12,198.75	14,885.50
Area Between Points (i.e., Frequency of Rebate)		5.17%	19.15%	14.98%	9.19%	4.4%	1.66%	.48%
Average Player Loss Between Points		308.75	1,652.13	4,030.13	6,408.13	8,786.13	11,164.13	13,542.13
10% Rebate		30.88	165.21	403.01	640.81	878.61	1,116.41	1,354.21
Frequency Times 10% Rebate		**1.60 +**	**31.64 +**	**60.37 +**	**58.89 +**	**38.66 +**	**18.53 +**	**6.50 = 216.19**
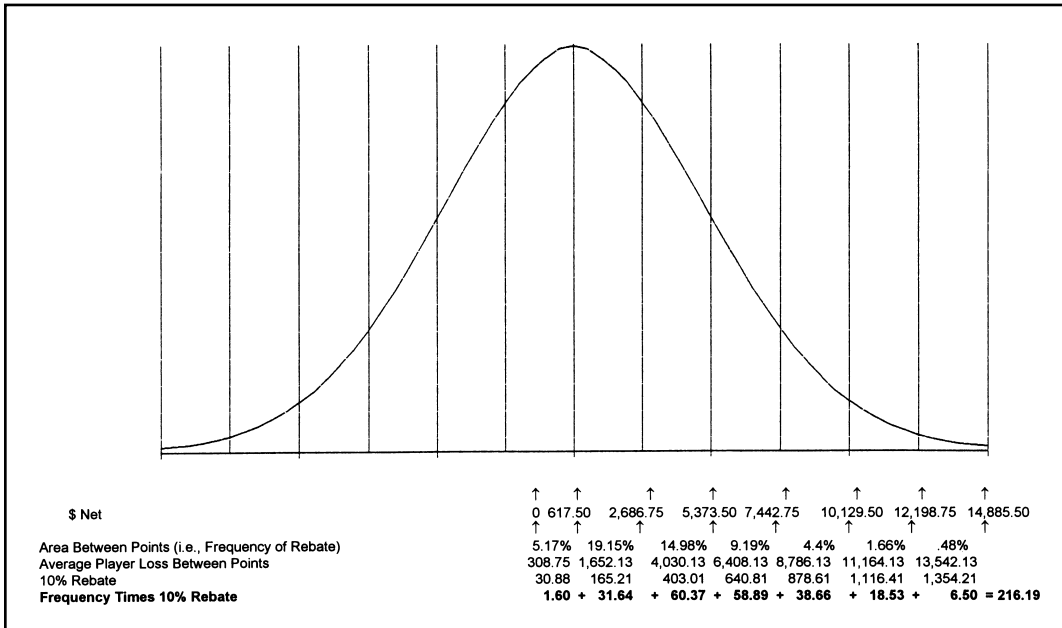
Figure 15.3   Cost of a Rebate Program (Greater Divisions)

With a 25% rebate and $N = 100$, the casino is returning 87.5% ($540.48 divided by $617.50) of the amount won.

The preceding analysis assumes the player wagers at a constant amount (flat bet). What if this isn't the case? A player who plays 999 hands at $1 and then plays one at $1,000 should not be treated as playing 1,000 hands. In this example, the 999 hands played essentially mean nothing. The actual win or loss is determined by the one large bet. The rebate should be treated as $N = 1.99$.

Andrew MacDonald, former casino manager at Conrad Jupiters Casino on the Gold Coast in Australia, has done much work on the subject of player rebates on loss. MacDonald's casino tracks each player's betting. If the amount wagered varies, he divides the total wagered by the largest bet to determine the proper size of N to use. He has prepared a schedule that is presented to each player in this program. The player knows exactly how his rebate will be calculated, and MacDonald's system assures the casino an acceptable profit margin.

If the player mentioned earlier were to ask for a rebate at the Conrad Jupiters Casino, the casino would total the amount wagered ($1,999) and divide it by the largest bet ($1,000). An N equal to 1.99 certainly would not qualify for much of a rebate, even though the player did play a total of 1,000 hands.

Mr. MacDonald has kindly provided the formula used in his baccarat rebate on loss calculations. Instead of determining what a fixed rebate amount costs the casino, he uses the formula to determine how much the casino is willing to return in theory and calculates the loss rebate that will equal that amount. The following, although not exact (35.01% using formulas previously described), provides an excellent means for quickly evaluating a baccarat rebate program.

$$b = a \times \frac{(yN) \times \sqrt{N}}{(0.5(yN) \times \sqrt{N}) + (0.171 \times (yN)^2) + 0.408\,N}$$

where

a = amount of theoretical win casino is willing to rebate
b = rebate on loss percentage to equal a
N = number of nontie hands played
y = game theoretical advantage

Example:

$N = 1,000$
$y = 1.36\%\ (0.0136)$
$a = 50\%\ (0.50)$

$$b = 0.50 \times \frac{(0.0136 \times 1,000)\sqrt{1,000}}{(0.5(0.0136 \times 1000)) \times \sqrt{1,000}) + (0.171 \times (0.0136 \times 1,000^2) + (0.408 \times 1,000)}$$

$b = 32.85\%$

According to MacDonald's formula, a casino willing to return 50% of its theoretical win would rebate 32.85% of a player's actual loss after 1,000 hands. Remember, this 1,000 is nontie hands and assumes level betting. To determine exactly how many hands must be dealt for a player to receive 1,000 nontie hands, another 10.5% must be added to the hands dealt (1,000 plus 10.5% equals 1,105 hands).

In order to determine how much a given rebate on loss actually costs, the following would be used:

$$b = \text{rebate as percent of actual loss}$$
$$a = \text{cost of rebate}$$

$$a = \frac{\dfrac{b}{yN \times \sqrt{N}}}{(0.5(yN) \times \sqrt{N}) + (0.171 \times (yN)^2) + 0.408N}$$

Example:

$$N = 900$$
$$y = 1.36\% \ (0.0136)$$
$$b = 10\% \ (0.10)$$

$$a = \frac{\dfrac{0.10}{12.24 \times 30}}{(0.5(12.24) \times 30) + (0.171 \times (12.24)^2) + (0.408(900))}$$

$$a = 15.7\%$$

The cost of the rebate is 15.5% if calculated using the formulas described previously in this chapter. If the casino is to rebate 10% of a player's actual loss, and requires 900 nontie hands of play, the ultimate cost of this proposition is 15.5% of the total the house wins. MacDonald's formula assumes baccarat bets where the standard deviation is close to 1, as well as level betting. This formula is inappropriate if the player is playing a highly volatile game, such as betting straight-up in roulette, or if the player is significantly varying his bets.

As indicated earlier, the player must first play an acceptable number of hands for rebates to be profitable and, second, erratic betting should be adjusted to reflect the effective number of hands played. The casino should not gamble with a particular type of program. If the casino is to avoid gambling on a program, management must understand that the selection of rebate amounts and conditions is critical to the success of the program.

A profitable rebate on loss program must be carefully structured. The following principles should be considered when styling a profitable rebate-on-loss program.

1. *The total number of hands played.* Casino advantage decreases as the total hands decrease.

2. *The placement of the bet on either the player or banker side.*   A banker bet has a different casino disadvantage and different probability of occurring than a player bet. Consequently, a given rebate's affect on the casino advantage is dependent on the side where the bet is placed.

3. *The volatility of the betting.* Casino advantage decreases as the betting becomes more volatile. Casino management will typically describe a player's action in terms of "average bet." As far as rebates on loss are concerned, the average bet is not a true indicator of the actual reduction in casino advantage unless the average bet is the result of flat bets.

Any rebate on loss is a sacrifice in the casino advantage. The best-case scenario for casino management is when the average bet equals a flat bet. As the variance in the betting increases, the sacrifice in casino advantage increases because player wins become larger and player losses become larger. Anything done by the player that increases the win/loss fluctuations increases the amount rebated.

To best understand this, first consider two players in roulette with each betting $1,000 per spin for 100 spins, and with each receiving a 10% rebate on loss. One player bets a color (even-money payoff) while the other bets one number straight-up. Each player will lose at the same theoretical, but the straight-up player's wins and losses will be much more extreme than those of the color bettor.

While the roulette example applies to volatility resulting from the probability of the win or loss and the payoff rate, the same applies to volatility as a result of variances in betting. A bettor with a flat bet of $500 will result in a much lower sacrifice in casino advantage than a player who bets $1 for half the bets and $999 for the other half. In both cases, the casino theoretical win is the same; however, the bettor betting $1 and $999 will experience much larger wins and losses than the flat $500 bettor. Both players will generate the same theoretical win, but the amount returned in the form of a rebate on loss will be greater for the $1 and $999 bettor than the flat $500 bettor.

Tables 15.1 through 15.4 show the effects of various rebates on loss at specific levels of hands played. Tables 15.1 and 15.3 indicate the effect the rebate on loss has on the casino advantage for banker and player bettors, respectively. Without a rebate, banker bettors have a theoretical disadvantage of 1.06% and player bettors have a disadvantage of 1.24%. At 300 hands played, a banker bettor receiving a 20% rebate on loss has a theoretical disadvantage of 0.52% of the total wagered instead of the non-rebate disadvantage of 1.06%.

Tables 15.2 and 15.4 indicate the equivalent bet required by a bettor not receiving the rebate. At 300 hands played, a $1,000-per-hand banker bettor receiving a 20% rebate on loss has the same earning potential for the casino as a $488-per-hand banker bettor *not* receiving the rebate.

Considerations in evaluating Tables 15.1– 15.4:

- The rebate-on-loss agreement should be conditioned so that the player must play x number of hands to receive y rebate on loss. If casino marketing requires an after-rebate advantage of at least 0.75%, a graduated schedule should be prepared that specifies the rebate as a function of hands played. For example, at least 50 hands are required to receive a 5% rebate, 250 hands to receive a 10% rebate, 650 hands to receive a 15% rebate, and 2,000 hands to receive a 20% rebate on loss. If the baccarat bettor wagers the player instead of the banker, the

Table 15.1 Banker Bets in Baccarat (1.06% Casino Advantage) Effective House Advantage after Rebate

Hands Played			*Rebate as Percentage of Actual Loss*		
	5%	10%	15%	20%	25%
50	0.77%	0.48%	0.19%	−0.98%	−0.39%
100	0.85%	0.63%	0.42%	0.21%	−0.01%
150	0.88%	0.70%	0.52%	0.34%	0.16%
200	0.90%	0.74%	0.58%	0.42%	0.26%
250	0.91%	0.77%	0.62%	0.48%	0.33%
300	0.92%	0.79%	0.65%	*0.52%*	0.38%
350	0.93%	0.80%	0.68%	0.55%	0.42%
400	0.94%	0.82%	0.69%	0.57%	0.45%
450	0.94%	0.83%	0.71%	0.59%	0.48%
500	0.95%	0.83%	0.72%	0.61%	0.50%
550	0.95%	0.84%	0.73%	0.63%	0.52%
600	0.95%	0.85%	0.74%	0.64%	0.53%
650	0.96%	0.85%	0.75%	0.65%	0.55%
700	0.96%	0.86%	0.76%	0.66%	0.56%
750	0.96%	0.86%	0.77%	0.67%	0.57%
800	0.96%	0.87%	0.77%	0.68%	0.58%
850	0.96%	0.87%	0.78%	0.68%	0.59%
900	0.97%	0.87%	0.78%	0.69%	0.60%
950	0.97%	0.88%	0.79%	0.70%	0.61%
1,000	0.97%	0.88%	0.79%	0.70%	0.61%
1,100	0.97%	0.89%	0.80%	0.71%	0.63%
1,200	0.97%	0.89%	0.81%	0.72%	0.64%
1,300	0.98%	0.89%	0.81%	0.73%	0.65%
1,400	0.98%	0.90%	0.82%	0.74%	0.66%
1,500	0.98%	0.90%	0.82%	0.74%	0.66%
1,600	0.98%	0.90%	0.83%	0.75%	0.67%
1,700	0.98%	0.91%	0.83%	0.75%	0.68%
1,800	0.98%	0.91%	0.83%	0.75%	0.68%
1,900	0.98%	0.91%	0.84%	0.75%	0.69%
2,000	0.98%	0.91%	0.84%	0.75%	0.69%

Table 15.2 Banker Bets in Baccarat Equivalent Bet without Rebate to $1,000 Bet with Rebate

Hands Played	Rebate as Percentage of Actual Loss				
	5%	10%	15%	20%	25%
50	$727	$454	$181	$−92	$−365
100	799	598	397	196	−5
150	831	662	493	323	154
200	850	700	549	399	249
250	863	725	588	450	313
300	872	744	616	*488*	360
350	879	759	638	518	397
400	885	771	656	541	427
450	890	780	671	561	451
500	894	789	683	577	471
550	898	796	693	591	489
600	901	802	703	603	504
650	904	807	711	614	518
700	906	812	718	624	530
750	908	816	724	632	540
800	910	820	730	640	550
850	912	823	735	647	559
900	913	827	740	653	567
950	915	830	744	659	574
1,000	916	832	748	665	581
1,100	919	837	756	674	593
1,200	921	841	762	683	603
1,300	922	845	767	690	612
1,400	924	848	772	696	620
1,500	926	851	777	702	628
1,600	927	854	780	707	634
1,700	928	856	784	712	640
1,800	929	858	787	712	645
1,900	930	860	790	712	650
2,000	931	862	793	712	655

same requirements for number of hands played would ensure an after-rebate advantage of at least 0.91%.

- Although tables for banker and player bettors are provided, it would be more conservative for casino management to assume all bettors will be banker bettors. Therefore, any bets other than banker bets will benefit the casino. In addition, the casino should always round down when determining the rebate or estimating the theoretical casino win. If 75 hands were played, the casino should use the row for 50 hands instead of 100 hands.

Table 15.3 Player Bets in Baccarat (1.24% Casino Advantage) Effective House Advantage after Rebate

Hands Played	Rebate as Percentage of Actual Loss				
	5%	10%	15%	20%	25%
50	0.93%	0.63%	0.33%	0.03%	−0.27%
100	1.01%	0.79%	0.57%	0.35%	0.12%
150	1.05%	0.86%	0.67%	0.48%	0.30%
200	1.07%	0.90%	0.73%	0.57%	0.40%
250	1.08%	0.93%	0.77%	0.62%	0.47%
300	1.09%	0.95%	0.81%	0.66%	0.52%
350	1.10%	0.96%	0.83%	0.69%	0.56%
400	1.11%	0.98%	0.85%	0.72%	0.59%
450	1.11%	0.99%	0.86%	0.74%	0.62%
500	1.12%	1.00%	0.88%	0.76%	0.64%
550	1.12%	1.00%	0.89%	0.77%	0.66%
600	1.12%	1.01%	0.90%	0.79%	0.67%
650	1.13%	1.02%	0.91%	0.80%	0.69%
700	1.13%	1.02%	0.91%	0.81%	0.70%
750	1.13%	1.03%	0.92%	0.82%	0.71%
800	1.13%	1.03%	0.93%	0.83%	0.72%
850	1.13%	1.03%	0.93%	0.83%	0.73%
900	1.14%	1.04%	0.94%	0.84%	0.74%
950	1.14%	1.04%	0.94%	0.85%	0.75%
1,000	1.14%	1.04%	0.95%	0.85%	0.76%
1,100	1.14%	1.05%	0.96%	0.86%	0.77%
1,200	1.14%	1.05%	0.96%	0.87%	0.78%
1,300	1.15%	1.06%	0.97%	0.88%	0.79%
1,400	1.15%	1.06%	0.97%	0.89%	0.80%
1,500	1.15%	1.06%	0.98%	0.89%	0.81%
1,600	1.15%	1.07%	0.98%	0.90%	0.81%
1,700	1.15%	1.07%	0.99%	0.90%	0.82%
1,800	1.15%	1.07%	0.99%	0.91%	0.82%
1,900	1.15%	1.07%	0.99%	0.91%	0.83%
2,000	1.15%	1.07%	0.99%	0.91%	0.83%

- The tables assume level betting. Any variance in bets negatively impacts the casino. The casino should keep in mind the effect of wide bet variances on the expected results and retain the right to cancel the agreement with the player. A banker bettor who wagers flat $500 banker bets for 300 hands will generate $1,590 in theoretical win. If given a 20% rebate, this theoretical win is reduced to $780 (51% reduction in theoretical win). This $780 represents the amount available for complimentaries, other costs, and profit.

Table 15.4   Player Bets in Baccarat Equivalent Bet without Rebate to $1,000 Bet
with Rebate

Hands Played	Rebate as Percentage of Actual Loss				
	5%	**10%**	**15%**	**20%**	**25%**
50	$757	$514	$271	$ 27	$−216
100	820	640	460	280	100
150	848	696	544	392	240
200	865	729	594	458	323
250	876	752	627	503	379
300	884	768	652	536	420
350	890	781	671	562	452
400	896	791	687	582	478
450	900	800	700	599	499
500	903	807	710	614	517
550	906	813	719	626	532
600	909	818	727	637	546
650	911	823	734	646	557
700	914	827	741	654	568
750	915	831	746	662	577
800	917	834	751	668	585
850	919	837	756	674	593
900	920	840	760	680	600
950	921	842	764	685	606
1,000	922	845	767	690	612
1,100	924	849	773	698	622
1,200	926	852	779	705	631
1,300	928	856	783	711	639
1,400	929	858	788	717	646
1,500	930	861	791	722	652
1,600	932	863	795	726	658
1,700	933	865	798	730	663
1,800	933	867	800	734	667
1,900	934	869	803	737	671
2,000	935	870	805	740	675

PLAYER ACTION CRITERIA

A casino that markets to premium table game players has a network of
hosts, branch office representatives, and, often, independent representa-
tives who are responsible for identifying and attracting premium players
to that casino. Premium players understand that their play will earn com-
plimentaries and often a reimbursement of their airfare expense. Casino
management must develop schedules that match a given level of play
with the appropriate level of complimentaries to be awarded.

A schedule of this type quantifies specific player action criteria that are used to help ensure that the casino maximizes profit on a per customer basis as well as rewarding the player for his level of play. The extent of complimentaries awarded to a player is a direct function of their costs. The player action criteria must be carefully constructed to identify the true cost of the complimentary to the casino. In addition, a tracking system must be established to associate the cost of the complimentaries awarded to the individual players to which they relate.

Casino management can structure these schedules in a manner that allows the average bet to be determined on the basis of all games played as opposed to being game specific. However, it is advisable for management to develop a schedule that is game specific since a roulette player, for example, can lose about three times as much per hour as a blackjack player. Table 15.5 provides an example of game-specific player action criteria that might be found at a Las Vegas casino catering to premium players, and Table 15.6 shows the information necessary to prepare such a schedule.

TABLE GAME RULE MODIFICATION AS A MARKETING TOOL

In their haste to increase profit or decrease loss, casino marketing executives often turn to game rule modification in an attempt to win customers over to their casino. This strategy may seem flawless, since everyone would rather play single-deck than multiple-deck blackjack, or place triple odds in dice rather than being limited to double odds. Unfortunately, this strategy is not as flawless as it seems. For a game rule variation to be successful, two conditions must be present:

Table 15.5   Player Action Criteria

Credit Limit	BJ and Baccarat	Dice	Roulette	Maximum Airfare
(Amounts reflected by game represent the minimum average bet required.)				
3,000	60	158	18	0
5,000	100	263	29	0
7,500	150	395	44	0
10,000	200	526	59	500
15,000	300	789	88	750
20,000	400	1,053	117	1,000
25,000	500	1,316	147	1,250
50,000	1,000	2,632	293	2,500

Note: The requirements are based on four hours play per one night stay. Excess playing time reduces the average bet requirement, and higher average bets reduce the playing time requirement.

Example: A $100 average bet for four hours is equal to a $50 average bet for eight hours and to a $200 average bet for two hours.

1. The rule variation must be viewed by the player as beneficial to her.
2. Play must increase to compensate for the decrease in the per-player house advantage.

Blackjack rule modification most often comes through a reduction in the number of decks being dealt. What impact does the number of decks dealt have on the house advantage? A portion of the gain or loss in house advantage, depending on whether the number of decks dealt is increased or decreased, is directly attributable to the impact on the player's doubling. As the number of decks dealt increases, doubling down becomes less favorable for the player.

Any doubling hand is a winning hand with proper strategy. The player's doubling increases only the amount of return. When a player doubles, he typically wants a large card and, failing to receive a large card, she at least wants the dealer to break any stiff hand (hard 12 through 16) the player might receive.

Take, for example, what happens if a player holds a six and five versus the dealer up-card of a two in both single- and four-deck blackjack. In both cases, three cards are missing from the complete pack (i.e., the six, five, and two). This leaves 49 cards remaining in the single-deck game, whereas 205 cards remain in the four-deck game. The player wants a ten-value card for her double down. The following are her chances:

Single Deck

$$\frac{16}{49} = 32.6\% \text{ chance of receiving a ten}$$

Four-Deck

$$\frac{64}{205} = 31.2\% \text{ chance of receiving a ten}$$

In addition to a decrease in the probability of doubling successfully, the player receives fewer blackjacks in multiple-deck games than single-deck games. This decrease in the number of blackjacks does not affect the house to the same degree. The reason is that when the player receives a blackjack, she is paid at a rate of 3:2, whereas a house blackjack is paid at a rate of only 1:1. The player's blackjack chances in both single- and four-deck games are as follows:

Single Deck

$$\left(\frac{4}{52} \times \frac{16}{51}\right) + \left(\frac{16}{52} \times \frac{4}{51}\right) = 0.048265 \text{ or one BJ in every 20.7 hands}$$

Table 15.6 Assumptions Used in Developing Player Action Criteria

		Room Types	
5.0%	Maximum airfare as % of line of credit	1 Regular:	$90
2.0%	Bet as % of line of credit	2 King:	120
1.00	Bets won per hour	3 1 B/R:	210
4.0	Hours played per night	4 2 B/R:	300
3.0	Nights stay per trip (standard)	5 1 B/R Pent.:	500
60.0%	Percent of line as markers transferred	6 2 B/R Pent.:	750
3.5%	Bad debt as % of markers transferred		

Comp Levels

RO Room only
RF Room & buffet, coffee shop (no liquor)
RFL Room & buffet, coffee shop, steak house & liquor (by glass only) & showroom
RFB Room & all restaurants & liquor (by bottle) & showroom

Food Cost Assumptions per Comp Level
(assumes 2 guests per meal, 9 meals per trip, maximum check cost)

RO 0: No food charges
RF 135: 6/Coffee shop & 3/buffet
RFL 319: 3/Coffee shop & 3/buffet & 3/steak house & showroom
RFB 418: 3/Coffee shop & 3/buffet & 3/gourmet & showroom

Range of Avg. Check (beverage not included)

$ 5.75–$6.75: Coffee shop
  6.50–9.00: Buffet
  20.00–25.00: Fine dining
  27.00–33.00: Gourmet
  13.50–16.50: Steak house
$75.00–125.00: Showroom

Liquor Assumptions

RFL 20: By Glass
RFB 100: By Bottle

Table 15.6 Assumptions Used in Developing Player Action Criteria (*continued*)

Blackjack and Baccarat
1.00: Bets Won per Hour

Credit	Bet Req.	Theo. Win	Bad Debt	Taxes	Available for Comps	Room	Type	Room Food	Comp Level	Liquor	Airfare	Profit	Contrib.
3,000	60	720	63	41	616	270	1	0	RO	0	0	346	48.0%
5,000	100	1,200	105	68	1,027	270	1	135	RF	0	0	622	51.8%
7,500	150	1,800	158	103	1,540	270	1	319	RFB	100	0	752	41.8%
10,000	200	2,400	210	137	2,053	360	2	319	RFB	100	500	676	28.2%
15,000	300	3,600	315	205	3,080	630	3	319	RFB	100	750	1,182	32.8%
20,000	400	4,800	420	274	4,106	900	4	319	RFB	100	1,000	1,689	35.2%
25,000	500	6,000	525	342	5,133	900	4	319	RFB	100	1,250	2,465	41.1%
50,000	1,000	12,000	1,050	684	10,266	2,250	6	319	RFB	100	2,500	4,998	41.7%

Dice
0.38: Bets Won Per Hour

Credit	Bet Req.	Theo. Win	Bad Debt	Taxes	Available for Comps	Room	Type	Room Food	Comp Level	Liquor	Airfare	Profit	Contrib.
3,000	158	720	63	41	616	270	1	0	RO	0	0	346	48.0%
5,000	263	1,200	105	68	1,027	270	1	135	RF	0	0	622	51.8%
7,500	395	1,800	158	103	1,540	270	1	319	RFB	100	375	476	26.5%
10,000	526	2,400	210	137	2,053	360	2	418	RFB	100	500	676	28.2%
15,000	789	3,600	315	205	3,080	630	3	418	RFB	100	750	1,182	32.8%
20,000	1,053	4,800	420	274	4,106	900	4	418	RFB	100	1,000	1,689	35.2%
25,000	1,316	6,000	525	342	5,133	900	4	418	RFB	100	1,250	2,465	41.1%
50,000	2,632	12,000	1,050	684	10,266	2,250	6	418	RFB	100	2,500	4,998	41.7%

Roulette
3.41: Bets Won Per Hour

Credit	Bet Req.	Theo. Win	Bad Debt	Taxes	Available for Comps	Room	Type	Room Food	Comp Level	Liquor	Airfare	Profit	Contrib.
3,000	18	720	63	41	616	270	1	0	RO	0	0	346	48.0%
5,000	29	1,200	105	68	1,027	270	1	135	RF	0	0	622	51.8%
7,500	44	1,800	158	103	1,540	270	1	319	RFB	100	375	476	26.5%
10,000	59	2,400	210	137	2,053	360	2	418	RFB	100	500	676	28.2%
15,000	88	3,600	315	205	3,080	630	3	418	RFB	100	750	1,182	32.8%
20,000	117	4,800	420	274	4,106	900	4	418	RFB	100	1,000	1,689	35.2%
25,000	147	6,000	525	342	5,133	900	4	418	RFB	100	1,250	2,465	41.1%
50,000	293	12,000	1,050	684	10,266	2,250	6	418	RFB	100	2,500	4,998	41.7%

Four Deck

$$\left(\frac{16}{208} \times \frac{64}{207}\right) + \left(\frac{64}{208} \times \frac{16}{207}\right) = 0.047565 \text{ or one BJ in every 21 hands}$$

The house gain on insurance bets also influences its advantage. As the number of decks increases, the player's insurance disadvantage also increases.

Single Deck

$$\left(\frac{16}{51} \times 2\right) + \left(\frac{35}{51} \times -1\right) = -5.8\% \text{ player disadvantage}$$

Four Deck

$$\left(\frac{64}{207} \times 2\right) + \left(\frac{143}{207} \times -1\right) = -7.3\% \text{ player disadvantage}$$

Baccarat rule modification generally takes the form of a decrease in house commission on the bank bets. The standard game calls for the player who bets the bank hand to win only 95% of her bet. If a player bets $100 on the bank hand and wins, she is paid only $95. The difference between what the player bets and the amount the house pays is called the commission.

Binion's Horseshoe casino in downtown Las Vegas charges only a 4% commission, which means the player is paid 96 cents on the dollar. The following would be used to determine the cost of decreasing the house commission:

Hands won by player side	44.62466%
Bank wins (45.85974% × 0.95)	43.56675%
Bank bettor disadvantage	1.05791%

At a 4% commission, the house will experience the following:

Hands won by player side	44.6246%
Bank wins (45.85974% × 0.96)	44.0254%
Bank bettor disadvantage	0.5993%

A 1% decrease in the baccarat commission decreases the house advantage by almost 50%. When this modification is made, baccarat play on the bank side must increase 100% for the casino to earn the same amount it did before the rule change. A few years back, the Sahara in Las Vegas of-

fered "no commission" baccarat, which resulted in the player betting the bank side having an advantage over the house. As a result, the promotion did not last long. The following calculates the bank bettor advantage with no commission:

Hands won by player side	44.62466%
Bank wins (45.85974% × 1)	45.85974%
Bank bettor advantage	1.23508%

The only other bet in baccarat subject to rule modification is the tie bet. Standard baccarat layouts offer the tie bet at a winning payoff of nine for one (eight to one odds). The following calculates the house advantage at nine for one and a rule modification of 10 for one:

$$9 \text{ for } 1 = 8 \text{ to } 1$$

$$(0.095156 \times +8) + (0.4462466 \times -1) + (0.4585974 \times -1) = -14.3596\%$$

$$10 \text{ for } 1 = 9 \text{ to } 1$$

$$(0.095156 \times +9) + (0.4462466 \times -1) + (0.4585974 \times -1) = -4.8440\%$$

Roulette modification is accomplished through the use of a wheel with a single zero instead of a wheel containing both the single and double zero. With the payoffs remaining the same, the house advantage decreases from 5.26% to 2.7% since the total possibilities decrease from 38 to 37. Play must double in order for this modification to earn as much as before the change was made.

Dice rules can be modified by increasing the proposition and field payoffs, charging the buy-bet commissions only if the bet wins and increasing the multiple the player can take in the odds bet. The most common approach is to increase the odds bet. A few casinos in Las Vegas, most notably Binion's Horseshoe, offer the player 100× odds. This modification is done in anticipation that the player will increase her line flat bet so as to permit her to take more in odds. The house earns 1.4% on the flat bet but nothing on the odds bet.

Rule Modification and Hold   As discussed previously, a decrease in the house advantage will result in a decrease in hold. When management resorts to rule modification in attempting to increase revenues, the strategy may prove successful; however, there should also be an expectation that the hold will decrease.

CASINO MARKETING III:
THE PREMIUM PLAYER SEGMENT

Marketing to the premium-play sector may be thought of in terms of a three-legged stool. One leg is represented by the amenities offered by a property. Hotel suites, fine dining establishments, and upscale retail shopping are examples of amenities designed to attract high rollers. The second leg of the stool is represented by hosts, who provide premium player contacts and serve as a vital communication channel between management and the high roller. The third leg is represented by the deal or, alternately stated, the value of the incentives offered to the player. Currently, the competition for high rollers is fierce. If one leg of the stool is missing, a property is most likely to find it difficult to attract and maintain a profitable position in the premium-player segment. For those able to compete for high-roller play, sustaining a profit becomes surprisingly difficult in the face of escalating play incentives. This chapter closely examines the deal and its effects on segment profitability, touching only briefly on the host and amenities aspects of this market.

The premium-play segment of casino gaming has typically been credited with producing a disproportionate share of casino profits—and with good reason. In 1999, for example, premium players (often called high rollers) represented 5% of all Las Vegas gamblers, but produced 40% of the gross gaming win (*High Roller's Vegas*, 1998). Extensive discussions with casino executives found that the premium-play segment is still considered a source of substantial profit. *A Wall Street Journal* article from 2001 included a commentary suggesting that premium players are necessary to produce cash flows commensurate with the capital outlay required to build a mega-resort (Binkley, 2001).

The fly in this ointment is that gross gaming win does not consider the effects of player-acquisition costs on casino profitability. The recent building boom on the Las Vegas Strip has intensified the competition for premium players. That increased competition, in turn, has led to expanded play incentives, chiefly comprising discounts on player losses. Although the premium-play segment offers the possibility of substantial

profit contributions, even the most profitable segment can be made unattractive by spiraling acquisition costs.

DEFINING THE PREMIUM-PLAY SEGMENT

Premium play is a subjective term with a definition that varies by property and casino executive. "Premium play" is often used loosely in gaming circles without regard to crucial distinctions related to wagering activity. A Discovery Channel documentary of the Las Vegas premium player, for instance, advanced a three-tier framework to describe this segment (*High Roller's Vegas*, 1998). Tier-1 premium players were defined as players with a minimum credit line of $20,000. Tier-2 players had credit lines that ranged from $100,000 to $500,000, while tier-3 players had credit lines that ranged from $1 million to $5 million. (Note that the documentary's categories are not all-inclusive—for example, there's a conspicuous gap between tier 2 and tier 3, and no classification for players with credit lines in excess of $5 million.)

ACQUISITION COSTS KEEP GOING UP

At the individual level, premium players appear to generate revenue that justifies considerable acquisition costs. Prior to the discounting era, premium players were awarded complimentary rooms, food, and beverage (RFB), with an occasional airfare reimbursement. Considering the revenue potential of these players, the overall cost of providing RFB was relatively modest.

Given that the competition for premium players has increased with the expansion of the casino business in recent years, these players have been able to negotiate substantially improved play incentives, far beyond the standard RFB approach. Most particularly, casinos have increased the use of discounts on losses. An a priori discount-on-loss agreement is a guarantee by casino executives to retire a predetermined percentage of a player's debt when a player loses. (These arrangements are also referred to as rebates on loss; see Figure 16.1 for a glossary of typical premium-player incentives.) In recent years, at least two industry executives have cited spiraling play incentives (notably, discounts and walk-in money) as the basis for curtailing marketing efforts in the premium-play sector (Binkley, 2001).

Extensive interviews of casino executives identified 12 major Las Vegas Strip properties actively offering a priori discounts to premium players. Other sources indicate the widespread use of the incentives as well (Binkley, 2001; Stratten, 2001, p. 5). Moreover, during the course of conversations with casino executives, it became evident that nearly all casinos are engaged in discounting losses to some degree. Atlantic City casinos, for instance, were found to employ discounting practices liber-

Airfare reimbursement

This incentive is a cash award payable to the player, ostensibly for the purposes of reimbursing airfare. If a premium player were coveted by a casino (e.g., an international baccarat player), the player need not produce an airline ticket for reimbursement. In the case of premium international baccarat players, the airfare award is viewed as an entitlement, having nothing to do with actual travel expenses. Most casinos arbitrarily set the airfare award as a function of the player's credit line. Competitive influences also play a key role in determining the airfare-award policy. It is not uncommon for top players to receive multiple airfare reimbursements (i.e., from several casinos) on a single trip.

Cash-deposit incentive

If a player deposits $100,000 cash in the casino cage, casino executives will award the player a $2,000 to $3,000 cash bonus. This award immediately becomes the player's money, unaffected by the outcome of wagering activity. The casino offers this incentive to manage credit risk and facilitate debt collection, should the player lose. Cash-deposit incentives are usually in the area of 2 to 3%, but are also incremental to all other discounts or play incentives, with the exception of quick pay (discussed below).

Room, food, and beverage (RFB) comps

Typically, casinos award RFB comps based on either the player's actual loss or the casino's theoretical win. For example, a player could be eligible for a maximum comp award equal to the greater of 45 percent of the casino's theoretical win or 15% of the player's actual loss. There is little variance in the comp policies across the Las Vegas Strip properties. The percentages related to the player's actual loss and the casino's theoretical win are most likely a function of competitive pressures.

Discount, rebate on loss

Casino managers agree to decrease the liability resulting from player losses by a fixed percentage (e.g., 15%). This type of arrangement is also referred to as a rebate on loss. In its a priori form, the percentage discount is negotiated prior to any wagering activity. In the post hoc form, the percentage discount is determined after the player has incurred a loss. The post hoc form is technically not a play incentive; it is a payment incentive. Quick-loss programs are a subset of the discount-on-loss incentives.

Promotional chips

Premium players are offered nonnegotiable chips for visiting a casino. Although these chips have no cash value, their betting value is equal to that of regular chips. On a game with a 1% house advantage, 98 additional wagers would be necessary to recoup the cost of a single promotional chip, assuming the additional wagers are identical in magnitude to the promotional-chip wager. Players receiving promotional chips are likely to wager those chips until all are gone, as these chips cannot be redeemed for cash. All winning promotional-chip wagers are paid with regular casino chips, redeemable for cash.

Quick-loss comp policy

This policy was originally created to address those players who lost a considerable portion of their credit line prior to reaching the minimum number of play-hours necessary for airfare reimbursement or a desired comp level. Standard comp policy requires players to gamble for a predetermined number of hours with a minimum average bet in order to receive an airfare reimbursement. Length of play and magnitude of the average bet are crucial in the determination of a player's comp level. However, there are instances in which players experience unusual losing streaks in the early stages of a trip, resulting in a substantial actual loss. In circumstances such as these, the quick-loss policy is employed. The policy accommodates those players who lose substantial sums of money before generating sufficient theoretical win to reach a desired comp level.

Quick pay

Quick pay is a discount (usually 3%) for payments received within a designated time period (usually 14 days). While this could be thought of as a payment incentive, players are made aware of this payment option prior to play, and therefore it could be a component of the player's decision process, with regard to casino patronage. This discount is offered in addition to all other discounts or play incentives, except the cash-deposit incentive.

Suite amenities (setups)

Some premium players require lavish amenity packages before agreeing to play at a casino. Examples include rare and expensive cases of wine, exotic chocolates, and shopping allowances. The value of such incentives varies.

Walk-in money

This incentive is a cash award payable to the player for agreeing to play at a particular casino. This is typically a negotiated incentive that is made available to the top tier of premium players. Players would receive this incentive prior to any gaming activity. No minimum amount of play is required to receive walk-in money. This incentive is not refunded to the casino if the player wins. Walk-in money is also referred to as show-up money.

Miscellaneous

A player could receive any or all of the previously listed incentives, with the exception of the mutually exclusive quick-pay and cash-deposit offers. It would be difficult, if not impossible, to produce an exhaustive list of play incentives. Examples of other incentives include private jet service, limousine service, and discounts for international players willing to retire their debt with U.S. dollars.

Figure 16.1   Abridged Play-Incentive Glossary

303

ally. In general, as a casino's reliance on premium play increased, so too did its tendency toward discounting losses.

The costs of these discounts and the widespread application of the practice combine to produce a damaging effect on premium-play profits. The *Wall Street Journal* article cited earlier addressed the mounting cost of catering to high rollers and questioned the profitability of this segment. With regard to cost issues, other gaming researchers have described the potential danger of discounting and the related complimentary policies directed at the premium-play segment (Eadington & Kent-Lemon, 1992; Kilby, 1990, pp. 15–18). Ultimately, it must be determined whether the high-roller market segment is as profitable as many in the casino industry believe. If the segment is not as profitable as believed, what can casino executives do to maintain the profitability of the high-roller segment?

DECONSTRUCTING THE PREMIUM-PLAY SEGMENT

First, it is important to demonstrate the true cost associated with the practice of discounting. Specifically, the face value of an a priori discount is nearly always understated in terms of its actual effect on a game's earning potential. As a case study, this chapter will explain how an a priori discount agreement can actually convert the house's advantage in baccarat to a player's advantage. The destructive effects of discounting on twenty-one and craps will be touched on, but the main focus is on baccarat discounts. This is because discounting is most often made available to the baccarat clientele, which largely comprises international high rollers. Other cost issues associated with catering to the premium-play market will also be reviewed. These cost-based concerns are relevant to the practice of discounting, because the net cash flow from premium play is the rationale for those investments in the first place.

THE HIDDEN COST OF DISCOUNTING

Analysis shows that a guaranteed 20% refund of losses in baccarat is capable of dissolving the casino's usual advantage in this game and actually creates a player advantage. Table 16.1 demonstrates the effect of discounting player losses on a casino's advantage.

By way of explanation, Table 16.1 conservatively assumes a constant wager on the banker side of a baccarat game in which the casino's advantage is 1.06% before the influence of a discount. The casino-advantage figures are calculated based on the discrete probability of each distinct possible outcome, given the specified number of hands played. Each of the distinct outcomes resulting in casino wins was discounted by its specified rebate level and multiplied by its probability of occurrence. Similarly, each of the distinct outcomes resulting in casino losses was also multiplied by its probability of occurrence. The net of these probability-

Table 16.1   How Rebates Affect Casino Advantage in Baccarat Banker Bets (© Cornell University. Used by permission. All rights reserved.)

Hands Played	*Percentage of Player Losses Refunded*					
	0*	**5%**	**10%**	**15%**	**20%**	**25%**
	Casino Advantage					
50	1.06%	0.77%	0.48%	0.19%	−0.10%	−0.39%
100	1.06%	0.85%	0.63%	0.42%	0.21%	−0.01%
150	1.06%	0.88%	0.70%	0.52%	0.34%	0.16%
200	1.06%	0.90%	0.74%	0.58%	0.42%	0.26%
250	1.06%	0.91%	0.77%	0.62%	0.48%	0.33%
300	1.06%	0.92%	0.79%	0.65%	0.52%	0.38%

* The casino advantage is 1.06% for banker bets (i.e., the casino edge with no discount in place). The number of hands played will not affect this expected value.

weighted outcomes was equal to the casino advantage, for the specified number of hands, at a specified rebate level.

The data in Table 16.1 indicate the importance of the number of hands played in the accumulation of theoretical win. At 50 hands, a player receiving a 20% discount actually has an advantage of 0.10%. From the casino's perspective, the effective advantage increases as the number of hands played increases.

The natural house advantage of 1.06% has a subtle effect. Because the house edge is so slight, the game requires several hands to accumulate a substantial amount of theoretical win. In actual play a win or loss of $100,000 can occur in a single hand in any of several Las Vegas baccarat rooms. Because of the high likelihood of losing a single hand, the casino cannot profitably discount this loss, award comps, and reimburse airfare in the same way as when the player loses the same $100,000 over 300 hands, as we explain next.

Not all $100,000 player losses are the same. To explain the difference, assume that a particular player loses $100,000 over 300 hands of baccarat (banker bets only). Assume also that this player wagered $1,000 each hand, which results in $3,180 of theoretical win ($1,000 × 1.06% × 300). In contrast, the theoretical win associated with the single-hand loss of $100,000 is only $1,060 ($100,000 × 1.06%), a theoretical win that does not allow for much of a discount or airfare reimbursement. Although both players lost $100,000, the 300-hand player generated three times the theoretical win of the one-hand player.

As the number of hands played increases, the variance of the outcome distribution decreases. Although additional variance increases the volatility associated with both player wins and losses, the effect of a re-

bate is leveraged, as it affects only the player-loss side of the distribution. This is why the effect of the discount on the house advantage is greater than the face value of the discount itself. All premium players will accept a discount for their losses, but these same players will not refund a portion of the profits to the casino when they win. All else held constant, the more variance in the possible outcome distribution, the less the casino can afford to rebate as a fixed percentage of losses.

When it comes to the number of hands played, evidence suggests that players are aware of the fact that less is more. For baccarat play in the year 2000, for example, executives from one Las Vegas casino reported that the average number of hours played per trip was nine, down from seventeen in 1997 (Binkley, 2001). Note that baccarat players are permitted to vary their wager amounts as long as they stay within the table betting limits. They are also free to choose among banker, player, and tie wagers.

When the casino allows baccarat players to negotiate a priori loss discounts, its executives can no longer allow the player to control the number of hands played. By varying wagers and drastically reducing the number of hands (or rounds) played, a player can create a relatively great amount of variance in the distribution of possible outcomes. By reducing the number of hands, the extreme outcomes become more probable, while the percentage rebate remains constant. Stated another way, the discount percentage remains constant regardless of the number of bets, while the probability of the worst-case scenario (i.e., the player losing every bet) increases as the number of plays decreases, increasing the negative contribution to the casino's expected value. Further, as the discount rate increases, so too does the damaging effect on the game's expected value.

Coin Toss

As a different example of how the increased numbers of plays decreases the variability of the outcome, use a bet on a coin toss. The likelihood that a coin will come up tails four consecutive times is far greater than the chance of that same coin landing tails eight consecutive times (assuming that the coin and the tosses are fair). For the player receiving a fixed-rate discount, placing four wagers is preferable to placing eight wagers, as the four-wager option creates more variance in the outcome distribution, thereby increasing the effect of the discount.

Table 16.1 shows that the casino industry has, ironically, invented a play disincentive (i.e., a policy that discourages extended play). As the number of wagers increases, the probability of a profitable outcome for the casino increases and the volatility of the outcome distribution decreases, all else held constant. In addition, as the total amount wagered

increases, the casino's expected win increases. Therefore, providing an incentive to curtail play fails on every level.

THE NET EFFECT OF A PREMIUM PLAY

Table 16.2 shows the results and expenses of a hypothetical three-day trip by a midlevel premium player. This exhibit is designed to demonstrate the fragile nature of premium-play profits. Table 16.2 uses the assumption of a constant wager (i.e., the same amount was wagered on each hand). Furthermore, this example assumes that the player makes only banker wagers in a baccarat game, with a 5% commission on all winning banker wagers. These are standard baccarat rules and payoffs. Other assumptions include a $150,000 credit line with a constant bet equal to 2% of the

Table 16.2 Estimated Contribution Toward Recovery of Fixed Costs (© Cornell University. Used by permission. All rights reserved.)

Revenue per win:		
Hands played[1]	60 hands per hour for 9 hours	540
Average bet[2]	Average bet equals 2 percent of $150,000 credit line	$3,000
Total amount wagered[3]	540 hands at a $3,000 per hand	$1.62M
Theoretical casino win[4]	$1.62 million × 0.84% house advantage remaining after 10% discount	$13,608
Expenses:		
Room food, and beverage (RFB)[5]	45% of theoretical win based on 1.06% house advantage	$3,477
Airfare allowance[6]	Based on a Las Vegas casino's comp policy	$9,000
Nevada gaming tax[7]	6.25%	$851
Estimated contribution to fixed costs (after most variable costs)[8]		$280

Notes:

[1] Assumes 60 hands per hour for 9 hours.

[2] Assumes a credit line of $150,000 with an average bet equal to 2 percent of the credit line.

[3] 540 hands at $3,000 per hand.

[4] 1.62 million × 0.84% (house advantage for banker wagers after accounting for the 10% *a priori* discount after 540 hands).

[5] Assumes 45% of theoretical win calculated at the original house advantage of 1.06 percent, not the effective advantage of 0.84%. However, this expense should not be considered at its retail value as the variable cost of the hotel portion is estimated at less than $50. For many casinos catering to premium play, the restaurants are leased, resulting in near retail charges for high-roller meal comps. RFB cost was calculated as follows: $1.62 million × 1.06% × 45% (allowable comp limit for that level of play) × 45% (converting retail value to actual variable cost) = $3,477.

[6] Estimate based on an actual Las Vegas casino's comp policy.

[7] Estimated Nevada gaming taxes for a nonrestricted gaming licensee ($13,608 × 6.25%).

[8] This estimated contribution might not include all variable costs. Other minor costs are likely to exist.

line. As length of play has been found to be decreasing for players receiving discounts (Binkley, 2001; Stratten 2001), a total of nine hours of play was estimated for the hypothetical player's three-day trip.

This player's contribution to operating profit is marginal. The player generates all of $280 in estimated cash flow from $1.62 million in wagers. Table 16.2 has not even considered the fixed costs of competing in this market, which are substantial (e.g., limousine fleets, hotel suites, and marketing salaries).

Gaming executives should also be aware that high rollers can and do win, as premium play is often characterized by risk and volatility (Eadington & Kent-Lemon, 1992) with a potentially small contribution margin (MacDonald, 2001). The slight profit margins combined with the volatility of the game can produce extreme results within a given financial quarter. Andrew MacDonald reports that nearly 15 million hands of baccarat must be dealt to construct a 95% confidence interval with endpoints at a distance of 0.0005 from the theoretical game advantage (MacDonald, 2001).

Because Wall Street pays close attention to quarterly earnings reports, public gaming companies should prepare for considerable stock price volatility when competing in the high-end baccarat market (Binkley, 2001, A1, A8). There are well-documented instances of premium players single-handedly producing devastating effects on casino earnings (Binkley, 2001, A1, A8; Eadington & Kent-Lemon, 1992). If casino executives are willing to accept the inherent risks of the premium-play segment, deals should be cautiously engineered to produce a profit commensurate with the risk. Otherwise, casinos may be better off without the play, given the likely effect of poor quarterly results on the stock price of the company.

A comparative profit contribution for a 25¢-slot player was developed to further emphasize the economic risk of entertaining baccarat high rollers. Nine hours of slot play at 700 spins per hour would result in 6,300 spins. Assuming an average bet of $1.25 (i.e., five quarters wagered on each spin) and a house advantage of 4.5% on the game, this play would produce $354 in theoretical win. Of course, some complimentary expense and gaming tax would be deducted, but the contribution of this play to operating profit is likely to exceed $280. In summary, $1.62 million of premium-player wagers in baccarat contributed about the same amount to profit as $7,875 of wagers by a 25¢-slot player.

QUICK-LOSS–REBATE POLICIES

Discussions with casino-marketing executives identified that "quick-loss" rebates are offered by nearly all Las Vegas Strip properties actively pursuing the premium-play segment. Typically, quick-loss offers are structured to award to the player the greater of 45% of theoretical win or 15% of a player's actual loss, to cover any airfare and RFB expense. This incentive

is offered *in addition to* any rebate on loss received by the player. Under the quick-loss comp provision, a player with a quick loss of $100,000 is eligible to receive $9,000 in airfare reimbursement and a minimum of $6,000 in RFB comp awards. The quick-loss reimbursement may exist because of management's belief that these short-term losses are the casino's to keep.

This type of comp policy provides players with an additional incentive to pursue a betting strategy characterized by making large wagers and playing few hands. Consider an example involving both a quick-loss comp policy and discounting to demonstrate how those marketing tools provide an incentive for players to curtail play. After considering the effects of these marketing incentives, a player who loses $100,000 should stop play immediately (Binkley, 2001). In many casinos, at this point the player would be eligible for a 19% rebate on loss (that is, a 10% discount, plus a $9,000 airfare award), plus any RFB awards he may have received under the quick-loss policy.

In the example, a player loss of $100,000 equals a house win of $81,000 less any RFB expense. Unfortunately for the casino, the reverse is not true. Should the player win $100,000, he should stop playing at that casino and start playing at another casino that offers a similar quick-loss policy (Binkley, 2001). Nearly all Las Vegas casinos that cater to the premium player will eagerly offer these quick-loss terms to the player. The player should leave the original casino because a $100,000 loss, following the initial $100,000 win, would net to a trip loss of zero at that casino. However, if the player takes the same $100,000 in winnings to another casino, the money is considered new at the second casino, and if lost, would fall under the favorable rebate and quick-loss terms. That is, as a new customer, the player cannot lose all of that $100,000 because the casino will rebate 19% of it—and probably award RFB as well.

Casinos also offer quick-pay discount programs for players receiving the quick-loss benefits. This program further destroys profit by discounting the player's loss by another 3% if the debt is retired within 14 days. Such policies allow premium players to visit Las Vegas, enjoy luxury accommodations, and gamble with a positive expected value. Once the casino relinquishes its house advantage in this way, it cannot produce a long-term profit.

The casino's ability to earn revenue is diminished under all discount provisions. In effect, even winning players receive the discount, as the new financial terms associated with the game change the casino's ability to produce win. Although casino executives often believe that only losing players receive discounts, winners also receive the discount because theoretical win is a function of the long-term difference between player wins and player losses. The discount decreases this difference by limiting the contribution of player losses to the expected value of the game. The casino's expected value is decreased by reducing the amount of the origi-

nal wager that is actually lost by the player (e.g., 80% of the wager versus 100% of the wager). In other words, under a discounting agreement, the probabilities of house wins and losses remain constant in the expected-value formula, but, when the house wins a hand, the amount collected from the player is a fraction of the original amount wagered, creating a new expected value for the game. Because this reduced expected value is created by the discount terms, all play is affected by the discount, not just losing play.

COSTS OF COMPETING FOR PREMIUM PLAY

Casino managers voluntarily award free rooms and expensive meals to premium players. There are obvious costs associated with these comps, so managers need guidelines to aid them in administering such awards. Most casinos will allow comp awards of as much as 35 to 50% of a player's theoretical loss (Rubin, 1994). However, for players receiving a discount, the original game advantage used for calculating the casino's theoretical win is artificially high, because the high advantage is reduced by a rebate on loss. This reduction was not reflected in the comp-award guidelines of any casino investigated, which means that the comps were in excess of the intended guideline. This failure to adjust the theoretical win estimate only further decreases the profitability of the premium-play segment.

A substantial capital investment is necessary to cater to premium players. Studies have shown the positive influence of amenities such as gourmet restaurants on gaming intentions (Roehl, 1996, pp. 57–62) and how amenities are used to position properties within gaming segments (Brock, Newman, & Thompson, 1992). This strategy is central to the pursuit of high rollers in Las Vegas, as evidenced by the limousine fleets, lavish hotel suites, and a growing number of world-class shopping and dining establishments (Miller, 2000). The profit from the high rollers attracted by these facilities should be commensurate with the cost of providing those amenities. These costs are often substantial. For example, in 1999 the MGM spent $180 million on its high-roller villa, often referred to as "the mansion" (Binkley, 2001).

Other cost concerns are associated with the high end of the high-roller segment. The top players receive additional incentives not previously mentioned. For example, players who received substantial discounts were also given "show-up" or "walk-in" money, promotional chips (free non-negotiable chips), and airfare allowance. These players received airfare allowance in spite of the fact that the casino's jet flew them to and from the property. At the same time, though, casinos set no minimum-play criterion (i.e., a minimum number of hands required to receive the incentives). The profit potential of such offers must be questioned. Other observers have noted the profitability issues surrounding the premium-play segment, cit-

ing high transaction costs as a profit deterrent. (For example, see Kale, 2001.) Deals featuring the play incentives described here are likely to support this general concern.

DISCOUNTS FOR TWENTY-ONE PLAYERS

In twenty-one, the house advantage is a function of the number of decks used, the house rules, and, most important, the player's skill. In a double-deck game, for instance, the house advantage can be as low as 0.32% under Las Vegas Strip rules, and a single-deck game actually carries a slight house disadvantage, of −0.01%. Those advantages were calculated using basic strategy, a term used to describe the method of play that optimizes the player's expected value (i.e., perfect play). To make matters worse, the game of twenty-one is inherently more volatile than baccarat, as split and double-down options greatly increase the number of possible outcomes. As compared with baccarat, the house edge is more easily relinquished to premium players receiving discounts on the twenty-one action.

The low house advantages in twenty-one assume basic strategy play, and most players do not play that well (Griffin, 1991, pp. 69–82, as quoted in Eadington & Kent-Lemon, *op. cit.*). However, one study indicated that the premium players (at or above $100 per hand) play at a higher skill level than do low-limit gamblers (Griffin, 1991).

Thus it is that casino executives who offer single- and double-deck games expose themselves to negative cash flows when they offer discounts to premium players. The complimentary expenses (RFB) and airfare reimbursement increase the casino's exposure to a losing proposition. Extreme caution should be used when negotiating discounts for twenty-one players. Because the game advantage is inversely related to the skill of the player, there may not be much theoretical win to rebate.

For basic-strategy twenty-one players, the value of the complimentary services is based on an estimated house advantage greater than the actual house advantage. The casino can "overcomp" these players because of limitations in the player-rating system and operating challenges. The player-rating system will most likely employ fixed rating categories such as "hard," "average," and "soft" to describe the skill level of the player. House advantages are attached to these categories, with the "hard" classification receiving the lowest house edge (e.g., 0.75%). If a player plays the game at a disadvantage below the system parameter, the house will often overvalue his play and, consequently, award complimentary services beyond the established guidelines (Rubin, 1994). During periods of high business volume, it is sometimes difficult for pit personnel to monitor the action of all premium players. Even card counters sometimes receive full complimentary privileges despite the fact that these players can play with a positive expected value (Singer, 2001, pp. 36–37). One Las Vegas casino recently realized the damaging effects of

discounting premium-play losses in twenty-one. This property suspended all discounts to such players, claiming lack of profitability as the rationale.

DISCOUNTS FOR CRAPS PLAYERS

Offering a priori discounts to premium craps players is a difficult proposition, because the wagers are independent and vary greatly in terms of house advantage. Therefore, it is difficult to determine the overall house advantage in craps. In offering an a priori discount to an individual player, the house would be forced to make assumptions about that player's wagering strategy and the resulting house edge. Alternatively, the house could establish an advantage by setting conditions on the player's wagers. As is always the case, play must at least be conditioned on a minimum number of throws required to receive the discount. Such conditions can guarantee that the casino maintains a theoretical advantage.

Because the house advantage varies both within and between games, casinos should not offer fixed-rate discounts on pooled losses that are incurred across different games (e.g., craps, twenty-one, and roulette). The effect of a 10% discount on craps is likely to differ greatly from the effect of a 10% discount on twenty-one. Discounts should be specific with regard to length of play (i.e., the minimum number of wagers) and all facets of wagering activity, including games played.

TESTING A MINIMUM-PLAY CONSTRAINT

Thus far minimum-play constraints have been discussed in terms of various length-of-play approaches. However, Eadington and Kent-Lemon described a more subtle form of minimum-play requirement employed by an Atlantic City casino catering to a premium player (Eadington & Kent-Lemon, 1992). In the early 1990s, an international high roller had experienced a highly publicized run of good luck at the baccarat tables of several well-known casinos. This player had won several million dollars from several of these casinos, resulting in the accumulation of a substantial bankroll. Despite his run of good fortune and deep pockets, an Atlantic City casino agreed to accept his wagers of $200,000 per hand of baccarat, but only if he agreed to play until he was either ahead or behind by $12 million. At a constant wager of $200,000 per hand, this agreement could be equivalently stated in terms of setting the collar at 60 betting units ahead or 60 units behind. Using Griffin's gamblers-ruin formula (Griffin, 1991), the probability of this player reaching the constraint of plus-60 units was .237, while the probability of this player finding himself behind 60 units was .663. These probabilities were calculated under the assumption that only banker wagers were placed. This casino-imposed win-loss constraint offered a degree of protection against a substantial house loss

and allowed the game's inherent house advantage to take its toll. Although no discounting was involved, this example demonstrates how minimum-play constraints protect the casino against substantial short-term fluctuations in a player's outcome distribution.

This kind of maximum-win-or-loss strategy might be difficult to enforce. Casino executives are not likely to require a player to continue play after incurring substantial losses. In fact, after 70 hours of play, the high roller in the Atlantic City example had lost $9.4 million and play was halted, short of the agreed-on $12 million collar (Eadington & Kent-Lemon, 1992).

RATIONALE BEHIND DISCOUNTING

If the practice of discounting is as damaging as calculated, why is it so prevalent, or, more specifically, why do its negative effects seem so poorly detected? These are difficult issues to examine. Drawing on experience and ongoing dialogue with industry executives, the following theories can be offered as to the origin and evolution of discounting practices.

To begin with, discounts or rebates are a relatively recent phenomenon in the Las Vegas market, having become popular in the early 1990s. The origin of the practice is most likely related to attempts to collect potentially bad debts (Binkley, 2001). The scenario begins with high rollers losing substantial sums of money and finding themselves unable to pay their debts to the casino. Initially, casino executives responded with payment plans. If that proved unsuccessful, the executives offered a discount, on the theory that collecting a fraction of the debt was preferable to collecting nothing. Eventually, the discount evolved from a debt-collection tactic into a play incentive designed to lure players from other casinos (Binkley, 2001). Once discounts became a play incentive, casinos used them in a bidding war, to the benefit of the players.

Even though some industry executives have stated that they have recognized deals resulting in player advantages, many casinos remain wedded to the high-roller segment (Binkley, 2001). Because of that segment's historical contributions to gross gaming win, we believe that many casino executives assume this segment to be inherently profitable. Combine this assumption with a misunderstanding of the game mathematics and you have the makings of a downward profit spiral.

Casino marketers and pit personnel communicate with players on an individual level. Negotiations and bet tracking are also conducted at the individual level.[1] The casino environment is often thought of as adversarial in nature, with players pitted against the casino (*High Roller's Vegas*, 1998). When casino marketers think of gaming profits at the individual level, they utter statements such as "We can beat player A" or "Player A never wins" (Binkley, 2001). In games such as baccarat, where discounts are prevalent, there is no player A or player B. Baccarat is a game of

chance, with the probability of a given outcome decided by the card inventory and the rules of the game. Under the standard rules and payoffs, the overall outcome is a positive expected value for the house. Casino marketers award large discounts to players who "always" lose, referring to the historical outcomes of these players as justification. Unfortunately, for every player who always loses, there is a player who almost always wins. All other things being equal, the difference between these two players equals the gross gaming win. The game doesn't know or care who makes the bet; it just takes its share of what is placed in the circle.

One might ask why the damaging effects of discounting have not yet been noted on income statements, but perhaps they have. One industry executive commented recently that he felt his slot win was subsidizing his table-game losses to high rollers (Binkley, 2001). To demonstrate his conviction to that theory, he pulled his company out of the premium-play sector and has now repositioned the property. Gross table-game win is often cited as a major contributor to Las Vegas Strip revenues, but this figure does not include the negative effects of discounts. Nevada properties are not required to report the effect of discounting practices to the Nevada Gaming Control Board (NGCB), which considers rebates and discounts to be a business issue, not a gaming issue (Stratten, 2001, pp. 1, 4). In addition, the profitability of the casino's successful lodging operations could obscure the effects of game discounting. For hotels with high average room rates anchored in the convention business, it's possible to make casino-marketing mistakes and still produce adequate earnings at the property level. The same argument could be made for properties featuring successful retail operations. In the most likely scenario, success in retail, hotel, slots, and fine dining combine to mask the damage inflicted by discounting. Moreover, the profit contribution from the midlevel gaming clientele is also likely to partially compensate for the negative effects of giving discounts to high rollers.

Casino marketers are often pressured to bring players to the property and are evaluated and compensated based on their ability to do so. Discounts serve as an attractive tool for casino marketers, as the effects are not understood by many industry executives but are much appreciated by players. The biggest of the premium players, or whales, as they are known in the industry (*High Roller's Vegas,* 1998), are courted by all of the major hotel casinos competing in the premium-play segment. Players of this caliber are rare (Eadington & Kent-Lemon, 1992), as sources indicate that about 250 to 300 whales usually exist worldwide (*High Roller's Vegas,* 1998; Ward, 2001, pp. 1–22). To "steal" a whale from another property is considered a coup, and the easiest way to succeed is to offer ever-greater play incentives. Some industry executives are beginning to acknowledge the detrimental effects of this strategy, as it has proliferated to the point of relinquishing the game advantage in some cases (Binkley, 2001). As demonstrated earlier, even small discounts can move the advantage to the player in the absence of play controls.

BACCARAT DISCOUNTING RECOMMENDATIONS

A discount on loss effectively reduces the casino's advantage in the game of baccarat. To create a profitable discount program, the casino must first determine its advantage after a discount is awarded. Once the new casino advantage is determined, casino management must decide how much of its remaining advantage should be returned to the player in the form of complimentaries and airfare. Table 16.3 demonstrates how the discount alone affects the casino's advantage. Table 16.4 presents an example of how to administer a discounting program for baccarat players without forfeiting an excessive amount of profit. Table 16.4 is an abbreviated version of a larger table that was actually employed at a Las Vegas hotel–casino. To use this table, a player's wagers must be tracked by pit personnel. The table has been engineered to produce an amount of comp expense, airfare reimbursement, and discount on player loss not to exceed a predetermined percentage of theoretical win.

Given the average bet and the number of completed shoes (a shoe is about 78 hands), the table provides the amount of comps, airfare, and discount on loss that the casino can award a baccarat player while maintaining at least 38% of the casino's theoretical win. Alternately stated, Table 16.4 returns a maximum of 62% of the casino's theoretical win. This 62% return constraint conservatively assumes all wagers are on the banker side. We tested this constraint in Las Vegas and found that this program actually returned only 50% of the casino's theoretical win, because of tie bets and player-side wagers. Finally, the average-bet calculation assumes that 50% of the wagers are made at 1 unit and 50% of the wagers are made at 4 units. This assumption is realistic, based on our observations.

Explaining Table 16.4   From left to right, the first column designates the number of completed baccarat shoes. Note that a shoe is equal to 78 hands played, not dealt, as many baccarat players pass or skip hands over the course of a shoe. The second column lists the percentage discount on actual player losses. The first row of numbers in each of the remaining columns represents the observed average bet. Holding the average bet constant, as the number of shoes completed increases so too does the discount. This length-of-play constraint is crucial, as it protects the casino from the cost inflation associated with unconditioned play.

Referring again to Table 16.4, if a baccarat player were to complete 10 shoes (i.e., 780 hands played), with an average bet equal to $3,000 over the course of play, the player would be eligible for a 13% discount on loss. In addition, the player would be eligible for $4,770 in airfare reimbursement and another $4,770 in RFB comps. (This $4,770 amount is found at the intersection of the $3,000 average-bet column and the row associated with 10 completed shoes.)

Potential profit-margin boosters in this approach include the $50,000 minimum loss needed to qualify for a discount and the airfare constraint.

Table 16.3 Casino Baccarat Advantage after Discount on Loss

Completed Shoes	Baccarat Discount	$1,000	$2,000	$3,000	$4,000	$5,000	$6,000	$7,000	$8,000	$9,000	$10,000	$12,000	$14,000
1	10%	1.058%	1.041%	0.938%	0.809%	0.737%	0.678%	0.638%	0.612%	0.589%	0.576%	0.559%	0.549%
2	10%	1.058%	0.972%	0.856%	0.782%	0.746%	0.717%	0.702%	0.694%	0.686%	0.679%	0.673%	0.668%
3	10%	1.048%	0.939%	0.843%	0.793%	0.769%	0.753%	0.747%	0.741%	0.736%	0.733%	0.729%	0.726%
4	10%	1.049%	0.919%	0.840%	0.807%	0.789%	0.780%	0.773%	0.771%	0.767%	0.765%	0.762%	0.761%
5	10%	1.036%	0.905%	0.842%	0.820%	0.805%	0.798%	0.794%	0.791%	0.789%	0.788%	0.787%	0.785%
6	10%	1.027%	0.900%	0.850%	0.829%	0.819%	0.813%	0.810%	0.807%	0.807%	0.806%	0.804%	0.804%
7	10%	1.010%	0.895%	0.854%	0.838%	0.830%	0.826%	0.822%	0.821%	0.820%	0.819%	0.818%	0.817%
8	11%	0.999%	0.880%	0.839%	0.824%	0.818%	0.813%	0.810%	0.809%	0.808%	0.808%	0.806%	0.806%
9	12%	0.988%	0.860%	0.824%	0.812%	0.804%	0.801%	0.798%	0.797%	0.796%	0.795%	0.794%	0.794%
10	13%	0.968%	0.844%	0.810%	0.798%	0.790%	0.789%	0.786%	0.785%	0.784%	0.783%	0.783%	0.782%
11	14%	0.957%	0.832%	0.797%	0.786%	0.780%	0.777%	0.774%	0.773%	0.772%	0.771%	0.771%	0.771%
12	14%	0.945%	0.832%	0.801%	0.792%	0.787%	0.784%	0.782%	0.781%	0.780%	0.780%	0.779%	0.779%
13	15%	0.934%	0.815%	0.788%	0.778%	0.774%	0.772%	0.769%	0.768%	0.768%	0.768%	0.767%	0.766%
14	15%	0.923%	0.819%	0.793%	0.785%	0.780%	0.778%	0.777%	0.776%	0.775%	0.774%	0.774%	0.774%
15	16%	0.911%	0.806%	0.780%	0.772%	0.768%	0.765%	0.764%	0.763%	0.762%	0.762%	0.762%	0.761%
16	16%	0.909%	0.805%	0.784%	0.777%	0.773%	0.770%	0.769%	0.769%	0.769%	0.768%	0.767%	0.767%
17	17%	0.890%	0.792%	0.771%	0.764%	0.760%	0.759%	0.757%	0.757%	0.756%	0.755%	0.755%	0.755%
18	17%	0.888%	0.795%	0.775%	0.770%	0.765%	0.763%	0.762%	0.761%	0.761%	0.761%	0.760%	0.760%
19	17%	0.886%	0.797%	0.778%	0.772%	0.769%	0.767%	0.766%	0.766%	0.766%	0.765%	0.765%	0.765%
20	17%	0.883%	0.799%	0.783%	0.777%	0.773%	0.772%	0.771%	0.770%	0.770%	0.770%	0.769%	0.769%

Assumptions:

Banker bets only

Casino advantage with NO DISCOUNT = 1.058%

50% of bets at ONE UNIT and 50% of bets at FOUR UNITS

$50,000 minimum loss before qualifying for discount

Table 16.4 Discount, Complimentary, and Airfare Incentives as Determined by Average Bet and Number of Baccarat Hands Played

Completed Shoes	Baccarat Discount	Airfare Schedule and Complimentary Level											
		$1,000	$2,000	$3,000	$4,000	$5,000	$6,000	$7,000	$8,000	$9,000	$10,000	$12,000	$14,000
1	10%	$256	$498	$627	$635	$653	$645	$644	$655	$657	$679	$734	$801
2	10%	$512	$889	$1,063	$1,187	$1,343	$1,473	$1,639	$1,820	$1,993	$2,162	$2,540	$2,910
3	10%	$756	$1,258	$1,547	$1,830	$2,147	$2,467	$2,824	$3,172	$3,514	$3,877	$4,596	$5,307
4	10%	$1,010	$1,613	$2,048	$2,527	$3,019	$3,540	$4,050	$4,602	$5,124	$5,667	$6,745	$7,843
5	10%	$1,237	$1,961	$2,573	$3,257	$3,931	$4,636	$5,355	$6,068	$6,800	$7,529	$9,007	$10,454
6	10%	$1,462	$2,329	$3,148	$3,993	$4,879	$5,773	$6,682	$7,584	$8,532	$9,453	$11,287	$13,169
7	10%	$1,659	$2,694	$3,700	$4,759	$5,837	$6,949	$8,025	$9,146	$10,263	$11,378	$13,628	$15,872
8	11%	$1,863	$2,982	$4,092	$5,265	$6,487	$7,692	$8,915	$10,159	$11,400	$12,667	$15,137	$17,630
9	12%	$2,057	$3,213	$4,449	$5,755	$7,057	$8,401	$9,736	$11,095	$12,451	$13,803	$16,531	$19,253
10	13%	$2,209	$3,445	$4,770	$6,173	$7,573	$9,053	$10,490	$11,995	$13,415	$14,871	$17,810	$20,745
11	14%	$2,380	$3,686	$5,090	$6,581	$8,105	$9,647	$11,179	$12,738	$14,293	$15,846	$18,978	$22,142
12	14%	$2,542	$4,021	$5,601	$7,306	$9,010	$10,732	$12,446	$14,187	$15,924	$17,693	$21,191	$24,682
13	15%	$2,695	$4,192	$5,875	$7,620	$9,441	$11,246	$13,039	$14,863	$16,683	$18,537	$22,202	$25,864
14	15%	$2,847	$4,551	$6,408	$8,367	$10,329	$12,313	$14,323	$16,326	$18,325	$20,322	$24,348	$28,406
15	16%	$2,980	$4,726	$6,639	$8,663	$10,692	$12,743	$14,823	$16,897	$18,967	$21,074	$25,243	$29,405
16	16%	$3,162	$5,035	$7,160	$9,358	$11,563	$13,791	$16,047	$18,298	$20,585	$22,830	$27,351	$31,910
17	17%	$3,236	$5,177	$7,347	$9,597	$11,857	$14,182	$16,497	$18,806	$21,111	$23,413	$28,095	$32,730
18	17%	$3,410	$5,515	$7,854	$10,321	$12,753	$15,208	$17,697	$20,181	$22,659	$25,177	$30,166	$35,194
19	17%	$3,583	$5,854	$8,364	$10,962	$13,609	$16,240	$18,904	$21,562	$24,257	$26,909	$32,291	$37,625
20	17%	$3,755	$6,193	$8,918	$11,689	$14,469	$17,317	$20,157	$22,989	$25,820	$28,689	$34,380	$40,110

Note: Airfare not to exceed the amount of the airline ticket. Unused airfare increases RFB allowance. Amounts indicate airfare allowance. An equal amount is available for RFB. Minimum loss for discount is $50,000.

Under this program, airfare reimbursement was not to exceed the amount of the actual airline ticket. Many casinos treat airfare as a cash incentive, rather than as a reimbursement. However, under the terms of this program, the value of unused airfare could be applied toward additional comp awards. If comps are awarded in casino-operated outlets, the result is a soft cost, which also improves actual profit margins associated with this program.

A strong benefit of this program is its "one voice" approach. With an even-handed policy, players are not competing with one another for a better deal or discovering that another customer has received a better offer. Moreover, casino-marketing employees who do not fully grasp the math behind discounting will no longer be outnegotiated by players or unwittingly offer terms that damage profitability. Given that international casino-marketing operations are often far-flung and encompass many distinct cultural conditions, this program provides a unifying structure that protects the profitability associated with the premium-play sector.

DANGERS OF DISCOUNTING

Ultimately, casino executives must understand the effects of discounting on profits and require premium players to play long enough to ensure that an acceptable degree of profitability is maintained. When offering loss rebates, managers must also condition wagering strategies to maintain an acceptably low degree of variance in the outcome distribution. Discounting policies should prevent players from pooling actual losses incurred across different games (e.g., craps and baccarat), because the house advantage on wagering activity varies between casino games. For twenty-one players, for instance, the player's skill level should be a primary concern in the design of a discounting agreement, not the player's historical results. If one cannot determine the player's skill level, conservative assumptions will help protect the house advantage. Executives need to carefully engineer play constraints to protect the game's ability to produce a profit. Finally, executives must be aware of the fixed and variable cost structures associated with the deals in particular, and the premium-play segment in general. Although discounting is not inherently disastrous, it is costly when one does not understand its true effects. As a consequence, given Las Vegas's competitive environment and the prevailing economic conditions, the wisdom of developing a new hotel casino that would rely on premium play for substantial profit contributions must be questioned.

NOTES

1. Bet tracking requires casino personnel to observe and record each wager made by a player.

CHAPTER SEVENTEEN
SPORTS BOOK OPERATIONS

HISTORY

The Wide Open Gambling Bill passed in 1931 did not provide for either race books or sports books (sports books are now called sports pools). Race book legalization did not come about until 1941.[1] In fact, the reason Bugsy Siegel came to Las Vegas was to set up a wire service to provide the newly legalized race books with the winning horses and their pari-mutuel payoffs from the large racetracks across the United States. Throughout the country, there were hundreds of illegal race books where bettors could place a horse wager. The wire service placed employees at the major tracks and forwarded the race results to the subscribing race books via telegraph. No one really knew how the wire service obtained this information because the racetracks tried to keep wire services out since the information was going to illegal operations that also served as competitors.

At the time, Bugsy owned the equivalent of the West Coast franchise of the Trans-America Wire Service (Reid & Demaris, 1963), which was set up by Al Capone's Chicago mob to compete with James M. Ragen's Continental Press Service.

In June 1946, Ragen was shot while in Chicago and was placed under a 24-hour police guard. Ragen appeared to be on the way to recovery when he suddenly died. In spite of the police protection, he died as a result of mercury poisoning. After Ragen's death, Capone took control of his sole competitor's service. With Capone controlling all the track wire services, there was no need to continue with the Trans-America Service.

Bugsy had worked hard setting up Trans-America in California and Nevada, but needed more money to finish the construction of the Flamingo. Bugsy eventually laid down the terms under which he would relinquish control of Trans-America for $2 million, take it or leave it (Reid & Demaris, 1963)! This ultimatum was probably not viewed favorably by the Chicago syndicate. His uncompromising position with regard to the sale of the wire service may have contributed to his subsequent murder.

In the late 1940s, all of the major Las Vegas casinos offered race books,

and the only place to get the race results was from the wire service controlled by members of organized crime. Casino management believed race books were a customer draw and, as a result, were necessary to successfully compete. Unfortunately, the mobsters refused to furnish the wire service unless they received "a piece of the joint" (Cahill, 1977).

The Kefauver hearings on organized crime in the United States resulted in several laws directed at illegal gambling. One was the passage of the Federal Excise Wagering Tax enacted on October 20, 1951, which imposed a 10% tax on all race book and sports book wagers.[2] The legislation also included an occupational tax[3] for anyone who was liable for the tax or who received wagers for those liable. The law was styled so that those subject to the occupational tax (i.e., the gamblers) could be charged with failing to register or charged with tax evasion if they failed to pay the 10% tax.

Race books had become an integral part of the legal casinos in Nevada, but the wire service was the lifeblood of the race books and it was controlled by organized crime. In an attempt to clean up the race books, the Tax Commission in 1952 enacted a regulation that prohibited race book betting at any establishment where any other type of gaming was operated.

The new regulation stated:

> Race Horse Betting is hereby declared to be a form of gambling materially different from other types of gambling. In the interest of public welfare therefore, race book operations shall be conducted only in a building wherein no other types of gaming are operated or liquor dispensed, and no other operations shall be permitted at any time in the room where race book operations are carried on.[4]

A race book now had to be a stand-alone facility in order to operate. Notice that the 1952 legislation even forbade liquor in the race books. The regulation did not address sports pools, but sports betting at the time was of little interest to the betting public. Nevertheless, wording was added in 1956 that included sports pool betting.

The number of race books in Nevada decreased to only nine in 1974. Then legislation was enacted to revive the dying books. First the Federal Excise Wagering Tax was reduced from 10% to 2%, effective December 1, 1974. The same legislation increased the occupational tax to $500 per person.[5] Initially the 2% tax was passed on to the bettor by the race books, but later it became the norm for the race book to pay the tax instead of the bettor.

The true rebirth of the race books and sports pools occurred in 1975, when the Nevada Gaming Commission repealed the location restrictions,

allowing the books back into the casinos.[6] On August 15, 1975, the Union Plaza became the first casino since 1952 to offer race and sports betting. The following year the Stardust became the second casino and the first on the strip to provide a race and sports book.

U.S. Senator Howard Cannon of Nevada introduced a bill lowering the federal excise wagering tax from 2% to 0.25%. The legislation was approved and became effective January 1, 1983. The 0.25% rate is the rate currently in effect and applies to all race book and sports pool wagers. Sports wagering in Nevada grew from $92 million in 1975 to over $2 billion by 1997.

Prohibited Wagers   Nevada's gaming regulations (Regulation 22.120) specifically forbid the acceptance of certain wagers by the books[7]:

1. Any amateur noncollegiate sport or athletic event
2. Any collegiate sport or athletic event that the licensee knows, or reasonably should know, is being placed by or on behalf of a coach or participant in the collegiate event
3. The outcome of any election for any public office both within and outside of the State of Nevada
4. Any event, regardless of where it is held, involving a professional team whose home field, court, or base is in Nevada, or any event played in Nevada involving a professional team, if, not later than 30 days before an event or the beginning of a series of events, the team's governing body files with the commission a written request that wagers on the event or series of events be prohibited, and the commission approves the request
5. Any event other than a horse race or an athletic sports event, unless the chairman permits otherwise in writing

Regulation 22 also stipulates procedures that the books must follow for the issuance and control of betting tickets (22.050) as well as accepting wagers (22.060), grading of betting tickets (22.070), and payment of winning wagers (22.080). These procedures were designed primarily for books utilizing manual systems. A requirement was included in the regulation that all books install a computerized bookmaking system not later than December 31, 1989, which would contain controls at least comparable to those specified. Computerized bookmaking systems have resulted in improved controls being in place for Nevada books.

One other interesting area addressed within Regulation 22 concerns telephone wagering (22.130 and 22.140). Books in Nevada are allowed to receive wagers over the telephone from bettors who are calling within the state. Before such a wager is accepted, the player is required to appear in person at the book and establish a telephone wagering account. If the player is not a resident of Nevada, there is a 96-hour period during which

the book is allowed to accept telephone wagers from the player. This period may be extended only once by the book and requires the patron to appear in person at the book to renew the account prior to the expiration of the initial 96-hour period. Many of the books in Nevada do not offer telephone wagering to their players.

SPORTS BETTING

Why bet on sports? Research has shown that the typical bettor's reasons for betting on a sporting event fall into one of two categories (Ignatin, 1984, p. 170):

1. "Investment" bettors are those who bet to increase wealth.
2. "Consumption" bettors are those who make bets to increase the utility, or satisfaction, a person receives from watching a sporting event.

Which sports are bet on most? More money is bet on college and professional football than on any other sport. Football is followed by horse racing, baseball, and basketball (Ignatin, 1984, p. 170).

Types of bets include the following (Homer & Dionne, 1985):

- Straight Bets (also called sides)—the player is picking one team to cover on point spread betting or win if money line betting.
- Totals (also called over/under)—the player is betting that the total points scored will be over or under an amount designated by the sports book. The winning team is irrelevant to this wager.
- Parlays—the same as "letting it ride" in table game bets. In sports book betting it places the first winning wager, along with the payoff on the next, in a predetermined series of games or events. The outcome of the parlay is contingent on all of the games selected having a favorable outcome.
- Parlay Cards—preprinted cards whereby the player chooses three to ten or more teams to win against the money line or point spread.
- Round Robins—the maximum number of parlays a player can make on a series of teams. It groups three or more games into sets of separate two-team parlays. For instance, assume the player likes the 49ers over the Broncos, the Cowboys over the Eagles, and the Raiders over the Chargers. There are three ways the player can bet her favorites on a two-team parlay: 49ers/Cowboys, 49ers/Raiders, Cowboys/Raiders. If only two of her favorites win, she wins a parlay.
- Proposition Bets—all the special and unusual bets in sport betting, like betting the fight will last x rounds, who will kick the first field

goal, who will win the coin toss, who will catch the first pass, which team will hit the most home runs, etc.

- Teasers—the player is allowed to buy between four and seven extra points off the usual point spread. The player must pick at least two teams and pays for the points in payoff odds. Assume the following betting lines:

Lakers	+8½
Supersonics	−8½
Celtics	+13½
Spurs	−13½
Suns	−7½
Trailblazers	+7½

If the bettor liked the Lakers, Spurs, and Suns, she could bet a three-team parlay card and be paid five to one or she could bet a three-team four-point teaser. A four-point teaser gives the player four points to add to each chosen team. The points given to the underdog are increased, and the points taken from the favorite are decreased. The four-point teaser would give the bettor the following lines to cover:

Lakers	+12½ (instead of +8½)
Spurs	−9½ (instead of −13½)
Suns	−3½ (instead of −7½)

However, the bettor pays for the points with odds. The three-team parlay card pays five to one while the four-point three-team teaser pays three to two (that is, 1.5 to 1).

Parlays and teasers can be bet either through preprinted cards or over the counter. The cards are printed early in the week, and the point spreads do not change. With parlays and teasers bet over the counter, the bettor picks the teams based on the current lines. Over-the-counter picks will pay more than the same picks made using the preprinted cards. An example of this is a major Las Vegas sports book that pays 5.5 to 1 on bets made using the cards and 6 to 1 on the same bets made over the counter.

Parlay and teaser cards can be styled with all spreads ending in one-half point so that ties cannot occur, or at full point spreads where a tie either wins or loses. The odds will change depending on how the tie is treated. The same Las Vegas sports book described earlier pays as follows:

- Ties win, four for four pays eleven for one
- Ties considered no action, four for four pays twelve for one

Line Making Theory   There are three key players involved in line making: the betting public, the bookmaker, and the oddsmaker. With the enormous number of sporting events held daily, the bookmaker must rely on an oddsmaker to set the opening line. The oddsmaker must analyze the game as well as the bettors.

The line is not an attempt to determine by how much one team will beat the other; rather, the purpose of the line is to balance the action. Balancing the action refers to the desire of the bookmaker to create a betting line that attracts enough action (wagers) to each team to ensure a profit regardless of which team wins. If it costs the same to bet both teams, as in point spread betting, then it is hoped that the line will attract half the money to each team. If a money line is used, the line should create betting on each team such that the book is still assured a profit.

*Probability and Odd*s   Probability is defined as the number of times a specific event can occur, whereas odds often represent how often an event will *not* occur. For example, the probability of rolling a six with one die is $\frac{1}{6}$ (or 0.17), add the odds against this same event occurring are $\frac{5}{6}$ (or 5 to 1).

MONEY LINES

Money lines are typically used in boxing, baseball, golf, tennis, and football. A money line would appear as follows:

Boxing

Muhammad Ali	−1800
Joe Frazier	+1200
	or
Joe Louis	−400
Rocky Marciano	+300
	or
Sonny Liston	−140
Floyd Patterson	+110

Baseball

Kansas City Royals (pitcher—Gubicza)	−135
Minnesota Twins (pitcher—Klingenbeck)	+125

The money line is used to make both teams attractive to their respective bettors so that the book wins regardless of the winning team.

The minus number in the money line is the rate at which the player must bet in order to win $1. In the baseball example, the player must bet at the rate of $1.35 to win $1. If the player were to win, she would receive

her $1.35 bet in addition to the winning amount of $1, for a total of $2.35. The plus amount is how much a $1 bet will win. A $1 bet on the Twins will win $1.25 plus the return of the initial bet of $1, for a total of $2.25.

Game	Line	Cost to Bet
Kansas City Royals (Gubicza)	−135	135
Minnesota Twins (Klingenbeck)	+125	100

The amount of the house (book) advantage on money lines is a function of the size of the line. In the immediately preceding example, the line of −135/+125 represents a 10¢ line. The 10¢ represents the difference between what the house risks on the underdog (1.25) and how much the bettor risks on the favorite (1.35). When a money line has one team at a plus amount and one team at a minus amount, it is easy to determine the size of the line. However, determining the size of the money line becomes a little tricky when both teams are minus. For instance, when a bettor wagers against the point spread in football, it usually costs $1.10 to win $1 and would appear as follows:

49ers	−6	−110
Broncos	+6	−110

This is an example of a 20¢ money line. To help illustrate this, the Royals/Twins game previously discussed will be used as an example. First, assume the book has received one wager on each team ($1.35 on the Royals and $1 on the Twins) for a total of $2.35. Now, for a comparison, note how much the book will keep when each team wins.

> If the Royals win, the book will pay $2.35 and will keep nothing.
> If the Twins win, the book will pay $2.25 and will keep 10¢.
> The total amount the book keeps will be 10¢.
> Consequently, this is called a 10¢ line.

If the bookmaker has received one wager on the 49ers and one wager on the Broncos, $2.20 has been collected. For comparison, note how much the book will keep when each team wins in this example.

> If the 49ers win, the book will pay $2.10 and will keep 10¢.
> If the Broncos win, the book will pay $2.10 and will keep 10¢.
> The total the book keeps will be 20¢.
> Consequently, this is called a 20¢ line.

How Money Lines Are Made   The oddsmaker first starts with what he believes the true odds are in the opinion of the bettor. Assume that the

oddsmaker has studied an athletic event, as well as the bettors, and has determined that the true odds are 7 to 5. The odds established by the oddsmaker for this event indicate that if the event were held 12 times, the favorite would win 7 times and the underdog would win 5 times. If the odds were 8 to 5, the favorite would win 8 times and the underdog 5 times. The oddsmaker or bookmaker then takes these probable odds and creates a money line. The following represents how 7 to 5 probable odds are turned into a 10¢ line.

1. Using 7 to 5 odds, turn the odds into odds to $1.

    7 multiplied by 20 equals 140, and 5 multiplied by 20 equals 100.

    This creates a ratio of 140:100.

2. Create a money line with *no* house advantage.

$$-140$$
$$+140$$

3. Post a money line *with* a house advantage. If a 10¢ line is created, then the book makes the favorite bettor bet 5¢ more and the underdog bettor will win 5¢ less.

$$-140 \text{ plus } 5¢ = -145$$
$$+140 \text{ minus } 5¢ = +135$$

House Advantage   What is the theoretical house advantage on the preceding favorite and underdog wagers? Probable odds of 7 to 5 means that in every 12 events (7 plus 5), the favorite will win 7 times and the underdog will win 5. With this information, the player's theoretical disadvantage can be calculated using the following model:

1. How much will an underdog bettor wager, in total, if she were to pick the underdog every time? Remember, +135 means the bettor bet $1 to win $1.35.

$$12 \times 1.00 = 12.00$$

2. How many times will the underdog bettor win the wager, and how much will be returned to the bettor (including the wager) when the underdog wins? If the probable odds are 7 to 5, this indicates that the underdog will win 5 of the 12 times the wager is placed. When the player wins, her wager of $1 is returned, plus $1.35, for a total of $2.35.

$$5 \times 2.35 = 11.75$$

3. If the player places $12 in wagers and is returned $11.75, her net loss is 25¢ and the player's disadvantage is:

$$\frac{0.25}{12.00} = 2.0833\%$$

The favorite bettor's disadvantage is calculated in the same manner, except that now the player wagers $1.45 to win $1.

Total wagered	$12 \times 1.45 =$	17.40
Total returned	$7 \times 2.45 =$	17.15
Player loss	$17.40 - 17.15 =$	0.25
Player disadvantage:	$\dfrac{0.25}{17.40} =$	1.4368%

What happens to the player's disadvantage as the size of the line increases? Use the preceding 7-to-5 probable odds and create a 20¢ line and then calculate the favorite and underdog bettor's disadvantages.

What happens to the player's disadvantage as the odds of the favorite winning increases? Using probable odds of 9 to 5, create a 10¢ line and compare the favorite and underdog bettor's disadvantages with the 7-to-5 odds on a 10¢ line.

What determines the size of the line? The size of the line determines the book's theoretical advantage and is largely determined by competition. Why would a player make a wager on a 20¢ line when the same game can be bet nearby at a 10¢ line?

Given the line, what are the odds? If the money line is known, it is easy to determine the probable odds. Take the Ali/Frazier fight, for example. The line is −1800/+1200, which is a 600 difference. We know that those betting the favorite must bet one-half the difference (i.e., 300) more than true odds and the winning underdog bettors win one-half the difference (i.e., 300) less than true odds. So the line with no casino advantage is −1500/+1500, which equals probable odds of 15 to 1. Start with 15 to 1 odds and create a $600 line. See if you end up with −1800/+1200.

Limit in Sports   The sports book meaning of limit is slightly different from the meaning of limit in typical casino games. Limit in table games means the maximum the player can wager on a single hand. In sports betting, limit has three different meanings:

1. When the player is "laying a price," that is, betting something more than $1 to win a dollar, the limit is the maximum the book is willing to lose on an individual wager. The −145 discussed ear-

lier is an example of laying a price. If the limit were $5,000, the player can wager:

$$\left(\frac{100}{145}\right) \times = 5,000$$

$$\times = 7,250$$

$$\left(\text{the } \frac{100}{145} \text{ denotes } \frac{\textit{player win}}{\textit{player wager}}\right)$$

2. When the bettor is "taking a price," that is, betting $1 to win something more, the limit means the maximum amount of the wager. The +135 mentioned earlier is an example of a bettor taking a price. A $5,000 limit means the underdog bettor can place a wager of $5,000. If the player wins, she wins.

$$\frac{135}{100} \times 5,000 = 6,750$$

3. The third definition of limit is the amount the book is willing to lose before the line is changed. In the preceding example (i.e., −145/+135), a limit of $5,000 means the book will stay at −145/+135 until a favorite or underdog win results in a book loss of $5,000. For example, assume a total of $22,000 is bet on the favorite and $10,000 is bet on the underdog. If the favorite wins, the winning bets are paid at a rate of $1 for each $1.45 wagered.

$$\frac{100}{145} \times 22,000 = 15,172.41$$

If the favorite wins, the underdog must lose. In this case, losing bets total $10,000, but the winning bets are paid $15,172.41 (plus the $22,000 in wagers). Consequently, the book loses $5,172.41 when the favorite wins. Since this loss is more than the book's limit of $5,000, the line should be moved. The direction of the line movement and the amount of line movement are discussed later.

Betting Limits   The sports book's betting limits vary from sport to sport and are a function of the percentage of knowledgeable players betting the game. The following represents the ranking of sports with the smallest percentage of knowledgeable bettors to the sports with the greatest percentage (Roxborough & Rhoden, 1991):

1. Super Bowl
2. World Series
3. NFL
4. NBA Championship
5. College Football
6. NCAA Basketball Championship

7. NBA
8. Hockey
9. Baseball
10. College Basketball

The limit in the book will generally be the largest in sports with the lowest percentage of knowledgeable bettors. For example, the Super Bowl will have higher betting limits than the World Series, and the World Series will have higher betting limits than the NFL games. The following limits are typical of a medium-sized sports book:

Hockey	Min.	Max.
Sides	$5	$500
Totals	$5	$500
Parlays	$5	$100

Pro and College Basketball		
Sides	$5	$1,000
Totals	$5	$ 300

College Football		
Sides	$5	$2,000
Totals	$5	$ 500

Pro Football		
Sides	$5	$5,000
Totals	$5	$1,000

Ideal Balance   If the book takes in one favorite bet for every underdog bet, the only time the book realizes any profit is when the underdog wins the event. For example, take the Royals/Twins game.

Game	Line	Cost to Bet
Kansas City Royals (Gubicza)	−135	135
Minnesota Twins (Klingenbeck)	+125	100

If one bettor bet the Royals at −135, the book collects 135. The Twins bettor bets 100 to win 125, so the book collects 100. With one bet on each side, the book collects 235 (135 + 100). If the Royals win, the book pays the winning bettor 235 (her bet of 135 plus the win of 100), keeping zero. If the Twins win, the book pays the winning bettor 225 (her bet of 100 plus the win of 125), keeping 10.

What if the probable odds are wrong? What if the underdog never wins? How does the book try to realize a profit with money lines regardless of which team wins? The answer is that the book tries to create

the ideal betting balance. The ideal balance is the amount bet on each team that assures the book a profit regardless of which team wins the event. Whenever quoting the book's advantage on a given money line, it is assumed that the ideal balance of betting was reached. Assume the following:

$$\text{Favorite} = -150 \ \ 2.8\% \text{ house advantage}$$
$$\text{Underdog} = +130 \ \ 4.2\% \text{ house advantage}$$

The formula for the ideal balance is as follows:

$$\frac{\dfrac{150}{150 \ + \ 100}}{\dfrac{150}{150 + 100} \ + \ \dfrac{100}{100 \ + \ 130}}$$

$$\frac{0.60}{1.034783} = 0.579832$$

The ideal balance would be to have 57.9832% of the wagers placed on the favorite and the balance of 42.0168% on the underdog. If this ideal balance did occur, the house advantage would be:

$$\text{house advantage} \ = 1 - \left(\text{ideal balance} \times \frac{\text{amount book pays winning favorite wagers}}{\text{amount favorite bettor must pay}} + \text{ideal balance} \right)$$

$$0.033613 \ = 1 \ - \ \left(0.579832 \times \frac{100}{150} + 0.579832 \right)$$

The ideal balance gives the book an advantage of 3.3613%, which is not as large as the 4.2% advantage over the underdog bettors or as little as the 2.8% advantage over the favorite bettors.

This same formula can be used to evaluate a potential bet. For instance, assume the bettor likes the favorite at a money line of $-160/+140$. What percent of the time must the favorite win for the bettor to break even?

$$\frac{\text{player cost to bet}}{\text{player cost to bet} \ + \ \text{win}} \ + \ \frac{160}{160 \ + \ 100} \ = \ 61.5\%$$

So, if the bettor believes that the favorite will win, but not 61.5% of the time, the bettor should not bet. The underdog bet is evaluated the same way and yields a 41.7% break-even.

Moving Lines   Any time the book risks losing the limit if one side beats the other, the line is moved so as to decrease the betting on one side while increasing the betting on the other. Lines are moved according to the following general rules:

< 40¢; the line is moved one-half the size of the line.
≥ 40¢; the line is moved one-fourth the size of the line.

For example, assume a limit of $5,000, a line of −190/+170, $13,000 bet on the favorite, and $10,600 bet on the underdog. Should the line be moved, and, if so, to what? The line should be moved if the book stands to lose the limit if one side beats the other. Analyze the favorite bets, first using the assumptions included in the example. If $13,000 is bet at −190, the winning wagers will be paid at a rate of:

$$\$1 \text{ for every } 190 \text{ wagered or } = \frac{\text{player win}}{\text{player wager}} = \frac{100}{190}$$

Therefore, the $13,000 in wagers will win:

$$13,000 \times \frac{100}{190} = 6,842.11$$

Since only one side can win, the underdog wagers of $10,600 are more than sufficient to pay the winning favorite bets. In fact, the book profits $3,757.89 ($10,600 − $6,842.11) if the favorite wins.

Now let's analyze the $10,600 in underdog bets. The winning underdog wagers will be paid at a rate of:

$$170 \text{ for every } \$1 \text{ wagered or } \frac{170}{100}$$

Therefore, the $10,600 in wagers will win:

$$10,600 \times \frac{170}{100} = 18,020$$

Again, only one team can win. So if the underdog wins, the favorite must lose. Losing favorite bets total $13,000, which is $5,020 less than necessary to pay the winning underdog bets. Since the book stands to lose more than the limit, the line should be moved.

A line of −190/+170 is a 20¢ line and, as indicated in the preceding guidelines, should be moved one-half the size of the line or, in this case,

10¢. Since too much is bet on the underdog, the underdog line is moved to make it 10¢ less attractive, while the favorite is moved to make it 10¢ more attractive.

Line	After Move
−190	−180
+170	+160

Those who didn't like the favorite at −190 now have to bet only −180 to win $1 (i.e., more attractive). Those who liked the underdog at +170 now will win only $1.60 for every $1 wagered (i.e., less attractive).

Line Movements   As the odds of the favorite winning increase, the house advantage decreases. Table 17.1 shows the logical way a sports book operator might move the line so as to protect the book's theoretical advantage. Notice how the size of the line increases as the odds of the favorite winning increase to maintain a house advantage of at least 1.5%.
   Given a limit of $7,500 and a line of −170/+150, determine the following:

1. What are the probable odds for this event (express as odds to 5)?
2. What is the bettor's disadvantage betting the favorite and the underdog?
3. What is the ideal balance, and what is the book's advantage at the ideal balance?
4. If $30,600 is bet on the favorite and $10,000 is bet on the underdog, should the line be moved and, if so, to what?

Betting Baseball   Since lines in baseball are a function of the starting pitcher, baseball bets can be conditioned. The bettor specifies under what conditions the bet is placed. Conditions include:

1. Listed pitchers—The more knowledgeable bettors typically bet listed pitchers. A listed pitchers condition means that both listed pitchers must start or the bettor's money is refunded. A listed pitcher is considered to have started if he throws the first pitch. Listed pitchers start about 98% of the time.
2. Designated pitcher—The bettor wants the bet in action if the pitcher she specifies starts. For instance, in the Royals/Twins game, the bettor could bet the Royals under the condition that Gubicza pitches for them or Klingenbeck pitches against them. Whenever the bettor designates a pitcher and there is a change of the other listed pitcher, the line may be adjusted after the bet is made. For example, if the bettor bet the Royals/Gubicza and Klingenbeck does

Table 17.1 Sports Book Line Movements

Probable Odds	Favorite	Underdog	Line Size	Theoretical Advantage (%)
5.000 to 5	−105	−105	10¢	2.38
5.250 to 5	−110	even	10¢	2.33
5.500 to 5	−115	+105	10¢	2.22
5.750 to 5	−120	+110	10¢	2.12
6.000 to 5	−125	+115	10¢	2.03
6.250 to 5	−130	+120	10¢	1.94
6.500 to 5	−135	+125	10¢	1.86
6.750 to 5	−140	+130	10¢	1.78
7.000 to 5	−145	+135	10¢	1.71
7.250 to 5	−150	+140	10¢	1.64
7.375 to 5	−155	+140	15¢	2.39
7.625 to 5	−160	+145	15¢	2.30
7.875 to 5	−165	+150	15¢	2.21
8.125 to 5	−170	+155	15¢	2.13
8.375 to 5	−175	+160	15¢	2.05
8.625 to 5	−180	+165	15¢	1.98
8.875 to 5	−185	+170	15¢	1.91
9.125 to 5	−190	+175	15¢	1.85
9.375 to 5	−195	+180	15¢	1.78
9.625 to 5	−200	+185	15¢	1.72
9.875 to 5	−205	+190	15¢	1.67
10.125 to 5	−210	+195	15¢	1.61
10.375 to 5	−215	+200	15¢	1.56
10.625 to 5	−220	+205	15¢	1.51
10.750 to 5	−225	+205	20¢	1.98
11.000 to 5	−230	+210	20¢	1.92

not throw the first pitch for the Twins, then the line of −135 may not apply. The book will change the line once the pitching change is made. This often occurs after the game has started.

3. Action—The final way a baseball game can be bet is action. An action wager means the player is picking a team and does not care which pitcher starts. As with designating a pitcher, a pitcher change can result in a line change after the bet is made.

Baseball 1½ and 2 Run Lines Some books will post a 1½ or 2 run line. Take the following game as an example:

Game	Line	
Colorado Rockies (Bailey)	−130	−1.5 runs @ +140
Chicago Cubs (Clark)	+120	+1.5 runs @ −160

Turning a money line into a run line usually turns the straight line around, which means that the favorite becomes the underdog, and the underdog becomes the favorite. In this example, the Rockies must win by at least 2 for the Rockies bettors to win. The Cubs must lose by no more than 1 for the Cubs bettors to win.

POINT SPREAD BETTING

Board Display   When a game is displayed on the board at the sports book, the teams involved appear in a particular order.

Rams		−110
		42
Raiders	−3	−110

This is an example of a point spread. Sometimes the minus sign before the 3 is omitted, but it still indicates that the Raiders are a 3-point favorite. Anyone betting the Raiders starts the game 3 points behind, and anyone betting the Rams starts the game 3 points ahead. In money line wagering, the perceived difference in the quality of the teams is adjusted by the amount wagered. In point spread betting, the perceived difference in the teams is adjusted by giving and taking points.

The 42 to the right represents the game's over/under. A player can bet the total points scored by both teams will be either more than 42 or less than 42. If the game falls exactly on 42, all over/under wagers are refunded. This same rule holds true when betting on a side (i.e., the Rams or the Raiders). If the Raiders win by exactly 3 points, all the wagers on both teams are refunded. Occasionally, 11/10 is used in the board display instead of −110, but both have the same meaning, which is that the player must bet 11 to win 10.

The bottom team is always the home team or the designated home team. For example, each year the University of Oklahoma plays the University of Texas in the Cotton Bowl in Dallas. The Cotton Bowl is considered a neutral field. Nevertheless, each game has a home team, and those rights alternate between the University of Oklahoma and the University of Texas. The sports book always refers to the pros by their nicknames (e.g., Eagles, Dolphins, Cowboys). The sports book refers to colleges by the names of the schools (e.g., University of Oklahoma, USC, UCLA).

When players bet against the point spread, they are betting their team to cover. In money line betting, the side bet must win for the bettor to win. In point spread betting the side bet can lose as long as it covers. If the final was Raiders 12 and Rams 10, those betting the Rams covered, despite the fact that the Rams lost the game, because they started the game with 3 points. The final score for betting purposes is the Raiders 12 and the Rams 13.

Whenever the cost is the same to bet either side, the probable odds are 5 to 5 (1 to 1, even). Whenever the odds are even, the book is trying to attract equal amounts to each team in the event. In theory, the sports book is supposed to "win" before the contest starts because the betting is balanced and the sports book wins regardless of which team wins.

Moving Point Spreads   As with money lines, the sports book favorite and underdog wagers get out of balance. If the sports book stands to lose the limit when one side beats the other, the line is moved to make one side more attractive while making the other side less attractive. The general rules governing line movements are:

- Single-digit spreads are moved in $\frac{1}{2}$-point increments.
- Double-digit spreads are moved in 1-point increments.
- Totals are moved in 1-point increments.

Magic Numbers   Certain margins of victory are more common in some sports. For instance, professional football's most common margins of victory are 3, 6, 7, and 10. College football's most common margin is 1. Consequently, when the spread is within $\frac{1}{2}$ point of these margins, extra precaution is taken by the sports book to minimize the possibility of "middles." Middles occur when the bettors win both sides of the event. If a game opened at $2\frac{1}{2}$, moved to $3\frac{1}{2}$, and the favorite won by 3, the book would return all the money wagered at 3 and lose all the favorite wagers at $-2\frac{1}{2}$ as well as the underdog wagers at $+3\frac{1}{2}$.

When the spread is one of these magic numbers, the sports book often adopts the following policy:

- With 6-, 7-, and 10-point spreads, the book will not move the line until it stands to lose 150% of the posted limit. The philosophy is that returning all the money wagered is better than being middled.
- With 3-point spreads, the sports book will either move the line *only* when it stands to lose 200% of the posted limit *or* go to a money line and stay at a 3-point spread.

For example, the book stands to lose the limit if the Rams win:

	Opening Line	Money Line/Point Spread
Rams	−110	−120
Raiders	3 −110	3 ev

The Rams are now less attractive and the Raiders are more attractive without affecting the 3-point spread.

Buying a $\frac{1}{2}$ Point   Often a player will like a team, but would like to have an extra $\frac{1}{2}$ point. Sports books typically will sell a $\frac{1}{2}$ point. The

player will buy the $\frac{1}{2}$ point by laying −120 instead of the standard −110. However, sports books adopt a very conservative posture when it comes to magic numbers. The Gold Coast in Las Vegas will not sell off of, or to, 3- and 7-point spreads in both college and professional football. If, for example, the spread is 3, the player cannot take the favorite at −$2\frac{1}{2}$ or the underdog at +$3\frac{1}{2}$; or, if the spread is −$2\frac{1}{2}$, the player cannot bet the underdog at +3 or the favorite at −3. LeRoys Race and Sports Book will sell off of, or to, 7 in college and professional football, but not off of, or to, 3.

Protection   When the betting public may know more about the game than the sports book operator, the operator will protect himself by "circling" the game or the total. A circle game, or total, typically means that the limit is being cut in half for the circled wager. Reasons for circling wagers include: (1) late-season game that is meaningless in standings, (2) personnel shakeups, (3) unusual weather forecasts, (4) unusually heavy action on one side (the operator will circle the game until he finds out why), (5) known or suspected injuries (Homer & Dionne, 1985). If the situation is serious enough, the game will be taken "off the board." Usually, the totals are the first affected.

Layoffs   When the sports book's wagering is significantly out of balance, Nevada gaming regulations[8] allow the sports book to "lay off" wagers. The sports book laying off the bets is keeping enough on each side to assure a profit and betting the balance with another sports book (provided that the other sports book will accept the wager). The only stipulation is that the sports book placing the wager inform the sports book accepting the wager that the wager is being placed by a sports book and disclose its identity. This layoff provision is of little benefit to the large sports book.

Parlay Cards   A parlay is a bet that two or more teams will cover (i.e., "beat the spread"). Sports books offer preprinted cards with the week's games and spreads. These preprinted cards are called "parlay cards." Casinos that don't offer a complete sports book often provide only parlay cards to their patrons. The house advantage is significant, and it provides a reason for a customer to visit a casino.

The parlay cards are generally issued early in the week, and the spreads indicated on the cards apply throughout the week. The fewest number of teams a player can bet from the card is three. If a player wanted to bet a two-team parlay, she must do so "over the counter" at the sports book and will receive that day's spread. If the player were to like the board spread better than the card's spread, she can bet any series of games over the counter as well. Also note that every spread on the card

includes a ½ point. With ½-point spreads, none of the games will end in a tie. Parlay card payoffs are as follows:

3	for	3	pays..........	6	for 1	(5 to 1)
4	for	4	pays	11	for 1	(10 to 1)
5	for	5	pays	20	for 1	(19 to 1)
6	for	6	pays	40	for 1	(39 to 1)
7	for	7	pays	80	for 1	(79 to 1)
8	for	8	pays	150	for 1	(149 to 1)
9	for	9	pays..........	300	for 1	(299 to 1)
10	for	10	pays..........	600	for 1	(599 to 1)

As mentioned before, whenever it costs the same to bet either team, the probable odds are 5 to 5 or even. Therefore, the line on a parlay is the theoretical spread that will result in the favorite winning half the time and the underdog winning half the time. If the line is established in this manner, the following assumptions can be made:

- Each game has only two outcomes; the favorite covering or the underdog covering.
- Each team has an equal chance of covering.

Assume the following three games:

Game 1	Game 2	Game 3
Bills	Saints	Oilers
vs.	vs.	vs.
Raiders	Browns	Falcons

Based on the aforementioned assumptions, a three-team parlay can have the following possible winners:

1. Bills, Saints, Oilers
2. Bills, Saints, Falcons
3. Bills, Browns, Oilers
4. Bills, Browns, Falcons
5. Raiders, Saints, Oilers
6. Raiders, Saints, Falcons
7. Raiders, Browns, Oilers
8. Raiders, Browns, Falcons

There are eight possibilities and only one results in a winning card. Since three teams are involved and each team has an equal chance of covering, the probabilities can be expressed as:

$$(\text{possible outcomes})^{\text{number of winners picked}}$$

With three winners picked and each game having only two possible outcomes, the formula becomes:

$$2^3 = 8$$

A three-team parlay pays 5 to 1 and the player has a $\frac{1}{8}$ probability of winning and a $\frac{7}{8}$ of losing. There the player's disadvantage in betting a three-team parlay is:

$$\left(\frac{1}{8} \times 5\right) + \left(\frac{7}{8} \times -1\right) = 25\%$$

As the number of teams picked increases, so does the sports book's advantage.

Parlay cards do not necessarily have to offer ½-point spreads. If full-point spreads are offered, the book's policy in dealing with ties could be any of the following:

1. Ties lose for the player.
2. Ties reduce to the next lowest number of games. For example, a 4-team parlay with one game tying would reduce to a 3-team parlay.
3. Ties win for the player.

The policies in the preceding list are placed in the order of highest sports book advantage to the lowest. Generally, parlay cards hold between 17% and 30%. If ties lose, the book's advantage increases about 10%, and the books' advantage decreases about 10% if ties win.

Teasers   A teaser is a parlay in which the bettor can take more points or lay fewer points than the line. However, the bettor sacrifices odds to do so. The following are example odds:

4	for	4	pays	7	for 2	(2½	to	1)
5	for	5	pays	5	for 1	(4	to	1)
6	for	6	pays	7	for 1	(6	to	1)
7	for	7	pays	10	for 1	(9	to	1)

8	for	8	pays	15	for 1	(14	to	1)
9	for	9	pays	20	for 1	(19	to	1)
10	for	10	pays	30	for 1	(29	to	1)
11	for	11	pays	40	for 1	(39	to	1)
12	for	12	pays	60	for 1	(59	to	1)
13	for	13	pays	100	for 1	(99	to	1)
14	for	14	pays	150	for 1	(149	to	1)
15	for	15	pays	250	for 1	(249	to	1)

A teaser can also be bet over the counter. The following is an over-the-counter payoff schedule offered by a Las Vegas casino:

	6 Points	6½ Points	7 Points
2 teams pay	even	10 to 11	5 to 6
3 teams pay	9 to 5	8 to 5	3 to 2
4 teams pay	3 to 1	5 to 2	2 to 1
5 teams pay	9 to 2	4 to 1	7 to 2
6 teams pay	7 to 1	6 to 1	5 to 1

It is commonly assumed that parlays and teasers are sucker bets. An exception to this occurred in the 1970s when players betting basketball teasers were allowed to move lines by as much as 5 points. At the time, the lines were so good that approximately 74% of the college basketball games fell within 5 points of the line. Consequently, a bettor using random game selection would have won more than 54% of the teasers played.[9] Even today, gamblers have turned betting teasers into a science. It is not unusual for a book to halt teasers altogether during the season because of significant losses.

Basketball Betting   Basketball is bet much like football. A larger percentage of sophisticated bettors wager on basketball, which results in lower limits than those in place for football. When limits are reached, single-digit spreads are moved ½ point and double-digit spreads are moved 1 point.

Goal Lines, Money Lines, and Split Lines   As discussed previously, three-point spreads in football are sometimes combined with money lines. This combination can also be used in other sports. Ice hockey can be bet a variety of ways, including the combination of a point spread (called goals in hockey) and money line. Consider the following:

Goal Lines

LA Kings	+1½	(−120)
NY Rangers	−1½	(ev)

Money Lines

LA Kings	+120
NY Rangers	−150

Split Lines

LA Kings	+1½	−100
NY Rangers	−2	−100

A split line looks attractive to the bettor because the player bets $1 and wins $1 without any "juice" (commission) being added to the bet/pay equation. A split line earns about the same for the sports book as a 40¢ to 45¢ line.

Future Books   Future books are extremely popular and profitable for the sports book operator. A future book is when the bettor wagers on her team to win the World Series, the Pennant, the Super Bowl, the NBA Championship, or another prominent future event. Often these wagers can be placed up to a year in advance. The Irish Sweepstakes is an example of a future bet in horse racing.

The odds in a future book are adjusted by the manager of the book offering the line and can vary from day to day and sports book to sports book. When a player places a future wager, any payoff will be based on the odds at the time the wager is made. It is not uncommon during the season to find teams that started out as long shots surging to the forefront. The bettor will still receive the odds at the time the bet was made, regardless of the changes in odds that occur. Examples of future books include the following (2/1 indicates that the player bets 1 and wins 2 in addition to receiving the original bet back; 2/1 also indicates that the 49ers will win the Super Bowl 1 in every 3 tries):

Super Bowl		NBA Championship	
Denver Broncos	1/1	Chicago Bulls	4/5
Green Bay Packers	7/5	Utah Jazz	5/1
San Francisco 49ers	2/1	L.A. Lakers	8/1
Pittsburgh Steelers	6/1	Seattle Supersonics	8/1
Dallas Cowboys	8/1	San Antonio Spurs	12/1
.		.	
.		.	
.		.	
Indianapolis Colts	999/1	Vancouver Grizzlies	500/1

Boxing   Money lines are used in boxing and are moved much like baseball lines. The size of the line in boxing increases the more uncertain the match or prohibitive the favorite. The line in the Ali/Frazier fight listed

previously was a $6 line. A typical boxing line is moved in increments equal to one-fourth the size of the money spread.

Proposition Bets Proposition bets are popular and common in most sports. For example, the Tyson/McNeeley fight had an over/under of one round, or the bettor could bet the fight would last less than or more than 2½ rounds. The fight lasted 89 seconds! One could bet that Tyson would win by a knockout (odds 1-13) or even money that he would win by a first-round knockout.

In 1985, the Chicago Bears played in the Super Bowl. During the course of the season, a huge defensive tackle named William "the Refrigerator" Perry had played running back and had scored on several occasions. Many books offered the Super Bowl proposition that the Refrigerator would score during the game. The line opened at 12 to 1 and closed at 2 to 1. The bettor could wager on only one side of the proposition, which was that the Refrigerator would score. The Refrigerator did carry the ball and he did score. Many of the sports books lost money on the Super Bowl because of this risky wager. Table 17.2 shows examples of typical bets offered by sports books.

Federal Excise Wagering Tax As mentioned in the beginning of this chapter, race and sports book bets are subject to an excise tax. When this tax was imposed in the early 1950s, the tax was 10% of the amount wagered. The tax was reduced to 2% in 1974, and finally to ¼%, where it

Table 17.2 Examples of Typical Proposition Bets Offered

Over/Under Regular Season Wins:

San Francisco 49ers	12	ov	−120
		un	even
Dallas Cowboys	11½	ov	even
		un	−120
Jacksonville Jaguars	2½	ov	−130
		un	+110
Texas A&M	10	ov	+105
		un	−125
Nebraska	10	ov	−110
		un	−110

stands today. All wagers placed by the bettors are subject to this tax. If the game ends in a draw, whereby all moneys are refunded to the bettors, the tax must still be remitted because it is based on the placing of the bet and is not impacted by the outcome of the event.

Sports Book Hold   More than 60% of the total money wagered in books throughout Nevada is wagered on the Las Vegas Strip. During a typical year, the sports books can expect to hold between 3% and 6% of the total amount wagered. This is before the federal excise tax, the state gaming tax, and any expenses. If a casino offers only parlay cards, the hold percentage will be much greater.

NOTES

1. Senate Bill 57 amended Chapter CCX of the Laws of Nevada that specifically prohibited race book wagering and dealing in sports pools.

2. 1951 Pub. L. 183, Part VII, Chap. 27A, Sec. 3285, pp. 529–31.

3. $50 per year per person required to register.

4. Nevada Tax Commission Regulations, adopted April 8, 1952.

5. 1974 Pub. L. 93-499, Sec. 3, p. 1150.

6. Regulation 22.020, repealed June 1975; regulations current as of August 1, 1975.

7. Regulation 22.120.

8. Regulation 22.110.

9. From a 1985 seminar conducted by oddsmaker Mike Roxborough at the Clark County Community College, in Nevada.

CHAPTER EIGHTEEN

RACE OPERATIONS

BETTING AT THE TRACK

Racetracks operate under a system of wagering known as pari-mutuel. Pari-mutuel wagering is a method of betting whereby the bettors wager among themselves, with the track operating in the middle to facilitate the wagering. The track retains a portion of the total wagered by the bettors as its fee for administering the betting, to cover expenses associated with the operation of the track and provide a margin of profit.

To illustrate the operation of a pari-mutuel system, assume a three-horse race including the horses Polly My Love, Baby Blue, and Always Remember. The money wagered on these three horses totals $2,000 and is distributed as follows:

Polly My Love	$1,000
Baby Blue	800
Always Remember	200
Total Wagered	$2,000

Of the total wagered, $1,000, or one-half of the $2,000, is wagered on Polly My Love, and the remaining one-half is wagered on the rest of the field, which consists of two-fifths on Baby Blue and one-tenth on Always Remember. If one-half is wagered on Polly My Love and one half is wagered against Polly My Love, the against/for ratio is one to one. Presented as ratios, these amounts would appear as follows:

	Ratio		
	Against		For
Polly My Love	1	to	1
Baby Blue	3	to	2
Always Remember	9	to	1

These against/for ratios represent the true odds, which are the odds that result in the winning bettors receiving 100% of the amount lost by the losing bettors.

For a $2 Bet   At the track, winning bets are expressed in the "for wager" form and most bets are expressed as "for a $2 wager." If Baby Blue were to pay three to two, a $2 bet wins $3. This same payout rate could be presented as paying $5 *for* $2, which indicates that a winning $2 wager is exchanged *for* $5. The net win for a three-to-two payout is the same as a five-for-two payout. If the preceding ratios were expressed in the "for a $2 wager" form, each would pay:

	True Odds Payout		
Polly My Love	$4	for	$2
Baby Blue	$5	for	$2
Always Remember	$20	for	$2

Takeout   The takeout is the amount of the total wagered by all bettors that is retained by the track to cover expenses and profit. The takeout varies from state to state and, within the state, by type of race. The following is an example of the official takeout one might encounter at a California track:

5.7%	to state
5.1%	to track for expenses and profit
4.2%	to purses for winning horse owners
15.0%	official takeout

If the track retains 15%, then 85% of the total wagered will be returned to the winning bettors. As a result of the takeout, the true odds previously established for Polly My Love, Baby Blue, and Always Remember will be reduced by 15%, thereby returning only 85% of the true odds.

	True Odds	Payout
Polly My Love	$4 × 0.85 =	$3.40
Baby Blue	$5 × 0.85 =	$4.25
Always Remember	$20 × 0.85 =	$17.00

Breakage   Tracks never pay exactly 85% of the total wagered. The amount paid by tracks is always rounded, and the rounding is always down, which benefits the track instead of the bettors, this rounding is known as breakage. Typically, tracks round down to the nearest 20¢ increment (i.e., 20¢, 40¢, 60¢, 80¢, or $1). A winning wager on Baby Blue that should pay $4.25, after the official takeout will be rounded down to $4.20.

Payout after Breakage

Polly My Love	$3.40
Baby Blue	$4.20
Always Remember	$17.00

The breakage resulting from rounding increases the track's official takeout by about 1%. Takeout varies from bet type to bet type. For example:

- Win - Place - Show; 15% takeout
- Exactas - Quinellas - Daily Doubles; 19.75% takeout
- Trifectas - Pic Six; 25% takeout

TYPES OF RACES

The following are types of horse races commonly offered by tracks:

- Claiming Race—More than 70% of a track's racing program is made up of claiming races (Ainslie, 1978, p. 53). Claiming races offer the lowest purses and are run by horses of the lowest quality. The races are known as claiming races (claimer) because, once entered in a race, the horse can be claimed (purchased) by another owner prior to the start of the race. This claiming feature maintains the competitiveness of the race by ensuring that horses entered are of equivalent value.

    For instance, a horse entered in a $12,500 claimer can be purchased by another horse owner for $12,500. The structure of this type of race prevents an owner from slipping in a horse such as Secretariat in a $12,500 claimer. The claiming owner runs all risks of injury, and any purse won by the claimed horse belongs to the previous owner, thereby ensuring a competitive race.
- Maiden Race—A "maiden" is a horse that has never won a race before. All the horses entered in a maiden race have never won before. The horse has "broken his/her maiden" once it wins a race.
- Allowance Race—Each track has what is known as a "condition book." The condition book specifies the previous accomplishments that render a horse ineligible for entry, maximum weights to be carried, and weight allowances (reductions) granted horses with inferior records (Ainslie, 1978, p. 23). The condition book considers past performance, amount of money won, age of the horse, etc.
- Handicap Race—A handicap race is one in which the speed of each horse is adjusted by the amount of weight carried by the horse. Instead of consulting a condition book, a track handicapper subjectively determines how much additional weight a horse must carry. The horse with the best record will be assigned the top weight to carry. Lesser horses (i.e., horses with inferior records) carry less weight.

- Stakes Race—The most lucrative purses and the highest-quality horses are found in stakes races. The Kentucky Derby, the Belmont, and the Preakness are all stakes races. Stakes races can be run as allowance or handicap races.

Generally, a track will offer between nine and twelve races a day. Most races offered will be claiming races. Two or three of the races offered will be allowance or maiden races, and one will be a handicap or stakes race.

TYPES OF BETS

The following are the types of bets accepted on horse races:

- Straight or Flat Bets
  Win—bet wins if horse finishes first.
  Place—bet wins if horse finishes first or second.
  Show—bet wins if horse finishes first, second, or third.
- Daily Double—bettor picks winner of two consecutive designated races (usually first and second or fifth and sixth races).
- Triple—bettor picks winner of three consecutive designated races.
- Pick 6 or Pick 9—bettor picks the winner of six or nine designated races.
- Quinella—bettor picks first two finishers in *any* order.
- Exacta or Perfecta—bettor picks first *two* finishers in exact order.
- Trifecta—bettor picks first *three* finishers in exact order.
- Superfecta—bettor picks first *four* finishers in exact order.
- Parlay—single wager on two or more events/races. All events/races included in the parlay must win for the ticket to win (if one horse is scratched, the parlay is reduced to the number of horses remaining).

RACING TERMS

In order to fully understand horse racing, it is important to have a working knowledge of the terminology common to the sport. The following terms are basic to horse racing:

- Fillies/Mares—a female horse is known as a filly until the age of five years and is referred to as a mare once this age has been attained.
- Colts/Horses—a male horse is known as a colt until the age of five years and is referred to as a horse once this age has been attained.
- Gelding—a castrated horse.
- Furlong—one-eighth of a mile, or 220 yards.
- Silks—the jockey's shirt and color pattern chosen by the horse's owner.
- Saddle Cloth—the saddle blanket worn by the horse, which displays the horse's number in the race.
- Scratch—a horse that has been withdrawn from the field prior to the start of the race.

- Entry—two horses running as one. When two horses have a common owner or trainer, they are typically run as entries. For example, if Polly My Love and Baby Blue were entries, a bet on Baby Blue would win if Polly My Love were to win and, conversely, a bet on Polly My Love would win if Baby Blue were to win.
- Field—when a track has more horses running than the odds board will accommodate (anything over 12). The track secretary will add two or more of the least competitive horses into the field. Bets on the field are made in the same manner as for an entry; that is, a bet on a field horse wins if *any* field horse wins the race.
- Steam—inside information about a race not known by the general public that could influence the outcome of the race.
- Combination Bet (i.e., "across the board")—an equal amount bet on the same horse to win, place, and show ($40 "across the board" means $40 to win, plus $40 to place and $40 to show).
- Board Tracks—designated by wall charts at the race book, player bets the horse by track, race, and saddle cloth number.
- Off Track (or Off Board)—minor track(s) carried in the racing form, but not carried as a board track.
- Future Bets—bets on races to be run at a future date (e.g., Kentucky Derby).
- Post Position—each horse in the field of horses is assigned, by draw, a gate position, from the inside gate (rail position) to the farthest gate position. The inside gate is known as post position one, the adjacent position is known as post position two, etc. The horses enter the gates in consecutive order beginning at gate one.
- Post Time—the time when the horse assigned gate one enters the starting gate.
- Off Time—the time a race actually starts.
- Time—the time it took the winning horse to finish the race.
- Official Track Handicapper—individual responsible for assigning weights to entrants in handicap races. May also serve as the racing secretary, who is the official who prescribes conditions of races at a given track.
- Simulcast—the live audio and video telecast of a race distributed by a licensed disseminator to race books.
- Disseminator—any person who provides, by any means, to the operator of a race book any race information used to determine winners or payoffs on wagers accepted at the race book.

REGULATORY REQUIREMENTS

In Nevada, there is perhaps no other single area that receives more regulatory coverage than race operations. In addition to the information provided in Chapter 17 relevant to prohibited wagers and the other aspects

of Regulation 22 that also apply to race books, there are several other regulations that specifically address race operations.

Regulation 20 (Disseminators)   The regulation details the requirements for persons providing disseminator services to buyers within Nevada. Disseminators are defined as any persons who are licensed to provide to the operator of a race book or sports pool information relating to horse racing or other racing that is used to determine winners of races or payoffs on wagers accepted by the operator. Persons who provide televised broadcasts of races without charge to the operator are excluded from this definition.

The regulation specifies requirements for the licensing of disseminators (20.020), as well as the rates and fees that they may charge for providing these services (20.030). Disseminators are also required to file quarterly reports with the Nevada Gaming Control Board, indicating the names of all buyers and users and including the amount charged for each service provided (20.050). In addition, disseminators must file audited financial statements with the Board on an annual basis (20.070).

Regulation 21 (Live Broadcast)   This regulation governs the relationship that disseminators have with tracks by requiring that agreements between the parties will not be authorized by the Board until certain conditions are met (21.020). Prohibited activities (21.030) for disseminators include distribution of audio-only, simultaneous transmissions of races run at tracks, distribution of audio-only for live broadcasts, and the granting of the exclusive rights to a live broadcast to any user. The regulation also details requirements relevant to the production of a live telecast (21.060) and signal transmission, reception, and security (21.070).

Regulation 26A (Off-track Pari-Mutuel Wagering)   This regulation governs all off-track pari-mutuel wagering by licensed operators (26A.030) within Nevada. Requirements for the conduct of wagering include (26A.040) the following:

- Off-track pari-mutuel wagering may be conducted only by a race book.
- The race book must pay winning off-track pari-mutuel wagers in accordance with official track results.
- An off-track pari-mutuel book may not use the information received from a live broadcast to determine winner and payoffs.
- The pari-mutuel book must comply with Regulation 22 requirements and may not pay compensation to any track unless the agreement has been approved as required under 22.140.

Additional requirements of the regulation pertain to tracks approved to share in revenue or receive compensation (26A.080), system operators

(26A.090–26A.100), off-track pari-mutuel systems (26A.110–26A.130), and approval of agreements (26A.140).

RACE BOOK OPERATIONS

Nevada casinos can offer either pari-mutuel *or* non-pari-mutuel races. In 1989, the Nevada Pari-mutuel Association was formed to negotiate pari-mutuel betting agreements between willing racetracks and Nevada's race books. Once an agreement has been reached between the track and the race books, any amounts wagered at the race book are included in the betting pool at the track. These agreements are the equivalent of "off-track betting," which is found in other states. Between 3% and 4% of the takeout is paid to the track. Accepting wagers that are part of the track's pari-mutuel pool enables the casino to accept wagers of any size since there is no risk of loss.

A track must be approved by Nevada's state gaming regulators in order to receive a percentage of the total wagered at the casino race book. Securing this approval is a lengthy and expensive process, and tracks often choose against licensing. In these cases, the bets accepted at the book are still pooled with the bets accepted at the track, but the track's share is determined on a flat-fee basis versus a percentage of the total wager.

Greyhound racing and some horse tracks do not offer pari-mutuel wagering at the race book. When pari-mutuel wagering is not available, the race book operators accept bets under a form of wagering known as "bookmaking." Until the inception of the Nevada Pari-mutuel Association and the subsequent agreements with the racetracks, all bets accepted in Nevada were placed using the bookmaking system of wagering.

With a bookmaking system, the race book accepts wagers and pays according to what the horse pays at the track. Since the track payout represents the total wagered less the takeout, the race book will realize, over time, approximately the same theoretical advantage represented by the takeout if the same odds paid by the track are paid by the race book. Unlike the track, the race book under a bookmaking system can experience large wins or losses. With the possibility of substantial race book losses, the bets accepted by the book are managed differently than those accepted under a pari-mutuel system.

Extension   Just as in every other casino game, the maximum bet limit is used to minimize loss fluctuations. For example, a casino that offers a maximum bet on the, pass line, in dice of $3,000 may have a maximum bet on crap twelve of $100. Crap twelve will win the bettor $3,000, and therefore this amount is the maximum amount the casino is willing to risk on the $100 wager. The race extension represents the maximum amount the race book is willing to lose on a given horse.

Morning Line   In dice, casino management knows that a crap twelve pays at a rate of 30 to 1. When booking racetrack bets, the amount of exposure or potential loss to the casino is unknown because the amount the horse will pay is a function of how the bettors have bet. In effect, the bettors set their own odds in horse racing. The tool available to race book management to estimate the total exposure is known as the *morning line*. The morning line is provided by the track's official handicapper and represents his "best guess" as to what the odds will be at post time.

If the track handicapper's best guess of post time odds was two to one, then race book management will use this same guess to estimate its loss exposure. This best guess will be used to estimate what a win bet, place bet, and show bet will win. If the morning odds were two to one, race book management would estimate that win bets will pay two to one, winning *place bets* will pay one-half of what win bets pay, and *show bets* will pay one-fourth of what win bets pay, or one to one and 0.5 to 1 respectively.

If $1,000 in total wagers were bet on Polly My Love to win, a win would cost the book two to one or $2,000 based on the morning line. The same $1,000 would win $1,000 in place bets or $500 in show bets. The morning line and extension are used together to determine how much in total wagers the book is willing to accept. Each bet placed is tracked and the estimated payout is deducted from the extension. Once the extension is depleted, a race book supervisor must make the subjective decision whether or not to accept additional wagers.

Consider Table 18.1 for an example of morning line, bets, and per-horse extension of $10,000.

Table 18.1   Example Morning Line and per-horse Extension

	Morning Line	Estimated Win Odds	Estimated Place Odds	Estimated Show Odds
Polly My Love	2:1	2:1	1:1	1/2:1
Baby Blue	4:1	4:1	2:1	1:1
Always Remember	20:1	20:1	10:1	5:1

	Bet to Win	Bet to Place	Bet to Show
Polly My Love	$800	$500	$300
Baby Blue	$200	$200	$160
Always Remember	$100	$100	$50

	Win Bets	Estimated Exposure On: Place Bets	Show Bets
Polly My Love	$1,600	$500	$150 = $2,250
Baby Blue	$800	$400	$160 = $1,360
Always Remember	$2,000	$1,000	$250 = $3,250

Based on the morning line and the bets given in the table, a Polly My Love win would cost the race book $2,250. Wagers will be accepted until the estimated total win on Polly My Love reaches the extension, or $10,000. Since one horse will win, the winning horse plus another horse will place, and these two horses plus a third horse will show, race books often establish an extension for each pool, which would result in extensions for win bets, place bets, and show bets.

If the race is simulcast, the book has access to the track tote board where the actual betting is known; therefore, the more accurate tote board odds will be used to calculate the extension. If the race is not simulcast, the tote board odds will be updated before post time by the disseminator. The early bets accepted are governed by the morning line. The actual payoff rates and winning horses are provided to the book by licensed disseminators.

Determining the Extension   The extension is a function of the track and race book total wagers. Bookmakers are subject to "pool manipulation." Pool manipulation is known as "salting." Ned Day gives an interesting description of several examples of pool manipulation in the following article (Roxborough & Rhoden, 1991, p. 11):

Bookies Bray as "The Build-Up" Jimmies Track Odds

By Ned Day

Sunday, September 29, 1985/*Las Vegas Review-Journal*

It's a beautiful move, conjuring up visions of Paul Newman and Robert Redford in "The Sting." Only instead of "The Sting," they call this one "the build-up." And it's got Las Vegas Bookies braying like a bunch of pin-pricked donkeys.

That's because certain strip scufflers are using the build-up to leave bookies right where it hurts—in the pocketbook. To understand how the build-up move works, you have to know the story of Baron Long, a flamboyant 1930's gambler and sportsman who owned a great sprinter named Linden Tree, a world-class thoroughbred. Long also owned a very small horse racing track back in the Midwest, a track where the cheapest of claiming horses plied their trade in front of small low rent crowds. With great fanfare one day, Baron Long announced that as a special treat for his track customers, he was shipping Linden Tree in to run a big race.

On the day of the race, the morning line tabbed Linden Tree as an overwhelming 1–10 favorite against a field of mutt claimers. They had almost no chance to beat the great thoroughbred sprinter. So, according to the morning line, you would have to bet, for example, $1,000 on Linden Tree in order to win a measly $100.

But when betting at the track began, the odds line mysteriously changed. Several thousand dollars was bet on one of the mutt claimers. The odds on Linden Tree soared to 5–1.

Here's what happened: Baron Long knew that his customers at the track were a relatively small number. He knew they had little money to lay down on Linden Tree. So by pumping a few thousand into the pari-mutuel pool on one of the mutt claimers, he built-up the odds on Linden Tree to 5–1.

With that accomplished just before race time, Long picked up his telephone and called bookmakers all across the country, betting a total of $200,000 on his sure-thing winner, Linden Tree. He made more than a million dollars that day, collecting at the jimmied 5–1 odds. And that's the build-up move.

Now back in Las Vegas in 1985 and specifically last Wednesday night, when eight local bookmakers began offering customers a chance to gamble on dog racing at the Tucson Dog Track. That night, the total pari-mutuel handle at the track amounted to a paltry $103,000 for 13 races, each of which features eight potential dogs on which to bet.

I'll spare you the arithmetic. But suffice to say that the pari-mutuel pool at the Tucson Dog Track was small enough to attract the attention of the Strip sharpies. And that explains what happened. In the feature race that night, the morning line favorite at 4–5 odds won the race as expected and paid a reasonable $6 to win (that's 2–1 odds). But amazingly, the odds on that dog in the Place pool (the second place slot on the board) were roughly 8–1 and the dog paid an outrageous $19 to place. That's for a $2 bet. If, for example, you had bet $2,000 with a Las Vegas bookmaker, you would have collected $19,000.

But even more amazing were the odds on the dog that ran second in this race. Listed as 8–1 on the morning line, the second place dog paid a whopping $362 to place. That's for a $2 bet. If you happened to lay in a couple of grand on that dog with your Las Vegas bookmakers, you would have collected $362,000. In fact, sources report, Strip bookies got stung and stung badly Wednesday night—although the exact amounts are being guarded like Pentagon secrets.

Sources say a similar circumstance occurred Thursday night at the Tucson Dog Track races. Says Las Vegas publisher and pari-mutuel gambling expert Ralph Petillo, "It's a classic example of the 'build-up'. It's very easy to manipulate the Tucson track odds with a minimal amount of money." Adds another well-known gambler, "There's no question the odds were jimmied." So now you know why the bookies are grousing. It's a beautiful move. Baron Long's build-up.

The relationship between total wagered, race purse, pool manipulation, race manipulation, and extension is demonstrated here:

	Possibility of Pool Manipulation	**Possibility of Race Manipulation**	**Extension**
As track handle increases	decreases		increases
As size of race purse increases		decreases	increases

The higher the quality of the track and horses, the higher the extension will be.

Protection   When booking horse races versus pari-mutuel wagering, the race book will pay track odds up to a point. The amount of the wager receiving full track odds is a function of competition. Competition drives up the amount of the wager receiving full track odds, but it also increases the amount the casino may lose due to manipulation or inside information. Some casinos will pay track odds up to the first $20 of the wager. One major strip casino in Las Vegas will pay the following on horse races or bets that are booked:

1. Straight bets at full track odds for first $100 of wager, then subject to Win of 20 to 1, Place 8 to 1, and Show 4 to 1
2. Quinella, Exacta, Daily Double wagers at 150 to 1
3. Daily Triple wagers at 500 to 1
4. Trifecta wagers at 500 to 1
5. Parlays (two, three, or four horses) subject to maximum Win of 100 to 1, Place 50 to 1, Show 25 to 1

House Quinella   A quinella bet is based on picking the first two finishers in any order. Some tracks do not offer a quinella wager, and in these cases most Nevada race books offer house quinellas with payouts determined by a formula. The amount a house quinella pays is obtained by multiplying what the win bet paid on the winning horse times one-half what a place bet paid on the place horse. For instance, assume the following results for Polly My Love, Baby Blue, and Always Remember coming in first, second, and third, respectively:

	Win	**Place**	**Show**
Polly My Love	$74	$40	$18
Baby Blue		$21	$11.20
Always Remember			$ 7.40

A $2 bet on Polly My Love to win paid $74 and a $2 bet on Baby Blue to place paid $21. The house quinella will pay an amount equal to $74 × (0.5 × $21) = $777 for a $2 house quinella wager.

Some race books offer a house trifecta. A house trifecta payoff is calculated by multiplying: win × place × show × 1.20. In the preceding race example, a house trifecta would pay $74 × $21 × $7.40 × 1.2 = $13,799.52. A payout this large (i.e., 6,898.76 to 1) would be limited by the payoff limits as outlined earlier. If the player placed the bet at the major strip casino described in the preceding paragraph, a bet that should pay $13,799.52 for $2 would pay at a rate of 500 to 1 or $1,002 for $2.

Upon entering a race book, a board track similar to the one presented in Figure 18.1 might be displayed. The example illustrated in Figure 18.1 lists the entrants in the fourth race at the Santa Anita racetrack. The distance of the race is six furlongs (a furlong is one-eighth of a mile) and the

<div>

Santa Anita
Fourth Race
Post 1:58
6 Furlongs

3 YO (MDN CLM)		M/L
1	Airhead	8/1
	M Garcia 118	
2	Okie	5/1
	G Almeida 118	
3	Smokey	20/1
	B Blanc 116	
4	BeBe	30/1
	R French 111	
5	Jughead	4/1
	A Solis 118	
6	Whitey	3/1
	L Pincay Jr. 118	
7	Blondie	8/1
	O Vergara 118	
8	Hobo	20/1
	J Garcia 116	
9	Panda II	12/1
	D Flores 118	
~~10~~	~~Victor Emmanuel~~	~~20/1~~
	R Douglas 118	
11	Curly Q	9/2
	C McCarron 118	

</div>

Figure 18.1   Board Track

first horse entered the gate at 1:58. Each horse in the race is three years old, has never won a race before (MDN = maidens), and can be claimed prior to the start of the race (CLM = claiming race). The saddle cloth number on Airhead is #1. Airhead is ridden by M. Garcia, and the total weight the horse will carry is 118 pounds. The morning line provided by the track handicapper is eight to one. Horse #10 was a scratch and did not race.

   After the race is run, the race book will post the results. The following are the results for that race:

	Finish	Win	Place	Show
1st	#11	9^{60}	6^{00}	3^{40}
2nd	#5		8^{80}	4^{60}
3rd	#6			2^{60}
	$2 Q	38^{00}	$2 EX	70^{60}
OFF	2:03		TIME	1:12.5

The #11 horse, Curly Q, won the race and paid $9.60 to win, $6.00 to place, and $3.40 to show. The track quinella paid $38.00 for a $2 wager, the track exacta paid $70.60 for a $2 wager. The time the race actually started was 2:03, and the winning horse ran the race in 1:12.5 minutes.

   Based on the morning line of nine to two, the track handicapper estimated that if Curly Q were to win, the horse would pay $11 (nine to two equals eleven for two). The horse actually paid $9.60.

   This chapter provides the information needed to gain a basic understanding of a rather complicated area. There are many intricacies involved in horse racing, which would take many more chapters to describe in detail. The successful bettor as well as the race book operator must have knowledge of track conditions, jockeys, trainers, the effects of weight, horse conditioning, handicapper skill, and many other factors.

CHAPTER NINETEEN

CASINO STATISTICS

Descriptive statistics are measures used to describe a mass of numerical data (Van Matre & Gilbreath, 1987, p. 4). In most gaming jurisdictions, performance statistics for casinos are available for either specific casinos or particular locations. Statistics are an important tool for casino owners and operators to use in comparing the results from their casinos to those of competitors within the market in which they operate. Statistics may also be used to evaluate the performance of areas within the casino and identify areas that may require additional attention.

Average occupancy and average daily room rate (ADR) are examples of statistics that provide valuable information to the general manager, hotel manager, and director of sales. These statistics indicate whether the hotel is meeting its budgeted occupancy and ADR, as well as how the hotel is performing in comparison to the same period in the prior year.

Casino management receives similar statistics from accounting personnel, which detail the casino table game drop, win, hold, and other key performance indicators. In view of the importance of these statistics in evaluating the operation, it is imperative that casino management develop a basic understanding of descriptive and inferential statistics. The focus of this chapter is to provide the information necessary to develop this understanding.

POPULATION

A population, or universe, is defined as an entire group of persons, things, or events having at least one trait in common (Sprinthall, 1990, p. 461). For example, all the students enrolled at the University of Nevada Las Vegas (UNLV) who transferred from another college would be considered a population. Another example of a population is all the UNLV students who are hotel majors. The key word in both of these examples is *all*.

When discussing populations, it is important to include each and every element meeting the established criteria. If discussing monthly table game hold, the population would contain each and every month's hold since the casino opened.

SAMPLE

A sample is a portion of the population that is selected for analysis. If there are 200 UNLV hotel majors and 20 are selected at random from this population, the group of 20 is called a random sample. Ten monthly table games' hold observations selected at random from all the monthly table game hold data since a casino's opening would represent a sample of the total population.

PARAMETERS AND STATISTICS

A parameter is a measure that comprises all elements of a population. Using the entire population to calculate a particular parameter could prove extremely difficult or even impossible. Imagine the difficulty in trying to determine the average height of all college freshmen in the United States. The population that would be required to be measured in order to compute this parameter is extremely large.

A statistic, on the other hand, is any measure obtained by having measured a sample (Sprinthall, 1990, p. 463). A statistic can be calculated with greater ease than a parameter since you are measuring a particular subset (sample) of the overall population instead of the population itself. In the preceding example, it would be much easier to determine the average height of college freshmen at selected universities rather than the height of all freshmen in the United States. A statistic provides an estimate of a population attribute, based on a sample. Any estimate of the population or related inferences will be based on information obtained from a sample.

AVERAGE OR MEAN

Average is a term familiar to most people since it is commonly used in everyday language. In football, average points per game and average yards per carry are common statistics. Many baseball enthusiasts can list the batting average or ERA (earned run average) for their favorite players. Average temperature and average rainfall are given daily on the local weather station. Students know, too well, their GPA or Grade Point Average.

The formula for average, or mean, is straightforward. All elements of the population or sample are totaled. The total is then divided by the number of elements in the population or sample. The resulting quotient is the average.

The number of elements in a population is denoted with an uppercase "N," whereas the number of elements in a sample is denoted with a lowercase "n."

N = 200   (the total number of UNLV hotel majors)
n =   20   (a sample selected from the population of UNLV hotel majors)

The Greek letter μ (pronounced "mu") is used to denote the population mean, and the symbol $\overline{X}$ (referred to as "X bar") is used to denote the sample mean.

μ = average of all elements in the population

$$\mu = \frac{\sum X_i}{N}$$

$\overline{X}$ = average of sample elements selected from the population

$$\overline{X} = \frac{\sum X_i}{n}$$

The following represents a sample of monthly table games' hold percentages for an individual casino (sorted from lowest to highest):

$$
\begin{aligned}
X_1 &= 15.4 \\
X_2 &= 16.4 \\
X_3 &= 16.4 \\
X_4 &= 16.8 \\
X_5 &= 16.9 \\
X_6 &= 18.0 \\
X_7 &= 18.4 \\
X_8 &= 19.2 \\
X_9 &= 19.4 \\
X_{10} &= \underline{20.1} \\
\sum X &= 177.0
\end{aligned}
$$

$$X = \frac{\sum X}{n}$$

$$n = 10$$

$$X = \frac{177.0}{10} = 17.7$$

MEDIAN

The median is the middle value in a population or sample. If the sample contained an odd number of elements (e.g., 3, 5, 7, 9) the median would be the middle value. If the sample contained an even number of elements, as in the preceding sample, the median is the average of the middle two elements.

$$16.9 = X_5$$
$$18.0 = X_6$$
$$\text{median} = \frac{16.9 + 18.0}{2} = 17.45$$

MODE

The mode in the example is 16.4, because it occurs twice and all the other numbers occur only once. If two numbers occur more frequently than all the other numbers in the group, the distribution is described as bimodal.

MEASURES OF DISPERSION

The average tells us nothing about the scatter or dispersion of values from which the average came. The values may be closely distributed around the average or there may be a great deal of variation in the distribution of the numbers around the average. The following represents a comparison of the data from two samples:

Sample A		Sample B	
X_1	= 15.4	X_1	= 5.4
X_2	= 16.4	X_2	= 8.4
X_3	= 16.4	X_3	= 11.4
X_4	= 16.8	X_4	= 12.8
X_5	= 16.9	X_5	= 14.9
X_6	= 18.0	X_6	= 20.0
X_7	= 18.4	X_7	= 22.4
X_8	= 19.2	X_8	= 24.3
X_9	= 19.4	X_9	= 27.3
X_{10}	= 20.1	X_{10}	= 30.1
ΣX	= 177.0	ΣX	= 177.0

$$\overline{X} = \frac{\Sigma X}{n} \qquad\qquad \overline{X} = \frac{\Sigma X}{n}$$

$$n = 10 \qquad\qquad n = 10$$

$$\overline{X} = \frac{177.0}{10} = 17.7 \qquad\qquad \overline{X} = \frac{177.0}{10} = 17.7$$

Although the averages are the same for the two samples, the scatter or dispersion of the data is substantially different. Range, variance, and standard deviation are measurements that will give the casino executive a better idea of the differences in the data.

RANGE

The range is the difference between the lowest and highest numbers in each sample.

Sample A		Sample B
highest	20.1	30.1
lowest	15.4	5.4
range	4.7	24.7

Range is a measure of variability. However, it is based on only two numbers in the set and ignores the remaining values.

VARIANCE

Variance measures the amount of variation of the elements from the average.

$$\text{population variance} = \sigma^2 = \frac{\Sigma (X_i - \mu)^2}{N}$$

$$\text{estimated variance of population} = s^2 = \frac{\Sigma (X_i - \overline{X})^2}{n - 1}$$

Low variability corresponds to consistency and the ability to predict, or estimate, with greater accuracy.

It is important to note that when a sample is used to infer the variance of the population, the denominator of the equation becomes $n - 1$. Dividing by n instead of $n - 1$ would, on average, underestimate the population variance. The following table shows the calculation of the population variance estimate when a sample is used.

X_i	$\overline{X}$	$(X_i - \overline{X})$	$(X_i - \overline{X})^2$
15.4	17.7	−2.3	5.29
16.4	17.7	−1.3	1.69
16.4	17.7	−1.3	1.69
16.8	17.7	−0.9	0.81
16.9	17.7	−0.8	0.64
18.0	17.7	+0.3	0.09
18.4	17.7	+0.7	0.49
19.2	17.7	+1.5	2.25
19.4	17.7	+1.7	2.89
20.1	17.7	+2.4	5.76
			21.60

$$\Sigma (X_i - \overline{X})^2 = 21.60$$

$$s^2 = \frac{21.60}{10 - 1} = 2.4$$

STANDARD DEVIATION

The standard deviation is the square root of the variance. If a distribution is normally distributed, the standard deviation can be used to determine the area under the curve. The area under the curve can refer to elements such as people, hands dealt per hour, or dollars lost. An area between −1 and +1 standard deviations (sd or s) from the mean contains 68.27% of the area under a normal curve. Two standard deviations on either side of the

mean contain 95.45% of the total area, and ±3 standard deviations contains 99.73% of the area under a normal curve.

If the sample elements are dealer hands dealt per hour, then the mean represents the average number of dealer hands dealt per hour, and ±1sd indicates that 68.27% of the time the number of dealer hands dealt per hour will fall within this range. If the elements are casino hands won, then ±1sd indicates that 68.27% of the time the number of casino hands won will fall within this interval.

Since the curve shown in Figure 19.1 is symmetric, and 68.27% of the area under the curve is contained within ±1σ of the mean, then from the mean (μ) to ±1σ must contain 34.135% of the area and the same must be true of the area from the mean to −1σ. The graph in Figure 19.2 depicts the percentage of the curve between each standard deviation increment.

Using the table game hold sample, the standard deviation of the population would be estimated as follows:

$$s = \sqrt{s^2} = \sqrt{2.4} = 1.55$$

Knowing the size of the sample and the estimated standard deviation of the population enables one to estimate the standard error of the mean. As discussed, the mean of the sample serves as a point estimate of the population mean; however, the amount of dispersion of the sample means from the population mean can be estimated using the following equation:

$$\text{Standard error of the sample mean} = \frac{\text{estimated population standard deviation}}{\sqrt{n}}$$
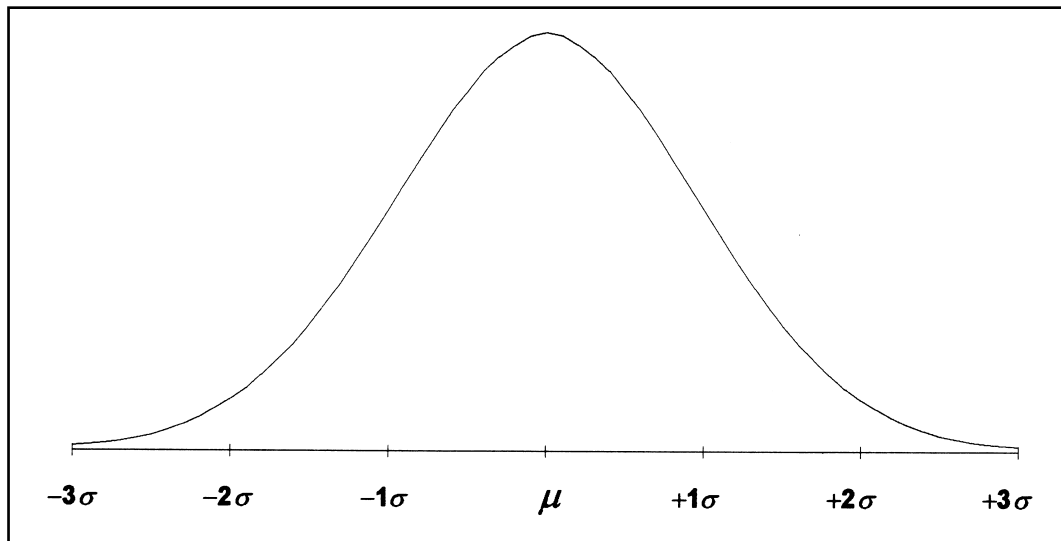
Figure 19.1   Standard Deviation
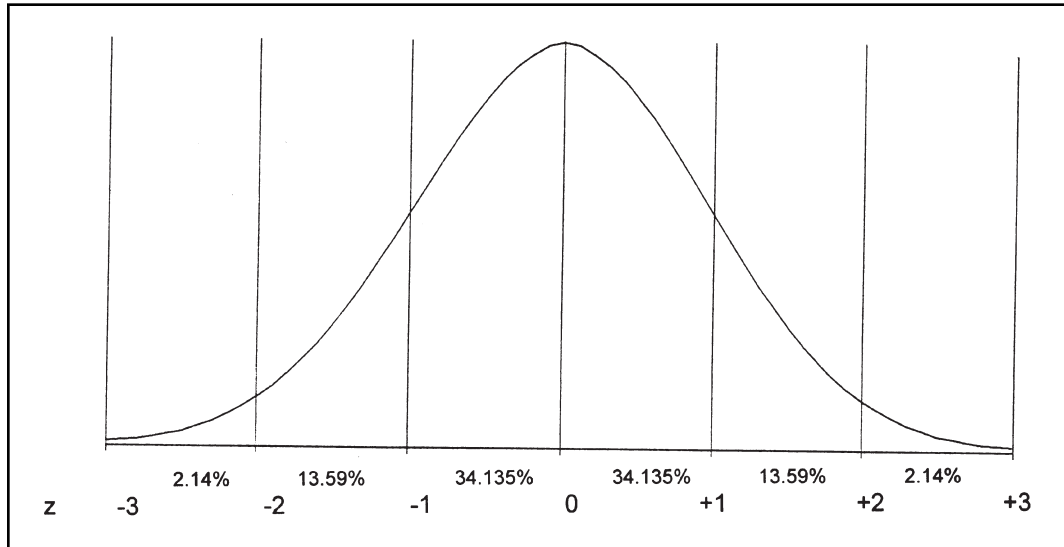
Figure 19.2   Percentage of the Curve within Each Standard Deviation Increment

In this formula, n equals the number of elements in the sample. Using the previous example, the standard error of the sample mean equals:

$$\text{Standard error of mean } = \frac{1.55}{\sqrt{10}} = 0.4902$$

Assuming a sample size of over 30, the standard error of the sample mean indicates that 68.27% of the sample means will lie within ±1 standard deviation of the population mean. As the sample size increases, the standard error of the mean decreases.

A practical application of using a sample to estimate the population mean and standard deviation would be in analyzing the dealer's shuffling procedure. Assume a new shuffle that should take 60 seconds to complete. To determine how well the dealers are following the procedure, surveillance personnel could be instructed to collect a random sample of timed dealer shuffles. After using the sample to estimate the mean and standard deviation of the population, inferences can be made about the shuffling procedure of the population. If the mean approximates 60 seconds and the standard deviation is only a few seconds, then it is safe to assume that the dealers are following the correct procedure. However, if the mean approximates 60 seconds but the standard deviation estimate of the population was, for example, 20 seconds, then it is safe to assume that many of the dealers are not shuffling as instructed.

WEIGHTED AVERAGE

One of the tools used to successfully market a casino is a computerized player rating system. The rating system is used to identify and stratify players based on their expected earning potential. A player's trip history will include his average bet, time played, win/loss, and so forth.

Players new to a casino are often given *action criteria*, which outline the average bet and time of play required to receive certain levels of complimentaries. For example, a casino may require an average bet of $150 for 12 hours during a three-night stay for the player to receive complimentary room, food, and beverage.

During the stay, the player will have several play sessions of various lengths and average bets. If a simple average was calculated, the result would prove misleading. Take the following two cases in which both players make the same number of bets per hour:

	Player A		Player B	
	Avg. Bet	Time/(hours)	Avg. Bet	Time/(hours)
1st session	500	2.00	1700	0.25
2nd session	450	4.00	75	5.00
3rd session	700	1.00	75	6.00
4th session	300	5.00	100	0.75
Totals	1950	12.00	1950	12.00
SIMPLE AVG.	487.50		487.50	

Weight[1]	Weight
500 × 0.17 = 83.33	1700 × 0.02 = 35.42
450 × 0.33 = 150.00	75 × 0.42 = 31.25
700 × 0.08 = 58.33	75 × 0.50 = 37.50
300 × 0.42 = 125.00	100 × 0.06 = 6.25
Weighted Average 416.67	110.42

Even though both players have the same average bet using a simple average, player A is worth considerably more to the casino than player B, as reflected using the weighted average.

The weighted average bet smooths the betting for the purpose of ascertaining the level of complimentaries earned. If an average bet of at least $150 for 12 hours was required by the casino in order for a player to receive a specified level of complimentaries, then player A attained the required level while player B did not.

PROBABILITY DISTRIBUTION

One of the most difficult concepts for many casino executives to accept is that of theoretical win (statisticians use the term "expected win"). This difficulty arises from the fact that theoretical and actual win may vary substantially for a given player's session of play. To accept the concept of theoretical win, it is necessary to have an understanding of what normally happens during the course of play. If N is more than 30, this can be accomplished by creating a probability distribution.

If the probability of a house win and a player win is known, the probability that the actual casino win will fall within a specified range can be calculated. To illustrate this, assume a baccarat player betting the player hand makes a flat bet of $500 each hand for 100 hands. What theoretical amount can the casino expect to win?

First, the probability of a player win and the probability of a bank win must be obtained.

Probability of banker win	0.4585974 (prob(banker))
Probability of player win	0.4462466 (prob(player))
Probability of tie	0.0951560 (prob(tie))

EXPECTED VALUE

A bettor wagering the player side in baccarat wins 1 unit when the player wins, loses 1 unit when the banker wins, and breaks even when the player and banker tie; consequently, the bettor has only three possible outcomes: +1, –1, 0. Based on the probabilities indicated in the preceding paragraph, the bettor's expected win amount from a $1 player bet in baccarat is:

$$\text{e.v.} = (0.4462466 \times 1) + (0.4585974 \times -1) + (0.095156 \times 0) = -0.01235$$
$$\text{where e.v.} = \text{expected value}$$

A player expected value of –0.01235 represents a casino expected value of +0.01235. Since percent equals parts per 100 and $1 is made up of 100 cents, an expected value of +0.01235 equals a casino advantage of +1.235%.

If the bet is $500, the casino expected value per bet is:

$$\text{e.v.} = 0.01235 \times \$500 = \$6.175$$

If the bettor were to play 100 hands, the casino's expected value for the entire session is:

$$\$6.175 \times 100 = \$617.50$$

In other words, the expected value is the net result the casino can expect, on average, after 100 hands are played. In this example, the casino expects to win $617.50 of the $50,000 wagered by the player.

On a given hand, a player wager of $500 will win $500, lose $500, or break even. To statisticians, these three possible outcomes are referred to as "random variable X." As demonstrated, knowing the possible outcomes and the corresponding probability of occurrence enables one to calculate the expected value. This knowledge also allows one to calculate the standard deviation of random variable X. The following model is constructed from the casino's perspective (i.e., +500 represents a player loss of $500).

A Outcomes X	B Probability $P(X)$	C Expected Value $E(X)$	D $X - E(X)$	E Column D Squared	F Product B × E
−500	0.4462466	$6.175	−506.175	256,213.13	114,334.24
0	0.095156	$6.175	−6.175	38.13	3.63
+500	0.4585974	$6.175	493.825	243,863.13	111,834.99
				Variance =	226,172.86

The square root of the variance equals the standard deviation of random variable X.

$$\sqrt{226172.86} = 475.576$$

The standard deviation per $500 wagered divided by the amount of the wager, that is, $500, yields the standard deviation of the win amount per $1 wagered on the player in baccarat.

$$\frac{475.576}{500} = 0.9512$$

A casino executive interested in the amount the actual win will vary from the expected win will use the following formula:

$$\sqrt{\text{(amount wagered per hand)}^2 \times \text{hands played}} \times \text{standard deviation per dollar wagered}$$

Figure 19.3 describes the results of this formula, when applied to the preceding example:

$$\sqrt{(500)^2 \times 100} \times 0.9512 = 4{,}756$$

At the end of 100 hands, the casino can expect to be between a $4,138.50 loser and a $5,373.50 winner 68.27% of the time, and between $8,894.50

−3σ	**−2**σ	**−1**σ	μ	**+1**σ	**+2**σ	**+3**σ

Casino:

$ Net	-13,650.50	-8,894.50	-4,138.50	+617.50	+5,373.50	+10,129.50	+14,885.50
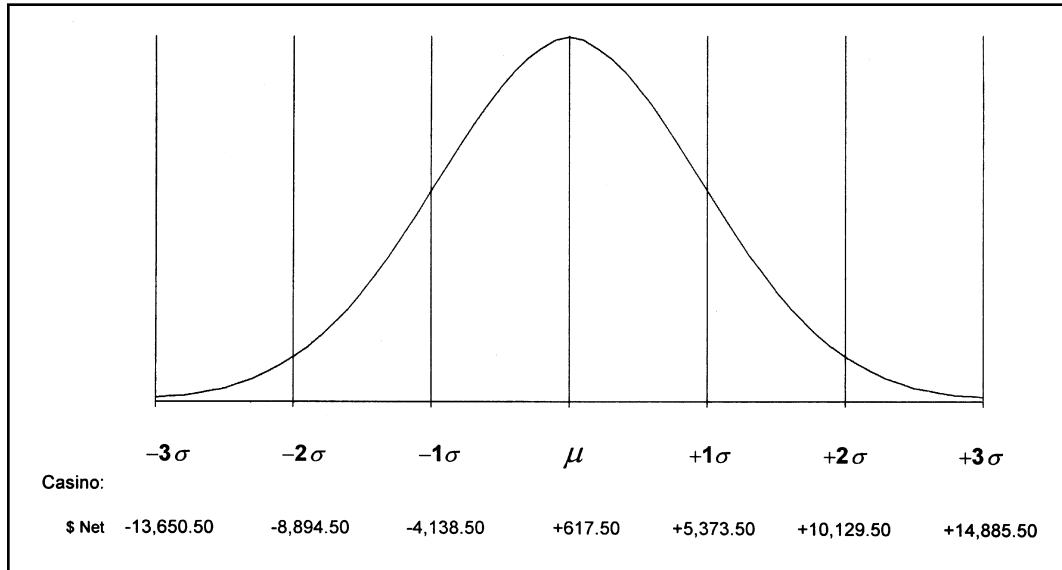
Figure 19.3   Casino Expected Win and Loss

loser and $10,129.50 winner 95.45% of the time. This is the area between −1 and +1 standard deviations and −2 and +2 standard deviations of the mean, respectively.

CALCULATING THE STANDARD DEVIATION WITH UNEVEN BETTING

In the real world, the player rarely makes the same flat bet. In the preceding example, calculating the standard deviation of the house win amount with the same bet size was straightforward. If the bet size varies, the calculations are made as follows.

First, the hands played at each of the different bet sizes must be tabulated. For example, assume the following player-hand bets in baccarat: $120 bet on 40 hands, $200 bet on 35 hands, $50 bet on 10 hands, and $5 bet on 15 hands.

Bet Size	Hands Played
$120	40
$200	35
$50	10
$5	15
	100

Second, square each bet size and multiply these squares by the number of hands played at that bet size.

Amount Wagered^2		Times Wagered		
120^2	×	40	=	$ 576,000
200^2	×	35	=	1,400,000
50^2	×	10	=	25,000
5^2	×	15	=	375
				$2,001,375

Third, multiply the square root of the sum of these products by the standard deviation per dollar wagered. As calculated, the standard deviation of the house win amount at a $1 bet on the player is 0.9512, and 0.9274 when betting the bank side (see calculation of standard deviation per hand for various games to follow). If the player were playing the player side in baccarat, the standard deviation calculations per the 100 hands of uneven betting would be:

$$\sqrt{2,001,375} \times 0.9512 = 1,345.66$$

In this example, a player betting the player side in baccarat made bets totaling $12,375. Consequently, with a house advantage of 1.235%, the mean theoretical casino win is $152.83 ($12,375 × 0.01235) with the standard deviation equal to $1,345.66. Therefore, the casino can expect a result between: –$1,192.83 ($152.83 minus $1,345.66) and $1,498.49 ($152.83 plus $1,345.66) 68.27% of the time, and between –$2,538.49 and $2,844.15 95.45% of the time, and between –$3,884.15 and $4,189.81, 99.73% of the time.

    In blackjack, there are numerous possible outcomes, depending on the player's initial two cards, the rules, and how the cards are played. The player can hit, stand, double down, and split if the initial cards are equal in value. The following table presents the results of a 200 million–hand six-deck blackjack simulation where Las Vegas Strip rules were used and the player could split up to four times and double after the split (player could win as many as 8 units). Additionally, the simulation was conducted assuming the player followed basic strategy. The outcomes are from the perspective of the casino. That is, a casino win is a player loss.

Outcome	Frequency	Probability
–8	124	0.00000062
–7	1,307	0.00000654
–6	7,670	0.00003835
–5	29,162	0.00014581
–4	144,214	0.00072107

Outcome	Frequency	Probability
−3	474,871	0.00237436
−2	11,733,850	0.05866925
−1.5	9,052,797	0.04526399
−1	65,252,858	0.32626429
0	17,543,631	0.08771816
+1	86,830,017	0.43415009
+2	8,409,124	0.04204562
+3	403,338	0.00201669
+4	94,931	0.00047466
+5	17,807	0.00008904
+6	3,729	0.00001865
+7	517	0.00000259
+8	53	0.00000027

There are as many as seven betting spots on a blackjack table. If during one round a bet is placed in only one spot, the outcome of this bet will not affect the outcome of the bet on the subsequent round. The events *house win at spot one on the first round of play* and *house win at spot one on the second round of play* are independent.

However, if bets are placed on, for example, spots one and two during the same round of play, the event *house win for the round* is dependent. Consequently, the variance of the house win amount when betting multiple positions per round is not calculated by adding the individual variances together. The following formula can be used for calculating the approximate variance per round (Griffin, 1988, p. 142):[2]

$$V(n) = 1.26n + 0.50n(n-1)$$

where n equals the number of spots played and the standard deviation per round equals the square root of the variance:

$$\sqrt{V(n)} = 1.26n + 0.50n(n-1)$$

This formula yields the following when multiple spots are played:

Spots Played	Approx. Variance	Standard Deviation
1	1.26	1.1225
2	3.52	1.8762
3	6.78	2.6038
4	11.04	3.3226
5	16.30	4.0373
6	22.56	4.7497
7	29.82	5.4608

Assume this scenario: A casino executive has the choice of two different players. Player "A" bets $350 per round in blackjack and plays one spot, whereas player "B" bets the same $350 per round, but instead of playing only one spot he plays seven spots of $50 each. Which player should the casino executive choose?

Player A's standard deviation per hand is as follows:

Amount Wagered^2		Times Wagered		
350^2	$\times$	1	$=$	122,500

The square root of this product is then multiplied by the standard deviation for one spot in blackjack:

$$\sqrt{122{,}500} \times 1.1225 = 392.875$$

This $392.875 represents the standard deviation of the house win amount on a $350 bet on one spot during a single round of play. If the player were to play 100 rounds, the standard deviation would be:

$$\text{SD per round} \times \sqrt{\text{total rounds played}}$$
$$392.875 \times \sqrt{100} = 3{,}928{,}75$$

The standard deviation of the house win amount for the seven $50 bets placed by player B would be different, because the outcomes of the bets at the seven spots are not independent.

Amount Wagered^2		Times Wagered		
50^2	$\times$	1	$=$	2,500

For player B, the square root of this product is multiplied by the standard deviation for seven spots in blackjack. This differs from the formula used to determine the standard deviation per round for player A, since only the standard deviation for one spot was used. The product represents the standard deviation of the house win on seven $50 spots for a single round of play for player B.

$$\sqrt{2{,}500} \times 5.4608 = 273.04$$

If player B were to play 100 rounds, his standard deviation would be:

$$273.04 \times \sqrt{100} = 2{,}703.40$$

Player B's standard deviation would be only 68.8% of the standard deviation determined for player A, who plays one spot. While the theoretical win or expected value is the same for both players, player B's play has less variance and, as a result, less downside risk for the casino.

The executive interested in minimizing the downside risk for the casino would choose player B. Unfortunately, it takes longer to deal a round to seven spots than to one spot. Therefore, a casino executive interested in maximizing the casino's win during a given time would prefer player A.

SAMPLE GAME PROBABILITIES, VARIANCES, AND STANDARD DEVIATIONS

Baccarat: Bank Bets

$$e.v. = (0.4462466 \times 1) + (0.4585974 \times \text{-}0.95) + (0.095156 \times 0) = 0.0106$$

A Outcomes X	B Probability $P(X)$	C Expected Value $E(X)$	D $X - E(X)$	E column D squared	F product B × E
−0.95	0.4585974	$0.0106	−0.9606	0.9228	0.4232
0	0.095156	$0.0106	−0.0106	0.0001	0.0000
1	0.4462466	$0.0106	0.9894	0.9789	0.4368
				Variance =	0.8600
				Std. Dev. =	0.9274

Roulette: Even Money Bets (0 and 00 wheel)

$$e.v. = \left(\frac{18}{38} \times \text{--}1 \right) + \left(\frac{20}{38} \times 1 \right) = 0.0526$$

A Outcomes X	B Probability $P(X)$	C Expected Value $E(X)$	D $X - E(X)$	E Column D Squared	F Product B × E
−1	18/38	$0.0526	−1.0526	1.10797	0.524826
1	20/38	$0.0526	0.9474	0.89757	0.472404
				Variance =	0.997230
				Std. Dev. =	0.998614

Roulette: Straight-Up Bets (0 and 00 wheel)

$$\text{e.v.} = \left(\frac{1}{38} \times -35\right) + \left(\frac{37}{38} \times 1\right) = 0.0526$$

A Outcomes X	B Probability P(X)	C Expected Value E(X)	D X − E(X)	E Column D Squared	F Product B × E
−35	1/38	$0.0526	−35.0526	1228.684	32.3338
1	37/38	$0.0526	0.9474	0.8976	0.8739
				Variance =	33.2077
				Std. Dev =	5.7626

It is important to note that the variance changes substantially, depending on the outcome and the probability of that outcome. The outcome distribution of a player placing bets on a single number will produce approximately 33 times the variance of the outcome distribution produced by an even money bettor.

OUR WORST FEARS REALIZED—"A MONEY MANAGER"

A myth has existed in the casino industry for many years. The myth is that the way a player bets his money can somehow have an adverse effect on the house advantage. It is believed by many within the industry that a player who is a "money manager" is of less value to the casino than other players.

A money manager is defined as a player who has some type of a betting system whereby the wager amount is increased only if the previous hand was won. It is believed that in these situations the player is betting with the casino's money since he is increasing the wager only following hands on which money was won from the casino. Some casinos have even gone so far as to decrease the theoretical disadvantage to affect the awarding of complimentaries for players they believe to be money managers.

In an attempt to determine whether there was any validity to this belief, simulations were developed for several different styles of money managers. Each simulation was conducted assuming a casino game with a 1% house advantage. The money manager was assumed to first bet one unit and, if he won, he bet two units. If he won again after betting two units, he drew back one unit and bet three. If he won this bet (winning payout would be six), he withdrew one unit and bet five. If he won this bet, he then drew back three units and bet seven.

He stayed at seven units until losing, at which time he reverted back to a one-unit bet. Anytime the player lost, it is assumed that he reverts back to a one-unit bet and started the management process all over again.

The following are the results of simulations for various money management systems:

1. Money manager, fixed hands per trip (i.e., each trip he will play 1,000 hands)

   Results of Simulation:

Total trips	20,000	
Fixed hands per trip	1,000	
Total hands	20,000,000	
Average bet	2.1 units	
Total wagered	41,989,326	
Theoretical win	419,893.26	(1.0%)
Actual win	441,402	(1.05%)

   Percent of hands where

1 unit bet	50.6%
2 units bet	25.0%
3 units bet	12.4%
5 units bet	6.1%
7 units bet	5.9%

   Conclusion: The money manager was supposed to lose 1% of the total wagered, based on the theoretical game advantage, and this money manager did lose approximately 1%. If the results for this player were compared with those of any other player whose average bet was 2.1 units and played 1,000 hands per trip, it would be evident that both players would be of equal value to the casino.

Another commonly held myth is that a player who comes into the casino with a specific bankroll, and leaves once he loses his bank or wins a specified amount, is worth less to the casino. For the following simulation, this type of player would be described as "you can only beat him out of $2,000, but, if he wins, he will beat you out of $5,000." To make the player even "tougher" by casino standards, it was assumed that the player is also a money manager as described earlier.

2. Money manager with a $2,000 starting bankroll who quits when losses equal $2,000 or when wins equal $5,000.

   Results of Simulation

Total trips	20,000
Trips where win = $5,000	4,418
Total hands played	4,316,425
Average hands per trip	215.82
Average bet	2.1 units
Total wagered	9,063,396

Theoretical win	90,633.96	(1.0%)
Actual win	90,740	(1.0%)

Percent of hands where

1 unit bet	50.6%
2 units bet	25.0%
3 units bet	12.4%
5 units bet	6.1%
7 units bet	5.9%

Conclusion: The money manager was supposed to lose 1% of the total wagered, and this money manager did lose approximately 1%. If this player was compared with any other player whose average bet was 2.1 units and who played 215.82 hands per trip, it would be evident that both players would be of equal value to the casino. The only impact that the limited bankroll, or desire to leave the game at a specific win, had was on the average hands played per trip.

3. Money manager with a $2,000 starting bankroll who quits when losses equal $2,000 or when wins equal $10,000.

Results of Simulation

Total trips	50,000	
Trips where win = $10,000	5,784	
Total hands played	14,811,921	
Average hands per trip	296.24	
Average bet	2.1 units	
Total wagered	31,129,994	
Theoretical win	311,299.94	(1.0%)
Actual win	305,920	(0.98%)

Percent of hands where

1 unit bet	50.6%
2 units bet	25.0%
3 units bet	12.4%
5 units bet	6.1%
7 units bet	5.9%

Conclusion: The money manager was supposed to lose 1% of the total wagered, and this money manager did lose approximately 1%. If this player was compared with any other player whose average bet was 2.1 units and who played 296.24 hands per trip, it would be evident that both players would be of equal value to the casino. The only impact that the limited bankroll, or desire to leave the game at a specific win, had was on the average hands played per trip.

4. Money manager with a $1,000 starting bankroll who quits when losses equal $1,000 or when wins equal $5,000.

Results of Simulation

Total trips	100,000
Trips where win = $5,000	12,819
Total hands played	10,825,093
Average hands per trip	108.25
Average bet	2.1 units
Total wagered	22,717,030
Theoretical win	227,170.30 (1.0%)
Actual win	230,860 (1.02%)
Percent of hands where	
1 unit bet	50.6%
2 units bet	25.0%
3 units bet	12.4%
5 units bet	6.1%
7 units bet	5.9%

Conclusion: The money manager was supposed to lose 1% of the total wagered, and this money manager did lose approximately 1%. If this player was compared with any other type player whose average bet is 2.1 units and who played 108.25 hands per trip, it would be evident that both players would be of equal value to the casino. As in the previous simulations, the only impact that the limited bankroll, or desire to leave the game at a specific win, had was on the average hands played per trip.

5. Money manager with a $1,000 starting bankroll who quits when losses equal $1,000 or when wins equal $10,000.

Results of Simulation

Total trips	100,000
Trips where win = $10,000	6,214
Total hands played	15,186,446
Average hands per trip	151.86
Average bet	2.1 units
Total wagered	31,912,230
Theoretical win	319,122.30 (1.0%)
Actual win	316,460 (0.99%)
Percent of hands where	
1 unit bet	50.5%
2 units bet	25.0%
3 units bet	12.4%
5 units bet	6.1%
7 units bet	6.0%

Conclusion: As in all of the previous simulations, the money manager was supposed to lose 1% of the total wagered and this money manager did lose approximately 1%. If this player was compared with any other player whose average bet was 2.1 units and who played 151.86 hands per trip, it would be evident that both players would be of equal value to the casino. The only impact that the limited bankroll, or desire to leave the game at a specific win, had was on the average hands played per trip.

As the results of all five simulations indicate, the idea that a particular player is worth less to the casino because he employs a money management strategy is nothing but a myth. Money management affects only the variance of a player's outcome distribution, producing no effect on the mean or expected value (i.e., theoretical win). The way that players of this type are perceived and valued should be reconsidered by those individuals within the casino industry who still believe in this myth.

NOTES

1. The weight is calculated by dividing the session time by the total time (i.e., 2 hrs ÷ 12 hrs = 0.17).
2. The 1.26 represents the single deck, no double after splitting, variance. As the number of decks increases or the rules change, so does the variance.

APPENDIX: Z TABLE

All percentages represent the area under a standard normal curve between the mean and z. Negative z scores indicate areas to the left of the mean.
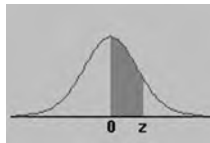
z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.000%	0.399%	0.798%	1.197%	1.595%	1.994%	2.392%	2.790%	3.188%	3.586%
0.1	3.983%	4.380%	4.776%	5.172%	5.567%	5.962%	6.356%	6.749%	7.142%	7.535%
0.2	7.926%	8.317%	8.706%	9.095%	9.483%	9.871%	10.257%	10.642%	11.026%	11.409%
0.3	11.791%	12.172%	12.552%	12.930%	13.307%	13.683%	14.058%	14.431%	14.803%	15.173%
0.4	15.542%	15.910%	16.276%	16.640%	17.003%	17.364%	17.724%	18.082%	18.439%	18.793%
0.5	19.146%	19.497%	19.847%	20.194%	20.540%	20.884%	21.226%	21.566%	21.904%	22.240%
0.6	22.575%	22.907%	23.237%	23.565%	23.891%	24.215%	24.537%	24.857%	25.175%	25.490%
0.7	25.804%	26.115%	26.424%	26.730%	27.035%	27.337%	27.637%	27.935%	28.230%	28.524%
0.8	28.814%	29.103%	29.389%	29.673%	29.955%	30.234%	30.511%	30.785%	31.057%	31.327%
0.9	31.594%	31.859%	32.121%	32.381%	32.639%	32.894%	33.147%	33.398%	33.646%	33.891%
1.0	34.134%	34.375%	34.614%	34.849%	35.083%	35.314%	35.543%	35.769%	35.993%	36.214%
1.1	36.433%	36.650%	36.864%	37.076%	37.286%	37.493%	37.698%	37.900%	38.100%	38.298%
1.2	38.493%	38.686%	38.877%	39.065%	39.251%	39.435%	39.617%	39.796%	39.973%	40.147%
1.3	40.320%	40.490%	40.658%	40.824%	40.988%	41.149%	41.308%	41.466%	41.621%	41.774%
1.4	41.924%	42.073%	42.220%	42.364%	42.507%	42.647%	42.785%	42.922%	43.056%	43.189%
1.5	43.319%	43.448%	43.574%	43.699%	43.822%	43.943%	44.062%	44.179%	44.295%	44.408%
1.6	44.520%	44.630%	44.738%	44.845%	44.950%	45.053%	45.154%	45.254%	45.352%	45.449%
1.7	45.543%	45.637%	45.728%	45.818%	45.907%	45.994%	46.080%	46.164%	46.246%	46.327%
1.8	46.407%	46.485%	46.562%	46.638%	46.712%	46.784%	46.856%	46.926%	46.995%	47.062%
1.9	47.128%	47.193%	47.257%	47.320%	47.381%	47.441%	47.500%	47.558%	47.615%	47.670%
2.0	47.725%	47.778%	47.831%	47.882%	47.932%	47.982%	48.030%	48.077%	48.124%	48.169%
2.1	48.214%	48.257%	48.300%	48.341%	48.382%	48.422%	48.461%	48.500%	48.537%	48.574%
2.2	48.610%	48.645%	48.679%	48.713%	48.745%	48.778%	48.809%	48.840%	48.870%	48.899%
2.3	48.928%	48.956%	48.983%	49.010%	49.036%	49.061%	49.086%	49.111%	49.134%	49.158%
2.4	49.180%	49.202%	49.224%	49.245%	49.266%	49.286%	49.305%	49.324%	49.343%	49.361%
2.5	49.379%	49.396%	49.413%	49.430%	49.446%	49.461%	49.477%	49.492%	49.506%	49.520%
2.6	49.534%	49.547%	49.560%	49.573%	49.585%	49.598%	49.609%	49.621%	49.632%	49.643%
2.7	49.653%	49.664%	49.674%	49.683%	49.693%	49.702%	49.711%	49.720%	49.728%	49.736%
2.8	49.744%	49.752%	49.760%	49.767%	49.774%	49.781%	49.788%	49.795%	49.801%	49.807%
2.9	49.813%	49.819%	49.825%	49.831%	49.836%	49.841%	49.846%	49.851%	49.856%	49.861%
3.0	49.865%	49.869%	49.874%	49.878%	49.882%	49.886%	49.889%	49.893%	49.896%	49.900%
4.0	49.997%	49.997%	49.997%	49.997%	49.997%	49.997%	49.998%	49.998%	49.998%	49.998%

Note: A z distribution has a mean of zero and a standard deviation of one. Thus a z score of 3.0 indicates a point in the distribution that lies 3 standard deviation units to the right of the mean.

GLOSSARY OF CASINO TERMINOLOGY

Over the years the casino industry has developed terminology that forms the basis for a language used by casino personnel and players. In order to fully understand and appreciate the casino industry, it is important to be able to interpret the language. This glossary is provided to assist the reader by defining some of the terminology that is common and at the same time unique to the industry.

Accountability   The total of all cash and cash equivalents (e.g., chips, tokens, receivables, and customer deposits) constituting the fund that is maintained by the casino cage.

Ace   The one-spot on a die and the highest-ranking card in poker.

Ace-Deuce   A throw of the dice totaling three.

Action   Amount of currency or chips being wagered or the sum of a player's wagers over the course of play.

Award schedule   A printed schedule that shows the payoffs or awards attributable to a particular casino game or device such as a slot machine (also known as a payout schedule).

Bank (bankroll)   The playing stake of a player. Also, the operating fund composed of cash, tokens, and cheques assigned to a casino cashier or change attendant. The term *bank* may also refer to the total operating fund maintained by the casino cage or the inventory of chips maintained on a gaming table (also known as the table float).

Bar   The act of prohibiting a player from gambling in a casino (also known as "86").

Basic strategy   The correct way to play a blackjack hand when the player has no knowledge of the remaining cards. Also, the correct way for the player to play the first hand dealt from a blackjack deck. Basic strat-

egy prescribes the decision that will optimize the player's expected value, given the player's original two cards and the dealer's up-card.

Beef   A gaming-related dispute.

Betting ticket   A form, normally generated by computer, that serves as a player's receipt for a wager placed in race and sports.

Big-six   Often called the money wheel or wheel of fortune. Players wager that a wheel spun by a dealer will land on one of six possible outcomes.

Bingo   A casino game using the draw of numbers combined with player cards to determine the winner of individual games.

Blackjack   A casino game in which the winning hand is determined by whether the dealer or the player is closest to twenty-one without going over. Also, a hand where the first two cards dealt total twenty-one.

Blower   An apparatus used in keno or bingo to mix and select numbered Ping-Pong balls.

Bones   A term used to refer to dice.

Book the action   Accept a wager.

Boxcars   A throw of the dice totaling twelve.

Boxperson   A casino employee who sits at the craps table and is responsible for supervising the game and placing currency received on the table into the drop box.

Break-in   A casino employee with little experience.

Break it down   Separate chips into countable stacks or by colors.

Buy-in   The amount of money a player presents to purchase chips at a table game or the amount required to enter a poker game.

Cage   The area designated for and controlled by the casino cashier. The cage is the financial center of the casino and operates like a bank.

Cage credit   Issuances of player credit in currency or cheques occurring at the casino cage, evidenced by the completion of a marker or a counter check.

Calibration module   The part of the hard count weigh scale that provides for adjustment of the amount or number of coins to be counted.

Call bet   Reserved for known premium players, a wager made without money or chips.

Caller   A casino employee who announces the numbers drawn in keno or bingo.

Card games   Include poker, bridge, solo, whist, and panguingui. The casino receives a percentage rake-off or a time buy-in from the operation of card games and is not a party to wagers.

Carousel   Slot cashier surrounded by slot machines (first used in northern Nevada to facilitate slot play).

Casino host   A casino executive who provides a personal link between the casino and premium table games and slot players.

Casino manager   The individual responsible for supervising the operation of the casino.

Catwalk   Historically, this refers to an area above the casino used by surveillance personnel to observe casino operations. Catwalks have been replaced in most casinos with electronic video equipment.

Central Credit   A credit reporting agency, employed by casinos, that provides information on the credit history of casino customers who have applied for or have been granted casino credit.

Change attendant   A casino employee who has a casino-issued bank used to make change for slot customers.

Checkout sheets   Count sheets used by cashiers in the casino to balance their banks at the end of their shifts.

Cheque   Negotiable gaming chip that has a specified value and can be used throughout the casino or redeemed for cash. The term *cheques* is used interchangeably throughout the book with the term *chips,* consistent with industry usage.

Chip float   The dollar value of chips or cheques that are held by customers. Float is also calculated for slot tokens.

Chips   Unlike cheques, chips do not have a predetermined value and can be wagered or redeemed only at the game where purchased (i.e., roulette).

Closer   The form used by casino supervisory personnel to document the inventory of cheques on a table at the end of a shift. A shift closer serves as the following shift opener.

Color up   A transaction whereby the player exchanges cheques for an equivalent amount of a higher denomination of cheques.

Come bet   A wager made after the shooter on a craps game establishes a point (works the same as a pass line bet)*. See also* Point.

Come-out roll   A throw of the dice immediately following a pass line decision. *See also* Point and Come bet.

Complimentary   Also known as a "comp," free use of casino services such as hotel rooms or restaurants.

Cooler   A deck of cards placed into use covertly for the purpose of cheating the casino.

Counter check   A document provided by the casino and used by a player in place of a personal check (also known as a marker).

Crap-out   The shooter throws a two, three, or twelve on the come-out roll.

Craps   A casino game played using a pair of dice, in which the outcome is determined based on throws of the dice by a player known as a "shooter."

Credit limit   The maximum amount of credit that casino management has authorized a player to receive.

Credit manager   The casino executive responsible for overseeing the credit policies of the casino.

Credit play   Wagering based on the issuance of credit and documented by the completion of a credit instrument (marker).

Credit slip   A document used to record the transfer of cheques or markers from a table to the casino cage (also known as a game credit).

Cross-fill   The transfer of cheques from one table game to another. Cross-fills are prohibited in most gaming jurisdictions.

Croupier   Another term used to refer to a casino dealer.

Currency acceptor   A device that allows the slot machine to accept currency (also referred to as a bill validator).

Customer deposits   Money deposited with the casino cage for the purpose of wagering (also known as front money).

Dealer   An employee who operates a casino game, individually or as part of a crew, administering house rules and making payoffs.

Discard   Cards that have been used in the course of playing a game.

Discard tray   An area where used cards are stored until they are shuffled. Used primarily in blackjack and baccarat.

Double down   The blackjack player's option to double the wager after the first two cards have been dealt. The player doubles down on the condition that a third card is taken.

Draw ticket   A keno ticket that is punched to reflect the numbers selected in the ball draw. The draw ticket is punched by keno employees and is used to verify winning tickets.

Drop   For slots, refers to the total amount of currency and coin removed from the slot machine currency acceptor box and drop bucket. For table

games, refers to the total amount of currency and chips removed from the drop box along with any credit issued at the game.

Drop box   A locked box affixed to the game into which currency, chips, and all documentation pertaining to transactions conducted at the table are dropped.

Drop bucket   A container that is stored in a locked cabinet in the base of the slot machine into which coins are diverted.

Eye in the sky   Refers to the surveillance system and personnel that monitor activity within the casino.

Fill   A transfer of cheques from the casino cashier to a table game, which is documented by a fill slip.

Fill slip   A document that records the denominations and amount of cheques, game number, game type, date, time, and signatures of the employees conducting the fill transaction.

First base   The player sitting to the left of the dealer in a blackjack game. Also, the stickperson in craps.

Floorperson   Supervisory employee responsible for overseeing the activity on assigned games (or slots) to ensure house rules are followed and that no irregularities occur. Responsibilities also include rating customer play, supervising dealers, and handling customer disputes.

Foreign chips   Cheques that are received from another casino.

Front money   Customer deposit at the casino cage used for gaming purposes in place of a line of credit. The customer plays at the tables, as if using a line of credit, and executes markers that will be applied against the deposit.

Game bankroll   Also known as the table float or inventory, refers to the house's gaming cheques maintained on the table. Increases or decreases to the bankroll are accomplished through fill or credit transactions and through player transactions.

Grind joint   A casino that is known for targeting small bettors.

Gross revenue   Specific to the casino, refers to the net win resulting from all gaming activities. Net win results from deducting all gaming losses from all wins prior to considering associated operating expenses. Also known as gross gaming revenue and win.

Group I Licensee   In Nevada, a nonrestricted casino licensee that either (1) has annual gross gaming revenue of $3 million or more or (2) consists primarily of a race or spots pool that accepts annual wagers of $50 million or more.

Group II Licensee   In Nevada, a nonrestricted licensee that either (1) has annual gross gaming revenue of more than $1 million, but less than $3 million, or (2) consists primarily of a race or sports pool that accepts annual wagers of more than $10 million, but less than $50 million.

Hand   Cards dealt to a player. Also, the number of dice tosses before a seven-out.

Handle   The total amount wagered. Some casinos refer to table games drop as handle.

Hard count   The process of counting the coins and tokens removed from the slot machine drop buckets through the use of a weigh scale or coin counter. The hard count is performed by designated count personnel, also known as a count team, in a secured room that is monitored by surveillance cameras.

Hardways   A four, six, eight, or ten thrown in craps appearing as two-two, three-three, four-four, and five-five, respectively (i.e., occurring only in pair combinations).

Head-on   The situation in which a player is alone at a table except for the dealer. Also referred to as playing head-up with the dealer.

High roller   A premium player.

Hit   An additional card from the dealer, requested by the player.

Hold check   A check received from a player as payment on a casino receivable and which the player requests be held for a specified period of time before it is deposited. The casino may return the marker to the player at this time, and the check will become the instrument supporting the receivable balance.

Hold percentage   Refers to the percentage calculated by dividing the win by the drop. Calculated by individual table as well as by game type, day or shift, and period-to-date (cumulative). Used by casino management as a key performance indicator.

Hole card   The dealer's bottom card, which is usually dealt face-down and is not exposed to the player until after the player has finalized her hand.

Hopper   A device within the slot machine that holds a predetermined amount of coin used to pay out player winnings.

Hopper fill slip   A document that is used to record the replenishments of the coin in the hopper that are required as a result of payouts to players. The hopper fill slip indicates the amount of coin placed into the hop-

pers, as well as the signatures of the employees involved in the transaction, the machine number and location, and the date.

House   Another term for the casino.

Independent agent   An individual outside the casino location (usually in a different city) who attracts customers who wish to play in the casino. Independent agents are not employees of the casino and are compensated with a commission based on head count or the customers' play.

Inside ticket   The keno ticket that is presented by the player with his selections and amount wagered indicated. The ticket retained by the casino.

Insurance   An additional wager of up to half of the original wager, which may be made on blackjack when the dealer has an ace up-card. The dealer will pay the player two-to-one if the dealer has a blackjack; otherwise, the player loses the additional wager.

Jackpot payout   Refers to a jackpot or a portion of a jackpot that is paid to the player directly by slot employees instead of from the machine hopper (also known as a hand pay).

Jackpot payout slip   A document that is used to record the amount of a jackpot paid to the player by slot employees. The jackpot payout slip indicates the amount paid to the player and includes the signatures of the employees involved in the transaction, the machine number and location, the winning combination, and the date.

Jai alai   A game played by two or more persons involving the use of a ball (pelota) and a device called a cesta, which is made from wicker and is used to receive and hurl the pelota.

Juice   Refers to influence in getting things accomplished; also, the bookmaker's commission.

Junket   A group of players who travel to the casino specifically for the purpose of gaming. The travel is prearranged through a junket representative, and the players' costs associated with traveling to and staying at the casino are normally paid by the casino.

Junket representative   The individual who is responsible for organizing junkets. May be an employee of the casino or an independent agent.

Keno runner   Employee who sells keno tickets and delivers winning payoffs to customers outside the keno area. Keno runners normally operate in areas such as restaurants and lounges.

Key employee   Nevada Regulation 3.110 defines a key employee as an executive, employee, or agent of a casino licensee who may have a signif-

icant influence on the gaming operation or who should be included on the report required by Regulation 3.100 (Employee Report).

Lammer button   Similar in appearance to a chip; lammer buttons are placed onto the table to indicate the amount of chips given on credit to a player for wagering purposes prior to the completion of a marker. Also referred to as a marker button.

Layoff   A wager made by one race or sports book at another in order to reduce the amount of risk resulting from having accepted too much in wagers on one side of a particular event.

Layout   The felt covering of a table for games such as blackjack or roulette, which contains designations for the betting areas.

Licensee   Any person to whom a valid gaming license is issued.

Limit   The maximum amount that the casino is willing to accept on any wager.

Marker   An instrument used by the casino to document extensions of credit to players. The marker is similar in appearance to a check and contains the player name, player signature, the amount of credit extended, and the date.

Marker system   Credit play system that allows the casino to both issue and redeem markers in the pit.

Master game report   A form, usually computer generated, that summarizes information for each table in order to determine the win or loss for the table. The master game report, also known as a stiff sheet, indicates the amount of currency and chips removed from the drop box as well as fills, credits, and marker transactions that occurred at the table.

Meter   A mechanical device contained in the slot machine, which may record information such as the number of coins placed into the machine, the number of coins paid out, and the number of coins dropped in the drop bucket. Computerized slot systems also contain meters to record the same type of information.

Name credit system   Credit play system that allows the casino to issue markers in the pit, but redemptions are not allowed in the pit.

Natural   A seven or an eleven thrown in dice and a two-card eight or nine in baccarat.

Off the board   An event that is declared ineligible for wagering. This may result from uncertainty caused by the injury to a key player.

Opener   The form used by casino supervisory personnel to document the inventory of cheques on a table at the beginning of a shift.

Our money   A term used to describe the situation where a winning player is believed by casino personnel to be placing his wagers with money that has been won from the casino. In practice, the game wins a percentage of the total wagered regardless of the source.

Outside ticket   A keno ticket, normally computer generated, that is presented to the player after the inside ticket and wager are received. The outside ticket indicates the numbers selected, the amount of the wager, and the game number.

Paddle   The device used by the dealer or boxperson to place currency or forms into the table drop box.

Panguingui (pan)   A card game similar to gin rummy in which wagers between players contribute to a pot, which is claimed by the winner.

Pari-mutuel   A system of wagering on a race or sporting event whereby the winners divide the total amount wagered, net of commissions and operating expenses, proportionate to the individual amounts wagered.

Parlay   Refers to a sports wager in which the outcome of the wager is dependent on the results of more than one event.

Past post   A player illegally attempts to place a wager on a winning outcome after the game is closed. For example, a player attempting to place a wager on the number eight in roulette after the wheel has already been spun and eight was determined to be the winner would be past posting.

Pat hand   A hand in which the blackjack player decides to maintain her original two cards without requesting additional cards.

Payoff   The amount paid to the player on a winning wager.

Payout schedule   A schedule that is posted or distributed by the casino to indicate to players the amount to be paid out for certain winning wagers. Payout schedules are common to slot machines as well as games such as keno and bingo.

PC   *See* Hold percentage.

Pit   An arrangement of tables within the casino, usually in a circular or oblong shape.

Pit boss   The employee responsible for overseeing all activity within a particular pit. The floorpersons within a pit report to the pit boss, who, in turn, reports to the casino shift supervisor.

Pit clerk   An employee who is dedicated to a particular pit, but generally reports to the casino cage and is independent of casino supervisory personnel. Responsibilities include input of information resulting in the generation of fill, credit, and marker transactions corresponding to the tables within the pit.

Plaques   Used primarily in casinos outside the United States, plaques are rectangular in shape and used in the same manner as cheques.

Point   Any of the numbers four, five, six, eight, nine, or ten that is rolled by the shooter on the come-out roll. Players may wager that the point number will repeat prior to a seven being rolled.

Poker   A card game using one deck, in which the participants play against each other instead of the casino. The players' wagers contribute to a pot, which is claimed by the winner. The casino removes a percentage of the pot as a commission. *See also* Rake-off.

Progressive slot machine   An individual slot machine or one linked to a group of machines, in which the jackpot amount increases with each coin wagered by the player.

Push   Refers to the situation where the result of the hand played is a tie between the player and the casino.

Rabbit ears   A term used to describe the two tubes into which the winning balls are blown on a keno game. The tubes allow the numbers on the balls to be displayed to players as well as employees.

Race book   A business that accepts wagers on horse or other races.

Rake-off   A percentage taken by the casino as a commission from customers playing poker.

Random number generator   Used in keno in place of a blower and rabbit ears to determine the numbers selected.

Reel strip listing   Arrangement of the symbols and spaces on the slot machine reel strips.

Second base   A player sitting in a position to the left of first base at the table.

Shift boss   The employee responsible for overseeing all activity in the casino during a shift. Also referred to as a casino shift supervisor. The shift boss reports directly to the casino manager.

Shill   An individual who works for the casino and acts in the same manner as a player in order to encourage play on a slow game.

Shoe   A device located on the table that is used to hold shuffled cards prior to the cards being dealt. The shoe normally will hold four to eight decks at one time.

Shortpay   A payout made by a slot machine that is less than the amount indicated by the payout schedule. Occurs when the hopper becomes depleted during a payout; the remaining amount is paid to the player by slot employees.

Single deck   A form of blackjack in which the dealer deals from only one deck of cards, which are usually held in the dealer's hand.

Sleeper   A winning wager that is unclaimed by the player. Sleepers occur on race, sports, and keno wagers.

Slot booth   A booth in the slot area operated by a cashier who is responsible for making change for slot customers, redeeming coin, conducting hopper fill transactions, and making jackpot payouts.

Slug   A counterfeit coin or token that is used to cheat slot machines.

Snake-eyes   A throw of the dice in craps on which both dice come up on the one.

Soft count   The process through which the contents of each table's drop box are counted and recorded on the master game report. The soft count is performed by a team of employees who report to a department independent of the casino.

Split   A wager option in blackjack in which the player can elect to convert a hand consisting of identical-value cards into separate hands. The player makes a wager in an amount equal to the original wager on the second hand.

Sports pool   A business that accepts wagers on sporting or other events with the exception of horse or other race events.

Stand   *See* Pat.

Stiff sheet   *See* Master game report.

Sweat card   A plastic card placed near the end of the deck by the dealer to indicate the point at which the cards will be reshuffled.

Table card   For premium players wagering through the use of call bets, the table card is a form used to track player wins and losses until the end of the period of play. When the period of play is complete, any amount owed by the player will be settled to a marker and the marker number will be indicated on the table card as a reference. Also referred to as an auxiliary table card, player card, or a call bet sheet.

Table float   The inventory of cheques maintained on a table in a tray that is secured by a clear lockable cover when the table is not in use. *See also* Game bankroll.

Tapped-out   Describes the situation in which the player has used all of his bankroll available for wagering.

Theoretical hold worksheet   A worksheet provided by the manufacturer for all slot machines, which indicates the theoretical percentages that the slot machine should hold based on adequate levels of coin-in. The worksheet also indicates the reel strip settings, number of coins that may be played, the payout schedule, the number of reels, and other information descriptive of the particular type of slot machine (also known as a spec sheet).

Third base   The player sitting to the right of the dealer.

Toke   Term used to describe tips given to casino personnel by players.

Tokens   Substitutes for coins, produced so that they are unique to each casino, which are used for slot machine play. Tokens are primarily used for slot machines with denominations of $1 or more.

Vigorish   Commission taken by the casino on wagers including baccarat bankers bets and sports wagers.

Walk   Refers to the player leaving a table at the end of a period of play.

Walked with   Refers to the amount of chips with which a player leaves the table with at the conclusion of a period of play.

Weigh count   The dollar amount of coins and tokens removed from the slot machine drop buckets and counted by the hard count team through the use of a weigh scale.

Wheel   Term used to refer to the roulette wheel.

Whiz machine   A machine used for dispensing and controlling manual slips used for table fills, table credits, slot hopper fills, and slot jackpot payouts. The supply of slips contained in the machine is usually in triplicate, with one copy remaining in a secured compartment within the machine once the slips are dispensed. Whiz machines are primarily used as a backup in the event of computer failure.

Win   *See* Gross revenue.

Wrap   The dollar amount of coins and tokens removed from the slot machine drop buckets and wrapped by the hard count team.

Write   The total amount wagered in the race book, sports book, keno, and bingo.

Writer   An employee of the race book, sports book, or keno who writes tickets.

REFERENCES

Ainslie, Tom, *Ainslie's Encyclopedia of Thorougbred Handicapping*, New York: Quill, 1978.

Binkley, Christina, "Reversal of Fortune," *Wall Street Journal*, September 7, 2001, pp. A1, A8.

Bitner, M.J. "Servicescapes: The Impact of Physical Surroundings on Customers and Employees," *Journal of Marketing*, (1992) *56*(April), pp. 57–71.

Brock, Floyd J., Newman, William A., & Thompson, William N. "Creating a Competitive Information System for the Hotel Casino Industry," in *Gambling and Commercial Gaming: Essays in Business, Economics, Philosophy and Science*, ed. William R. Eadington and Judy A. Cornelius, Reno: Institute for the Study of Gambling and Commercial Gaming, University of Nevada, Reno, 1992.

Cahill, Robert E., "Recollections of Work in State Government, Taxation, Gaming Control, Clark County Administration, and Nevada Resort Association," Oral History Project, University of Nevada, Reno: Library University of Nevada System, 1977.

Code of Federal Regulations ap. 1, Part 103.22.

Eadington, William R., & Kent-Lemon, Nigel, "Dealing to the Premium Player. Casino Marketing and Management Strategies to Cope with High-risk Situations," in *Gambling and Commercial Gaming: Essays in Business, Economics, Philosophy and Science*, ed. William R. Eadington and Judy A. Cornelius, Reno: Institute for the Study of Gambling and Commercial Gaming, University of Nevada–Reno, 1992; Kilby, Jim, "Comping Decisions: Dealing with Actual Losses," *Casino Gaming International*, 6(5), 1990.

Demaris, Ovid, *The Boardwalk Jungle*, New York: Bantam Books, 1986.

Goodwin, John R., *Gaming Control Law*, Columbus, OH: Publishing Horizon, Inc., 1985.

Goodwin, John, *Gaming Control Law*, Columbus, OH: Publishing Horizons, 1985, p. 28.

Greenlees, E. Malcolm, *Casino Accounting and Financial Management*, University of Nevada Press, 1988, p. 6.

Griffin, Peter, *Extra Stuff: Gambling Ramblings*, Las Vegas, NV: Huntington Press, 1991.

Griffin, Peter, *Gambling Rumblings*, Las Vegas: Huntington Press, 1991.

Griffin, Peter A., *The Theory of Blackjack*, 4th ed., Las Vegas: Huntington Press.

Gwynn, John M. Jr., *Pai Gow Revisited—A Significant Positive Expectation,* Sacramento, CA: California State University, 1984.

Hadley, Caroline J., "America's Doxy Grows Up," *Nevada Magazine* (March/April 1981), p. 6.

High Roller's Vegas, produced by Ross Television for Discovery Channel (VHS #721837, 52 minutes, 1998).

Homer, J. Stanley, & Dionne, Roger, *Las Vegas Sports and Race Betting Guide,* Las Vegas, NV: Homer Gaming Publications, 1985.

Ignatin, George, "Sports Betting," *The Annals of the American Academy of Political and Social Science,* Beverly Hills, CA: Sage Publications, 1984.

Internal Revenue Service Code 60501.

Kale, Sudhir H., "Life time Value of a Casino Customer," http://urbino. net/articles.cfm?specificarticle=Lifetime%20Value%20of%20a%20Casino %20Customer%2E, as viewed on October 9, 2001.

Las Vegas Review Journal, Supplement "75th Anniversary Year," March 3, 1986, p. 16B.

Lucas, A.F. "The Determinants and Effects of Slot Servicescape Satisfaction in a Las Vegas Casino," *Digital Dissertations (UMI)*, Publication number: AAT 3001916, 2000.

Lucas, A.F. "The Determinants and Effects of Slot Servicescape Satisfaction in a Las Vegas Hotel Casino," *The UNLV Gaming Research & Review Journal,* (2003) *7*(1), pp. 1–20.

Lucas, A.F., and Bowen, J.T. (2002). "Measuring the Effectiveness of Casino Promotions." *International Journal of Hospitality Management 21*(2): 189–202.

Lucas, A.F., and Brewer, K.P. (2001). "Managing the Slot Operations of a Hotel Casino in the Las Vegas Locals' Market." *Journal of Hospitality and Tourism Research 25*(3): 289–301.

Lucas, A.F., Dunn, W., Roehl, W.S., & Wolcott, G. "Evaluating Slot Machine Performance: A Performance-Potential Model," manuscript submitted for publication in the *International Journal of Hospitality Management*, 2003.

Lucas, A.F., and Kilby, J., "Table Games Match-Play Offers: Measurement and Effectiveness Issues," *Bottomline,* (2002) 17(1).

Lucas, A.F., & Roehl, W.S. "Influences on Video Poker Machine Performance: Measuring the Effect of Floor Location,*" Journal of Travel & Tourism Marketing,* (2002) *12*(4), pp. 75–92.

Lucas, A.F., and Santos, J. (2003). "Measuring the Effect of Casino-Operated Restaurant Volume on Slot Machine Business Volume." *Journal of Hospitality and Tourism Research 27*(1): 101–117.

MacDonald, Andrew, "Dealing With High Rollers," urbino.net/articles.cfm?specificarticle=Dealing%20with%20High%20Rollers%2E, as viewed on October 9, 2001.

Mayer, K.J. & Johnson, L.,"A Customer-Based Assessment of Casino Atmospherics," *The UNLV Gaming Research & Review Journal,* (2003) *7*(1), pp. 21–32.

Miller, Richard K., & Associates, Inc., *The 2000 Casino and Gaming Business Market Research Handbook*, Norcross, GA: Richard K. Miller & Associates, Inc., 2000.

Nevadan Magazine, January 28, 1990, p. 12S.

Nevada Magazine, Special Issue: 50 Years of Gaming, March/April 1981.

N.J.S.A., 5:12–51 (New Jersey Statutes Annotated, St. Paul, MN: West Publishing, 1988).

Park, Stephen R., and Miller, Keith M., "Random Number Generators: Good Ones Are Hard to Find," *Communications of the ACM* (October 1988), 31(10), p. 1192.

Pollack, Michael, *Hostage to Fortune: Atlantic City and Casino Gambling*, Princeton, NJ: Center for Analysis of Public Issues, 1987.

Reid, Ed, Demaris, Ovid, *The Green Felt Jungle*, New York: Pocket Books, 1963, Fig. 4, p. 13.

Reid, Ed, and Demaris, Ovid, *The Green Felt Jungle*, New York: Pocket Books, 1964.

Richard, M.D., and Adrian, C.M. "Determinants of Casino Repeat Purchase Intentions," *Journal of Hospitality and Leisure Marketing,* (1996) 4(3).

Roehl, Wesley S., "Competition, Casino Spending, and Use of Casino Amenities," *Journal of Travel Research*, (1996), Vol. 34, 3.

Roske, Ralph, "Nevada Gambling, First Phase, 1861–1931." Paper presented to the Western Association Section on Gambling in Nevada, October 13–15, 1977.

Roxborough, Michael, & Rhoden, Mike, *Race and Sports Book Management*, Las Vegas, NV, 1991.

Rubin, Max, *Comp City: A Guide to Free Las Vegas Vacations*, Las Vegas, NV: Huntington Press, 1994.

Scarne, John, *New Complete Guide to Gambling*, New York: Simon & Schuster, 1974.

Shenkel, William M., *Modern Real Estate Principles,* Dallas: Business Publications, 1977.

Singer, Bobby, "Can Card Counters Get Comps?," *Gambling Times*, 15(1), 2001.

Skolnick, Jerome H., *House of Cards*, Boston: Little Brown, 1978.

Soares, John, *Loaded Dice*, Dallas, TX: Taylor Publishing, 1985, p. 39.

Sprinthall, Richard C., *Basic Statistical Analysis*, Englewood Cliffs, NJ: Prentice-Hall, 1990.

Stratten, David, "Locals Want Same Deal as Out-of-towners," *Gaming Today*, 26(11), 2001.

Stratten, David, "Whales Becoming Extinct?" *Gaming Today*, 26(47), 2001.

Turco, D.M., and Riley, R.W. "Choice Factors and Alternative Activities for Riverboat Gamblers." *Journal of Travel Research*, (1996) 34(3).

U.S. Congress, Senate Special Committee to Investigate Organized Crime in Interstate Commerce, Third Interim Report 93, Washington, DC: U.S. Government Printing Office, 1951.

Vallen, Jerome J., Ed., *Nevada Gaming License Guide*, Lionel Sawyer & Collins Attorneys at Law, Las Vegas, 1988, p. 8.

Van Matre, Joseph G., & Gilbreath, Glenn H., *Statistics for Business and Economics,* Plano, TX: Business Publications, Inc., 1987.

Wakefield, K.L., & Blodgett, J.G. "The Effect of the Servicescape on Customers' Behavioral Intentions in Leisure Service Settings," *The Journal of Services Marketing,* (2003), *10*(6), pp. 45–61.

Ward, Ken, "High-roller Salons to Demand Big Tickets," *Gaming Today*, 26(35), 2001.

Wong, Stanford, *Optimal Strategy for Pai Gow Poker*, La Jolla, CA: Pi Yee Press, 1992.

Zender, Bill, *Pai Gow without Tears,* Las Vegas: Gamblers Book Club, 1989.

INDEX