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The optimal room inventory of Las Vegas casino hotels

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THE OPTIMAL ROOM INVENTORY OF
LAS VEGAS CASINO HOTELS

by

Ming Chen

Bachelor of Economics
Hangzhou Institute of Commerce, China
1992

A thesis submitted in partial fulfillment
of the requirements for the

Master of Science Degree
William F. Harrah College of Hotel Administration

Graduate College
University of Nevada, Las Vegas
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ABSTRACT

**The Optimal Room Inventory of
Las Vegas Casino Hotels**

by

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Room oversupply is a recent concern for Las Vegas gaming industry. The purpose of this research is to quantify this problem and try to determine whether room oversupply exists and if it does, how serious the problem is in the lodging market of Las Vegas casino hotels (the subject market). A room inventory model is developed for estimating the optimal room inventory of the subject market. The real room inventory of the past nine fiscal years and the planned room inventory of the next two fiscal years are compared with the optimal room inventory. The research finds that the room oversupply does exist and will be enlarged in the next two fiscal years.

TABLE OF CONTENTS

| | |
|--|------|
| ABSTRACT | iii |
| LIST OF TABLES | vi |
| LIST OF FIGURES | vii |
| List OF EXHIBITS | viii |
| ACKNOWLEDGEMENTS | x |
| CHAPTER 1 INTRODUCTION | 1 |
| The Statement of the Problem | 1 |
| The Delimitation of the Study | 2 |
| The Limitation of the Study | 3 |
| The Assumption of the Study | 3 |
| Research objectives | 5 |
| The Definition of Terms | 5 |
| Abbreviations | 9 |
| CHAPTER 2 LITERATURE REVIEW | 11 |
| Recent Concerns of Las Vegas Gaming Industry | 11 |
| Forecasting Methodology | 13 |
| Supply and Demand | 16 |
| Inventory Models | 20 |
| CHAPTER 3 METHODOLOGY AND DATA DESCRIPTION | 25 |
| Introduction | 25 |
| The Data | 25 |
| The Research Method | 31 |
| The Instrument Used for the Research | 47 |
| CHAPTER 4 DATA ANALYSIS | 48 |
| Introduction | 48 |
| Forecasting of Future Probabilistic Demand | 48 |
| The Cost Per Room of Oversupply | 49 |
| The Cost Per Room of Under-Supply | 63 |
| Optimal Room Inventory | 71 |
| Quantity of the Oversupplied Room Inventory | 81 |

| | |
|---|-----|
| CHAPTER 5 CONCLUSIONS AND RECOMMENDATIONS | 90 |
| Summary of Findings | 90 |
| Conclusions | 98 |
| Directions for Future Research | 99 |
| APPENDIX: Exhibits | 101 |
| REFERENCES | 137 |
| VITA | 140 |

LIST OF TABLES

| | | |
|----------|---|----|
| Table 1 | Standard Error of the Predicted Demand in the Past | 50 |
| Table 2 | Predicted Future Demand | 56 |
| Table 3 | The Total Variable Cost of the Rooms Department (TVCRD) | 59 |
| Table 4 | Testing of the Smoothing Constant Values for the FCPRPN Forecasting Model | 61 |
| Table 5 | The Fixed Cost Per Room Per Night (FCPRPN) | 62 |
| Table 6 | Testing of the Smoothing Constant Values for the ADR Forecasting Model | 64 |
| Table 7 | The Historical and Predicted Net Income per Occupied Room From Rooms Department (NIPRRD) | 65 |
| Table 8 | The Percentage of Total Visitors' Gambling Spending (TVGS) in Total Gambling Spending (TGS) | 66 |
| Table 9 | Net Income Per Occupied Room from Casino Department (NIPRCD) of the Past Nine Fiscal Years | 67 |
| Table 10 | Testing of Smoothing Constant Values for the NIPRCD Forecasting Model | 68 |
| Table 11 | Summary of the Cost Per Room of Under-Supply (CU) and the Cost Per Room of Oversupply (CO) | 70 |
| Table 12 | Probability of the Demand Less Than or Equal to the Optimal Supply and Its Matched Z Values | 72 |
| Table 13 | The Optimal Room Inventory of the Past Nine Fiscal Years | 73 |
| Table 14 | Predicted Optimal Room Inventory for the Next Two Fiscal Years | 79 |
| Table 15 | Quantity of Oversupplied Rooms in the Past | 82 |
| Table 16 | Gap between the Optimal Room Inventory and the Planned Room Inventory | 88 |

LIST OF FIGURES

| | | |
|----------|--|----|
| Figure 1 | The Fixed Cost Per Room Per Night (FCPRPN) | 90 |
| Figure 2 | The Average Daily Rate (ADR) and the Total Cost Per Room Per Night (TCPRPN) | 91 |
| Figure 3 | The Net Income Per Occupied Room from Casino Department | 92 |
| Figure 4 | Rooms Occupied Per Fiscal Year | 93 |
| Figure 5 | The Real (or Planned) Room Inventory and Optimal room Inventory of Las Vegas Casino Hotels | 94 |

LIST OF EXHIBITS

| | | |
|------------|---|-----|
| Exhibit 1 | Rooms Occupied of Casino Hotels On Las Vegas Strip, in Down Las Vegas, and on Boulder Strip | 102 |
| Exhibit 2 | Available Rooms of Casino Hotels On Las Vegas Strip, in Down Las Vegas, and on Boulder Strip | 107 |
| Exhibit 3 | The Annual Total Revenue of Casino Hotels On Las Vegas Strip, in Down Las Vegas, and on Boulder Strip | 112 |
| Exhibit 4 | The Casino Departmental Revenue of Casino Hotels On Las Vegas Strip, in Down Las Vegas, and on Boulder Strip | 113 |
| Exhibit 5 | The Annual Total Rooms Departmental Revenue of Casino Hotels On Las Vegas Strip, in Down Las Vegas, and on Boulder Strip | 114 |
| Exhibit 6 | The Annual Total Energy Expense of Casino Hotels On Las Vegas Strip, in Down Las Vegas, and on Boulder Strip | 115 |
| Exhibit 7 | The Annual Total Utilities (Other Than Energy Expense) of Casino Hotels On Las Vegas Strip, in Down Las Vegas, and on Boulder Strip | 116 |
| Exhibit 8 | The Annual Total Net Income (Loss) Before Federal Income Taxes and Extraordinary Items of Casino Hotels On Las Vegas Strip, in Down Las Vegas, and on Boulder Strip | 117 |
| Exhibit 9 | The Annual Total Complimentary Expense of Rooms Department of Casino Hotels On Las Vegas Strip, in Down Las Vegas, and on Boulder Strip | 118 |
| Exhibit 10 | The Annual Total Payroll Taxes of the Rooms Departments of Casino Hotels On Las Vegas Strip, in Down Las Vegas, and on Boulder Strip | 119 |

| | | |
|------------|--|-----|
| Exhibit 11 | The Annual Total Payroll-Employment Benefits of the Rooms Departments of Casino Hotels On Las Vegas Strip, in Down Las Vegas, and on Boulder Strip | 120 |
| Exhibit 12 | The Annual Total Payroll-Officers of the Rooms Departments of Casino Hotels On Las Vegas Strip, in Down Las Vegas, and on Boulder Strip | 121 |
| Exhibit 13 | The Annual Total Payroll-Other Employees of Rooms Departments of Casino Hotels On Las Vegas Strip, in Down Las Vegas, and on Boulder Strip | 122 |
| Exhibit 14 | The Annual Total Other Departmental Expense of Rooms Departments of Casino Hotels On Las Vegas Strip, in Down Las Vegas, and on Boulder Strip | 123 |
| Exhibit 15 | Some Characteristics of Las Vegas Visitors | 124 |
| Exhibit 16 | Some Characteristics of Las Vegas Residents | 125 |
| Exhibit 17 | Visitor Volume of Las Vegas | 126 |
| Exhibit 18 | The Planned Las Vegas Casino Hotels (with Determined Completion Date) in the Next two Fiscal Years | 127 |
| Exhibit 19 | Consumer Price Index | 128 |
| Exhibit 20 | Population of Las Vegas Valley | 129 |
| Exhibit 21 | Age Distribution of Clark County | 130 |
| Exhibit 22 | The Items Identified as Mixed Cost in General and Administrative Expenses Category of Combined Income Statements | 131 |
| Exhibit 23 | The Items identified as Mixed Cost in Rooms Departmental Expense Category of Combined Income Statements | 132 |
| Exhibit 24 | CPI adjusted Mixed Cost that Attributes to Rooms Department | 133 |
| Exhibit 25 | Total Costs Allocated to Rooms Department ... | 134 |
| Exhibit 26 | The Fixed Cost Per Room Per Night (FCPRPN) | 135 |
| Exhibit 27 | Total Net Income Generated from Casino Department | 136 |

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CHAPTER 1

INTRODUCTION

The Statement of the Problem

The Problem

Room oversupply is a recent concern for Las Vegas gaming industry. Some entrepreneurs believe that room oversupply will never happen because supply creates its own demand and "build it and they will come". On the other hand, some others believe that there will be oversupplied rooms if the demand can not keep the same pace with the supply. The purpose of this research is to quantify this problem and try to determine whether room oversupply exists and how serious the problem is in the lodging market of Las Vegas casino hotels (the subject market).

The Sub-Problems

The first sub-problem. The first sub-problem is to use the historical lodging demand data of the subject market to forecast the future demand.

The second sub-problem. The second sub-problem is to estimate the cost per room of oversupply.

The third sub-problem. The third sub-problem is to estimate the cost per room of under-supply.

The fourth sub-problem. The fourth sub-problem is to use the single-period inventory model with probabilistic demand to determine the optimal room inventory of the subject market.

The fifth sub-problem. The fifth sub-problem is to compare the predicted optimal room inventory with the planned room inventory to determine whether room oversupply will occur in the subject market during the next two fiscal years.

The Delimitation of the Study

The study does not forecast a long-term optimal room inventory for the subject market.

The study only focuses on the room inventory of Las Vegas casino hotels. The room inventory of non-gaming lodging facilities is excluded from this study.

The casino hotels in this study refer to the casino hotels located on Las Vegas Strip, in Downtown Las Vegas, and on Boulder Strip with annual gaming revenue of 1 million dollars and over. The casino hotels with annual

gaming revenue below 1 million dollars and the casino hotels located outside the aforementioned locations are excluded from this study.

The Limitation of the Study

The study is limited by the availability of the secondary data.

Part of the data used in the study comes from surveys that were conducted by the Las Vegas Convention and Visitors Authority. Therefore, the accuracy of the survey results influences the accuracy of this study.

The impacts of special events, such as the celebration of new millennium, are not considered in the study.

The Assumptions of the Study

The First Assumption

The first assumption is that the lodging demand of the subject market has a monthly seasonality, the cycle for this seasonality is one year.

The Second Assumption

The second assumption is that the demand (rooms occupied), as the dependent variable, is statistically and quantitatively related to some independent variables.

The Third Assumption

The third assumption is that the lodging demand (rooms occupied) for the subject market is stochastic and have a normal distribution.

The Fourth Assumption

The fourth assumption is that there is no major unexpected event, which could significantly influence the demand for the subject market, will occur in the next two fiscal years.

The Fifth Assumption

The fifth assumption is that the total cost of sales and the total general administrative expenses of casino hotel properties can be proportionally allocated to the rooms department and the casino department according to its departmental revenues.

The Sixth Assumption

The sixth assumption is that the total cost of per hotel room sold can be divided into fixed cost and variable cost.

The Seventh Assumption

The seventh assumption is that the sales of rooms is the only revenue source for the rooms department.

Research Objectives

A room inventory model will be developed for the subject market. The optimal room inventory of the subject market for the past nine fiscal years will be calculated and the optimal room inventory for the next two fiscal years will be predicted by using the room inventory model. The real room inventory of the past nine fiscal years and the planned room inventory of the next two fiscal years will be compared with the optimal room inventory to determine whether oversupply is a problem for the subject market and if it is, how serious the problem is.

The Definition of Terms

Casino Hotels

Casino hotels refer to those establishments in which gaming is the primary source of revenue, and where lodging accommodations are offered.

Cost Per Room of Oversupply

It can also be called cost per unit of overestimating the demand. This cost represents the loss of ordering one additional unit that cannot be sold. In this study, the cost per room of oversupply equals fixed cost per room, per night.

Cost Per Room of Under-Supply

It can also be called cost per unit of underestimating demand. This cost represents the opportunity loss of not ordering one additional unit that could have been sold. In this study, the cost per room of under-supply is the sum of net income per occupied room from rooms department and the net income per occupied room from casino department.

Dependent Variable

Dependent variable also called consequent variable or criterion variable. It is the variable that is thought to be influenced by other variables.

Dummy Variable

Dummy variable is variable that takes on one of two values, 0 or 1. It can provide a numerical representation for attributes or characteristics that are not essentially quantitative (Churchill, 1995).

Fixed Costs

Fixed costs are those that remain constant in the short run, even when sales volume varies.

Forecast

Forecast is a projection or prediction of future values of a time series.

Independent Variable

Independent variable also called antecedent variable or predictor variable. It is the variable that is thought to influence other variables.

Las Vegas Casino Hotels

Las Vegas casino hotels refer to the casino hotels located on Las Vegas Strip, in Downtown Las Vegas, and on Boulder Strip with annual gaming revenue of 1 million dollars and over.

Las Vegas Residents

Las Vegas residents refer to the inhabitants of Las Vegas Valley.

Las Vegas Valley

Las Vegas Valley refers to the City of Las Vegas, the City of North Las Vegas, the City of Henderson, Boulder City.

Las Vegas Visitors

According to the definition of Las Vegas Convention and Visitors Authority, Las Vegas visitors refer to the visitors to Las Vegas Valley.

Mixed Costs

Mixed costs are those that change, but not proportionally change, with the volume of business. They contain fixed and variable cost elements.

Net Income Per Occupied Room from Casino Department

Net income per occupied room from casino department is the net income contributed by the room occupants (visitors) and generated in casino department. It is the total net income of casino department contributed by visitors divided by total occupied rooms.

Net Income Per Occupied Room from Rooms Department

Net income per occupied room from rooms department is the total net income generated in rooms department divided by the number of occupied rooms. It is also the room rate per night subtracted by total cost per room per night.

Probabilistic Demand

Probabilistic demand can also be called stochastic demand. It is the demand that has a probability distribution.

Regression Analysis

Regression analysis is a statistical technique that can be used to develop a mathematical equation showing how variables are related.

The Subject Market

The subject market refers to the lodging market of Las Vegas casino hotels.

Total Gambling Spending

Total gambling spending is the sum of the total residents' gambling spending and the total visitors' gambling spending.

Variable Costs

Variable costs are those that change proportionally with the volume of business.

Z Value

Z value is the score that tells how many standard deviation units above or below the mean a value falls.

Abbreviations

ADR is the average daily rate per room.

CO is the cost per room of oversupply.

CPI is the consumer price index.

CU is the cost per room of under-supply.

FC is the fixed cost.

FCPRPN is the fixed cost per room per night.

FY is the fiscal year.

LVCVA is the Las Vegas Convention and Visitor Authority.

MC is the mixed cost.

NIPRRD is the net income per occupied room from rooms department.

NIPRCD is the net income per occupied room from casino department.

TC is the total cost.

TCPRPN is the total cost per room per night.

TCRD is the total cost allocated to rooms department .

TFC is the total fixed cost.

TFCRD is the total fixed cost of rooms department.

TGS is the total gambling spending.

TRGS is the total resident gamblers' gambling spending.

TVC is the total variable cost.

TVCRD is the total variable cost of rooms department.

TVGS is the total visitors' gambling spending.

VC is variable cost.

VCPRPN is the variable cost per room per night.

CHAPTER 2

LITERATURE REVIEW

Recent Concerns of Las Vegas

Gaming Industry

Oversupply is one of the recent concerns for the Las Vegas gaming industry. The opening of Bellagio, Mandalay Bay, Paris, the Venetian, and the Aladdin will add more than 12,000 rooms to the subject market. In addition, the ongoing constructions of other properties are further contributing to the expansion of supply. All these will raise the supply to be in excess of current and immediately prospective demand (Reifer, 1998). According to Gu (1997), oversupply has already created problems for many casinos on Las Vegas Strip, it could be a disaster during an economic recession.

On the other hand, Las Vegas is currently confronting serious transportation problems. Las Vegas' McCarran International Airport saw traffic drop slightly in 1997,

and more so in 1998. According to the casino operators, people still want to come to the resorts of Las Vegas, they just cannot find the flights or the fares they want. The major airlines are re-deploying their aircraft from the leisure-dominated routes to higher-yield services elsewhere in the USA. Consequently, McCarran Airport is experiencing the difficulty of attracting more scheduled airline services. In fact, the scheduled airline services are actually declining. It is estimated that by the year 2000 there will be a deficiency of 11,000 daily seats needed to fill in all the hotel rooms in Las Vegas ("Wheel of fortune", 1998). In addition to the air transportation difficulties, the severe road congestion on the main California-Las Vegas highways is also a big problem for Las Vegas gaming industry in getting enough visitors to feed an increasing number of hotel rooms.

Another problem for Las Vegas gaming industry is the increasing competition from other gaming jurisdictions. The casinos in expanding areas may actually be drawing patrons, especially the hard-core gamblers from Las Vegas casinos (Reifer, 1998). As a result, the pure player market for Las Vegas casinos is shrinking. The data from Las Vegas Convention and Visitors Authority shows that the average gambling spending of Las Vegas visitors has a trend of

declining. The latest threat for the Las Vegas gaming industry is the approval of California's Proposition 5, which means Vegas-style casino gambling is coming to California, Nevada's most robust feeder market ("Competition to the west", 1998).

The prosperity of Las Vegas' gaming industry in the past decade is partly attributable to the booming of the U.S. and the world economies. However, it seems that the Asian financial crisis, which started in July 1997, still has a negative impact on the world economy. While Asians account for only 1.9% of all visitors to Las Vegas, a significant percentage of premium baccarat players come from the Pacific Rim (Ader and Lumpkins, 1997). Consequently, the high-end visitor volume and amounts wagered could dip. In addition, because of currency devaluation, some Asian gaming destinations such as Philippines have become more competitive in attracting international players ("Gambling industry", 1998; Gu, 1998).

Forecasting Methodology

The three general classes of methods used in prior studies for forecasting variables such as lodging demand

are econometric (or causal) method, time series method, and judgmental method.

Econometric method utilizes a regression equation or equations to establish a causal relationship between the dependent variable (e.g. gaming revenue) and independent variables such as the total visitor number, average gaming budget, etc. One of the advantages of the econometric method is that the decision-makers can logically formulate the model based on a cause and effect relationship between the independent variables and the dependent variable (Cranage, 1992). There are, however, disadvantages in using econometric method. First, the future values of the causal variables themselves have to be predicted. Therefore, the data in an econometric model could be inaccurate and the ability of the model to forecast the future values could be weak. Second, the relationship found between the dependent and independent variables may be a spurious one. Furthermore, causal relationships can change over time, making it necessary to constantly update the forecasting model.

The objective of time series method is to discover a pattern in the historical data and then extrapolate this pattern into the future. "The forecast is based solely on past values of the variable that we are trying to forecast

and/or on past forecast errors (Anderson, Sweeney and Williams, 1998).” Obviously, when the market environment has a substantial change, this method will not be very effective. Smoothing, trend projection, and trend projection adjusted for seasonal influence are common time series forecasting methods.

Time series forecasting method and causal forecasting method are also being called quantitative method. They can be used when: (1) past information about the variable being forecast is available, (2) the information can be quantified, (3) a reasonable assumption is that the pattern of the past will continue into the future. If the above criteria cannot be met, then judgmental forecasting method (qualitative methods) would be employed. Judgmental forecasting generally involves the use of expert judgment to develop forecasts. It consists of an “intuitive” forecast based on the expert’s collective experience regarding the variable in question. There are arguments about the accuracy of this method (Cranage, 1992). However, it is still a good alternative when the assumptions required by the quantitative methods cannot be met.

In addition to these three forecasting methods, combinations of these methods have been used in the past several years in attempts to improve forecasting accuracy.

According to Armstrong, research from over 200 studies demonstrates that combining forecasts produces consistent but modest gains in accuracy (Armstrong, 1989).

Supply and Demand

Demand in economics means effective demand, which is what someone is willing and able to pay for the commodity or service in question (Moore, 1973). While the quantity demanded of any particular commodity is a function of many variables, the price of the commodity is frequently singled out as the most important determinant. The law of demand states that quantity demanded and price charged are inversely related. Quantity demanded is a decreasing function of price. The higher the price, the smaller the quantity demanded. Conversely, the lower the price, the larger the quantity demanded. In addition to price, the consumer's tastes and preferences, the consumer's household income are also the determinants of the demand (Haveman and Knopf, 1978).

Supply is the combined amounts of goods and resources offered to the marketplace at various prices (Philips and Pearl, 1973). There is a positive relationship between the price and the quantity supplied. Demand and supply relationships together explain how the prices of

commodities bought and sold in competitive markets are determined. The quantity demanded by buyers equals the quantity supplied by sellers at the equilibrium price. The equilibrium price is an ideal point. Only at the equilibrium price is there no excess supply or excess demand. In reality, the equilibrium price should be higher than the cost.

Whenever the non-price determinants affecting the demand or supply curves change, there will be a new equilibrium position. For example, if the demand increases, the supply cannot keep the same increase rate of the demand in the short run, then a new equilibrium price (EP2) will be reached and it will be higher than the original equilibrium price (EP1). However, the high profit from EP2 will attract more investment to the supply side. Therefore, the quantity supplied will increase until it reaches the quantity demanded. But in the real world, the quantity supplied usually keeps increasing after it exceeds the quantity demanded. As a result, the latest equilibrium price (EP3) will be lower than the EP1. The low profit from EP3 will deter the further investment and /or cause some suppliers to exit the market. Consequently, the increase rate of supply will slow down until the quantity demanded exceed the quantity supplied again and begin a new round of

supply expansion (Moore, 1973). In the long run, the equilibrium price tends to be the cost plus fair profit (average profit of all industries). Investors always try to invest in the industry where they can maximize the profit. In other word, they always try to get the profit that is above the fair profit. Price and profit are highly related to the quantity supplied and the quantity demanded. Therefore, an accurate forecasting of demand and supply is very important for the investors.

The general rule of the relation between supply and demand is that supply depends on demand. According to consumer sovereignty principle, what products are supplied depends upon what consumers demand. The reason behind that principle is that what products are supplied by business firms will be those that can be profitably sold. If consumer do not buy what is supplied, business firms will shift their resources to make other goods that can be profitably sold (Philips and Pearl, 1973).

On the other hand, some researchers believe that the supply creates its own demand. Say's law is usually cited by these researchers to support their argument. In fact, Say's law is a view of the macroeconomics and it is "based on the idea that production creates factor incomes which bring about a demand for the goods produced elsewhere in the

economy (Rutherford, 1992).” Obviously, Say’s law is appropriate when applied in a concealed economy but it is inappropriate when applied in a certain industry.

For a specified industry, the supply depends on demand but the supply does influence demand on certain conditions. One example is the phenomena explained by the gravity model. The gravity model traditionally used in retailing industry. The model states that given shopping center of equal size, people will shop more frequently at the closest one. However, when the shopping centers are of unequal size, people will gravitate to the larger, more diverse center more frequently and from greater distances than to the smaller shopping center. The model predicts that consumer preferences are directly related to quantifiable factor such as square feet and inversely related to the square of the travel distance. Las Vegas is the best example of the gravity model in full operation. Even though gaming continues to expand, Las Vegas is more popular than ever because it offers an unique experience. Customer are willing, although gaming may be present in their own area, to spend the additional time travelling to Las Vegas (Johnson & Bowen, 1994). As a result, the demand for gaming in Las Vegas increases as Las Vegas casinos keeps expanding. However, the overall increase rate of demand for

gaming in the national market and the world market is not influenced by the casino expansion in Las Vegas. The fact is that the casinos in Las Vegas seize more market share while the casinos in other locations lose their market share. The demand due to the gravity model has some limitations. For example, there is a limit in the distance that people will travel.

Inventory Models

Inventory refers to the goods or material that are held by an organization for use sometime in the future. It serves as a buffer against uncertain and fluctuating demand. While inventory plays an important and essential role, the expense associated with financing and maintaining inventory is a substantial part of the cost of doing business. Several quantitative inventory models, such as economic order quantity (EOQ) model, economic production lot-size model, single-period inventory model with probabilistic demand, order-quantity & reorder-point model with probabilistic demand, periodic-review model with probabilistic demand, are created to determine the optimal inventory (Anderson, Sweeney and Williams, 1998).

EOQ model is applicable when the demand for an item has a constant, or nearly constant, rate and when the

entire quantity ordered arrives in inventory at one point in time. The economic production lot-size model is designed for production situations in which, once an order is placed, production begins and a constant number of units is added to inventory each day until the production run has been completed. It assumes that both the demand rate and the supply rate are constant. Obviously, both the EOQ model and the economic production lot-size model are not appropriate for the room inventory because the demand for rooms is not constant but probabilistic.

Both the order-quantity & reorder-point model with probabilistic demand and the periodic-review model with probabilistic demand assume that the inventory can be carried from one period to the next. It seems that the room inventory can be carried from one period to the next because an unsold room for today can be sold in the following day. However, the reality is that the value of the unsold room for today is gone forever. A room sold in the following day means that the value of the room for the following day is realized but the value of the room for today can not be compensated by the following day's selling. As a matter of fact, the room inventory is perishable and the room inventory can not be carried from

one period to the next period. Therefore, these two models are also not appropriate for the room inventory.

"The single-period inventory model refers to inventory situations in which one order is placed for the product; at the end of the period, the product has either sold out, or a surplus of unsold items will be sold for a salvage value (Anderson, Sweeney and Williams, 1998)." The single-period inventory model with probabilistic demand is applicable in situations involving seasonal or perishable items that cannot be carried in inventory and sold in future periods and the demand for the perishable items is not determined. Newspaper sales is an excellent example of a single-period situation. Although newspapers are ordered daily, they cannot be carried in inventory and sold in later periods. Thus, newspaper orders may be treated as a sequence of single-period models. The situation of room inventory is very similar to that of the newspapers because both of them are perishable. The only difference is that the supply of newspapers is full of elasticity while the supply of the rooms is lack of elasticity. The inventory of newspaper can be adjusted on a daily base while it takes much longer to adjust the room inventory.

In single-period inventory model with probability demand, an incremental analysis is used to determine the

optimal order quantity. Incremental analysis addresses the how-much-to-order question by comparing the cost per unit of overestimating demand (CO) with the cost per unit of underestimating demand (CU). The optimal order quantity should occur when the incremental analysis shows that:

$$EL(Q^* + 1) = EL(Q^*)$$

Where

Q^* = optimal order quantity

$Q^* + 1$ = one unit above optimal order quantity

EL = expected loss

Because

$$EL(Q^* + 1) = CO \times P(\text{demand} \leq Q^*)$$

$$EL(Q^*) = CU \times P(\text{demand} > Q^*)$$

$$P(\text{demand} \leq Q^*) + P(\text{demand} > Q^*) = 1$$

Where

P = probability

CO = cost per unit of overestimating demand

CU = cost per unit of underestimating demand

Therefore

$$P(\text{demand} \leq Q^*) = CU / (CU + CO)$$

Then, according to the probability distribution that describes the demand for the product, the optimal order quantity, or the optimal inventory, can be located by using

the obtained $P(\text{demand} \leq Q^*)$. For example, if the predicted demand has a normal probability demand distribution, we can use $P(\text{demand} \leq Q^*)$ to calculate the Z value. The optimal inventory, or optimal order quantity should be

$$Q^* = \mu + z \sigma$$

Where

μ = predicted mean demand (the expected demand)

σ = standard deviation of the predicted mean demand

z = the score that tells how many standard deviation units above or below the mean a value falls.

CHAPTER 3

METHODOLOGY AND DATA DESCRIPTION

Introduction

The sources of data and how the data are used to estimate the optimal room inventory for the subject market are explained in this chapter. The instruments used for data processing are also described herein.

The Data

Secondary data are utilized in this study. The data sources are as follows: Nevada Gaming Control Board, Las Vegas Convention and Visitor Authority, U.S. Department of Labor, the Department of Comprehensive Planning of Clark County, Nevada State Demographer's Office, Oregon State University.

The Data Published by Nevada Gaming Control Board

Nevada Gaming Control Board is the gaming regulatory agency of Nevada. The Tax and License Division of Nevada

Gaming Control Board collects, controls and accounts for all state gaming fees, taxes, fines and penalties. Nevada Gaming Abstract is an annual publication of Nevada Gaming Control Board, which is "a report of combined financial information regarding Nevada gaming licensees grossing \$1 million or more in gaming revenue during the fiscal year ended June 30 (1990, Nevada Gaming Control Board)." The casinos reported in Nevada Gaming Abstract are categorized according to their locations. The data of the past 9 fiscal years (from FY 1990 to FY 1998) of casino hotels in the following locations is collected: Las Vegas Strip, Downtown Las Vegas, Boulder Strip. Both monthly data and annual data are collected.

The monthly data includes rooms occupied per month (Exhibit 1) and available rooms per month (Exhibit 2).

The annual data includes: the total revenue of casino hotels (Exhibit 3), the total revenue of the casino department (Exhibit 4), the total revenue of the rooms department (Exhibit 5), the energy expense (Exhibit 6), the utilities (other than energy expense) (Exhibit 7), the net income (loss) before federal income taxes and extraordinary items (Exhibit 8), the complimentary expense of the rooms department (Exhibit 9), the payroll taxes of the rooms department (Exhibit 10), the payroll-employment benefits of

the rooms department (Exhibit 11), the payroll-officers of the rooms department (Exhibit 12), the payroll-other employees of the rooms department (Exhibit 13), and the other departmental expenses of the rooms department (Exhibit 14).

The Data Published by LVCVA

The Las Vegas Convention and Visitors Authority (LVCVA) is the official destination marketing organization of Las Vegas. Several publications of LVCVA are used as the data sources for the research.

Las Vegas Visitor Profile Study. Las Vegas Visitor Profile Study is an annual publication of LVCVA since 1978. The study is conducted monthly during the fiscal year and reported annually to provide an on-going assessment of the Las Vegas visitor and trends in visitor behavior over time (LVCVA, 1989-1997). The report of FY 1997 presents the findings from the 3,300 personal interviews conducted by GLS Research from July 1, 1996 to June 30, 1997. Approximately 275 in-person interviews were conducted per month in or near Las Vegas hotel-casinos and motels. The following are some highlights of the methodology of the Las Vegas Visitor Profile study:

“Qualified survey respondents were visitors to Las Vegas (excluding residents of Clark County, Nevada) who were at least 21 years of age. In

addition, only visitors who planned to leave Las Vegas within 24 hours were asked to complete the survey."

"To assure a random selection of visitors, different locations were utilized on each interviewing day, and interviewing was conducted at different times of the day. Upon completion of the interview, visitors were given souvenirs as incentives. Verification procedures were conducted throughout the project to assure accurate and valid interviewing."

"Interviews were edited for completeness and accuracy, coded, and entered into a computerized database for analysis. The information was then analyzed using statistical software packages available to GLS Research."

"When we note that a difference between subgroups on a particular measure is 'significant' or 'statistically significant,' we mean that there is a 95% or better chance that the difference is the result of true differences between the subgroup populations and is not due to sampling error alone."

The data of some characteristics of Las Vegas visitors of the past 9 fiscal years (FY 1989 to FY 1997) is collected from Las Vegas Visitor Profile Study (Exhibit 15). It includes: proportion of respondents with persons under 21 in their immediate party, proportion who gamble while visiting Las Vegas, and average trip gambling budget (among those who gamble). The data of 1998 fiscal year is estimated to be the same as that of 1997 fiscal year because the data of 1998 fiscal year is not available yet.

Clark County Residents Study. Clark County Residents Study is another publication of LVCVA. The study is

conducted biennially by GLS Research, and four studies have been completed to date in the following fiscal years: 1989-90, 1991-92, 1993-94, and 1995-96 (LVCVA, 1990-1996). GLS Research conducted telephone interviews with 1,200 respondents selected at random from a random-digit-dial sample of Clark County households. The interviewing of 1995-96 study was conducted in four waves of 300 interviews each in August 1995, November 1995, February 1996 and May 1996 to avoid the seasonal differences in response patterns. The margin of error for the 1,200 respondent sample is $\pm 2.8\%$ at the 95% level of confidence. The data of the past 8 fiscal years (FY 1989 to FY 1996) is collected from Clark County Residents Study. It includes: percentage of residents who gamble, percentage of gambling more than 5 times a week, daily gambling budget of people who gambling "more than 5 times a week", percentage of gambling "about twice a week" and "about once a week", weekly gambling budget of people who gamble "about twice a week" or "about once a week", percentage of gambling "about twice a month" and "about once a month", monthly gambling budget of people who gamble "about twice a month" or "about once a month", percentage of gambling "about four times a year", "about twice a year" and "once a year or less", and annual gambling budget of people who gamble "about four

times a year", "about twice a year" or "once a year or less" (Exhibit 16). The data of 1997-98 fiscal years is estimated to be the same as that of 1995-96 fiscal year because the data of 1997-98 fiscal years is not available yet.

Marketing Bulletin. The monthly visitor volume of Las Vegas from July 1989 to June 1998 is collected from Marketing Bulletin, a quarterly publication of LVCVA. Then the annual visitor volume of Las Vegas for each fiscal year is derived (Exhibit 17).

LVCVA Internet homepage. The data of the planned room inventory of Las Vegas casino hotels is obtained from the Internet homepage of LVCVA (1999). The planned casino hotels in the aforementioned locations are identified (Exhibit 18) and the planned new room inventory are calculated and used in the study.

The Data Published by U.S. Department of Labor

The semiannual data of U.S. city average consumer price index (CPI) from 1989 to 1998 is collected from the internet (U.S. Department of Labor, 1999). The CPI of each fiscal year is derived from the semiannual data of CPI (Exhibit 19).

The Data from Department of Comprehensive Planning, Clark County

The population of Las Vegas City, North Las Vegas City, Henderson City, and Boulder City from FY 1989 to FY 1997 (Exhibit 20) is obtained via fax from Department of Comprehensive Planning, Clark County (E. Verkarik, fax, February 24, 1999).

The Data from Nevada State Demographer's Office

The population of Las Vegas City, North Las Vegas City, Henderson City, and Boulder City in FY 1998 (also in Exhibit 20) is obtained from the internet (Nevada State Demographer's Office, 1998).

The Data from Oregon State University

The age distribution of Clark County residents in 1990 census is collected from the Internet (Oregon State University, no date). The percentage of adult (21 years and older) population in Las Vegas Valley is derived from the data of age distribution of Clark County residents in 1990 census (Exhibit 21).

The Research Method

The basic method of this research is using the single-period inventory model with probabilistic demand to estimate the optimal room inventory for the subject market.

As mentioned in Chapter 2, the data of the probabilistic demand (mean demand and its standard deviation), the cost per unit of underestimating, and the cost per unit of overestimating is needed for using the model. Therefore, the detailed procedures of this research is as follows:

Step 1: Use the historical demand data (rooms occupied) to forecast the future probabilistic demand.

Step 2: Calculate the cost per room of oversupply.

Step 3: Calculate the cost per room of under-supply.

Step 4: Input all the acquired data to the single-period inventory model with probabilistic demand to determine the optimal room inventory for the subject market.

Step 5: Compare the optimal room inventory with the planned room inventory to determine whether room oversupply will occur.

Step One: Forecast the Future Demand

The combined data of casino hotel rooms occupied per month on Las Vegas Strip, in Downtown Las Vegas, and on Boulder Strip is used as the indicator of historical lodging demand for the subject market. The historical data shows that the lodging demand for the subject market is seasonal and has a trend of increasing. A regression model is used to forecast the demand based on the causal relation

among the demand, the trend, and the seasonality. The dependent variable of this model is the monthly rooms occupied. Eleven monthly dummy variables (M1 to M11) and a trend variable are used as the independent variables for the regression analysis. The regression model is as follows:

$$\begin{aligned} &\text{Monthly rooms occupied} \\ &= b_0 + b_t \times \text{Trend} + b_1 \times M1 + b_2 \times M2 + b_3 \times M3 + b_4 \times \\ &M4 + b_5 \times M5 + b_6 \times M6 + b_7 \times M7 + b_8 \times M8 + b_9 \times M9 + \\ &b_{10} \times M10 + b_{11} \times M11 \end{aligned}$$

where

b_0 = constant of the regression equation

b_t = coefficient of Trend

b_1 = coefficient of M1 (January)

b_2 = coefficient of M2 (February)

b_3 = coefficient of M3 (March)

b_4 = coefficient of M4 (April)

b_5 = coefficient of M5 (May)

b_6 = coefficient of M6 (June)

b_7 = coefficient of M7 (July)

b_8 = coefficient of M8 (August)

b_9 = coefficient of M9 (September)

b_{10} = coefficient of M10 (October)

b_{11} = coefficient of M11 (November)

Trend = number of period

M1 = dummy variable for January. It equals to 1 when it is January and it equals to 0 when it is not January.

M2 = dummy variable for February. It equals to 1 when it is February and it equals to 0 when it is not February.

M3 = dummy variable for March. It equals to 1 when it is March and it equals to 0 when it is not March.

M4 = dummy variable for April. It equals to 1 when it is April and it equals to 0 when it is not April.

M5 = dummy variable for May. It equals to 1 when it is May and it equals to 0 when it is not May.

M6 = dummy variable for June. It equals to 1 when it is June and it equals to 0 when it is not June.

M7 = dummy variable for July. It equals to 1 when it is July and it equals to 0 when it is not July.

M8 = dummy variable for August. It equals to 1 when it is August and it equals to 0 when it is not August.

M9 = dummy variable for September. It equals to 1 when it is September and it equals to 0 when it is not September.

M10 = dummy variable for October. It equals to 1 when it is October and it equals to 0 when it is not October.

M11 = dummy variable for November. It equals to 1 when it is November and it equals to 0 when it is not November.

The mean of predicted monthly rooms occupied and the standard error of the predicted value can be obtained by running linear regression analysis in the SPSS software program.

Step 2: Calculate the Cost Per Room of Oversupply

Cost per room of oversupply represents the loss of having one additional room available and finding that it cannot be sold. The cost per room of oversupply room equals fixed cost per room per night. Therefore, the process of calculating the cost per room of oversupply is the process of calculating the fixed cost per room per night (FCPRPN).

Because:

$$TC = TFC + TVC$$

Where

TC = total cost

TFC = total fixed cost

TVC = total variable cost

Therefore, the equation used to calculate the FCPRPN is:

$$\text{FCPRPN} = (\text{TCRD} - \text{TVCRD}) / \text{total available rooms}$$

Where

TCRD = total cost allocated to rooms department

TVCRD = total variable cost of rooms department

Variable cost. The data of variable cost of rooms department of Las Vegas casino hotels cannot be obtained directly but it can be derived from the mixed cost. The items identified as mixed cost in General and Administrative Expenses category of Combined Income Statements in Nevada Gaming Abstract are the energy expense and the utility expense (other than the energy expense). These expenses are allocated to the rooms department according to the percentage of rooms revenue in total casino hotel revenues (see Exhibit 22). The reason why the utility expense and the energy expense are identified as the mixed cost is that they change but do not proportionally change as the number of rooms occupied changes. The items identified as mixed cost in Rooms Departmental Expenses category of Combined Income Statements are as follows: payroll-tax allocated to other employees, payroll-employment benefits allocated to other employees, payroll-other employees, other departmental expenses, complimentary expenses (see Exhibit 23). Part of the employees in the rooms department are on-call

employees. That is why the expenses related to the payroll of other employees in rooms department are identified as mixed cost. The item of the complimentary expenses of rooms department listed in Nevada Gaming Abstract does not include the expenses of complimentary rooms. These expenses are the cost of supplying complimentary guest services to the room occupants. These expenses also change, but not proportionally, as the number of occupied rooms changes. Items appearing under other expenses in rooms department vary from property to property. Operating supplies, linen, laundry & dry cleaning commonly appear under the other expenses of the rooms department (The Hotel Association of New York Inc., 1996). Therefore, the other expenses of rooms department are also identified as mixed costs. Total mixed costs associated with the rooms department is the sum of the mixed cost of rooms department and the allocated mixed costs from the general & administration expense. In order to eliminate the inflation factor, the total mixed cost that attributes to the rooms department are adjusted by CPI (see Exhibit 24).

There are three accepted methods to determine the variable element of the mixed cost. Regression analysis is one of them (Schmidgall, 1997). The total mixed cost is the dependent variable and the business volume is the

independent variable in the regression model. The mixed cost is divided into the fixed cost element (constant) and the variable element (slope times business volume). The regression model for this study is

$$y = a + bx$$

where

y = total mixed cost that allocated to rooms department in each fiscal year (CPI adjusted)

x = total rooms occupied in each fiscal year

a = fixed cost element of total mixed cost that allocated to rooms department (CPI adjusted)

b = the variable cost per room per night (CPI adjusted)

The dependent variable of this model is y -- total mixed cost allocated to the rooms department in each fiscal year. The independent variable of this model is x -- total rooms occupied in each fiscal year. The value of b, which can be obtained from this model, is used as the variable cost per room per night (VCPRPN).

The total variable cost of rooms department (TVCRD) is calculated by the following equation:

$$\text{TVCRD} = \text{VCPRPN} \times \text{total room occupied}$$

The total cost allocated to rooms department (TCRD).

The total revenue of the casino hotels subtracted by the

total net income of the casino hotels is the total cost of the casino hotels. The total cost is allocated to rooms department according to the percentage of rooms revenue in total revenue. In order to eliminate the inflation factor, the TCRD of each fiscal year is adjusted by CPI (see Exhibit 25).

Fixed cost. The following equation is used to calculate FCPRPN of the past nine fiscal years:

$$\begin{aligned}\text{FCPRPN} &= \text{TCRD} / \text{total available rooms} \\ &= (\text{TCRD} - \text{TVCRD}) / \text{total available rooms}\end{aligned}$$

where

TCRD = The total cost (CPI adjusted) of rooms department of each fiscal year

TVCRD = the total variable cost of rooms department of each fiscal year

total available rooms = the total available rooms of each fiscal year

Only 9 historical observations of FCPRPN can be obtained. Therefore, an exponential smoothing model is used to predict the FCPRPN of the next fiscal year in order to guarantee the forecasting accuracy. Exponential smoothing uses a weighted average of past time series values as the

forecast (Anderson, Sweeney and Williams, 1998). The model is:

$$F_{t+1} = \alpha Y_t + (1 - \alpha) F_t$$

Where

F_{t+1} = forecast of the FCPRPN for fiscal year
t + 1

Y_t = actual value of the FCPRPN for fiscal year t

F_t = forecast of the FCPRPN for fiscal year t

α = smoothing constant ($0 \leq \alpha \leq 1$)

Choosing a good value for smoothing constant α is very important for the forecast accuracy. Eleven possible values of constant α are tested in the model: 0, 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, and 1. The one that yields the least mean square error (MSE) is selected as the value for the smoothing constant α . Once the smoothing constant α is determined, the FCPRPN of the next fiscal year can be predicted by using the FCPRPN of the current year and the selected value of α .

Step 3: Calculate the Cost Per Room of Under-supply

The cost per room of under-supply represents the opportunity loss of not having one additional room that could have been sold. The opportunity loss includes the net income per occupied room from rooms department (NIPRRD) and

the net income per occupied room from casino department (NIPRCD).

NIPRRD. Average daily rate (ADR) has to be obtained to calculate the NIPRRD. The total room revenue of each fiscal year (Exhibit 5) divided by the total rooms occupied (Exhibit 1) comes to the ADR of the past nine fiscal years. In order to eliminate the inflation factor, it is adjusted by CPI. An exponential smoothing model is used to predict the ADR of the next two fiscal years.

The model is:

$$F_{t+1} = \alpha Y_t + (1 - \alpha) F_t$$

Where

F_{t+1} = forecast of the ADR for fiscal year $t + 1$

Y_t = actual value of the ADR for fiscal year t

F_t = forecast of the ADR for fiscal year t

α = smoothing constant ($0 \leq \alpha \leq 1$)

Eleven possible values of constant α are tested in the model: 0, 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, and 1. The one that yields the least mean square error (MSE) is selected as the value for the smoothing constant α .

After the values of ADR in each fiscal year are obtained, the net income per room from the rooms department

of each fiscal year can be calculated by the following equation

$$\text{NIPRRD}$$

$$= \text{ADR} - \text{FCPRPN} - \text{VCPRPN}$$

NIPRCD. The net income generated in the casino department comes from both the local residents and visitors. The percentage of net income contributed by visitors has to be estimated before calculating NIPRCD. The estimation is based on the percentage of total visitors' gambling spend (TVGS) in total gambling spending (TGS).

The TGS is the sum of the TVGS and TRGS (total resident gambler's spending).

The equation used to calculate the total visitors' gambling spending in each fiscal year is:

$$\text{TVGS}$$

$$= \text{total visitor volume} \times \text{percentage of adult visitors} \times \text{percentage of adult visitors who gamble} \times \text{average trip gambling budget}$$

The data of total visitor volume is shown in Exhibit 17. The data of the percentage of adult visitors, the percentage of adult visitors who gamble, and the average trip gambling budget is shown in Exhibit 15.

The equation used to calculate the TRGS in each fiscal year is:

$$\begin{aligned} &\text{Total residents' gambling spending} \\ &= \text{total population of Las Vegas Valley} \times \\ &\quad \text{percentage of people who are 21 years and older} \times \\ &\quad \text{percentage of adult residents who gamble} \times \\ &\quad (\text{percentage of daily gambler} \times \text{daily gambling} \\ &\quad \text{budget of daily gambler} \times 365 + \text{percentage of} \\ &\quad \text{weekly gambler} \times \text{weekly gambling budget of weekly} \\ &\quad \text{gambler} \times 52 + \text{percentage of monthly gambler} \times \\ &\quad \text{monthly gambling budget of monthly gambler} \times 12 + \\ &\quad \text{percentage of annually gambler} \times \text{annually} \\ &\quad \text{gambling budget of annually gambler}) \end{aligned}$$

The data of the total population of Las Vegas Valley is shown in Exhibit 20. The data of percentage of people who are 21 years and older is shown in Exhibit 21. The data of percentage of adult residents who gamble, the percentage of daily gamblers, the daily gambling budget of daily gambler, the percentage of weekly gambler, the weekly gambling budget of weekly gambler, the percentage of monthly gambler, the monthly gambling budget of monthly gambler, the percentage of annually gambler, and the annually gambling budget of annually gambler is shown in Exhibit 16.

Then the percentage of TVGS in TGS of the past nine fiscal years is calculated based on the following equation:

$$\begin{aligned} &\text{The percentage of TVGS in TGS} \\ &= \text{TVGS} / (\text{TVGS} + \text{TRGS}) \end{aligned}$$

The total net income of casino department is equal to total revenue of casino department subtracted by the total cost allocated to casino department (Exhibit 27). The total net income of casino department that is contributed by visitors is calculated by the following equation:

$$\begin{aligned} &\text{Total net income of casino department that is} \\ &\text{contributed by visitors} \\ &= \text{total net income of casino department} \times \text{the} \\ &\text{percentage of TVGS in TGS} \end{aligned}$$

Then the NIPRCD in the past nine fiscal years is calculated by the following equation:

$$\begin{aligned} &\text{NIPRCD} \\ &= \text{total net income of casino department that is} \\ &\text{contributed by visitors} / \text{total rooms occupied} \end{aligned}$$

An exponential model is used to forecast the NIPRCD for the next fiscal years. The model is:

$$F_{t+1} = \alpha Y_t + (1 - \alpha) F_t$$

Where

F_{t+1} = forecast of the NIPRCD for fiscal year
 $t + 1$

Y_t = actual value of the NIPRCD for fiscal year t

F_t = forecast of the NUPRCD for fiscal year t

α = smoothing constant ($0 \leq \alpha \leq 10$)

Eleven possible values of constant α are tested in the model: 0, 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, and 1. The one that yields the least mean square error (MSE) is selected as the value for the smoothing constant α .

Cost per room of under-supply. The sum of the NIPRRD and the NIPRCD is the total cost per room of under-supply.

Step 4: Determine the Optimal Room Inventory for the Subject Market

According to the single-period model with probabilistic demand that is presented in Chapter 2, the optimal inventory Q^* should be the inventory that meets the following equation:

$$P(\text{demand} \leq Q^*) = CU / (CU + CO)$$

Based on the result of step 2 (cost of oversupply) and the result of step 3 (cost of under-supply), the probability of demand less than or equal to optimal room inventory is obtained. Then the Z score that matches each

probability is obtained by checking the table of Areas for the Standard Normal Distribution (Anderson, Sweeney and Williams, 1998).

Then the optimal room inventory of Las Vegas casino hotels can be obtained by the model:

$$Q^* = \mu + z \sigma$$

Where

Q^* = optimal room inventory of Las Vegas hotel casinos

μ = predicted mean demand (room occupied)

σ = standard deviation of the predicted mean demand (room occupied)

z = the score that tells how many standard deviation units above or below the mean a value falls.

Step 5: Compare the Optimal Room Inventory with the Planned Room Inventory

The optimal room inventory of the subject market in the past nine years will be compared with the real room inventory. The predicted optimal room inventory for the subject market in the next two fiscal years is compared with the planned room inventory.

The Instrument Used for the Research

Three software programs are utilized. They are:

Microsoft Excel 97

It is used for data entry, data formatting, data computing, selecting of best value for smoothing constant α in exponential smoothing forecasting, chart creating.

SPSS 8.0 for Windows

It is used for regression analysis.

Microsoft Word 97

It is used for word processing.

CHAPTER 4

DATA ANALYSIS

Introduction

The computing process, forecasting process, and the results of each analysis step are shown in this chapter. The sequence of presenting the results of data analysis in each step follows the research procedures outlined in Chapter 3.

Forecasting of Future

Probabilistic Demand

The regression model for predicting rooms occupied in the next two fiscal years is obtained after running a regression analysis in the SPSS software program. It is shown below:

Monthly rooms occupied

$$\begin{aligned}
 &= 1,050,624.8 + \text{Trend} \times 8,534.9 + M1 \times 72,008.7 + \\
 &M2 \times 70,317.3 + M3 \times 235,565.6 + M4 \times 181,235.4 + \\
 &M5 \times 192,027 + M6 \times 119,023.5 + M7 \times 157,937 + M8 \\
 &\times 202,904.6 + M9 \times 97,289.9 + M10 \times 201,916.4 + \\
 &M11 \times 76,543.4
 \end{aligned}$$

The R square of this model is 0.939, which means that 93.9% of the variation of monthly rooms occupied can be explained by this model. The F value of this model is 121.196 and the significance level is below 0.01, which means that this forecasting model can be accepted at 99% confidence level.

Table 1 shows the standard errors of using the regression model to predict the rooms occupied per month in the past. Table 2 shows the result of predicted rooms occupied per month in the next two fiscal years and the standard errors of the predicted values.

The Cost Per Room of Oversupply

As discussed before, the cost per room of oversupply is equal to fixed cost per room per night (FCPRPN). In order to get the value of FCPRPN, the data of total cost and total variable cost have to be obtained beforehand.

Table 1

Standard Error of the Predicted Demand in the Past

| Month | Real data of rooms occupied | Predicted rooms occupied | Standard error |
|--------|--------------------------------|-----------------------------|-------------------|
| Jul-89 | 1,183,728 | 1,217,097 | 27,380 |
| Aug-89 | 1,193,588 | 1,270,599 | 27,380 |
| Sep-89 | 1,135,020 | 1,173,519 | 27,380 |
| Oct-89 | 1,202,556 | 1,286,681 | 27,380 |
| Nov-89 | 1,161,503 | 1,169,843 | 27,380 |
| Dec-89 | 1,130,276 | 1,101,834 | 27,380 |
| Jan-90 | 1,224,110 | 1,182,378 | 27,380 |
| Feb-90 | 1,238,135 | 1,189,221 | 27,380 |
| Mar-90 | 1,382,539 | 1,363,005 | 27,380 |
| Apr-90 | 1,312,681 | 1,317,209 | 27,380 |
| May-90 | 1,318,597 | 1,336,536 | 27,380 |
| Jun-90 | 1,364,854 | 1,272,067 | 27,380 |
| Jul-90 | 1,421,949 | 1,319,516 | 26,363 |
| Aug-90 | 1,438,698 | 1,373,018 | 26,363 |
| Sep-90 | 1,392,175 | 1,275,939 | 26,363 |
| Oct-90 | 1,526,595 | 1,389,100 | 26,363 |
| Nov-90 | 1,366,190 | 1,272,262 | 26,363 |
| Dec-90 | 1,306,672 | 1,204,253 | 26,363 |

(table continues)

Table 1 (continued)

| Month | Real data of rooms occupied | Predicted rooms occupied | Standard error |
|-------------------|--------------------------------|-----------------------------|-------------------|
| Jan-91 | 1,248,435 | 1,284,797 | 26,363 |
| Feb-91 | 1,308,691 | 1,291,641 | 26,363 |
| Mar-91 | 1,464,073 | 1,465,424 | 26,363 |
| Apr-91 | 1,477,085 | 1,419,629 | 26,363 |
| May-91 | 1,451,693 | 1,438,955 | 26,363 |
| Jun-91 | 1,397,261 | 1,374,486 | 26,363 |
| Jul-91 | 1,454,949 | 1,421,935 | 25,612 |
| Aug-91 | 1,525,474 | 1,475,437 | 25,612 |
| Sep-91 | 1,416,317 | 1,378,358 | 25,612 |
| Oct-91 | 1,534,853 | 1,491,519 | 25,612 |
| Nov-91 | 1,324,544 | 1,374,681 | 25,612 |
| Dec-91 | 1,305,091 | 1,306,673 | 25,612 |
| Jan-92 | 1,340,482 | 1,387,216 | 25,612 |
| Feb-92 | 1,417,060 | 1,394,060 | 25,612 |
| Mar-92 | 1,447,323 | 1,567,843 | 25,612 |
| Apr-92 | 1,458,128 | 1,522,048 | 25,612 |
| May-92 | 1,510,362 | 1,541,374 | 25,612 |
| Jun-92 | 1,434,485 | 1,476,906 | 25,612 |
| (table continues) | | | |

Table 1 (continued)

| Month | Real data of rooms occupied | Predicted rooms occupied | Standard error |
|--------|--------------------------------|-----------------------------|-------------------|
| Jul-92 | 1,479,782 | 1,524,354 | 25,150 |
| Aug-92 | 1,536,749 | 1,577,856 | 25,150 |
| Sep-92 | 1,442,795 | 1,480,777 | 25,150 |
| Oct-92 | 1,494,656 | 1,593,938 | 25,150 |
| Nov-92 | 1,407,197 | 1,477,100 | 25,150 |
| Dec-92 | 1,295,277 | 1,409,092 | 25,150 |
| Jan-93 | 1,334,884 | 1,489,635 | 25,150 |
| Feb-93 | 1,384,608 | 1,496,479 | 25,150 |
| Mar-93 | 1,512,045 | 1,670,262 | 25,150 |
| Apr-93 | 1,489,614 | 1,624,467 | 25,150 |
| May-93 | 1,503,399 | 1,643,793 | 25,150 |
| Jun-93 | 1,445,066 | 1,579,325 | 25,150 |
| Jul-93 | 1,508,759 | 1,626,773 | 24,995 |
| Aug-93 | 1,545,529 | 1,680,276 | 24,995 |
| Sep-93 | 1,451,068 | 1,583,196 | 24,995 |
| Oct-93 | 1,596,251 | 1,696,357 | 24,995 |
| Nov-93 | 1,601,858 | 1,579,519 | 24,995 |
| Dec-93 | 1,576,128 | 1,511,511 | 24,995 |

(table continues)

Table 1 (continued)

| Month | Real data of rooms occupied | Predicted rooms occupied | Standard error |
|--------|--------------------------------|-----------------------------|-------------------|
| Jan-94 | 1,702,537 | 1,592,054 | 24,995 |
| Feb-94 | 1,679,632 | 1,598,898 | 24,995 |
| Mar-94 | 1,891,268 | 1,772,681 | 24,995 |
| Apr-94 | 1,825,637 | 1,726,886 | 24,995 |
| May-94 | 1,856,366 | 1,746,212 | 24,995 |
| Jun-94 | 1,789,091 | 1,681,744 | 24,995 |
| Jul-94 | 1,872,544 | 1,729,192 | 25,150 |
| Aug-94 | 1,882,727 | 1,782,695 | 25,150 |
| Sep-94 | 1,789,098 | 1,685,615 | 25,150 |
| Oct-94 | 1,892,392 | 1,798,776 | 25,150 |
| Nov-94 | 1,733,884 | 1,681,938 | 25,150 |
| Dec-94 | 1,643,730 | 1,613,930 | 25,150 |
| Jan-95 | 1,705,117 | 1,694,473 | 25,150 |
| Feb-95 | 1,685,879 | 1,701,317 | 25,150 |
| Mar-95 | 1,932,654 | 1,875,100 | 25,150 |
| Apr-95 | 1,858,090 | 1,829,305 | 25,150 |
| May-95 | 1,834,400 | 1,848,631 | 25,150 |
| Jun-95 | 1,810,718 | 1,784,163 | 25,150 |

(table continues)

Table 1 (continued)

| Month | Real data of rooms occupied | Predicted rooms occupied | Standard error |
|--------|--------------------------------|-----------------------------|-------------------|
| Jul-95 | 1,741,893 | 1,831,611 | 25,612 |
| Aug-95 | 1,810,746 | 1,885,114 | 25,612 |
| Sep-95 | 1,760,702 | 1,788,034 | 25,612 |
| Oct-95 | 1,893,454 | 1,901,195 | 25,612 |
| Nov-95 | 1,740,382 | 1,784,357 | 25,612 |
| Dec-95 | 1,709,303 | 1,716,349 | 25,612 |
| Jan-96 | 1,829,510 | 1,796,892 | 25,612 |
| Feb-96 | 1,821,097 | 1,803,736 | 25,612 |
| Mar-96 | 1,981,896 | 1,977,519 | 25,612 |
| Apr-96 | 1,918,895 | 1,931,724 | 25,612 |
| May-96 | 1,973,249 | 1,951,050 | 25,612 |
| Jun-96 | 1,905,156 | 1,886,582 | 25,612 |
| Jul-96 | 1,958,447 | 1,934,030 | 26,363 |
| Aug-96 | 2,031,721 | 1,987,533 | 26,363 |
| Sep-96 | 1,902,195 | 1,890,453 | 26,363 |
| Oct-96 | 2,011,784 | 2,003,614 | 26,363 |
| Nov-96 | 1,866,297 | 1,886,776 | 26,363 |
| Dec-96 | 1,769,559 | 1,818,768 | 26,363 |

(table continues)

Table 1 (continued)

| Month | Real data of rooms occupied | Predicted rooms occupied | Standard error |
|--------|--------------------------------|-----------------------------|-------------------|
| Jan-97 | 1,976,815 | 1,899,312 | 26,363 |
| Feb-97 | 1,914,339 | 1,906,155 | 26,363 |
| Mar-97 | 2,150,954 | 2,079,938 | 26,363 |
| Apr-97 | 2,072,619 | 2,034,143 | 26,363 |
| May-97 | 2,090,997 | 2,053,470 | 26,363 |
| Jun-97 | 1,957,523 | 1,989,001 | 26,363 |
| Jul-97 | 2,018,907 | 2,036,449 | 27,380 |
| Aug-97 | 2,157,248 | 2,089,952 | 27,380 |
| Sep-97 | 1,959,392 | 1,992,872 | 27,380 |
| Oct-97 | 2,114,674 | 2,106,034 | 27,380 |
| Nov-97 | 2,013,817 | 1,989,195 | 27,380 |
| Dec-97 | 1,867,560 | 1,921,187 | 27,380 |
| Jan-98 | 1,966,599 | 2,001,731 | 27,380 |
| Feb-98 | 1,940,639 | 2,008,574 | 27,380 |
| Mar-98 | 2,191,377 | 2,182,357 | 27,380 |
| Apr-98 | 2,129,223 | 2,136,562 | 27,380 |
| May-98 | 2,176,848 | 2,155,889 | 27,380 |
| Jun-98 | 2,031,539 | 2,091,420 | 27,380 |

Table 2

Predicted Future Demand

| Month | Predicted rooms occupied | Standard error |
|--------|-----------------------------|----------------|
| Jul-98 | 2,138,868 | 28,635 |
| Aug-98 | 2,192,371 | 28,635 |
| Sep-98 | 2,095,291 | 28,635 |
| Oct-98 | 2,208,453 | 28,635 |
| Nov-98 | 2,091,614 | 28,635 |
| Dec-98 | 2,023,606 | 28,635 |
| Jan-99 | 2,104,150 | 28,635 |
| Feb-99 | 2,110,993 | 28,635 |
| Mar-99 | 2,284,776 | 28,635 |
| Apr-99 | 2,238,981 | 28,635 |
| May-99 | 2,258,308 | 28,635 |
| Jun-99 | 2,193,839 | 28,635 |

(table continues)

Table 2 (continued)

| Month | Predicted rooms occupied | Standard error |
|--------|-----------------------------|----------------|
| Jul-99 | 2,241,288 | 30,098 |
| Aug-99 | 2,294,790 | 30,098 |
| Sep-99 | 2,197,710 | 30,098 |
| Oct-99 | 2,310,872 | 30,098 |
| Nov-99 | 2,194,034 | 30,098 |
| Dec-99 | 2,126,025 | 30,098 |
| Jan-00 | 2,206,569 | 30,098 |
| Feb-00 | 2,213,412 | 30,098 |
| Mar-00 | 2,387,195 | 30,098 |
| Apr-00 | 2,341,400 | 30,098 |
| May-00 | 2,360,727 | 30,098 |
| Jun-00 | 2,296,258 | 30,098 |

Variable Cost Per Room Per Night (VCPRPN)

Variable cost is derived from mixed cost. As mentioned in Chapter 3, a regression model is used to estimate the VCPRPN. After running regression analysis, the following model is obtained:

$$y = \$6,645.710.1 + \$18.015x$$

where

y = total MC that allocated to rooms department
in each fiscal year (CPI adjusted)

x = total rooms occupied in each fiscal year

The R square of this model is 0.988 and the significance level is below 0.01.

In the model, \$6,645.710.1 is the fixed portion of the total mixed cost. \$18.015 times rooms occupied is the variable portion of the total mixed cost. The rooms occupied increased by 1, the total mixed cost will increase by \$18,015. Therefore, the VCPRPN is \$18.015 (1982-84 constant dollar).

The total variable cost of rooms department in each fiscal year is shown in Table 3.

Table 3

The Total Variable Cost of the RoomsDepartment (TVCRD)

| Fiscal Year | Total rooms occupied | TVCRD (1982-84 constant dollar) |
|----------------|-------------------------|------------------------------------|
| 1990 | 14,847,587 | \$267,479,280 |
| 1991 | 16,799,517 | \$302,643,299 |
| 1992 | 17,169,068 | \$309,300,760 |
| 1993 | 17,326,072 | \$312,129,187 |
| 1994 | 20,024,124 | \$360,734,594 |
| 1995 | 21,641,233 | \$389,866,812 |
| 1996 | 22,086,283 | \$397,884,388 |
| 1997 | 23,703,250 | \$427,014,049 |
| 1998 | 24,567,823 | \$442,589,331 |

Fixed Cost

As discussed in chapter 3, the equation used to calculate the fixed cost per room per night is:

$$\text{FCPRPN}$$

$$= (\text{TCRD} - \text{TVCRD}) / \text{total available rooms}$$

A summary of the data used to calculate FCPRPN and the FCPRPN of the past nine fiscal years is shown in Exhibit 26. The FCPRPN of the next two fiscal years are predicted

by an exponential model. Eleven possible values of smoothing constant α and their matched mean square errors (MSE) are shown in Table 4. The testing shows that the best value of the smoothing constant α is 1. Therefore, the model for forecasting ADR is

$$F_{t+1} = Y_t + (1 - \alpha) F_t = Y_t$$

Where

F_{t+1} = forecast of the FCPRPN for fiscal year
 $t + 1$

Y_t = actual value of the FCPRPN for fiscal year t

F_t = forecast of the FCPRPN for fiscal year t

According to this model, the predicted FCPRPN for fiscal year 1999 is \$20.8 (1982-1984 constant dollar). The predicted FCPRPN for fiscal year 2000 can be obtained by the same method when the actual value of the ADR of fiscal year 1999 is available. Here the FCPRPN of fiscal year 2000 is estimated as the same of fiscal year 1999.

The historical and predicted FCPRPN are shown in Table 5. They are regarded as the cost per room of oversupply.

Table 4

Testing of the Smoothing Constant Values
for the FCPRRN Forecasting Model

| Smoothing constant value | MSE |
|--------------------------|---------|
| 0 | 6.83259 |
| 0.1 | 7.15994 |
| 0.2 | 6.87302 |
| 0.3 | 6.25450 |
| 0.4 | 5.54190 |
| 0.5 | 4.86223 |
| 0.6 | 4.26215 |
| 0.7 | 3.74736 |
| 0.8 | 3.30827 |
| 0.9 | 2.93230 |
| 1 | 2.60825 |

Table 5

The Fixed Cost Per Room Per Night
(FCPRPN)

| | Fiscal year | FCPRPN (adjusted by CPI) |
|------------|----------------|--------------------------------|
| Historical | 1990 | \$17.7 |
| data | 1991 | \$16.3 |
| | 1992 | \$14.0 |
| | 1993 | \$14.2 |
| | 1994 | \$16.8 |
| | 1995 | \$19.1 |
| | 1996 | \$20.0 |
| | 1997 | \$20.7 |
| | 1998 | \$20.8 |
| Predicted | 1999 | \$20.8 |
| data | 2000 | \$20.8 |

The Cost Per Room of Under-Supply

As discussed before, the cost per room of under-supply includes the net income per occupied room from rooms department (NIPRRD) and the net income per occupied room from casino department (NIPRCD).

NIPRRD

As discussed in chapter 3, the first step to calculate the NIPRRD is to calculate the ADR. The ADR of the past nine fiscal years are obtained by using the data of total rooms revenue and the data of total rooms occupied. The ADR of the next fiscal year is predicted by an exponential smoothing model. Eleven possible values of smoothing constant α and their matched mean square errors (MSE) are shown in Table 6. The testing shows that the best value of the smoothing constant α is 1. Therefore, the model for forecasting ADR is

$$F_{t+1} = Y_t + (1 - \alpha) F_t = Y_t$$

Where

F_{t+1} = forecast of the ADR for fiscal year $t + 1$

Y_t = actual value of the ADR for fiscal year t

F_t = forecast of the ADR for fiscal year t

Table 6

Testing of the Smoothing Constant Values
for the ADR Forecasting Model

| Smoothing constant value | MSE |
|--------------------------|----------|
| 0 | 11.06648 |
| 0.1 | 11.38934 |
| 0.2 | 10.69346 |
| 0.3 | 9.53426 |
| 0.4 | 8.29558 |
| 0.5 | 7.15912 |
| 0.6 | 6.17994 |
| 0.7 | 5.35540 |
| 0.8 | 4.66493 |
| 0.9 | 4.08700 |
| 1 | 3.60397 |

According to this model, the predicted ADR for fiscal year 1999 is \$45.1 (1982-1984 constant dollar). The ADR of fiscal year 2000 is estimated as the same of fiscal year 1999. The historical and the predicted ADRs are shown in Table 7.

NIPRRD is equals to the ADR subtracted by FCPRPN and VCPRPN. The historical and predicted NIPRRDs are also shown in Table 7.

Table 7

The Historical and Predicted Net Income Per Occupied Room
from Rooms Department (NIPRRD)

| | FY | ADR | FCPRPN | VCPRPN | NIPRRD |
|------------|------|--------|--------|---------|--------|
| Historical | 1990 | \$41.2 | \$17.7 | \$18.02 | \$5.50 |
| data | 1991 | \$38.8 | \$16.3 | \$18.02 | \$4.47 |
| | 1992 | \$37.1 | \$14.0 | \$18.02 | \$5.10 |
| | 1993 | \$37.8 | \$14.2 | \$18.02 | \$5.63 |
| | 1994 | \$39.7 | \$16.8 | \$18.02 | \$4.93 |
| | 1995 | \$43.3 | \$19.1 | \$18.02 | \$6.19 |
| | 1996 | \$45.0 | \$20.0 | \$18.02 | \$7.03 |
| | 1997 | \$45.4 | \$20.7 | \$18.02 | \$6.70 |
| | 1998 | \$45.1 | \$20.8 | \$18.02 | \$6.29 |
| Predicted | 1999 | \$45.1 | \$20.8 | \$18.02 | \$6.29 |
| data | 2000 | \$45.1 | \$20.8 | \$18.02 | \$6.29 |

Note. The value of the ADR, the FCPRPN, the VCPRPN, and the NIPRRPN are CPI adjusted (in 1982-1984 constant dollar).

NIPRCD

The percentages of TVGS in TGS of the past nine fiscal years are shown in Table 8.

Table 8

The Percentage of Total Visitors' Gambling Spending (TVGS)
in Total Gambling Spending (TGS)

| FY | TVGS | TRGS ^a | TGS | TVGS as a percentage of TGS |
|------|----------|-------------------|----------|-----------------------------------|
| 1990 | \$8,909 | \$392 | \$9,301 | 95.78% |
| 1991 | \$7,610 | \$417 | \$8,027 | 94.81% |
| 1992 | \$8,231 | \$444 | \$8,675 | 94.89% |
| 1993 | \$8,283 | \$1,388 | \$9,671 | 85.65% |
| 1994 | \$10,686 | \$1,516 | \$12,203 | 87.57% |
| 1995 | \$11,631 | \$1,000 | \$12,630 | 92.08% |
| 1996 | \$13,145 | \$1,087 | \$14,232 | 92.36% |
| 1997 | \$12,496 | \$1,142 | \$13,638 | 91.63% |
| 1998 | \$12,489 | \$1,252 | \$13,741 | 90.89% |

Note. TGS, TRGS, and TVGS are in million dollars.

^a TRGS is the total residents' gambling spending.

Total net income of casino department that is generated by visitors (CPI adjusted), total rooms occupied, and the NIPRCD for the past nine fiscal years are shown in Table 9.

Table 9

Net Income Per Occupied Room from Casino Department
(NIPRCD) of the Past Nine Fiscal Years

| Fiscal Year | TNICDV ^a | Total rooms occupied | NIPRCD |
|----------------|---------------------|-------------------------|--------|
| 1990 | \$183,423,267 | 14,847,587 | \$12.4 |
| 1991 | \$136,245,101 | 16,799,517 | \$8.1 |
| 1992 | \$205,044,968 | 17,169,068 | \$11.9 |
| 1993 | \$277,105,951 | 17,326,072 | \$16.0 |
| 1994 | \$280,752,896 | 20,024,124 | \$14.0 |
| 1995 | \$357,130,910 | 21,641,233 | \$16.5 |
| 1996 | \$423,034,304 | 22,086,283 | \$19.2 |
| 1997 | \$378,503,405 | 23,703,250 | \$16.0 |
| 1998 | \$325,929,660 | 24,567,823 | \$13.3 |

Note.

^a TNICDV is the total net income of the casino department that is contributed by the visitors.

The NIPRCD of the next fiscal year is predicted by an exponential smoothing model. Eleven possible values of smoothing constant α and their matched mean square errors (MSE) are shown in Table 10.

Table 10

Testing of the Smoothing Constant Values
for the NIPRCD Forecasting Model

| Smoothing constant value | MSE |
|--------------------------|----------|
| 0 | 13.94432 |
| 0.1 | 12.32198 |
| 0.2 | 11.24034 |
| 0.3 | 10.61289 |
| 0.4 | 10.28060 |
| 0.5 | 10.12103 |
| 0.6 | 10.06635 |
| 0.7 | 10.08598 |
| 0.8 | 10.16551 |
| 0.9 | 10.29314 |
| 1 | 10.45428 |

The testing shows that the best value of the smoothing constant α is 0.6. Therefore, the model for forecasting ADR is

$$F_{t+1} = 0.6Y_t + (1 - 0.6) F_t = 0.6Y_t + 0.4F_t$$

Where

F_{t+1} = forecast of the NIPRCD for fiscal year $t + 1$

Y_t = actual value of the NIPRCD for fiscal year t

F_t = forecast of the NIPRCD for fiscal year t

According to this model, the predicted NIPRCD for fiscal year 1999 is \$14.35 (1982-1984 constant dollar). The NIPRCD of fiscal year 2000 is estimated as the same of fiscal year 1999.

Table 11 is a summary of the under-supply cost per room and the over supply cost per room.

Table 11:

Summary of the Cost Per Room of Under-Supply (CU)
and the Cost Per Room of Oversupply (CO)

| | FY | CU | | | CO |
|------------|------|--------|--------|--------|--------|
| | | NIPRRD | NIPRCD | CU | FCPRPN |
| Historical | 1990 | \$5.5 | \$12.4 | \$17.8 | \$17.7 |
| data | 1991 | \$4.5 | \$8.1 | \$12.6 | \$16.3 |
| | 1992 | \$5.1 | \$11.9 | \$17.0 | \$14.0 |
| | 1993 | \$5.6 | \$16.0 | \$21.6 | \$14.2 |
| | 1994 | \$4.9 | \$14.0 | \$18.9 | \$16.8 |
| | 1995 | \$6.2 | \$16.5 | \$22.7 | \$19.1 |
| | 1996 | \$7.0 | \$19.2 | \$26.2 | \$20.0 |
| | 1997 | \$6.7 | \$16.0 | \$22.7 | \$20.7 |
| | 1998 | \$6.3 | \$13.3 | \$19.6 | \$20.8 |
| Predicted | 1999 | \$6.3 | \$14.4 | \$20.6 | \$20.8 |
| data | 2000 | \$6.3 | \$14.4 | \$20.6 | \$20.8 |

Optimal Room Inventory

As discussed in Chapter 3, the predicted mean demand, the standard deviation of the predicted mean demand, and the Z value are needed to calculate the optimal room supply.

The predicted mean demand and the standard deviation of the predicted mean demand for each fiscal year has been obtained in Step 1. Z values are derived from the probability of demand less than or equal to optimal supply. The data needed to calculate probability of demand less than or equal to optimal supply, cost per room of under-supply and cost per room of oversupply, has been obtained in step 2 and step 3. The probability of demand less than or equal to optimal supply of each fiscal year and its matched Z value is shown in Table 12.

Based on the formula discussed in Chapter 3, the optimal room supply by month for the past 9 fiscal years are calculated. The optimal room supply (total rooms available of each month) divided by the total days of that month is regarded as the optimal monthly room inventory (See Table 13). The predicted optimal room inventories by month for the next two fiscal years are shown in Table 14.

Table 12:

Probability of the Demand Less Than or Equal to the
Optimal Supply and Its Matched Z value

| | FY | CU | CO | Probability ^a | Z value |
|------------|------|--------|--------|--------------------------|---------|
| Historical | 1990 | \$17.8 | \$17.7 | 50.22% | 0.006 |
| data | 1991 | \$12.6 | \$16.3 | 43.53% | -0.163 |
| | 1992 | \$17.0 | \$14.0 | 54.92% | 0.124 |
| | 1993 | \$21.6 | \$14.2 | 60.44% | 0.265 |
| | 1994 | \$18.9 | \$16.8 | 53.07% | 0.077 |
| | 1995 | \$22.7 | \$19.1 | 54.31% | 0.108 |
| | 1996 | \$26.2 | \$20.0 | 56.74% | 0.170 |
| | 1997 | \$22.7 | \$20.7 | 52.29% | 0.058 |
| | 1998 | \$19.6 | \$20.8 | 48.47% | -0.038 |
| Predicted | 1999 | \$20.6 | \$20.8 | 49.81% | -0.005 |
| data | 2000 | \$20.6 | \$20.8 | 49.81% | -0.005 |

Note.

^aProbability refers to the probability of the demand less than or equal to the optimal supply.

Table 13:

The Optimal Room Inventory of the Past Nine Fiscal Years

| Month | Predicted demand | Standard deviation | Z value | Optimal supply | Optimal inventory |
|--------|---------------------|-----------------------|------------|-------------------|----------------------|
| Jul-89 | 1,217,097 | 27,380 | 0.006 | 1,217,251 | 39,266 |
| Aug-89 | 1,270,599 | 27,380 | 0.006 | 1,270,753 | 40,992 |
| Sep-89 | 1,173,519 | 27,380 | 0.006 | 1,173,673 | 39,122 |
| Oct-89 | 1,286,681 | 27,380 | 0.006 | 1,286,835 | 41,511 |
| Nov-89 | 1,169,843 | 27,380 | 0.006 | 1,169,997 | 39,000 |
| Dec-89 | 1,101,834 | 27,380 | 0.006 | 1,101,988 | 35,548 |
| Jan-90 | 1,182,378 | 27,380 | 0.006 | 1,182,532 | 38,146 |
| Feb-90 | 1,189,221 | 27,380 | 0.006 | 1,189,375 | 42,478 |
| Mar-90 | 1,363,005 | 27,380 | 0.006 | 1,363,159 | 43,973 |
| Apr-90 | 1,317,209 | 27,380 | 0.006 | 1,317,363 | 43,912 |
| May-90 | 1,336,536 | 27,380 | 0.006 | 1,336,690 | 43,119 |
| Jun-90 | 1,272,067 | 27,380 | 0.006 | 1,272,221 | 42,407 |
| Jul-90 | 1,319,516 | 26,363 | -0.163 | 1,315,220 | 42,426 |
| Aug-90 | 1,373,018 | 26,363 | -0.163 | 1,368,722 | 44,152 |
| Sep-90 | 1,275,939 | 26,363 | -0.163 | 1,271,643 | 42,388 |
| Oct-90 | 1,389,100 | 26,363 | -0.163 | 1,384,804 | 44,671 |
| Nov-90 | 1,272,262 | 26,363 | -0.163 | 1,267,966 | 42,266 |
| Dec-90 | 1,204,253 | 26,363 | -0.163 | 1,199,957 | 38,708 |

(table continues)

Table 13 (continued)

| Month | Predicted demand | Standard deviation | Z value | Optimal supply | Optimal inventory |
|--------|---------------------|-----------------------|------------|-------------------|----------------------|
| Jan-91 | 1,284,797 | 26,363 | -0.163 | 1,280,501 | 41,306 |
| Feb-91 | 1,291,641 | 26,363 | -0.163 | 1,287,345 | 45,977 |
| Mar-91 | 1,465,424 | 26,363 | -0.163 | 1,461,128 | 47,133 |
| Apr-91 | 1,419,629 | 26,363 | -0.163 | 1,415,333 | 47,178 |
| May-91 | 1,438,955 | 26,363 | -0.163 | 1,434,659 | 46,279 |
| Jun-91 | 1,374,486 | 26,363 | -0.163 | 1,370,190 | 45,673 |
| Jul-91 | 1,421,935 | 25,612 | 0.124 | 1,425,103 | 45,971 |
| Aug-91 | 1,475,437 | 25,612 | 0.124 | 1,478,605 | 47,697 |
| Sep-91 | 1,378,358 | 25,612 | 0.124 | 1,381,526 | 46,051 |
| Oct-91 | 1,491,519 | 25,612 | 0.124 | 1,494,687 | 48,216 |
| Nov-91 | 1,374,681 | 25,612 | 0.124 | 1,377,849 | 45,928 |
| Dec-91 | 1,306,673 | 25,612 | 0.124 | 1,309,841 | 42,253 |
| Jan-92 | 1,387,216 | 25,612 | 0.124 | 1,390,384 | 44,851 |
| Feb-92 | 1,394,060 | 25,612 | 0.124 | 1,397,228 | 49,901 |
| Mar-92 | 1,567,843 | 25,612 | 0.124 | 1,571,011 | 50,678 |
| Apr-92 | 1,522,048 | 25,612 | 0.124 | 1,525,216 | 50,841 |
| May-92 | 1,541,374 | 25,612 | 0.124 | 1,544,542 | 49,824 |
| Jun-92 | 1,476,906 | 25,612 | 0.124 | 1,480,074 | 49,336 |

(table continues)

Table 13 (continued)

| Month | Predicted demand | Standard deviation | Z value | Optimal supply | Optimal inventory |
|--------|---------------------|-----------------------|------------|-------------------|----------------------|
| Jul-92 | 1,524,354 | 25,150 | 0.265 | 1,531,013 | 49,388 |
| Aug-92 | 1,577,856 | 25,150 | 0.265 | 1,584,515 | 51,113 |
| Sep-92 | 1,480,777 | 25,150 | 0.265 | 1,487,436 | 49,581 |
| Oct-92 | 1,593,938 | 25,150 | 0.265 | 1,600,597 | 51,632 |
| Nov-92 | 1,477,100 | 25,150 | 0.265 | 1,483,759 | 49,459 |
| Dec-92 | 1,409,092 | 25,150 | 0.265 | 1,415,751 | 45,669 |
| Jan-93 | 1,489,635 | 25,150 | 0.265 | 1,496,294 | 48,268 |
| Feb-93 | 1,496,479 | 25,150 | 0.265 | 1,503,138 | 53,683 |
| Mar-93 | 1,670,262 | 25,150 | 0.265 | 1,676,921 | 54,094 |
| Apr-93 | 1,624,467 | 25,150 | 0.265 | 1,631,126 | 54,371 |
| May-93 | 1,643,793 | 25,150 | 0.265 | 1,650,452 | 53,240 |
| Jun-93 | 1,579,325 | 25,150 | 0.265 | 1,585,984 | 52,866 |
| Jul-93 | 1,626,773 | 24,995 | 0.077 | 1,628,696 | 52,539 |
| Aug-93 | 1,680,276 | 24,995 | 0.077 | 1,682,199 | 54,264 |
| Sep-93 | 1,583,196 | 24,995 | 0.077 | 1,585,119 | 52,837 |
| Oct-93 | 1,696,357 | 24,995 | 0.077 | 1,698,280 | 54,783 |
| Nov-93 | 1,579,519 | 24,995 | 0.077 | 1,581,442 | 52,715 |
| Dec-93 | 1,511,511 | 24,995 | 0.077 | 1,513,434 | 48,820 |

(table continues)

Table 13 (continued)

| Month | Predicted demand | Standard deviation | Z value | Optimal supply | Optimal inventory |
|--------|---------------------|-----------------------|------------|-------------------|----------------------|
| Jan-94 | 1,592,054 | 24,995 | 0.077 | 1,593,977 | 51,419 |
| Feb-94 | 1,598,898 | 24,995 | 0.077 | 1,600,821 | 57,172 |
| Mar-94 | 1,772,681 | 24,995 | 0.077 | 1,774,604 | 57,245 |
| Apr-94 | 1,726,886 | 24,995 | 0.077 | 1,728,809 | 57,627 |
| May-94 | 1,746,212 | 24,995 | 0.077 | 1,748,135 | 56,391 |
| Jun-94 | 1,681,744 | 24,995 | 0.077 | 1,683,667 | 56,122 |
| Jul-94 | 1,729,192 | 25,150 | 0.108 | 1,731,913 | 55,868 |
| Aug-94 | 1,782,695 | 25,150 | 0.108 | 1,785,416 | 57,594 |
| Sep-94 | 1,685,615 | 25,150 | 0.108 | 1,688,336 | 56,278 |
| Oct-94 | 1,798,776 | 25,150 | 0.108 | 1,801,497 | 58,113 |
| Nov-94 | 1,681,938 | 25,150 | 0.108 | 1,684,659 | 56,155 |
| Dec-94 | 1,613,930 | 25,150 | 0.108 | 1,616,651 | 52,150 |
| Jan-95 | 1,694,473 | 25,150 | 0.108 | 1,697,194 | 54,748 |
| Feb-95 | 1,701,317 | 25,150 | 0.108 | 1,704,038 | 60,859 |
| Mar-95 | 1,875,100 | 25,150 | 0.108 | 1,877,821 | 60,575 |
| Apr-95 | 1,829,305 | 25,150 | 0.108 | 1,832,026 | 61,068 |
| May-95 | 1,848,631 | 25,150 | 0.108 | 1,851,352 | 59,721 |
| Jun-95 | 1,784,163 | 25,150 | 0.108 | 1,786,884 | 59,563 |

(table continues)

Table 13 (continued)

| Month | Predicted demand | Standard deviation | Z value | Optimal supply | Optimal inventory |
|--------|---------------------|-----------------------|------------|-------------------|----------------------|
| Jul-95 | 1,831,611 | 25,612 | 0.170 | 1,835,961 | 59,225 |
| Aug-95 | 1,885,114 | 25,612 | 0.170 | 1,889,464 | 60,950 |
| Sep-95 | 1,788,034 | 25,612 | 0.170 | 1,792,384 | 59,746 |
| Oct-95 | 1,901,195 | 25,612 | 0.170 | 1,905,545 | 61,469 |
| Nov-95 | 1,784,357 | 25,612 | 0.170 | 1,788,707 | 59,624 |
| Dec-95 | 1,716,349 | 25,612 | 0.170 | 1,720,699 | 55,506 |
| Jan-96 | 1,796,892 | 25,612 | 0.170 | 1,801,242 | 58,105 |
| Feb-96 | 1,803,736 | 25,612 | 0.170 | 1,808,086 | 64,575 |
| Mar-96 | 1,977,519 | 25,612 | 0.170 | 1,981,869 | 63,931 |
| Apr-96 | 1,931,724 | 25,612 | 0.170 | 1,936,074 | 64,536 |
| May-96 | 1,951,050 | 25,612 | 0.170 | 1,955,400 | 63,077 |
| Jun-96 | 1,886,582 | 25,612 | 0.170 | 1,890,932 | 63,031 |
| Jul-96 | 1,934,030 | 26,363 | 0.058 | 1,935,546 | 62,437 |
| Aug-96 | 1,987,533 | 26,363 | 0.058 | 1,989,049 | 64,163 |
| Sep-96 | 1,890,453 | 26,363 | 0.058 | 1,891,969 | 63,066 |
| Oct-96 | 2,003,614 | 26,363 | 0.058 | 2,005,130 | 64,682 |
| Nov-96 | 1,886,776 | 26,363 | 0.058 | 1,888,292 | 62,943 |
| Dec-96 | 1,818,768 | 26,363 | 0.058 | 1,820,284 | 58,719 |

(table continues)

Table 13 (continued)

| Month | Predicted demand | Standard deviation | Z value | Optimal supply | Optimal inventory |
|--------|---------------------|-----------------------|------------|-------------------|----------------------|
| Jan-97 | 1,899,312 | 26,363 | 0.058 | 1,900,828 | 61,317 |
| Feb-97 | 1,906,155 | 26,363 | 0.058 | 1,907,671 | 68,131 |
| Mar-97 | 2,079,938 | 26,363 | 0.058 | 2,081,454 | 67,144 |
| Apr-97 | 2,034,143 | 26,363 | 0.058 | 2,035,659 | 67,855 |
| May-97 | 2,053,470 | 26,363 | 0.058 | 2,054,986 | 66,290 |
| Jun-97 | 1,989,001 | 26,363 | 0.058 | 1,990,517 | 66,351 |
| Jul-97 | 2,036,449 | 27,380 | -0.038 | 2,035,401 | 65,658 |
| Aug-97 | 2,089,952 | 27,380 | -0.038 | 2,088,904 | 67,384 |
| Sep-97 | 1,992,872 | 27,380 | -0.038 | 1,991,824 | 66,394 |
| Oct-97 | 2,106,034 | 27,380 | -0.038 | 2,104,986 | 67,903 |
| Nov-97 | 1,989,195 | 27,380 | -0.038 | 1,988,147 | 66,272 |
| Dec-97 | 1,921,187 | 27,380 | -0.038 | 1,920,139 | 61,940 |
| Jan-98 | 2,001,731 | 27,380 | -0.038 | 2,000,683 | 64,538 |
| Feb-98 | 2,008,574 | 27,380 | -0.038 | 2,007,526 | 71,697 |
| Mar-98 | 2,182,357 | 27,380 | -0.038 | 2,181,309 | 70,365 |
| Apr-98 | 2,136,562 | 27,380 | -0.038 | 2,135,514 | 71,184 |
| May-98 | 2,155,889 | 27,380 | -0.038 | 2,154,841 | 69,511 |
| Jun-98 | 2,091,420 | 27,380 | -0.038 | 2,090,372 | 69,679 |

Note. Predicted demand is reflected by rooms occupied per month. Optimal supply is reflected by available rooms per month. Optimal inventory refers to monthly room inventory.

Table 14

Predicted Optimal Room Inventory for the Next TwoFiscal Years

| Month | Predicted demand | Standard deviation | Z value | Optimal supply | Optimal inventory |
|--------|---------------------|-----------------------|------------|-------------------|----------------------|
| Jul-98 | 2,138,868 | 28,635 | -0.005 | 2,138,732 | 68,991 |
| Aug-98 | 2,192,371 | 28,635 | -0.005 | 2,192,235 | 70,717 |
| Sep-98 | 2,095,291 | 28,635 | -0.005 | 2,095,155 | 69,839 |
| Oct-98 | 2,208,453 | 28,635 | -0.005 | 2,208,317 | 71,236 |
| Nov-98 | 2,091,614 | 28,635 | -0.005 | 2,091,478 | 69,716 |
| Dec-98 | 2,023,606 | 28,635 | -0.005 | 2,023,470 | 65,273 |
| Jan-99 | 2,104,150 | 28,635 | -0.005 | 2,104,014 | 67,871 |
| Feb-99 | 2,110,993 | 28,635 | -0.005 | 2,110,857 | 75,388 |
| Mar-99 | 2,284,776 | 28,635 | -0.005 | 2,284,640 | 73,698 |
| Apr-99 | 2,238,981 | 28,635 | -0.005 | 2,238,845 | 74,628 |
| May-99 | 2,258,308 | 28,635 | -0.005 | 2,258,172 | 72,844 |
| Jun-99 | 2,193,839 | 28,635 | -0.005 | 2,193,703 | 73,123 |

(table continues)

Table 14 (continued)

| Month | Predicted demand | Standard deviation | Z value | Optimal supply | Optimal inventory |
|--------|---------------------|-----------------------|------------|-------------------|----------------------|
| Jul-99 | 2,241,288 | 30,098 | -0.005 | 2,241,145 | 72,295 |
| Aug-99 | 2,294,790 | 30,098 | -0.005 | 2,294,647 | 74,021 |
| Sep-99 | 2,197,710 | 30,098 | -0.005 | 2,197,567 | 73,252 |
| Oct-99 | 2,310,872 | 30,098 | -0.005 | 2,310,729 | 74,540 |
| Nov-99 | 2,194,034 | 30,098 | -0.005 | 2,193,891 | 73,130 |
| Dec-99 | 2,126,025 | 30,098 | -0.005 | 2,125,882 | 68,577 |
| Jan-00 | 2,206,569 | 30,098 | -0.005 | 2,206,426 | 71,175 |
| Feb-00 | 2,213,412 | 30,098 | -0.005 | 2,213,269 | 79,045 |
| Mar-00 | 2,387,195 | 30,098 | -0.005 | 2,387,052 | 77,002 |
| Apr-00 | 2,341,400 | 30,098 | -0.005 | 2,341,257 | 78,042 |
| May-00 | 2,360,727 | 30,098 | -0.005 | 2,360,584 | 76,148 |
| Jun-00 | 2,296,258 | 30,098 | -0.005 | 2,296,115 | 76,537 |

Note. Predicted demand is reflected by rooms occupied per month. Optimal supply is reflected by available rooms per month. Optimal inventory refers to monthly room inventory.

Quantity of the OversuppliedRoom Inventory

The quantity of the oversupplied room inventory for the past nine fiscal years is the real room inventory subtracted by the optimal room inventory (see Table 15). The quantity of the oversupplied room inventory for the next two fiscal years is the planned room inventory subtracted by the predicted optimal room inventory (see Table 16).

Table 15

Quantity of Oversupplied Rooms in the Past

| Month | Available rooms by month | Real monthly inventory | Optimal monthly inventory | Over- supplied rooms |
|-------------------|--------------------------------|------------------------------|---------------------------------|----------------------------|
| Jul-89 | 1,298,918 | 41,901 | 39,266 | 2,634 |
| Aug-89 | 1,310,656 | 42,279 | 40,992 | 1,287 |
| Sep-89 | 1,262,948 | 42,098 | 39,122 | 2,976 |
| Oct-89 | 1,302,346 | 42,011 | 41,511 | 500 |
| Nov-89 | 1,305,251 | 43,508 | 39,000 | 4,508 |
| Dec-89 | 1,405,747 | 45,347 | 35,548 | 9,799 |
| Jan-90 | 1,452,953 | 46,869 | 38,146 | 8,723 |
| Feb-90 | 1,368,345 | 48,869 | 42,478 | 6,392 |
| Mar-90 | 1,499,537 | 48,372 | 43,973 | 4,399 |
| Apr-90 | 1,455,923 | 48,531 | 43,912 | 4,619 |
| May-90 | 1,512,478 | 48,790 | 43,119 | 5,671 |
| Jun-90 | 1,496,578 | 49,886 | 42,407 | 7,479 |
| Jul-90 | 1,605,405 | 51,787 | 42,426 | 9,361 |
| Aug-90 | 1,620,299 | 52,268 | 44,152 | 8,115 |
| Sep-90 | 1,561,336 | 52,045 | 42,388 | 9,656 |
| Oct-90 | 1,613,753 | 52,057 | 44,671 | 7,385 |
| Nov-90 | 1,572,282 | 52,409 | 42,266 | 10,144 |
| Dec-90 | 1,599,003 | 51,581 | 38,708 | 12,872 |
| (table continues) | | | | |

Table 15 (table continued)

| Month | Available rooms by month | Real monthly inventory | Optimal monthly inventory | Over- supplied rooms |
|-------------------|--------------------------------|------------------------------|---------------------------------|----------------------------|
| Jan-91 | 1,602,000 | 51,677 | 41,306 | 10,371 |
| Feb-91 | 1,484,355 | 53,013 | 45,977 | 7,036 |
| Mar-91 | 1,648,360 | 53,173 | 47,133 | 6,040 |
| Apr-91 | 1,625,209 | 54,174 | 47,178 | 6,996 |
| May-91 | 1,699,255 | 54,815 | 46,279 | 8,535 |
| Jun-91 | 1,634,752 | 54,492 | 45,673 | 8,819 |
| Jul-91 | 1,663,292 | 53,655 | 45,971 | 7,684 |
| Aug-91 | 1,677,986 | 54,129 | 47,697 | 6,432 |
| Sep-91 | 1,609,836 | 53,661 | 46,051 | 7,610 |
| Oct-91 | 1,669,252 | 53,847 | 48,216 | 5,631 |
| Nov-91 | 1,615,212 | 53,840 | 45,928 | 7,912 |
| Dec-91 | 1,647,706 | 53,152 | 42,253 | 10,899 |
| Jan-92 | 1,665,622 | 53,730 | 44,851 | 8,879 |
| Feb-92 | 1,579,833 | 56,423 | 49,901 | 6,522 |
| Mar-92 | 1,661,373 | 53,593 | 50,678 | 2,915 |
| Apr-92 | 1,606,733 | 53,558 | 50,841 | 2,717 |
| May-92 | 1,669,823 | 53,865 | 49,824 | 4,041 |
| Jun-92 | 1,597,638 | 53,255 | 49,336 | 3,919 |
| (table continues) | | | | |

Table 15 (table continued)

| Month | Available rooms by month | Real monthly inventory | Optimal monthly inventory | Over- supplied rooms |
|-------------------|--------------------------------|------------------------------|---------------------------------|----------------------------|
| Jul-92 | 1,583,938 | 51,095 | 49,388 | 1,707 |
| Aug-92 | 1,599,482 | 51,596 | 51,113 | 483 |
| Sep-92 | 1,545,538 | 51,518 | 49,581 | 1,937 |
| Oct-92 | 1,595,059 | 51,454 | 51,632 | -179 |
| Nov-92 | 1,558,245 | 51,942 | 49,459 | 2,483 |
| Dec-92 | 1,571,010 | 50,678 | 45,669 | 5,008 |
| Jan-93 | 1,585,820 | 51,155 | 48,268 | 2,888 |
| Feb-93 | 1,465,651 | 52,345 | 53,683 | -1,339 |
| Mar-93 | 1,603,778 | 51,735 | 54,094 | -2,359 |
| Apr-93 | 1,557,505 | 51,917 | 54,371 | -2,454 |
| May-93 | 1,612,329 | 52,011 | 53,240 | -1,230 |
| Jun-93 | 1,542,004 | 51,400 | 52,866 | -1,466 |
| Jul-93 | 1,566,728 | 50,540 | 52,539 | -1,999 |
| Aug-93 | 1,574,296 | 50,784 | 54,264 | -3,481 |
| Sep-93 | 1,522,422 | 50,747 | 52,837 | -2,090 |
| Oct-93 | 1,635,380 | 52,754 | 54,783 | -2,029 |
| Nov-93 | 1,722,361 | 57,412 | 52,715 | 4,697 |
| Dec-93 | 1,816,368 | 58,593 | 48,820 | 9,772 |
| (table continues) | | | | |

Table 15 (table continued)

| Month | Available rooms by month | Real monthly inventory | Optimal monthly inventory | Over- supplied rooms |
|-------------------|--------------------------------|------------------------------|---------------------------------|----------------------------|
| Jan-94 | 1,896,744 | 61,185 | 51,419 | 9,767 |
| Feb-94 | 1,748,679 | 62,453 | 57,172 | 5,281 |
| Mar-94 | 1,925,342 | 62,108 | 57,245 | 4,863 |
| Apr-94 | 1,863,802 | 62,127 | 57,627 | 4,500 |
| May-94 | 1,937,546 | 62,501 | 56,391 | 6,110 |
| Jun-94 | 1,876,971 | 62,566 | 56,122 | 6,443 |
| Jul-94 | 1,939,722 | 62,572 | 55,868 | 6,704 |
| Aug-94 | 1,954,138 | 63,037 | 57,594 | 5,443 |
| Sep-94 | 1,898,507 | 63,284 | 56,278 | 7,006 |
| Oct-94 | 1,957,374 | 63,141 | 58,113 | 5,028 |
| Nov-94 | 1,909,696 | 63,657 | 56,155 | 7,501 |
| Dec-94 | 1,948,010 | 62,839 | 52,150 | 10,689 |
| Jan-95 | 1,967,754 | 63,476 | 54,748 | 8,728 |
| Feb-95 | 1,815,482 | 64,839 | 60,859 | 3,980 |
| Mar-95 | 1,995,181 | 64,361 | 60,575 | 3,786 |
| Apr-95 | 1,933,156 | 64,439 | 61,068 | 3,371 |
| May-95 | 2,001,254 | 64,557 | 59,721 | 4,836 |
| Jun-95 | 1,923,208 | 64,107 | 59,563 | 4,544 |
| (table continues) | | | | |

Table 15 (table continued)

| Month | Available rooms by month | Real monthly inventory | Optimal monthly inventory | Over- supplied rooms |
|-------------------|--------------------------------|------------------------------|---------------------------------|----------------------------|
| Jul-95 | 1,883,475 | 60,757 | 59,225 | 1,533 |
| Aug-95 | 1,919,052 | 61,905 | 60,950 | 954 |
| Sep-95 | 1,888,830 | 62,961 | 59,746 | 3,215 |
| Oct-95 | 1,999,900 | 64,513 | 61,469 | 3,044 |
| Nov-95 | 1,956,085 | 65,203 | 59,624 | 5,579 |
| Dec-95 | 1,986,564 | 64,083 | 55,506 | 8,576 |
| Jan-96 | 2,001,687 | 64,571 | 58,105 | 6,466 |
| Feb-96 | 1,901,168 | 67,899 | 64,575 | 3,324 |
| Mar-96 | 2,016,263 | 65,041 | 63,931 | 1,109 |
| Apr-96 | 1,953,459 | 65,115 | 64,536 | 579 |
| May-96 | 2,070,473 | 66,789 | 63,077 | 3,712 |
| Jun-96 | 2,007,557 | 66,919 | 63,031 | 3,887 |
| Jul-96 | 2,088,300 | 67,365 | 62,437 | 4,928 |
| Aug-96 | 2,101,936 | 67,804 | 64,163 | 3,642 |
| Sep-96 | 2,025,234 | 67,508 | 63,066 | 4,442 |
| Oct-96 | 2,091,425 | 67,465 | 64,682 | 2,784 |
| Nov-96 | 2,052,023 | 68,401 | 62,943 | 5,458 |
| Dec-96 | 2,089,837 | 67,414 | 58,719 | 8,695 |
| (table continues) | | | | |

Table 15 (table continued)

| Month | Available rooms by month | Real monthly inventory | Optimal monthly inventory | Over- supplied rooms |
|-------------------|--------------------------------|------------------------------|---------------------------------|----------------------------|
| Jan-97 | 2,223,835 | 71,737 | 61,317 | 10,420 |
| Feb-97 | 2,031,543 | 72,555 | 68,131 | 4,424 |
| Mar-97 | 2,238,700 | 72,216 | 67,144 | 5,072 |
| Apr-97 | 2,174,986 | 72,500 | 67,855 | 4,644 |
| May-97 | 2,271,638 | 73,279 | 66,290 | 6,989 |
| Jun-97 | 2,195,846 | 73,195 | 66,351 | 6,844 |
| Jul-97 | 2,248,480 | 72,532 | 65,658 | 6,874 |
| Aug-97 | 2,268,645 | 73,182 | 67,384 | 5,798 |
| Sep-97 | 2,188,707 | 72,957 | 66,394 | 6,563 |
| Oct-97 | 2,273,590 | 73,342 | 67,903 | 5,439 |
| Nov-97 | 2,233,833 | 74,461 | 66,272 | 8,190 |
| Dec-97 | 2,264,216 | 73,039 | 61,940 | 11,099 |
| Jan-98 | 2,281,370 | 73,593 | 64,538 | 9,054 |
| Feb-98 | 2,116,440 | 75,587 | 71,697 | 3,890 |
| Mar-98 | 2,322,418 | 74,917 | 70,365 | 4,552 |
| Apr-98 | 2,247,919 | 74,931 | 71,184 | 3,747 |
| May-98 | 2,331,871 | 75,222 | 69,511 | 5,711 |
| Jun-98 | 2,233,179 | 74,439 | 69,679 | 4,760 |
| (table continues) | | | | |

Table 16

Gap between the Optimal Room Inventory and the
Planned Room Inventory

| Month | Planned new rooms | Planned monthly inventory | Optimal monthly inventory | Over- supplied rooms |
|--------|-------------------------|---------------------------------|---------------------------------|----------------------------|
| Jul-98 | 0 | 74,439 | 68,991 | 5,448 |
| Aug-98 | 0 | 74,439 | 70,717 | 3,722 |
| Sep-98 | 7 | 74,446 | 69,839 | 4,608 |
| Oct-98 | 3,005 | 77,451 | 71,236 | 6,215 |
| Nov-98 | 0 | 77,451 | 69,716 | 7,735 |
| Dec-98 | 0 | 77,451 | 65,273 | 12,178 |
| Jan-99 | 0 | 77,451 | 67,871 | 9,580 |
| Feb-99 | 0 | 77,451 | 75,388 | 2,064 |
| Mar-99 | 3,709 | 81,160 | 73,698 | 7,462 |
| Apr-99 | 3,066 | 84,226 | 74,628 | 9,598 |
| May-99 | 340 | 84,566 | 72,844 | 11,722 |
| Jun-99 | 0 | 84,566 | 73,123 | 11,443 |

(table continues)

Table 16 (continued)

| Month | Planned new rooms | Planned monthly inventory | Optimal monthly inventory | Over- supplied rooms |
|--------|-------------------------|---------------------------------|---------------------------------|----------------------------|
| Jul-99 | 0 | 84,566 | 72,295 | 12,271 |
| Aug-99 | 0 | 84,566 | 74,021 | 10,545 |
| Sep-99 | 2,914 | 87,480 | 73,252 | 14,228 |
| Oct-99 | 0 | 87,480 | 74,540 | 12,941 |
| Nov-99 | 0 | 87,480 | 73,130 | 14,351 |
| Dec-99 | 0 | 87,480 | 68,577 | 18,903 |
| Jan-00 | 0 | 87,480 | 71,175 | 16,305 |
| Feb-00 | 0 | 87,480 | 79,045 | 8,435 |
| Mar-00 | 0 | 87,480 | 77,002 | 10,479 |
| Apr-00 | 2,600 | 90,080 | 78,042 | 12,038 |
| May-00 | 0 | 90,080 | 76,148 | 13,932 |
| Jun-00 | 0 | 90,080 | 76,537 | 13,543 |

CHAPTER 5

CONCLUSION AND RECOMMENDATION

Summary of Findings

New Hotel Rooms Are More Upgraded

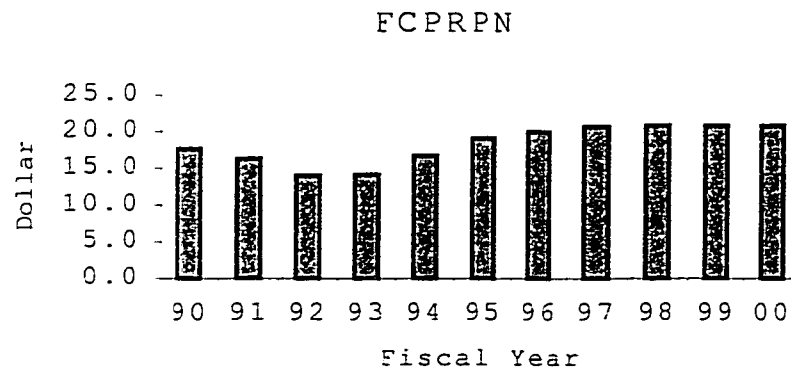


Figure 1: The fixed cost per room per night (FCPRPN)

The fixed cost per room per night (FCPRPN) in FY 1992 is \$14 (1982-1984 constant dollar). However, the FCPRPN in FY 1998 is \$20.8 (1982-1984 constant dollar), or a 49% increase. FCPRPN has a trend of increasing (see Figure 1).

It is a reflection of the fact that the hotel rooms of the new Las Vegas casino hotels are more upgraded than the older ones.

ADR and TCPRPN Increase at the Same Pace

As Table 7 shows, the ADR in FY 1992 is \$37.1 (1982-1984 constant dollar) while the ADR in FY 1998 is \$45.1 (1982-1984 constant dollar). The ADR had increased by 22% from FY 1992 to FY 1998. The total cost per room per night (TCPRPN), which is the sum of fixed cost per room per night (FCPRPN) and variable cost per room per night (VCPRPN), had increased by 21% for the same period. As Figure 2 shows, the ADR almost keeps the same increase pace with the TCPRPN.

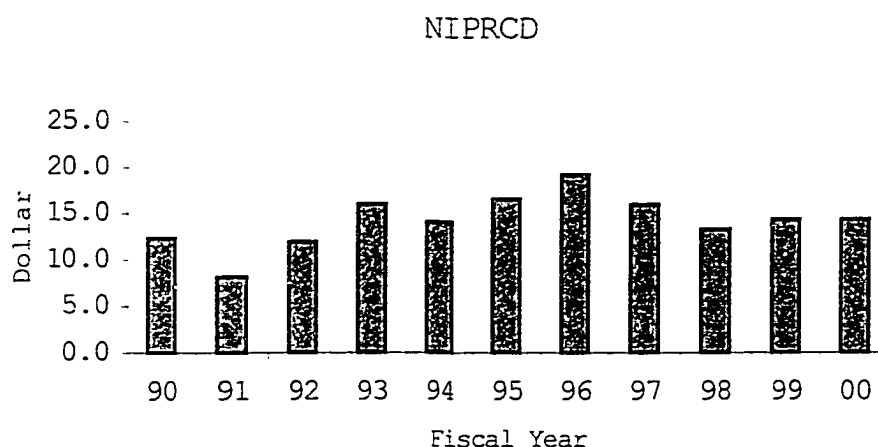


Figure 2: The average daily rate (ADR) and the total cost per room per night (TCPRPN)

NIPRCD Does Not Have a Trend of Increasing

As Figure 3 shows, the net income per room from casino department (NIPRCD) in the past nine fiscal years had not increased remarkably. On the contrary, the NIPRCD had declined since 1996. This is a reflection of the changes in visitor composition during these years. Las Vegas gets more sight-seeing oriented visitors while the percentage of gambling oriented visitors is declining in recent years.

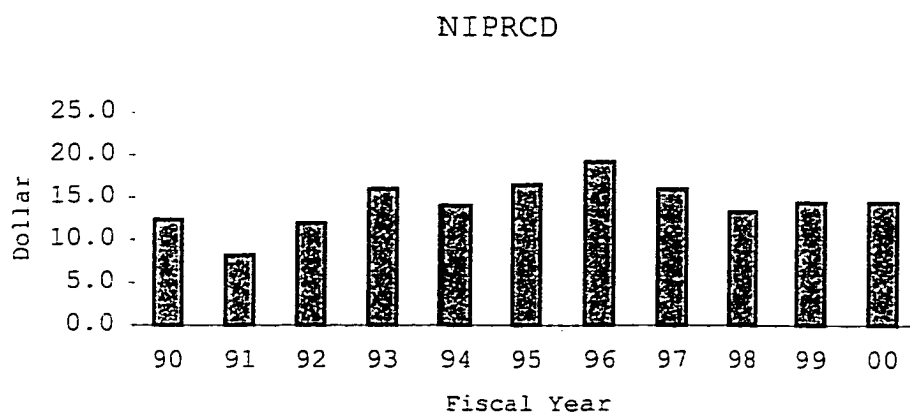


Figure 3: The net income per occupied room from casino department (NIPRCD)

The Demand Could Be Influenced by Some Incidents

The demand of the subject market could be influenced by some incidents. As Figure 4 shows, the demand, reflected by the rooms occupied, had a trend of increasing from FY

1990 to FY 1991. But the increase of demand halted in FY 1992. It could be partly attributed to the Gulf War, which occurred in FY 1992. On the other hand, it seems that the Asian Financial Crisis, which started in July 1997, slightly hurt the lodging demand though it could seriously hurt the gaming demand.

The room inventory model developed in this study does not consider the impact of incidents such as the war, the economic crisis. Therefore, the unexpected incidents in the future may influence the accuracy of the model.

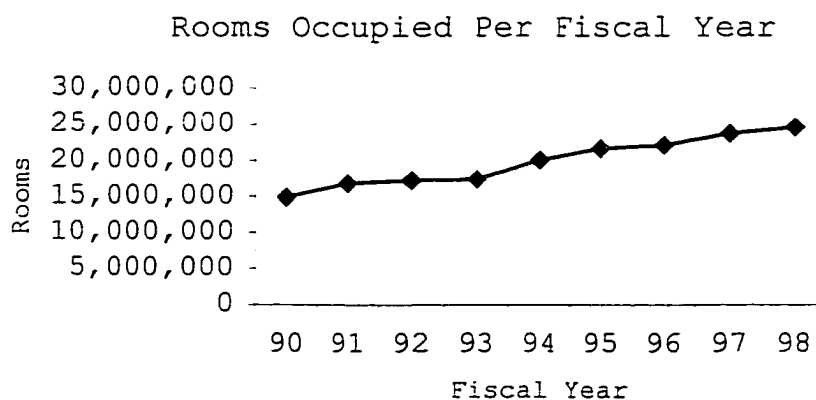


Figure 4: Rooms occupied per fiscal year

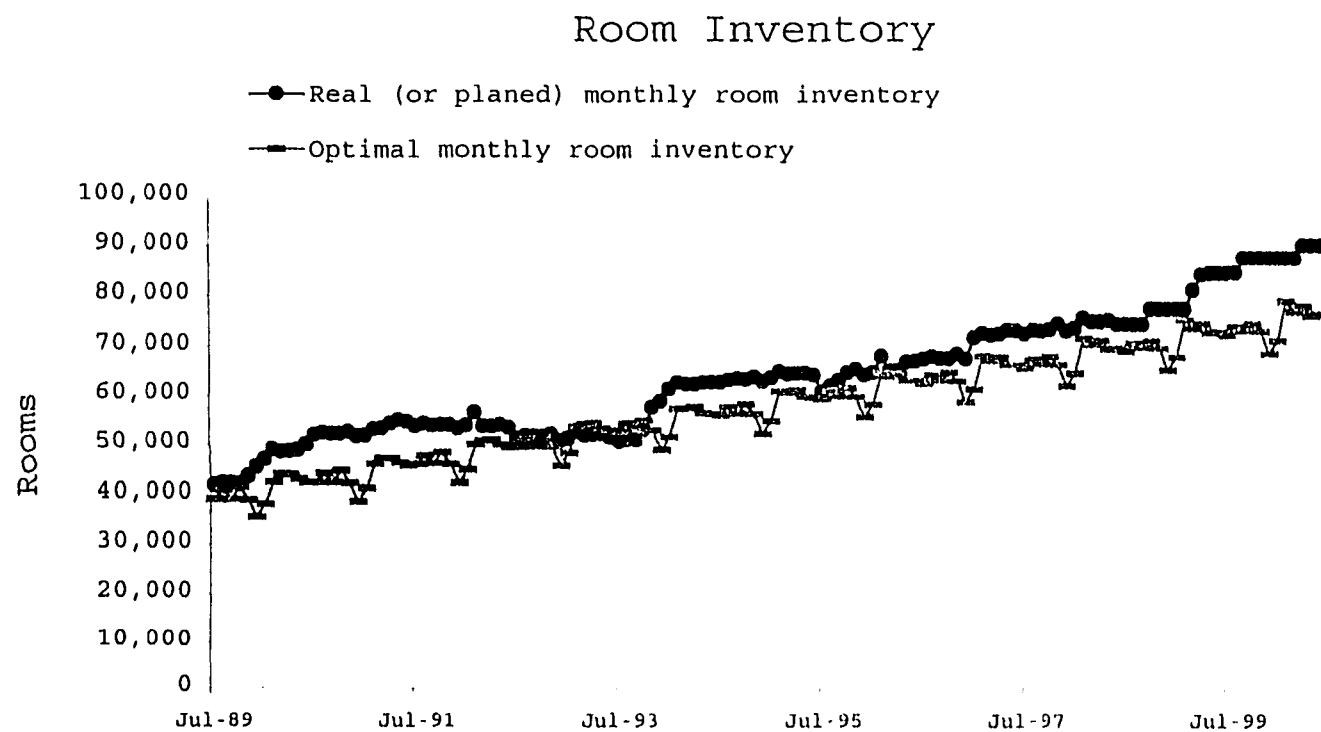


Figure 5: The real (or planed) room inventory and optimal room inventory of Las Vegas casino hotels

Both the Optimal Room Inventory and the Real Room Inventory Have a Trend of Increasing

As Figure 5 shows, both the real room inventory (the dark line in the chart) and the optimal room inventory (the light line in the chart) of the subject market have increased in the past nine fiscal years and they should keep increasing in the next two fiscal years.

The Optimal Room Inventory Is Seasonal

The optimal room inventory for the subject market is seasonal (see Figure 5) because the lodging demand is seasonal. However, the real room inventory does not have a seasonal characteristic. The supply of rooms is lack of elasticity because it is restricted by the construction cycle. Unlike the supply of newspaper, which can be adjusted daily, it takes a long time to adjust the supply of rooms.

There Were Under-Supplies in FY 1993 and FY 1994

In general, the real room inventory is above the optimal room inventory because the optimal room inventory is seasonal but the supply of rooms is lack of elasticity. At the beginning of the 90s', the real room inventory was more than the optimal room inventory. However, in certain months of FY 1993 and FY 1994, the real room inventory was below the optimal room inventory (see Figure 5). The

booming of U.S. economy and world economy in the first half of the 90s', the attitude change of Americans toward gambling, and the gravity effects of Las Vegas mega-resorts support the increase of lodging demand for the subject market. Supply depends on demand. As the demand increases, the supply will increase, too. However, the supply of lodging facilities are restrained by its long construction cycle. The lodging supply usually has a lagged response toward a change in demand. That is why in certain months in FY 1993 and FY 1994 there was an under-supply of rooms.

Oversupply Exists and Will Continue

Recognizing that there is a supply shortage, many investors were attracted by the potentially above-the-average profits and invested in Las Vegas casino hotel industry. From FY 1994 to FY 1998, the real room inventory was again above the optimal room inventory but the gap is not very large.

The increasing competition from other gaming jurisdictions, the limitation of accessibility to Las Vegas, and the Asian Financial Crisis definitely have negative impact on the lodging demand for the subject market. In addition, the majority of the newly-added rooms are mid-class or high-class casino hotels. The total cost per room per night (TCPRPN) of these new hotel rooms are

higher than the older ones. The room rates are restricted by the costs. The ADR increases as the TCPRPN increases in recent years and it seems that the ADR will not decline in the following years (see Figure 2). Vacation tourists are very price-sensitive. According to the law of demand, there is an inverse relationship between the demand and the price. The average room rate of Las Vegas casino hotels has already been lower than the other cities in U.S. The casino hotels of the subject market really have very limited freedom to stimulate the demand by reducing the room rates. On the other hand, because of its long construction cycle, the supply of lodging facilities cannot stop immediately as the growth rate of demand slows down. In the next two fiscal years, more than 20,000 rooms will be added to the room inventory of Las Vegas Valley. Therefore, the gap between the real room inventory and the optimal room inventory could be enlarged in the next two fiscal years.

The Profit from the Other Department (Shopping, Entertainment) Becomes More and More Important

In limited service lodging industry, the room rate should be higher than the variable cost per room per night (VCPRPN) in the short run and should be higher than the TCPRPN in the long run. In full service lodging industry, the room rate could be lower than the VCPRPN in the short

run and could be lower than the TCPRPN in the long run because the rooms department can be compensated by the income from the other departments such as F/B department, casino department, etc. As the NIPRCD has a trend of declining, the rooms department of the subject market can not get much compensation from the casino department. On the other hand, some researches shows that the visitors of Las Vegas tend to spend more money on shopping and entertainment. Therefore, in order to get advantageous positions in the competition, the casino hotels of the subject market should make more efforts to increase the profit from the other departments such as shopping, entertainment etc.

Conclusions

The optimal room inventory of the subject market already exceeds the real room inventory. It is predicted that the optimal room inventory of the subject market will continue to exceed the real room inventory in the next two fiscal years. In other word, the room oversupply does exist and will continue in the next two fiscal years.

Those casino hotels with good capital structures will be in advantageous positions in the competition. As the competition intensifies, it is likely that some casino

hotels of the subject market will be out of business. In order to survive, the casino hotels have to fortify their marketing efforts.

The research shows that the optimal room inventory is seasonal while the real room inventory is not seasonal. More effort should be made in yield management to avoid the impact of seasonality on the profit. The timing of the opening and the timing of the room renovation should be consistent with the seasonal characteristic of the optimal room inventory.

Directions for Future Research

The methodology developed in this research is for determining the optimal room inventory of casino hotels. But it can also be applied to the non-gaming lodging industry. The difference is that the cost of under-supply for non-gaming lodging industry does not include the net income from casino department while the cost of under-supply for casino hotels includes the net income from casino department.

Some researches show that the expenditures in entertainment and shopping of Las Vegas visitors have a trend of increasing. The income generated from these departments becomes increasingly important for some mega-

resorts casino hotels. However, unlike the casino operation, which requires a license, the entertainment operation and the shopping operation are directly facing the competition of the non-gaming businesses. In addition, it is difficult to divide the income of these departments into residential portion and visitors' portion. But the net income of entertainment and shopping still could be considered as part of cost of under-supply in the future research.

All the casino hotels with annual gaming revenue of 1 million and over in Las Vegas are analyzed as a whole in this research. However, the ability of competition of different casino hotels are different. The different class casino hotels have different segments of customers. The future research may analyze the different market segments individually and tries to find which market segments will be hurt most seriously as the competition becomes increasingly intensified.

APPENDIX

EXHIBITS

EXHIBIT 1

Rooms Occupied of Casino Hotels on Las Vegas Strip, in
Downtown Las Vegas, and on Boulder Strip

| Month/year | Las Vegas Strip | Downtown Las Vegas | Boulder Strip | Total | FY total |
|------------|--------------------|-----------------------|------------------|-----------|------------|
| Jul-89 | 923,824 | 241,671 | 18,233 | 1,183,728 | |
| Aug-89 | 932,497 | 243,676 | 17,415 | 1,193,588 | |
| Sep-89 | 883,525 | 236,000 | 15,495 | 1,135,020 | |
| Oct-89 | 936,872 | 248,812 | 16,872 | 1,202,556 | |
| Nov-89 | 912,910 | 232,914 | 15,679 | 1,161,503 | |
| Dec-89 | 898,261 | 218,314 | 13,701 | 1,130,276 | |
| Jan-90 | 974,062 | 234,806 | 15,242 | 1,224,110 | |
| Feb-90 | 995,100 | 227,148 | 15,887 | 1,238,135 | |
| Mar-90 | 1,112,809 | 251,897 | 17,833 | 1,382,539 | |
| Apr-90 | 1,062,895 | 233,892 | 15,894 | 1,312,681 | |
| May-90 | 1,069,368 | 234,673 | 14,556 | 1,318,597 | |
| Jun-90 | 1,113,488 | 235,467 | 15,899 | 1,364,854 | 14,847,587 |
| Jul-90 | 1,159,612 | 246,167 | 16,170 | 1,421,949 | |
| Aug-90 | 1,176,835 | 247,038 | 14,825 | 1,438,698 | |
| Sep-90 | 1,130,822 | 246,546 | 14,807 | 1,392,175 | |
| Oct-90 | 1,244,954 | 264,888 | 16,753 | 1,526,595 | |
| Nov-90 | 1,107,356 | 244,216 | 14,618 | 1,366,190 | |
| Dec-90 | 1,061,907 | 232,520 | 12,245 | 1,306,672 | |
| Jan-91 | 998,227 | 237,365 | 12,843 | 1,248,435 | |
| Feb-91 | 1,062,597 | 231,668 | 14,426 | 1,308,691 | |
| Mar-91 | 1,186,334 | 261,345 | 16,394 | 1,464,073 | |
| Apr-91 | 1,207,304 | 253,958 | 15,823 | 1,477,085 | |
| May-91 | 1,188,009 | 248,868 | 14,816 | 1,451,693 | |
| Jun-91 | 1,132,775 | 250,323 | 14,163 | 1,397,261 | 16,799,517 |

(exhibit continues)

Exhibit 1 (continued)

| Month/year | Las Vegas | Downtown | Boulder | Total | FY total |
|------------|-----------|-----------|---------|-----------|------------|
| | Strip | Las Vegas | Strip | | |
| Jul-91 | 1,210,647 | 228,951 | 15,351 | 1,454,949 | |
| Aug-91 | 1,279,018 | 230,609 | 15,847 | 1,525,474 | |
| Sep-91 | 1,184,077 | 216,917 | 15,323 | 1,416,317 | |
| Oct-91 | 1,282,731 | 234,990 | 17,132 | 1,534,853 | |
| Nov-91 | 1,101,156 | 210,519 | 12,869 | 1,324,544 | |
| Dec-91 | 1,088,475 | 204,281 | 12,335 | 1,305,091 | |
| Jan-92 | 1,103,069 | 224,593 | 12,820 | 1,340,482 | |
| Feb-92 | 1,185,220 | 216,770 | 15,070 | 1,417,060 | |
| Mar-92 | 1,207,191 | 225,053 | 15,079 | 1,447,323 | |
| Apr-92 | 1,219,383 | 222,670 | 16,075 | 1,458,128 | |
| May-92 | 1,262,802 | 230,615 | 16,945 | 1,510,362 | |
| Jun-92 | 1,192,187 | 224,722 | 17,576 | 1,434,485 | 17,169,068 |
| Jul-92 | 1,226,758 | 234,546 | 18,478 | 1,479,782 | |
| Aug-92 | 1,278,862 | 238,805 | 19,082 | 1,536,749 | |
| Sep-92 | 1,198,946 | 226,370 | 17,479 | 1,442,795 | |
| Oct-92 | 1,239,653 | 236,854 | 18,149 | 1,494,656 | |
| Nov-92 | 1,169,661 | 221,174 | 16,362 | 1,407,197 | |
| Dec-92 | 1,074,936 | 205,910 | 14,431 | 1,295,277 | |
| Jan-93 | 1,092,795 | 226,810 | 15,279 | 1,334,884 | |
| Feb-93 | 1,146,165 | 221,413 | 17,030 | 1,384,608 | |
| Mar-93 | 1,251,413 | 241,265 | 19,367 | 1,512,045 | |
| Apr-93 | 1,235,017 | 235,989 | 18,608 | 1,489,614 | |
| May-93 | 1,249,566 | 235,433 | 18,400 | 1,503,399 | |
| Jun-93 | 1,198,152 | 229,081 | 17,833 | 1,445,066 | 17,326,072 |

(exhibit continues)

Exhibit 1 (continued)

| Month/year | Las Vegas Strip | Downtown Las Vegas | Boulder Strip | Total | FY total |
|---------------------|--------------------|-----------------------|------------------|-----------|------------|
| Jul-93 | 1,253,488 | 237,000 | 18,271 | 1,508,759 | |
| Aug-93 | 1,289,863 | 241,686 | 13,980 | 1,545,529 | |
| Sep-93 | 1,210,038 | 228,232 | 12,798 | 1,451,068 | |
| Oct-93 | 1,340,205 | 242,178 | 13,868 | 1,596,251 | |
| Nov-93 | 1,365,246 | 223,766 | 12,846 | 1,601,858 | |
| Dec-93 | 1,348,275 | 215,622 | 12,231 | 1,576,128 | |
| Jan-94 | 1,455,591 | 233,662 | 13,284 | 1,702,537 | |
| Feb-94 | 1,450,598 | 216,334 | 12,700 | 1,679,632 | |
| Mar-94 | 1,635,891 | 240,932 | 14,445 | 1,891,268 | |
| Apr-94 | 1,577,069 | 235,878 | 12,690 | 1,825,637 | |
| May-94 | 1,603,805 | 238,627 | 13,934 | 1,856,366 | |
| Jun-94 | 1,537,222 | 229,433 | 22,436 | 1,789,091 | 20,024,124 |
| Jul-94 | 1,605,471 | 237,027 | 30,046 | 1,872,544 | |
| Aug-94 | 1,612,163 | 238,519 | 32,045 | 1,882,727 | |
| Sep-94 | 1,525,498 | 227,132 | 36,468 | 1,789,098 | |
| Oct-94 | 1,613,407 | 238,342 | 40,643 | 1,892,392 | |
| Nov-94 | 1,477,852 | 218,493 | 37,539 | 1,733,884 | |
| Dec-94 | 1,390,296 | 216,177 | 37,257 | 1,643,730 | |
| Jan-95 | 1,433,903 | 230,868 | 40,346 | 1,705,117 | |
| Feb-95 | 1,433,617 | 212,410 | 39,852 | 1,685,879 | |
| Mar-95 | 1,642,891 | 242,775 | 46,988 | 1,932,654 | |
| Apr-95 | 1,583,186 | 230,185 | 44,719 | 1,858,090 | |
| May-95 | 1,563,406 | 229,470 | 41,524 | 1,834,400 | |
| Jun-95 | 1,542,483 | 225,546 | 42,689 | 1,810,718 | 21,641,233 |
| (exhibit continues) | | | | | |

Exhibit 1 (continued)

| Month/year | Las Vegas | Downtown | Boulder | Total | FY total |
|------------|-----------|-----------|---------|-----------|------------|
| | Strip | Las Vegas | Strip | | |
| Jul-95 | 1,473,290 | 225,275 | 43,328 | 1,741,893 | |
| Aug-95 | 1,532,585 | 234,613 | 43,548 | 1,810,746 | |
| Sep-95 | 1,493,843 | 226,466 | 40,393 | 1,760,702 | |
| Oct-95 | 1,613,226 | 234,660 | 45,568 | 1,893,454 | |
| Nov-95 | 1,484,791 | 215,753 | 39,838 | 1,740,382 | |
| Dec-95 | 1,452,082 | 218,198 | 39,023 | 1,709,303 | |
| Jan-96 | 1,556,623 | 231,657 | 41,230 | 1,829,510 | |
| Feb-96 | 1,543,782 | 234,186 | 43,129 | 1,821,097 | |
| Mar-96 | 1,685,428 | 248,586 | 47,882 | 1,981,896 | |
| Apr-96 | 1,632,046 | 241,613 | 45,236 | 1,918,895 | |
| May-96 | 1,651,431 | 278,209 | 43,609 | 1,973,249 | |
| Jun-96 | 1,598,965 | 262,533 | 43,658 | 1,905,156 | 22,086,283 |
| Jul-96 | 1,654,224 | 260,233 | 43,990 | 1,958,447 | |
| Aug-96 | 1,709,407 | 277,002 | 45,312 | 2,031,721 | |
| Sep-96 | 1,592,078 | 267,331 | 42,786 | 1,902,195 | |
| Oct-96 | 1,679,521 | 286,786 | 45,477 | 2,011,784 | |
| Nov-96 | 1,562,939 | 262,696 | 40,662 | 1,866,297 | |
| Dec-96 | 1,474,270 | 257,353 | 37,936 | 1,769,559 | |
| Jan-97 | 1,661,956 | 275,459 | 39,400 | 1,976,815 | |
| Feb-97 | 1,614,147 | 260,202 | 39,990 | 1,914,339 | |
| Mar-97 | 1,808,913 | 296,426 | 45,615 | 2,150,954 | |
| Apr-97 | 1,742,419 | 286,584 | 43,616 | 2,072,619 | |
| May-97 | 1,757,867 | 289,886 | 43,244 | 2,090,997 | |
| Jun-97 | 1,634,720 | 271,115 | 51,688 | 1,957,523 | 23,703,250 |

(exhibit continues)

Exhibit 1 (continued)

| Month/year | Las Vegas | Downtown | Boulder | Total | FY total |
|------------|-----------|-----------|---------|-----------|------------|
| | Strip | Las Vegas | Strip | | |
| Jul-97 | 1,689,461 | 272,837 | 56,609 | 2,018,907 | |
| Aug-97 | 1,808,941 | 290,162 | 58,145 | 2,157,248 | |
| Sep-97 | 1,640,135 | 269,641 | 49,616 | 1,959,392 | |
| Oct-97 | 1,780,660 | 280,954 | 53,060 | 2,114,674 | |
| Nov-97 | 1,694,562 | 267,695 | 51,560 | 2,013,817 | |
| Dec-97 | 1,559,612 | 259,091 | 48,857 | 1,867,560 | |
| Jan-98 | 1,641,250 | 274,612 | 50,737 | 1,966,599 | |
| Feb-98 | 1,619,606 | 268,692 | 52,341 | 1,940,639 | |
| Mar-98 | 1,828,225 | 302,014 | 61,138 | 2,191,377 | |
| Apr-98 | 1,781,908 | 285,748 | 61,567 | 2,129,223 | |
| May-98 | 1,824,201 | 293,268 | 59,379 | 2,176,848 | |
| Jun-98 | 1,703,126 | 273,817 | 54,596 | 2,031,539 | 24,567,823 |

EXHIBIT 2

Available Rooms of Casino Hotels on Las Vegas Strip,
in Downtown Las Vegas, and on Boulder Strip

| Month/year | Las Vegas Strip | Downtown Las Vegas | Boulder Strip | Total | FY total |
|------------|--------------------|-----------------------|------------------|-----------|------------|
| Jul-89 | 1,015,087 | 262,865 | 20,966 | 1,298,918 | |
| Aug-89 | 1,026,624 | 262,927 | 21,105 | 1,310,656 | |
| Sep-89 | 986,424 | 255,976 | 20,548 | 1,262,948 | |
| Oct-89 | 1,017,527 | 264,112 | 20,707 | 1,302,346 | |
| Nov-89 | 1,029,331 | 255,716 | 20,204 | 1,305,251 | |
| Dec-89 | 1,120,900 | 264,169 | 20,678 | 1,405,747 | |
| Jan-90 | 1,167,785 | 264,391 | 20,777 | 1,452,953 | |
| Feb-90 | 1,111,359 | 238,305 | 18,681 | 1,368,345 | |
| Mar-90 | 1,214,839 | 263,989 | 20,709 | 1,499,537 | |
| Apr-90 | 1,180,479 | 255,513 | 19,931 | 1,455,923 | |
| May-90 | 1,227,832 | 264,448 | 20,198 | 1,512,478 | |
| Jun-90 | 1,225,584 | 251,187 | 19,807 | 1,496,578 | 16,671,680 |
| Jul-90 | 1,311,470 | 273,239 | 20,696 | 1,605,405 | |
| Aug-90 | 1,327,161 | 272,637 | 20,501 | 1,620,299 | |
| Sep-90 | 1,271,734 | 269,286 | 20,316 | 1,561,336 | |
| Oct-90 | 1,313,658 | 279,145 | 20,950 | 1,613,753 | |
| Nov-90 | 1,284,186 | 267,693 | 20,403 | 1,572,282 | |
| Dec-90 | 1,302,464 | 275,452 | 21,087 | 1,599,003 | |
| Jan-91 | 1,304,374 | 276,736 | 20,890 | 1,602,000 | |
| Feb-91 | 1,211,600 | 253,946 | 18,809 | 1,484,355 | |
| Mar-91 | 1,338,662 | 288,760 | 20,938 | 1,648,360 | |
| Apr-91 | 1,328,246 | 276,582 | 20,381 | 1,625,209 | |
| May-91 | 1,394,370 | 283,883 | 21,002 | 1,699,255 | |
| Jun-91 | 1,339,282 | 275,914 | 19,556 | 1,634,752 | 19,266,009 |

(exhibit continues)

Exhibit 2 (continued)

| Month/year | Las Vegas Strip | Downtown Las Vegas | Boulder Strip | Total | FY total |
|------------|--------------------|-----------------------|------------------|-----------|------------|
| Jul-91 | 1,386,229 | 256,275 | 20,788 | 1,663,292 | |
| Aug-91 | 1,404,171 | 253,035 | 20,780 | 1,677,986 | |
| Sep-91 | 1,350,294 | 239,324 | 20,218 | 1,609,836 | |
| Oct-91 | 1,399,577 | 248,830 | 20,845 | 1,669,252 | |
| Nov-91 | 1,358,334 | 236,740 | 20,138 | 1,615,212 | |
| Dec-91 | 1,382,496 | 244,277 | 20,933 | 1,647,706 | |
| Jan-92 | 1,395,480 | 249,237 | 20,905 | 1,665,622 | |
| Feb-92 | 1,325,313 | 234,984 | 19,536 | 1,579,833 | |
| Mar-92 | 1,391,717 | 248,861 | 20,795 | 1,661,373 | |
| Apr-92 | 1,340,333 | 246,326 | 20,074 | 1,606,733 | |
| May-92 | 1,391,384 | 257,696 | 20,743 | 1,669,823 | |
| Jun-92 | 1,329,520 | 248,091 | 20,027 | 1,597,638 | 19,664,306 |
| Jul-92 | 1,311,285 | 252,170 | 20,483 | 1,583,938 | |
| Aug-92 | 1,326,924 | 251,968 | 20,590 | 1,599,482 | |
| Sep-92 | 1,280,479 | 244,964 | 20,095 | 1,545,538 | |
| Oct-92 | 1,321,936 | 252,286 | 20,837 | 1,595,059 | |
| Nov-92 | 1,293,134 | 244,847 | 20,264 | 1,558,245 | |
| Dec-92 | 1,301,264 | 248,854 | 20,892 | 1,571,010 | |
| Jan-93 | 1,313,410 | 251,727 | 20,683 | 1,585,820 | |
| Feb-93 | 1,212,458 | 234,405 | 18,788 | 1,465,651 | |
| Mar-93 | 1,326,345 | 256,587 | 20,846 | 1,603,778 | |
| Apr-93 | 1,288,766 | 248,655 | 20,084 | 1,557,505 | |
| May-93 | 1,335,024 | 256,486 | 20,819 | 1,612,329 | |
| Jun-93 | 1,272,464 | 249,420 | 20,120 | 1,542,004 | 18,820,359 |

(exhibit continues)

Exhibit 2 (continued)

| Month/year | Las Vegas Strip | Downtown Las Vegas | Boulder Strip | Total | FY total |
|------------|--------------------|-----------------------|------------------|-----------|------------|
| Jul-93 | 1,293,345 | 252,768 | 20,615 | 1,566,728 | |
| Aug-93 | 1,307,176 | 252,279 | 14,841 | 1,574,296 | |
| Sep-93 | 1,263,949 | 244,187 | 14,286 | 1,522,422 | |
| Oct-93 | 1,368,637 | 251,876 | 14,867 | 1,635,380 | |
| Nov-93 | 1,464,229 | 243,780 | 14,352 | 1,722,361 | |
| Dec-93 | 1,550,970 | 250,547 | 14,851 | 1,816,368 | |
| Jan-94 | 1,630,894 | 251,066 | 14,784 | 1,896,744 | |
| Feb-94 | 1,510,213 | 225,107 | 13,359 | 1,748,679 | |
| Mar-94 | 1,661,358 | 249,187 | 14,797 | 1,925,342 | |
| Apr-94 | 1,605,369 | 244,200 | 14,233 | 1,863,802 | |
| May-94 | 1,669,409 | 252,066 | 16,071 | 1,937,546 | |
| Jun-94 | 1,606,037 | 243,569 | 27,365 | 1,876,971 | 21,086,639 |
| Jul-94 | 1,656,428 | 249,901 | 33,393 | 1,939,722 | |
| Aug-94 | 1,667,297 | 250,569 | 36,272 | 1,954,138 | |
| Sep-94 | 1,613,074 | 244,242 | 41,191 | 1,898,507 | |
| Oct-94 | 1,662,375 | 251,202 | 43,797 | 1,957,374 | |
| Nov-94 | 1,624,131 | 241,945 | 43,620 | 1,909,696 | |
| Dec-94 | 1,650,760 | 248,982 | 48,268 | 1,948,010 | |
| Jan-95 | 1,663,245 | 253,666 | 50,843 | 1,967,754 | |
| Feb-95 | 1,540,880 | 228,626 | 45,976 | 1,815,482 | |
| Mar-95 | 1,689,587 | 254,475 | 51,119 | 1,995,181 | |
| Apr-95 | 1,637,503 | 246,188 | 49,465 | 1,933,156 | |
| May-95 | 1,699,524 | 250,713 | 51,017 | 2,001,254 | |
| Jun-95 | 1,632,766 | 241,071 | 49,371 | 1,923,208 | 23,243,482 |

(exhibit continues)

Exhibit 2 (continued)

| Month/year | Las Vegas | Downtown | Boulder | Total | FY total |
|---------------------|-----------|-----------|---------|-----------|------------|
| | Strip | Las Vegas | Strip | | |
| Jul-95 | 1,581,542 | 250,889 | 51,044 | 1,883,475 | |
| Aug-95 | 1,610,882 | 257,217 | 50,953 | 1,919,052 | |
| Sep-95 | 1,592,954 | 246,486 | 49,390 | 1,888,830 | |
| Oct-95 | 1,702,584 | 246,187 | 51,129 | 1,999,900 | |
| Nov-95 | 1,663,988 | 242,608 | 49,489 | 1,956,085 | |
| Dec-95 | 1,683,979 | 251,449 | 51,136 | 1,986,564 | |
| Jan-96 | 1,696,353 | 254,216 | 51,118 | 2,001,687 | |
| Feb-96 | 1,612,642 | 240,767 | 47,759 | 1,901,168 | |
| Mar-96 | 1,710,564 | 254,656 | 51,043 | 2,016,263 | |
| Apr-96 | 1,654,524 | 249,624 | 49,311 | 1,953,459 | |
| May-96 | 1,717,030 | 302,792 | 50,651 | 2,070,473 | |
| Jun-96 | 1,670,818 | 287,950 | 48,789 | 2,007,557 | 23,584,513 |
| Jul-96 | 1,744,484 | 293,038 | 50,778 | 2,088,300 | |
| Aug-96 | 1,760,404 | 290,804 | 50,728 | 2,101,936 | |
| Sep-96 | 1,688,799 | 287,323 | 49,112 | 2,025,234 | |
| Oct-96 | 1,740,116 | 300,399 | 50,910 | 2,091,425 | |
| Nov-96 | 1,707,459 | 295,433 | 49,131 | 2,052,023 | |
| Dec-96 | 1,731,248 | 310,937 | 47,652 | 2,089,837 | |
| Jan-97 | 1,872,139 | 302,846 | 48,850 | 2,223,835 | |
| Feb-97 | 1,708,942 | 277,052 | 45,549 | 2,031,543 | |
| Mar-97 | 1,877,558 | 310,569 | 50,573 | 2,238,700 | |
| Apr-97 | 1,824,837 | 301,489 | 48,660 | 2,174,986 | |
| May-97 | 1,906,597 | 314,162 | 50,879 | 2,271,638 | |
| Jun-97 | 1,831,606 | 306,321 | 57,919 | 2,195,846 | 25,585,303 |
| (exhibit continues) | | | | | |

Exhibit 2 (continued)

| Month/year | Las Vegas | Downtown | Boulder | Total | FY total |
|------------|-----------|-----------|---------|-----------|------------|
| | Strip | Las Vegas | Strip | | |
| Jul-97 | 1,870,778 | 312,940 | 64,762 | 2,248,480 | |
| Aug-97 | 1,895,066 | 309,362 | 64,217 | 2,268,645 | |
| Sep-97 | 1,822,014 | 304,414 | 62,279 | 2,188,707 | |
| Oct-97 | 1,898,816 | 310,207 | 64,567 | 2,273,590 | |
| Nov-97 | 1,869,156 | 302,259 | 62,418 | 2,233,833 | |
| Dec-97 | 1,882,712 | 317,318 | 64,186 | 2,264,216 | |
| Jan-98 | 1,904,594 | 311,753 | 65,023 | 2,281,370 | |
| Feb-98 | 1,769,807 | 285,436 | 61,197 | 2,116,440 | |
| Mar-98 | 1,934,078 | 318,883 | 69,457 | 2,322,418 | |
| Apr-98 | 1,875,682 | 304,681 | 67,556 | 2,247,919 | |
| May-98 | 1,946,068 | 314,725 | 71,078 | 2,331,871 | |
| Jun-98 | 1,861,128 | 308,749 | 63,302 | 2,233,179 | 27,010,668 |

EXHIBIT 3

The Annual Total Revenue of Casino Hotels on Las Vegas
Strip, in Downtown Las Vegas, and on Boulder Strip

| Fiscal | Las Vegas | Downtown | Boulder | Total |
|--------|-----------------|-----------------|---------------|-----------------|
| Year | Strip | Las Vegas | Strip | |
| 1990 | \$3,939,331,858 | \$949,305,276 | \$202,014,407 | \$5,090,651,541 |
| 1991 | \$4,531,867,842 | \$989,946,611 | \$211,876,738 | \$5,733,691,191 |
| 1992 | \$4,463,692,494 | \$955,386,733 | \$219,967,472 | \$5,639,046,699 |
| 1993 | \$4,707,202,656 | \$993,536,149 | \$235,660,140 | \$5,936,398,945 |
| 1994 | \$5,777,872,257 | \$979,322,742 | \$258,106,378 | \$7,015,301,377 |
| 1995 | \$6,537,678,305 | \$977,850,230 | \$398,615,517 | \$7,914,144,052 |
| 1996 | \$6,866,354,281 | \$1,005,161,880 | \$483,583,406 | \$8,355,099,567 |
| 1997 | \$7,087,266,194 | \$1,145,922,069 | \$530,571,241 | \$8,763,759,504 |
| 1998 | \$7,397,825,633 | \$1,123,169,837 | \$667,787,627 | \$9,188,783,097 |

EXHIBIT 4

The Total Casino Departmental Revenue of Casino Hotels
on Las Vegas Strip, in Downtown Las Vegas, and on
Boulder Strip

| Fiscal | Las Vegas | Downtown | Boulder | Total |
|--------|-----------------|---------------|---------------|-----------------|
| Year | Strip | Las Vegas | Strip | |
| 1990 | \$2,278,666,097 | \$641,990,399 | \$137,264,969 | \$3,057,921,465 |
| 1991 | \$2,616,868,246 | \$669,248,089 | \$143,306,743 | \$3,429,423,078 |
| 1992 | \$2,530,932,046 | \$646,577,431 | \$150,854,021 | \$3,328,363,498 |
| 1993 | \$2,680,865,771 | \$677,801,673 | \$161,810,480 | \$3,520,477,924 |
| 1994 | \$3,188,994,040 | \$657,173,136 | \$179,042,227 | \$4,025,209,403 |
| 1995 | \$3,516,053,825 | \$655,972,440 | \$270,703,558 | \$4,442,729,823 |
| 1996 | \$3,629,745,193 | \$654,362,075 | \$333,852,342 | \$4,617,959,610 |
| 1997 | \$3,650,458,259 | \$687,734,387 | \$367,671,847 | \$4,705,864,493 |
| 1998 | \$3,717,773,057 | \$683,125,890 | \$465,977,932 | \$4,866,876,879 |

EXHIBIT 5

The Annual Total Rooms Departmental Revenue of Casino
Hotels on Las Vegas Strip, in Downtown Las Vegas,
and on Boulder Strip

| Fiscal | Las Vegas | Downtown | Boulder | Total |
|--------|-----------------|---------------|--------------|-----------------|
| Year | Strip | Las Vegas | Strip | |
| 1990 | \$662,311,307 | \$107,448,255 | \$6,194,702 | \$775,954,264 |
| 1991 | \$761,203,722 | \$105,539,635 | \$5,885,166 | \$872,628,523 |
| 1992 | \$775,713,227 | \$98,875,172 | \$5,530,247 | \$880,118,646 |
| 1993 | \$821,671,207 | \$106,116,416 | \$5,835,642 | \$933,623,265 |
| 1994 | \$1,048,102,543 | \$109,138,855 | \$4,650,845 | \$1,161,892,243 |
| 1995 | \$1,283,252,531 | \$110,534,623 | \$16,376,485 | \$1,410,163,639 |
| 1996 | \$1,391,133,176 | \$123,538,718 | \$20,662,785 | \$1,535,334,679 |
| 1997 | \$1,535,714,914 | \$149,243,804 | \$25,039,256 | \$1,709,997,974 |
| 1998 | \$1,618,896,618 | \$140,896,169 | \$32,150,518 | \$1,791,943,305 |

EXHIBIT 6

The Annual Total Energy Expense of Casino Hotels on Las Vegas Strip, in Downtown Las Vegas, and on Boulder Strip

| Fiscal | Las Vegas | Downtown | Boulder | Total |
|--------|--------------|--------------|-------------|---------------|
| Year | Strip | Las Vegas | Strip | |
| 1990 | \$51,870,483 | \$14,733,645 | \$2,795,097 | \$69,399,225 |
| 1991 | \$64,004,416 | \$17,096,604 | \$3,229,942 | \$84,330,962 |
| 1992 | \$65,520,700 | \$17,045,064 | \$3,202,028 | \$85,767,792 |
| 1993 | \$62,419,115 | \$16,765,913 | \$3,503,704 | \$82,688,732 |
| 1994 | \$75,339,358 | \$17,632,487 | \$4,421,340 | \$97,393,185 |
| 1995 | \$87,093,171 | \$17,973,468 | \$7,593,952 | \$112,660,591 |
| 1996 | \$83,229,696 | \$17,542,410 | \$7,763,634 | \$108,535,740 |
| 1997 | \$87,645,029 | \$19,666,034 | \$7,820,082 | \$115,131,145 |
| 1998 | \$84,224,017 | \$18,574,740 | \$9,731,020 | \$112,529,777 |

EXHIBIT 7

The Annual Total Utilities (Other Than Energy Expense) of
Casino Hotels on Las Vegas Strip, in Downtown
Las Vegas, and on Boulder Strip

| Fiscal | Las Vegas | Downtown | Boulder | Total |
|--------|--------------|-------------|-------------|--------------|
| Year | Strip | Las Vegas | Strip | |
| 1990 | \$10,224,720 | \$2,307,223 | \$738,640 | \$13,270,583 |
| 1991 | \$14,769,262 | \$2,944,249 | \$871,225 | \$18,584,736 |
| 1992 | \$16,641,111 | \$2,614,169 | \$1,094,976 | \$20,350,256 |
| 1993 | \$15,713,382 | \$2,552,478 | \$920,939 | \$19,186,799 |
| 1994 | \$18,747,447 | \$3,119,990 | \$1,123,278 | \$22,990,715 |
| 1995 | \$21,572,503 | \$2,697,922 | \$1,361,438 | \$25,631,863 |
| 1996 | \$24,436,598 | \$3,181,584 | \$2,636,343 | \$30,254,525 |
| 1997 | \$23,109,928 | \$3,785,429 | \$2,051,760 | \$28,947,117 |
| 1998 | \$24,121,611 | \$4,377,568 | \$3,036,196 | \$31,535,375 |

EXHIBIT 8

The Annual Total Net Income (Loss) Before Federal Income
Taxes and Extraordinary Items of Casino Hotels on Las
Vegas Strip, in Downtown Las Vegas,
and on Boulder Strip

| Fiscal | Las Vegas | Downtown | Boulder | Total |
|--------|---------------|---------------|--------------|-----------------|
| Year | Strip | Las Vegas | Strip | |
| 1990 | \$358,135,218 | \$23,602,793 | \$23,129,249 | \$404,867,260 |
| 1991 | \$312,929,972 | -\$39,364,216 | \$31,574,945 | \$305,140,701 |
| 1992 | \$397,130,946 | \$28,384,314 | \$39,455,320 | \$464,970,580 |
| 1993 | \$593,755,945 | \$55,808,586 | \$43,298,291 | \$692,862,822 |
| 1994 | \$610,199,820 | \$62,248,173 | \$37,159,183 | \$709,607,176 |
| 1995 | \$764,539,080 | \$78,324,784 | \$34,536,907 | \$877,400,771 |
| 1996 | \$973,685,009 | \$20,437,445 | \$58,285,649 | \$1,052,408,103 |
| 1997 | \$968,281,180 | -\$49,787,524 | \$58,492,470 | \$976,986,126 |
| 1998 | \$802,773,736 | -\$853,719 | \$57,923,777 | \$859,843,794 |

EXHIBIT 9

The Annual Total Complimentary Expense of Rooms Department
Of Casino Hotels on Las Vegas Strip, in Downtown
Las Vegas, and on Boulder Strip

| Fiscal | Las Vegas | Downtown | Boulder | Total |
|--------|--------------|-------------|-----------|--------------|
| Year | Strip | Las Vegas | Strip | |
| 1990 | \$3,081,009 | \$1,020,863 | \$51,905 | \$4,153,777 |
| 1991 | \$4,802,270 | \$1,081,344 | \$51,187 | \$5,934,801 |
| 1992 | \$4,914,727 | \$1,467,563 | \$60,212 | \$6,442,502 |
| 1993 | \$5,106,740 | \$1,433,052 | \$65,064 | \$6,604,856 |
| 1994 | \$6,199,310 | \$2,052,481 | \$60,787 | \$8,312,578 |
| 1995 | \$8,188,574 | \$2,510,127 | \$234,737 | \$10,933,438 |
| 1996 | \$7,750,041 | \$2,711,048 | \$138,804 | \$10,599,893 |
| 1997 | \$8,340,828 | \$3,166,732 | \$154,852 | \$11,662,412 |
| 1998 | \$12,740,693 | \$3,196,739 | \$296,324 | \$16,233,756 |

EXHIBIT 10

The Annual Total Payroll Taxes of the Rooms Departments of
Casino Hotels on Las Vegas Strip, in Downtown Las Vegas,
and on Boulder Strip

| Fiscal | Las Vegas | Downtown | Boulder | Total |
|--------|--------------|-------------|-----------|--------------|
| Year | Strip | Las Vegas | Strip | |
| 1990 | \$17,323,093 | \$3,278,528 | \$172,247 | \$20,773,868 |
| 1991 | \$19,893,979 | \$3,393,166 | \$167,080 | \$23,454,225 |
| 1992 | \$20,589,444 | \$2,977,033 | \$174,141 | \$23,740,618 |
| 1993 | \$22,126,828 | \$3,255,105 | \$238,181 | \$25,620,114 |
| 1994 | \$27,585,854 | \$3,455,284 | \$192,146 | \$31,233,284 |
| 1995 | \$29,454,353 | \$3,752,926 | \$481,593 | \$33,688,872 |
| 1996 | \$29,727,793 | \$3,955,668 | \$538,322 | \$34,221,783 |
| 1997 | \$31,051,602 | \$4,621,861 | \$583,426 | \$36,256,889 |
| 1998 | \$38,239,474 | \$4,223,960 | \$792,315 | \$43,255,749 |

EXHIBIT 11

The Annual Total Payroll-Employment Benefits of the Rooms
Departments of Casino Hotels on Las Vegas Strip,
in Downtown Las Vegas, and on Boulder Strip

| Fiscal | Las Vegas | Downtown | Boulder | Total |
|--------|--------------|--------------|-------------|---------------|
| Year | Strip | Las Vegas | Strip | |
| 1990 | \$44,909,155 | \$7,323,022 | \$291,958 | \$52,524,135 |
| 1991 | \$52,849,011 | \$8,269,683 | \$299,713 | \$61,418,407 |
| 1992 | \$56,703,361 | \$8,930,544 | \$335,045 | \$65,968,950 |
| 1993 | \$59,610,949 | \$9,893,656 | \$283,285 | \$69,787,890 |
| 1994 | \$74,120,690 | \$10,072,410 | \$239,259 | \$84,432,359 |
| 1995 | \$80,273,385 | \$9,629,894 | \$856,230 | \$90,759,509 |
| 1996 | \$84,393,474 | \$10,282,573 | \$1,050,537 | \$95,726,584 |
| 1997 | \$89,581,806 | \$11,057,787 | \$1,221,958 | \$101,861,551 |
| 1998 | \$89,919,079 | \$12,591,377 | \$1,602,930 | \$104,113,386 |

EXHIBIT 12

The Annual Total Payroll-Officers of Rooms Departments of
Casino Hotels on Las Vegas Strip, in Downtown
Las Vegas, and on Boulder Strip

| Fiscal | Las Vegas | Downtown | Boulder | Total |
|--------|-----------|-------------|-----------|-------------|
| Year | Strip | Las Vegas | Strip | |
| 1990 | \$178,550 | \$95,766 | \$0 | \$274,316 |
| 1991 | \$183,558 | \$113,146 | \$0 | \$296,704 |
| 1992 | \$423,845 | \$142,783 | \$0 | \$566,628 |
| 1993 | \$436,795 | \$193,270 | \$72,000 | \$702,065 |
| 1994 | \$699,803 | \$199,119 | \$134,931 | \$1,033,853 |
| 1995 | \$446,900 | \$214,119 | \$195,451 | \$856,470 |
| 1996 | \$547,200 | \$290,606 | \$143,000 | \$980,806 |
| 1997 | \$633,326 | \$152,162 | \$122,618 | \$908,106 |
| 1998 | \$974,266 | \$2,407,284 | \$122,795 | \$3,504,345 |

EXHIBIT 13

The Annual Total Payroll-Other Employees of Rooms
Departments of Casino Hotels on Las Vegas Strip,
in Downtown Las Vegas, and on Boulder Strip

| Fiscal | Las Vegas | Downtown | Boulder | Total |
|--------|---------------|--------------|-------------|---------------|
| Year | Strip | Las Vegas | Strip | |
| 1990 | \$149,201,957 | \$31,853,373 | \$1,615,533 | \$182,670,863 |
| 1991 | \$169,306,634 | \$33,743,492 | \$1,593,546 | \$204,643,672 |
| 1992 | \$174,133,180 | \$31,279,086 | \$1,642,525 | \$207,054,791 |
| 1993 | \$176,641,805 | \$32,327,411 | \$1,870,777 | \$210,839,993 |
| 1994 | \$218,897,091 | \$34,515,972 | \$1,545,858 | \$254,958,921 |
| 1995 | \$242,731,035 | \$36,066,607 | \$4,704,327 | \$283,501,969 |
| 1996 | \$254,223,596 | \$38,901,672 | \$5,642,839 | \$298,768,107 |
| 1997 | \$278,188,932 | \$46,480,354 | \$6,141,597 | \$330,810,883 |
| 1998 | \$298,252,696 | \$42,656,589 | \$8,613,399 | \$349,522,684 |

EXHIBIT 14

The Annual Total Other Department Expense Of Rooms
Departments of Casino Hotels on Las Vegas Strip,
in Downtown Las Vegas, and on Boulder Strip

| Fiscal | Las Vegas | Downtown | Boulder | Total |
|--------|---------------|--------------|-------------|---------------|
| Year | Strip | Las Vegas | Strip | |
| 1990 | \$76,943,410 | \$13,344,681 | \$812,314 | \$91,100,405 |
| 1991 | \$90,846,377 | \$14,870,696 | \$772,441 | \$106,489,514 |
| 1992 | \$93,465,110 | \$14,094,402 | \$790,820 | \$108,350,332 |
| 1993 | \$91,792,872 | \$15,328,018 | \$981,382 | \$108,102,272 |
| 1994 | \$118,450,790 | \$16,470,051 | \$685,831 | \$135,606,672 |
| 1995 | \$135,339,412 | \$17,176,833 | \$2,340,427 | \$154,856,672 |
| 1996 | \$142,694,789 | \$17,821,272 | \$2,982,849 | \$163,498,910 |
| 1997 | \$158,749,046 | \$20,272,323 | \$2,844,206 | \$181,865,575 |
| 1998 | \$167,924,328 | \$19,136,453 | \$3,953,601 | \$191,014,382 |

EXHIBIT 15

Some Characteristics of Las Vegas Visitors

| Fiscal Year | Proportion of respondents with persons under 21 in their immediate party | Proportion who gamble while visiting Las Vegas | Average trip gambling budget (among those who gamble) |
|-------------|--|---|--|
| 1989 | 9% | 89% | \$494 |
| 1990 | 5% | 91% | \$533 |
| 1991 | 7% | 90% | \$431 |
| 1992 | 7% | 90% | \$454 |
| 1993 | 8% | 90% | \$445 |
| 1994 | 8% | 92% | \$480 |
| 1995 | 11% | 89% | \$514 |
| 1996 | 11% | 87% | \$581 |
| 1997 | 10% | 89% | \$515 |

EXHIBIT 16

Some Characteristics of Las Vegas Residents

| FY | PRG ^a | PD ^b | DGB ^c | PW ^d | WGB ^e | PM ^f | MGB ^g | PY ^h | YGB ⁱ |
|------|------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|
| 1989 | 65% | 7% | \$48 | 41% | \$64 | 31% | \$32 | 20% | \$75 |
| 1990 | 65% | 7% | \$48 | 41% | \$64 | 31% | \$32 | 20% | \$75 |
| 1991 | 66% | 7% | \$48 | 43% | \$54 | 36% | \$45 | 13% | \$80 |
| 1992 | 66% | 7% | \$48 | 43% | \$54 | 36% | \$45 | 13% | \$80 |
| 1993 | 67% | 8% | \$165 | 43% | \$71 | 33% | \$60 | 15% | \$147 |
| 1994 | 67% | 8% | \$165 | 43% | \$71 | 33% | \$60 | 15% | \$147 |
| 1995 | 72% | 9% | \$57 | 44% | \$96 | 33% | \$96 | 13% | \$118 |
| 1996 | 72% | 9% | \$57 | 44% | \$96 | 33% | \$96 | 13% | \$118 |

Note.

^aPRG is the percentage of residents who gamble. ^bPD is the percentage of daily gamblers. Daily gambler refers to gambler who gambles more than 5 times a week. ^cDGB is the daily gambling budget of daily gamblers. ^dPW is the percentage of weekly gamblers. Weekly gambler refers to gambler who gambles "about twice a week" and "about once a week". ^eWGB is the weekly gambling budget of weekly gambler. ^fPM is the percentage of monthly gamblers. Monthly gambler refers to gambler who gambles "about twice a month" and "about once a month". ^gMGB is the monthly gambling budget of monthly gambler. ^hPY is the percentage of yearly gambler. Yearly gambler refers to gambler who gambles "about four times a year", "about twice a year" and "once a year or less". ⁱYGB is the annual gambling budget of yearly gambler.

EXHIBIT 17

Visitor Volume of Las Vegas

| FY | 1989-90 | 1990-91 | 1991-92 | 1992-93 | 1993-94 | 1994-95 | 1995-96 | 1996-97 | 1997-98 |
|-----------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| July | 1,762,544 | 1,778,244 | 1,839,696 | 1,888,148 | 2,059,509 | 2,467,791 | 2,462,907 | 2,535,594 | 2,554,184 |
| August | 1,541,831 | 1,834,265 | 1,934,438 | 1,957,668 | 2,077,388 | 2,441,706 | 2,526,211 | 2,638,753 | 2,735,092 |
| September | 1,568,427 | 1,825,087 | 1,794,385 | 1,844,770 | 1,956,673 | 2,388,154 | 2,434,132 | 2,480,466 | 2,447,891 |
| October | 1,610,075 | 1,883,290 | 1,908,889 | 1,916,300 | 2,128,831 | 2,484,523 | 2,552,215 | 2,642,990 | 2,630,184 |
| November | 1,408,127 | 1,732,616 | 1,696,025 | 1,774,628 | 2,041,256 | 2,263,003 | 2,306,106 | 2,428,806 | 2,513,975 |
| December | 1,218,405 | 1,676,484 | 1,775,209 | 1,787,689 | 1,963,784 | 2,099,268 | 2,283,294 | 2,250,016 | 2,293,492 |
| January | 1,590,961 | 1,526,085 | 1,683,894 | 1,765,818 | 2,227,706 | 2,310,501 | 2,342,654 | 2,489,284 | 2,427,013 |
| February | 1,610,149 | 1,632,669 | 1,767,442 | 1,804,948 | 2,189,656 | 2,221,036 | 2,316,278 | 2,435,559 | 2,321,774 |
| March | 1,827,528 | 1,853,386 | 1,798,927 | 1,958,863 | 2,492,949 | 2,602,503 | 2,571,661 | 2,729,842 | 2,667,136 |
| April | 1,658,838 | 1,828,336 | 1,802,697 | 1,951,557 | 2,431,233 | 2,471,788 | 2,485,989 | 2,612,980 | 2,579,068 |
| May | 1,722,537 | 1,827,974 | 1,885,396 | 1,948,482 | 2,430,025 | 2,418,547 | 2,512,922 | 2,604,163 | 2,636,908 |
| June | 1,814,421 | 1,698,024 | 1,779,306 | 1,865,484 | 2,316,348 | 2,412,882 | 2,430,232 | 2,417,989 | 2,443,892 |
| FY Total | 19,333,843 | 21,096,460 | 21,666,304 | 22,464,355 | 26,315,358 | 28,581,702 | 29,224,601 | 30,266,442 | 30,250,609 |

EXHIBIT 18

The Planed Las Vegas Casino Hotels (with Determined
Completion Dates) in the Next Two Fiscal Years

| Name of Property | Completion | Rooms |
|--------------------------|----------------|-------|
| Sunset Station | 15-Sep-98 | 7 |
| Bellagio | 15-Oct-98 | 3,005 |
| Manison at the MGM Grand | Apr-99 | 30 |
| Rio Suites | 15-Mar-99 | 9 |
| Mandalay Bay | 2-Mar-99 | 3,276 |
| Four Season Resort | 2-Mar-99 | 424 |
| Venetian (Phase I only) | Apr-99 | 3,036 |
| Hard Rock Hotel | 1-May-99 | 340 |
| Paris Las Vegas | September 1999 | 2,914 |
| The New Aladdin | Spring 2000 | 2,600 |

EXHIBIT 19

Consumer Price Index (1982-1984=100)

| | | 1st half | 2nd half |
|----------|------|----------|----------|
| Calendar | 1989 | 122.7 | 125.3 |
| year | 1990 | 128.7 | 132.6 |
| | 1991 | 135.2 | 137.2 |
| | 1992 | 139.2 | 141.4 |
| | 1993 | 143.7 | 145.3 |
| | 1994 | 147.2 | 149.3 |
| | 1995 | 151.5 | 153.2 |
| | 1996 | 155.8 | 157.9 |
| | 1997 | 159.9 | 161.2 |
| | 1998 | 162.3 | 163.7 |
| Fiscal | 1990 | 127.0 | |
| year | 1991 | 133.9 | |
| | 1992 | 138.2 | |
| | 1993 | 142.6 | |
| | 1994 | 146.3 | |
| | 1995 | 150.4 | |
| | 1996 | 154.5 | |
| | 1997 | 158.9 | |
| | 1998 | 161.8 | |

EXHIBIT 20

Population of Las Vegas Valley

| Fiscal | Boulder | Henderson | Las | North | Total |
|--------|---------|-----------|---------|-----------|---------|
| year | city | | Vegas | Las Vegas | |
| 1989 | 13,514 | 59,915 | 261,664 | 48,717 | 383,810 |
| 1990 | 13,374 | 69,933 | 281,891 | 47,987 | 413,185 |
| 1991 | 13,414 | 76,932 | 291,591 | 51,570 | 433,507 |
| 1992 | 13,502 | 85,903 | 306,858 | 55,023 | 461,286 |
| 1993 | 13,943 | 95,140 | 325,018 | 60,159 | 494,260 |
| 1994 | 14,339 | 108,208 | 348,147 | 69,367 | 540,061 |
| 1995 | 14,448 | 117,846 | 367,074 | 77,187 | 576,555 |
| 1996 | 14,656 | 131,887 | 396,968 | 83,329 | 626,840 |
| 1997 | 14,873 | 144,019 | 409,266 | 90,155 | 658,313 |
| 1998 | 14,790 | 156,973 | 451,449 | 98,736 | 721,948 |

EXHIBIT 21

Age Distribution of Clark County, 1990 Census

| | Population | Percentage |
|-------------------|------------|------------|
| Total | 741,459 | 100.00% |
| Under 1 year | 10,302 | 1.39% |
| 1 and 2 years | 24,195 | 3.26% |
| 3 and 4 years | 22,491 | 3.03% |
| 5 years | 11,019 | 1.49% |
| 6 years | 10,457 | 1.41% |
| 7 to 9 years | 30,706 | 4.14% |
| 10 and 11 years | 19,462 | 2.62% |
| 12 and 13 years | 18,161 | 2.45% |
| 14 years | 8,603 | 1.16% |
| 15 years | 8,555 | 1.15% |
| 16 years | 8,824 | 1.19% |
| 17 years | 9,034 | 1.22% |
| 18 years | 9,231 | 1.24% |
| 19 years | 10,054 | 1.36% |
| 20 years | 10,710 | 1.44% |
| Total under 21 | 211,804 | 28.57% |
| years old | | |
| Total 21 years or | 529,655 | 71.43% |
| older | | |

EXHIBIT 22

The items identified as mixed cost in General and
Administrative Expenses category of Combined
Income Statements

| FY | Percentage of rooms revenue in total revenue | Energy expenses | Energy expenses allocated to rooms department | Utility expenses (other than energy expenses) | Utility expenses allocated to rooms department |
|------|--|--------------------|---|---|--|
| 1990 | 15.24% | \$69,399,225 | \$10,578,336 | \$13,270,583 | \$2,022,799 |
| 1991 | 15.22% | \$84,330,962 | \$12,834,595 | \$18,584,736 | \$2,828,470 |
| 1992 | 15.61% | \$85,767,792 | \$13,386,276 | \$20,350,256 | \$3,176,182 |
| 1993 | 15.73% | \$82,688,732 | \$13,004,538 | \$19,186,799 | \$3,017,527 |
| 1994 | 16.56% | \$97,393,185 | \$16,130,510 | \$22,990,715 | \$3,807,781 |
| 1995 | 17.82% | \$112,660,591 | \$20,074,169 | \$25,631,863 | \$4,567,155 |
| 1996 | 18.38% | \$108,535,740 | \$19,944,548 | \$30,254,525 | \$5,559,577 |
| 1997 | 19.51% | \$115,131,145 | \$22,464,563 | \$28,947,117 | \$5,648,205 |
| 1998 | 19.50% | \$112,529,777 | \$21,944,906 | \$31,535,375 | \$6,149,846 |

EXHIBIT 23

The Items Identified as Mixed Cost in Rooms Departmental Expenses Category of Combined Income Statements

| FY | % of other employees' payroll in department total | Rooms payroll-tax allocated to other employees | Rooms payroll- employment benefits allocated to other employees | Rooms payroll- other employees | Rooms other departmental expenses | Rooms department complimentary expenses |
|------|---|--|---|-----------------------------------|---|--|
| 1990 | 99.85% | \$20,742,719 | \$52,445,378 | \$182,670,863 | \$91,100,405 | \$4,153,777 |
| 1991 | 99.86% | \$23,420,269 | \$61,329,488 | \$204,643,672 | \$106,489,514 | \$5,934,801 |
| 1992 | 99.73% | \$23,675,827 | \$65,788,911 | \$207,054,791 | \$108,350,332 | \$6,442,502 |
| 1993 | 99.67% | \$25,535,086 | \$69,556,278 | \$210,839,993 | \$108,102,272 | \$6,604,856 |
| 1994 | 99.60% | \$31,107,145 | \$84,091,370 | \$254,958,921 | \$135,606,672 | \$8,312,578 |
| 1995 | 99.70% | \$33,587,403 | \$90,486,147 | \$283,501,969 | \$154,856,672 | \$10,933,438 |
| 1996 | 99.67% | \$34,109,806 | \$95,413,358 | \$298,768,107 | \$163,498,910 | \$10,599,893 |
| 1997 | 99.73% | \$36,157,633 | \$101,582,697 | \$330,810,883 | \$181,865,575 | \$11,662,412 |
| 1998 | 99.01% | \$42,826,368 | \$103,079,898 | \$349,522,684 | \$191,014,382 | \$16,233,756 |

EXHIBIT 24

CPI Adjusted Mixed Cost That Attributes to Rooms
Department (1982-1984 Constant Dollar)

| Fiscal Year | Total mixed cost that attributes to rooms department | CPI adjusted mixed cost that attributes to rooms department |
|-------------|---|---|
| 1990 | \$363,714,277 | \$286,389,195 |
| 1991 | \$417,480,808 | \$311,785,518 |
| 1992 | \$427,874,821 | \$309,605,514 |
| 1993 | \$436,660,550 | \$306,320,975 |
| 1994 | \$534,014,977 | \$365,138,446 |
| 1995 | \$598,006,953 | \$397,611,006 |
| 1996 | \$627,894,199 | \$406,404,013 |
| 1997 | \$690,191,968 | \$434,356,179 |
| 1998 | \$730,771,840 | \$451,790,937 |

EXHIBIT 25

Total Costs Allocated to Rooms Department

| FY | Total revenue of hotel/casinos | Total net income of hotel/casinos | Total cost of hotel/casinos | Percentage of rooms revenue in total revenue | Total cost allocated to rooms department | Total cost allocated to rooms department (CPI adjusted) |
|------|--------------------------------------|--------------------------------------|--------------------------------|--|--|--|
| 1990 | \$5,090,651,541 | \$404,867,260 | \$4,685,784,281 | 15.24% | \$714,241,441 | \$562,394,836 |
| 1991 | \$5,733,691,191 | \$305,140,701 | \$5,428,550,490 | 15.22% | \$826,188,199 | \$617,018,819 |
| 1992 | \$5,639,046,699 | \$464,970,580 | \$5,174,076,119 | 15.61% | \$807,547,997 | \$584,332,849 |
| 1993 | \$5,936,398,945 | \$692,862,822 | \$5,243,536,123 | 15.73% | \$824,656,052 | \$578,503,018 |
| 1994 | \$7,015,301,377 | \$709,607,176 | \$6,305,694,201 | 16.56% | \$1,044,365,279 | \$714,095,917 |
| 1995 | \$7,914,144,052 | \$877,400,771 | \$7,036,743,281 | 17.82% | \$1,253,825,991 | \$833,660,899 |
| 1996 | \$8,355,099,567 | \$1,052,408,103 | \$7,302,691,464 | 18.38% | \$1,341,943,967 | \$868,572,147 |
| 1997 | \$8,763,759,504 | \$976,986,126 | \$7,786,773,378 | 19.51% | \$1,519,366,967 | \$956,178,079 |
| 1998 | \$9,188,783,097 | \$859,843,794 | \$8,328,939,303 | 19.50% | \$1,624,261,544 | \$1,004,180,244 |

EXHIBIT 26

The Fixed Cost Per Room Per Night (FCPRPN)

| FY | TCRD | TVCRD | TFCRD | Total | FCPRPN |
|------|-----------------|---------------|---------------|------------|---------|
| | (CPI adjusted) | | | available | |
| | | | | rooms | |
| 1990 | \$562,394,836 | \$267,475,004 | \$294,919,832 | 16,671,680 | \$17.69 |
| 1991 | \$617,018,819 | \$302,638,461 | \$314,380,358 | 19,266,009 | \$16.32 |
| 1992 | \$584,332,849 | \$309,295,816 | \$275,037,033 | 19,664,306 | \$13.99 |
| 1993 | \$578,503,018 | \$312,124,197 | \$266,378,820 | 18,820,359 | \$14.15 |
| 1994 | \$714,095,917 | \$360,728,827 | \$353,367,090 | 21,086,639 | \$16.76 |
| 1995 | \$833,660,899 | \$389,860,580 | \$443,800,318 | 23,243,482 | \$19.09 |
| 1996 | \$868,572,147 | \$397,878,028 | \$470,694,119 | 23,584,513 | \$19.96 |
| 1997 | \$956,178,079 | \$427,007,222 | \$529,170,856 | 25,585,303 | \$20.68 |
| 1998 | \$1,004,180,244 | \$442,582,256 | \$561,597,988 | 27,010,668 | \$20.79 |

EXHIBIT 27

Total Net Income Generated from Casino Department

| FY | Total gaming revenue of casino / hotels | Percentage of gaming revenue in total revenue | Total cost of casino / hotels | Total cost allocated to casino department | Total net income generated from casino department | Total CPI adjusted net income generated from casino department |
|------|--|---|-------------------------------------|--|---|---|
| 1990 | \$3,057,921,465 | 60% | \$4,685,784,281 | \$2,814,720,320 | \$243,201,145 | \$2,216,315,212 |
| 1991 | \$3,429,423,078 | 60% | \$5,428,550,490 | \$3,246,912,976 | \$182,510,102 | \$2,556,624,391 |
| 1992 | \$3,328,363,498 | 59% | \$5,174,076,119 | \$3,053,921,524 | \$274,441,974 | \$2,404,662,618 |
| 1993 | \$3,520,477,924 | 59% | \$5,243,536,123 | \$3,109,587,704 | \$410,890,220 | \$2,448,494,255 |
| 1994 | \$4,025,209,403 | 57% | \$6,305,694,201 | \$3,618,054,054 | \$407,155,349 | \$2,848,861,460 |
| 1995 | \$4,442,729,823 | 56% | \$7,036,743,281 | \$3,950,187,036 | \$492,542,787 | \$3,110,383,493 |
| 1996 | \$4,617,959,610 | 55% | \$7,302,691,464 | \$4,036,281,549 | \$581,678,061 | \$3,178,174,448 |
| 1997 | \$4,705,864,493 | 54% | \$7,786,773,378 | \$4,181,253,529 | \$524,610,964 | \$3,292,325,613 |
| 1998 | \$4,866,876,879 | 53% | \$8,328,939,303 | \$4,411,457,066 | \$455,419,813 | \$3,473,588,241 |

REFERENCES

Ader, J. N. & Lumpkins, C. J. (1997). Las Vegas: Only a Handful of Winners. New York: Bear Stearns

Anderson, D. R., Sweeney, D. J., & Williams, T. A. (1998). Quantitative Methods for Business. Cincinnati: South-Western College Publishing

Armstrong, J. S., (1989). Combining forecasts: The end of the beginning or the beginning of the end? International Journal of Forecasting, 5, 585-588

Berns, D. (1998). Vegas developer blasts gaming peers. Hotel & Motel Management, 213(8), 3

Cargill, T. F. & Eadington, W. L. (1978). Nevada's gaming revenues: time characteristics and forecasting. Management Science 24(12), 1221-1230

Competition to the west. (1998, November 13). Las Vegas Review - Journal. p. B18

Cranage, D. A. (1992). A comparison of time series and economic models for forecasting restaurant sales. International Journal of Hospitality Management, 11(2), 129-142

Gambling industry beats Asian flu (1998). International Gaming & Wagering Business, 19(9), 14

Goussak, G. W. (1994). An Estimate of The Impact That Mega-Resort Casino/Hotels Have On Existing Las Vegas Strip Casino/Hotels. Unpublished master's thesis. University of Nevada, Las Vegas

Gu, Z. (1997). Saturation surfaces on Strip. Casino Journal, 10(8), 28

Gu, Z., (1998). Asian crisis bodes ill for U.S. gaming industry. Casino Journal, 11(1), 24

Haveman, R. H., & Knopf, K. A., (1978). The market system: an introduction to Microeconomics. Santa Barbara: John Wiley & Sons, Inc.

Johnson, L., & Bowen, J., (1994). Riverboat site selection. Gaming Research & Review Journal, 1(2), 79-93

Las Vegas Convention and Visitors Authority, (1999). Hotel Construction Report [Online]. Available: <http://lasvegas24hours.com/general/index.html> [1999, March 8]

Lubove, S., (1997). Picasso among the high rollers. Forbes, 159(10), 44

Moore, B. J., (1973). An Introduction to Modern Economic Theory. New York: The Free Press

Nevada State Demographer's Office, (1998). Total Population Projections for Cities And Judicial Townships: 1998-2002. [Online]. Available: <http://www.scs.unr.edu/demographer/citytown.pdf> [1999, February 28]

Oregon State University, (No date) 1990 Census of Population and Housing: Clark County, Nevada. [Online]. Available: <http://govinfo.kerr.orst.edu/cgi-bin/buildit?1a-003.nvc=150435>

Phillips, J., & Pearl, C. (1973). Elements of Economics. New York: The Macmillan Company.

Reifer, J. M. (1998). Gaming in Las Vegas, a constrain view. Casino Journal, 11(9), 8

Rutherford, D., (1992). Dictionary of Economics. New York: Routledge

Shonkewiler, J.S. (1992). A structural time series model of Nevada gross taxable gaming revenues. Review of Regional Studies Winter 1992, 22, 239-249

Schmidgall, R. S., (1997). Hospitality Industry Managerial Accounting. East Lansing, Mich: Educational Institute, American Hotel & Motel Association,

The Hotel Association of New York City, Inc. (1996). Uniform System of Accounts for the Lodging Industry. East Lansing, Michigan: The Education Institute of the American Hotel & Motel Association

U.S. Department of Labor. (1999). Consumer Price Index: All Urban Consumers, [Online]. Available: <ftp://ftp.bls.gov/pub/special.requests/cpi/cpi.ai.txt> [1999, February 28]

Wheel of fortune, (1998). Flight International, 152(31), 5

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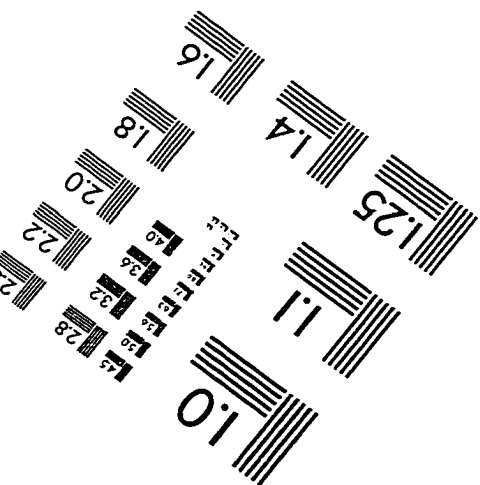
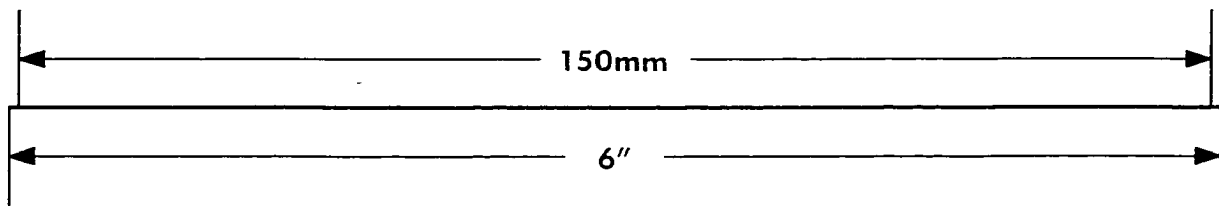
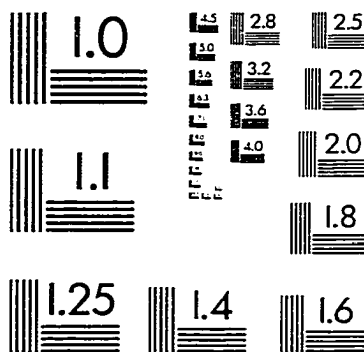
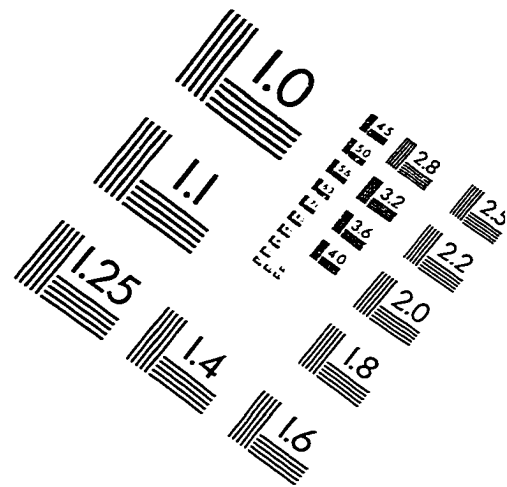
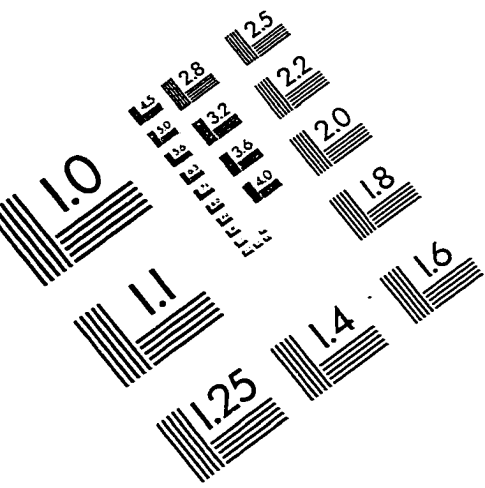
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