Southern California Theme Park Attendance

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TABLE OF CONTENTS

PROJECT SUMMARY

2004 was a good year for the theme park industry, as the country finally began moving out of an economic recession. However, looking closely at the attendance numbers, there are some puzzling results. Central Florida, the largest theme park destination in the world, had just one major new attraction open during the year.[1] Despite being hit by a record three hurricanes, Florida's theme parks had a great year, with a 5.1% growth in attendance. Meanwhile, the seven theme parks of Southern California experienced a dry, sunny summer and opened four major new thrill attractions.[2] Their attendance growth was just 3.1%.[3] How can this be, when clearly people prefer roller coasters to hurricanes?

As part of the UCLA Anderson School of Management's Applied Management Research Program, we had the opportunity to conduct a research into a subject of our choice. We decided to investigate the issues influencing theme park attendance in Southern California.

The Importance of Attendance to Southern California's Theme Parks

The primary profit drivers for any theme park are attendance and the average revenue per customer. Parks face very high fixed costs as compared to variable costs, and every customer represents profit once the park reaches the breakeven point.

However, Southern California's theme parks have experienced consistently slow attendance growth over the past two decades. Market shares have also remained very stagnant, and no park has been able to consistently capture share from the others. Every year each park takes their portion of the region's total theme park attendance, and that total attendance grows extremely slowly. Attendance is an interesting issue because it connects all of the parks in the region.

Project Methodology

To begin the project we researched the theme park industry, focusing in particular on attendance issues. We could not find any existing published studies of theme park attendance drivers, but we found many sources that suggested what the attendance drivers might be. To learn more about the local industry we interviewed theme park managers in Southern California. This initial research allowed us to generate a list of potential factors that influence attendance. The next step was to collect and compile data for all of these factors.

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[1] *Revenge of the Mummy* at Universal Studios. EPCOT's *Mission Space* was also fairly new, having opened the previous fall.
[2] *Tower of Terror* at California Adventure, *Revenge of the Mummy* at Universal Studios, *Journey to Atlantis* at SeaWorld, and *Coastersaurus* at Legoland
[3] Attendance growth was calculated from *Amusement Business* year-end attendance figures. See Appendix D.

Once the data was collected, we used statistical analysis to investigate which factors had the strongest impact on attendance. This resulted in an excellent predictive model of attendance in Southern California, using just three key variables: California population, California unemployment, and the total number of theme parks.

Conclusions

The dominant predictor for theme park attendance in Southern California is population size, and attendance growth over the past two decades has simply mirrored population growth. From year to year there are variations that can be explained by economic factors, particularly unemployment. But over the long term, attendance growth has simply matched population growth.

Weather has no measurable impact on annual theme park attendance in Southern California. This was a surprise, because weather was cited so frequently during our background research. Because weather clearly has a huge short-term impact on attendance, it seems likely that people simply assume that it must also have an impact on total annual attendance.

Another conclusion from our analysis is that the increasing prices of theme park vacations aren't impacting attendance. Ticket prices have been rising consistently faster than inflation, but people keep visiting theme parks with the same frequency.

It appears that many people in the theme park industry, including management, hold misunderstandings when it comes to attendance. No one we spoke to and nothing we read connected slow attendance growth to the equally slow growth of the population. We heard that weather has a major impact, but the annual data indicates that it doesn't. We also were led to expect that higher fuel prices would reduce attendance, but we found that the opposite may be true – high fuel prices may keep people closer to home, actually increasing theme park attendance. Another important concern of the industry is the opening of new attractions, but it appears that even popular, expensive new attractions do not cause a lasting impact on attendance, although they do help to maintain attendance levels.

Recommendations

Attendance growth is firmly tied to population growth, suggesting that consumers are in the habit of visiting theme parks with a certain frequency. Increasing attendance growth can only be accomplished if the parks can convince these consumers to increase the frequency of their visits. However, it is hard to imagine that the parks could increase their attendance when so many of their managers have a limited understanding of what drives attendance.

Further research into attendance would benefit the industry. Our study faced limitations because we could only use published, publicly available data. The individual theme park companies have a great deal of confidential data (such as for customer demographics and marketing expenditures), and this data may hold clues for how the rate of attendance could be increased. By having a third party conduct the research, the theme park owners could allow additional research to take place while still protecting their own confidentiality.

Although the theme park companies in Southern California view each other as competitors, growth at each individual park is dependent on the growth within the industry as a whole. The industry faces competition from a wide variety of entertainment options. Today's consumers have many entertainment choices, including zoos, museums, beaches, shopping malls, video games and DVDs. Cooperation would allow the parks to learn from each others' experiences, and strengthen the entire industry.

INTRODUCTION

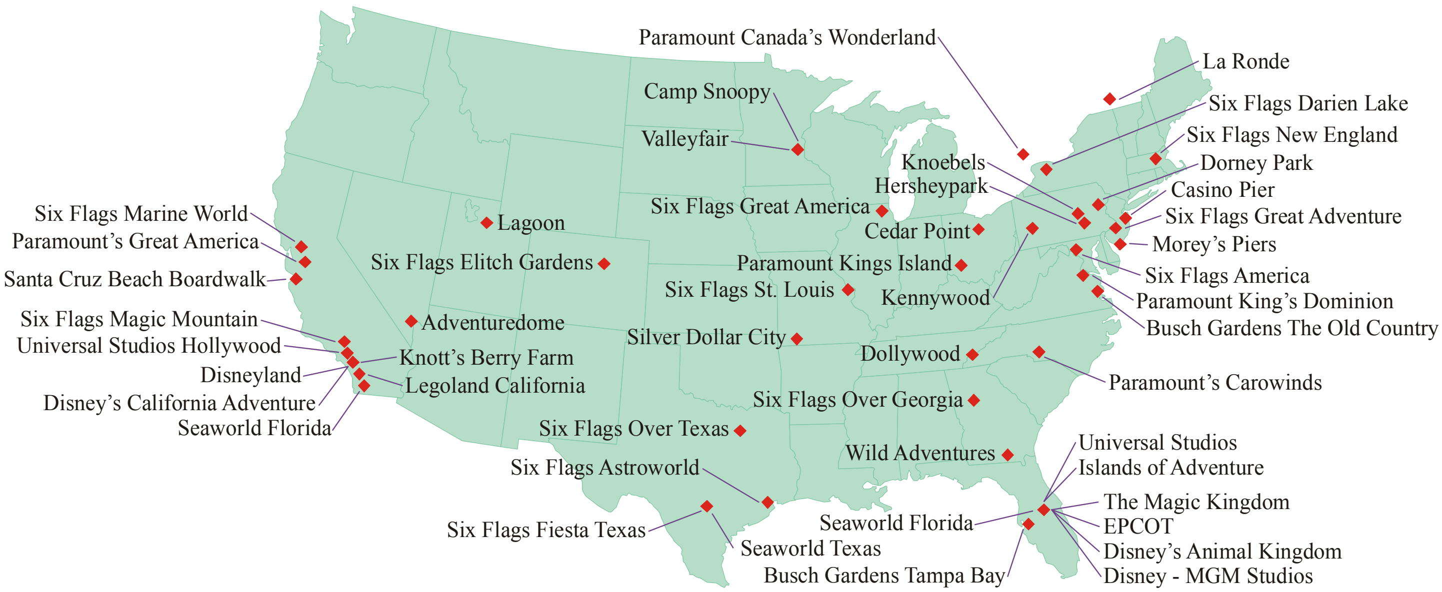
Late every December, the theme park industry looks with great interest to *Amusement Business* magazine to see the latest list of the top 50 parks' attendance levels. Attendance levels are a matter of great pride to competing parks, who hope that their latest new attraction will help them top the competition and move up the list. However, attendance is also a very serious issue for the parks, because their profits are strongly tied to attendance.

From fall 2004 through spring 2005 we conducted a research project to look deeper into the issues surrounding attendance levels at theme parks, focusing ultimately on attendance levels in Southern California. We generated a good predictive model for regional attendance and identified the most significant factors driving attendance. To help us understand the issue we also took a brief look at national attendance data (summarized in Appendix H.)

This paper begins with an overview of the theme park industry that explains why attendance is such an important issue. Next the full research project is described in detail, followed by the conclusions we reached. Finally, our report ends with suggestions for further research and recommendations for the theme park industry.

INDUSTRY OVERVIEW

Figure 1: Top 50 Theme Parks in North America, 2004[4]



THE THEME PARK INDUSTRY IN THE UNITED STATES

By the end of 2003, there were about 450 theme and amusement parks in the United States, generating annual revenue of $10.2 billion dollars.[5] Most of these parks are small, independently owned regional parks. They operate on a seasonal basis and attract consumers who live in the area. Nearly every midsize to large city has a theme park or amusement park nearby.

The largest theme parks in the country attract millions of visitors every year and have a longer operating season, with many remaining open year-round. They are often referred to as "destination" parks because they are tourist destinations, attracting some consumers who do not live nearby. The most popular destination parks are surrounded by tourist facilities such as hotels, restaurants, water parks, and golf courses. Although only a small percentage of the nation's theme and amusement parks are in the destination parks category, they account for nearly a third of overall industry revenues. (See Figure 2.)

Among the large parks the industry is highly consolidated, with six companies capturing 85% of the attendance of the top 50 parks (see Figure 3.) Appendix A lists the top 50 theme parks in North America and their owners.

[4] Source: *Amusement Business*. See Appendix A for a detailed list of the top 50 parks.
[5] Euromonitor, "Overview of North America Amusement Park Industry", 2004.

Figure 2: Breakdown of Revenues by Sector, 2003[6]

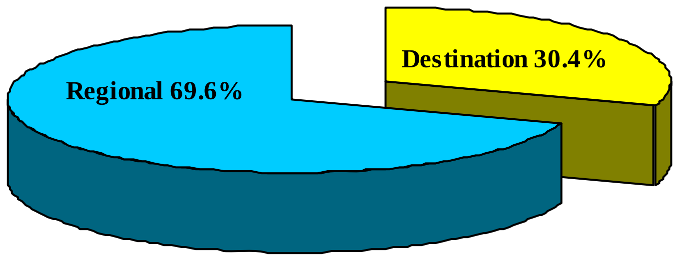
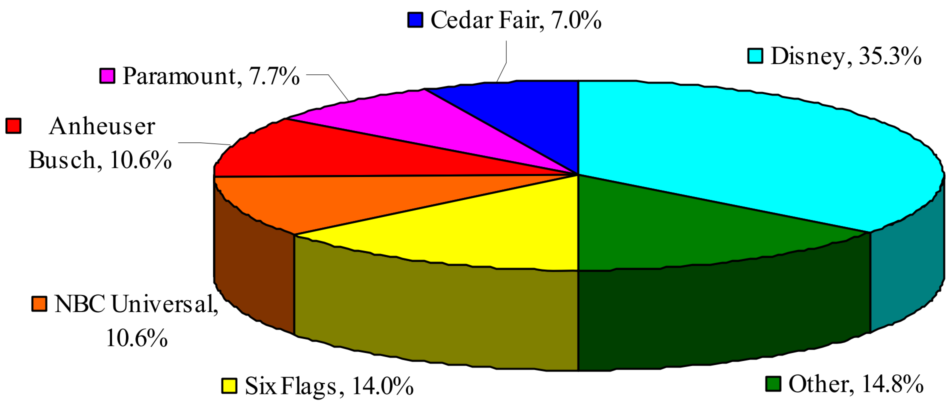


Figure 3: Breakdown of Attendance by Key Players, 2004[7]



THEME PARK CHARACTERISTICS

Both large and small theme parks have a similar financial structure and face challenges that are common throughout the industry. There are two primary concerns that affect theme park profits: attendance levels and the average revenue per customer. To understand why, it is important to consider the features shared by all theme and amusement parks.

Key Financial Characteristics

High Initial Costs. Building a small regional park costs at least $200 million[8] and a new destination theme park can cost as much as $1 billion.[9] Every new park that opens is already heavily in debt, and it can take ten years or more before the initial debt is recovered and the park becomes profitable.

[6] Euromonitor International, "Theme Parks in the USA", October 2004
[7] Calculation based on 2004 Attendance of National Top 50 Parks, published by Amusement Business. Dec, 2004.
[8] Euromonitor International, "Theme Parks in the USA", October 2004

Ongoing Capital Expenditures. Even after a theme park is built, the need for additional capital expenditures is constant. Without occasional new attractions, attendance will begin to decline.[10] The amount of capital investment required has increased in recent years, as consumers raised on a wide variety of entertainment options have raised their expectations. The expensive nature of the industry is one of the key reasons that major parks are owned by large companies with the resources to build attractions that will bring in a large number of customers.[11]

High Operating Leverage. Amusement parks have very high fixed costs. This goes beyond the costs of initial construction and ongoing capital expenditures, as even the costs for ongoing daily operations are largely fixed. To open the gates on any given day, a large labor force must be in place. Power and maintenance costs for attractions are the same whether the attractions are running full or half-empty. These fixed costs are the key to understanding the importance of attendance levels. If a park can not attract enough visitors, it loses money very quickly. However, once sales reach the breakeven point, each additional guest who enters the park contributes a high marginal profit.[12]

Other Significant Industry Characteristics

Large Cash Flows: Theme parks are a cash business, and parks typically carry a relatively low level of accounts receivable. Well managed theme parks maintain a negative cash cycle by collecting entrance charges in advance, collecting retail and food sales at the time of purchase, and then paying their suppliers over a much longer period. This negative cash cycle provides parks with working capital, and can act as a form of free financing. Today many parks encourage guests to buy their tickets online before they arrive at the park, allowing the park to capture the revenue long before the costs from that customer are realized.

Seasonal Effects: Attendance at theme parks is highly seasonal, tied to school holidays and the local climate.[13] Regional parks only open their gates during the summer, and the year-round destination parks have significantly lower attendance during the off-season. Many parks try to extend the summer season through Halloween-themed events in the fall.

Resilience to Economic Downturns: Historically, the industry has shown a strong ability to weather economic recessions.[14] Regional parks particularly fare well during an economic downturn, because families choose to visit local attractions rather than travel out of town on vacations. Destination parks are

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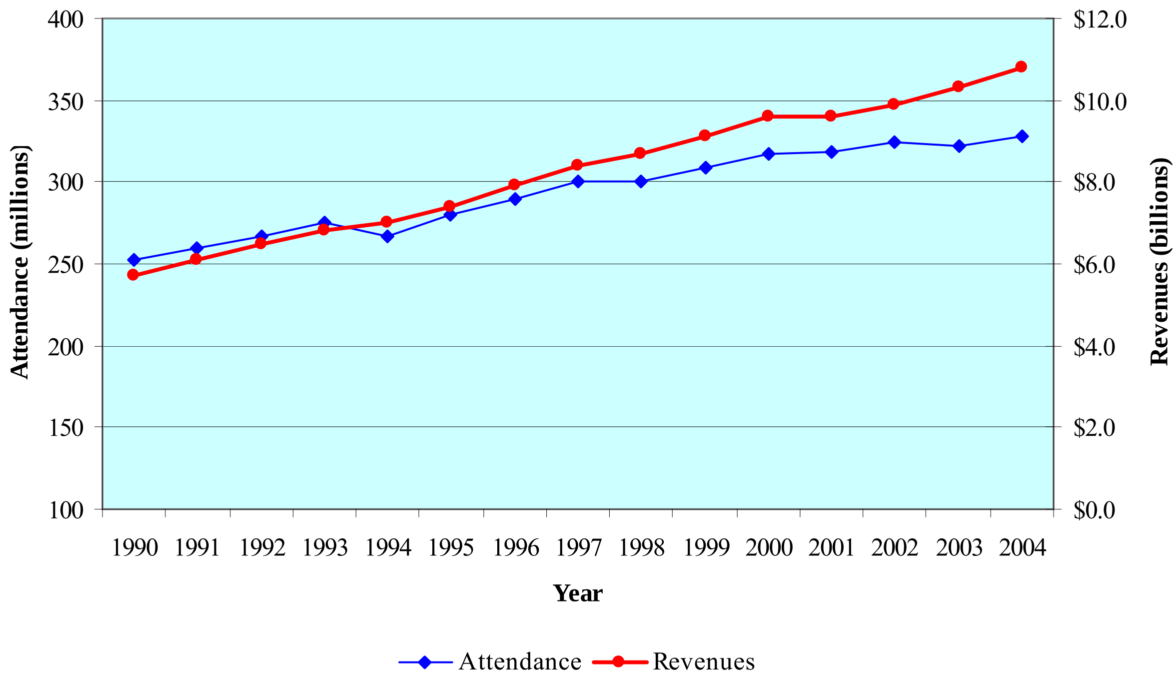
9 Wilson, Jim, "Outdoing Disney", *Popular Mechanics*, July 1, 1999.
10 Price, Harrison (Buzz), Walt's Revolution! By the Numbers, Orlando, Florida: VP Publishing, 2004.
11 Vogel, Harold L., Entertainment Industry Economics, New York: Cambridge University Press, 2004.
12 Vogel, Harold L., Entertainment Industry Economics, New York: Cambridge University Press, 2004.
13 See Euromonitor International, "Theme Parks in the USA", October 2004, and Price, Harrison (Buzz), Walt's Revolution! By the Numbers, Orlando, Florida: VP Publishing, 2004.
14 Price, Harrison (Buzz), Walt's Revolution! By the Numbers, Orlando, Florida: VP Publishing, 2004.

hit more heavily by a recession, but the impact is lessened by consumers who "downgrade" their vacation plans (for example, by choosing to go to Disney World instead of traveling to Europe.)

As an example, consider the recent economic recession, which was enhanced by the September 11th, 2001 terrorist attacks. The recession slowed the attendance growth the industry experienced during the 1990's. However, attendance continued to grow, albeit more slowly, and revenues continued to rise (see Figure 4.) A little over a year after the terrorist attacks, *Amusement Business* reported that the industry's fears had not been realized, and that 2002 had been a very normal year.[15]

Figure 4: Theme Park Attendance and Revenue in the United States, 1990 - 2004 [16]



[15] O'Brien, Tim, "2002: Third Best Season Ever for North American Amusement Parks" *Amusement Business* volume 114 Issue 51, December 23, 2002.
[16] "U.S. Amusement/Theme Parks & Attractions Industry – Attendance & Revenues", International Association of Amusement Parks and Attractions. (See www.iaapa.org/modules/MediaNews/index.cfm)

PROFIT DRIVERS

Profits for any company are impacted by both revenues and costs. For the theme park industry, cutting costs is difficult without compromising customer satisfaction and safety, so parks focus primarily on revenue as the driver of profits. Revenue can be broken down into two key components: attendance and revenue per customer.[17]

Attendance

Theme parks face very large fixed costs and relatively small variable costs. This means that costs are similar no matter whether attendance is very low or very high. A crowded park represents large revenues and therefore large profits, so attendance is always a top concern for theme park owners. Marketing, promotions, and the construction of new attractions are typically focused on attracting increased attendance to the park.

Revenue per Customer

Although every customer who enters the turnstiles represents revenue for the park, some individuals will spend more than others. Ticket sales typically represent around half of the revenue received from each customer, with most of the remaining coming from food and merchandise sales.[18] To increase revenues, parks seek to increase the revenue per customer through careful pricing as well as by marketing food and merchandise to consumers once they are inside the park.

Spending also varies according to the demographics of the customer. Tourists from outside the region typically spend more at a theme park than local visitors, with international visitors spending the most. Parks work to increase revenues by attracting more tourist visitors, for example by advertising in neighboring states.

[17] Vogel, Harold L., Entertainment Industry Economics, New York: Cambridge University Press, 2004.
[18] Euromonitor International, "Theme Parks in the USA", October 2004.

PROJECT OBJECTIVE

Attendance and revenue per customer are both important profit drivers for theme parks. We chose to research attendance issues for several reasons:

- Attendance interested us because it is a complex issue that goes beyond the efforts of each individual theme park.
- We could not find any published research on theme park attendance drivers.
- Published attendance data is available. To study revenue per customer we would have needed information on park revenues and customer demographics, which are confidential to the theme park companies.

THE SOUTHERN CALIFORNIA THEME PARK INDUSTRY

Our project focused on Southern California partly due to proximity, but also because the region is home to the second-largest concentration of destination theme parks in the world. There are seven large parks within just three California counties. The only larger concentration of parks is in central Florida, where seven parks are located just outside of Orlando, with an eighth just a short drive away in Tampa.

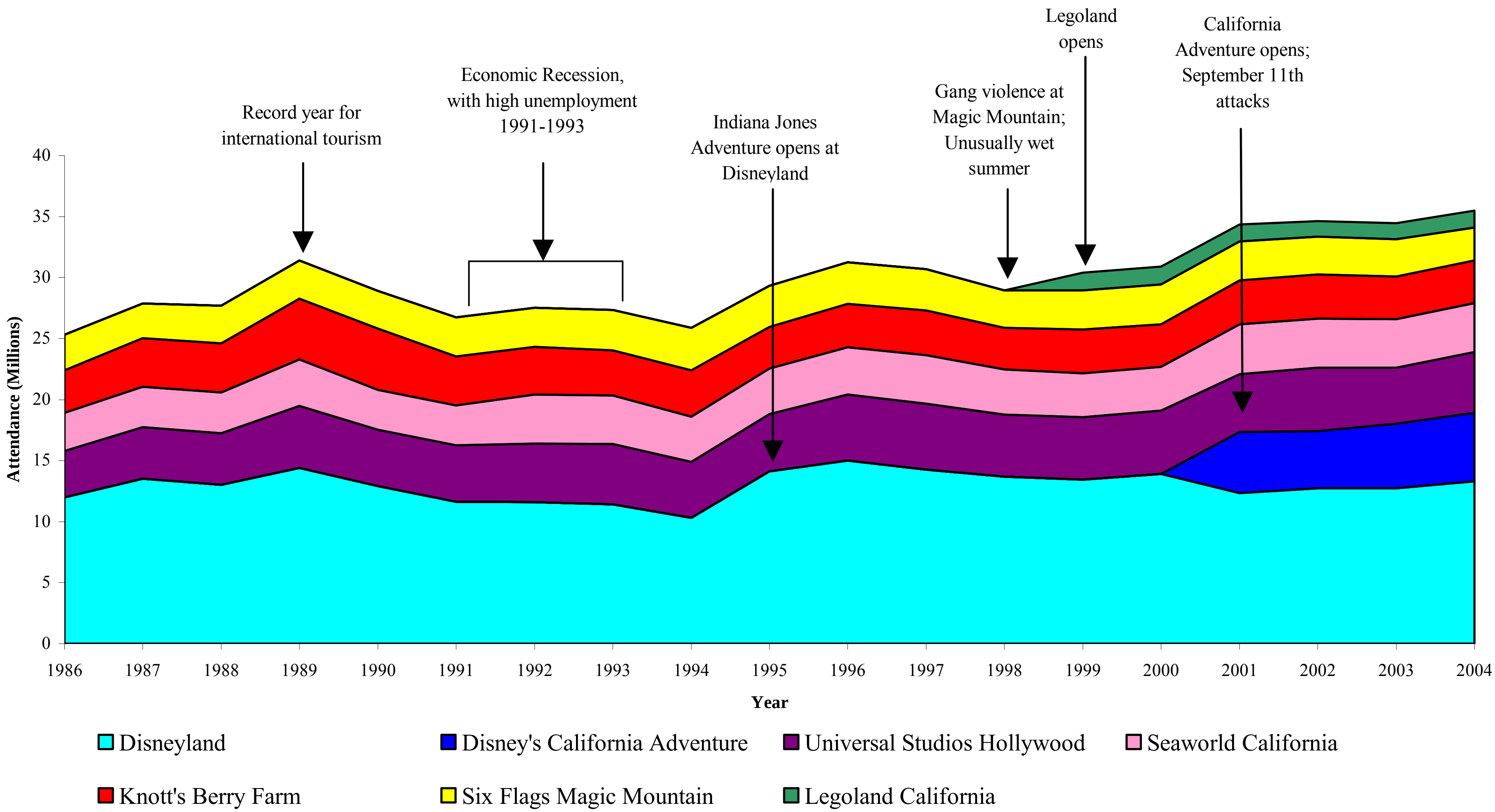
The seven parks in Southern California are listed in Table 1, and more information on each park can be found in Appendix B. Figure 5 shows a timeline of attendance patterns in Southern California, along with major events that may have impacted attendance.

Table 1: Theme Parks in Southern California[19]

Park	Owner	2004 Attendance[20]
Disneyland	The Walt Disney Company	13,300,000
Disney's California Adventure	The Walt Disney Company	5,600,000
Universal Studios Hollywood	General Electric	5,000,000
Seaworld California	Anheuser Busch	4,000,000
Knott's Berry Farm	Cedar Fair, L.P.	3,500,000
Six Flags Magic Mountain	Six Flags	2,700,000
Legoland California	The Lego Group	1,400,000
	Regional Attendance Total for 2004:	**35,700,000**

[19] For more information on each park, see Appendix B.
[20] Source: *Amusement Business*. See Appendix D for more information.

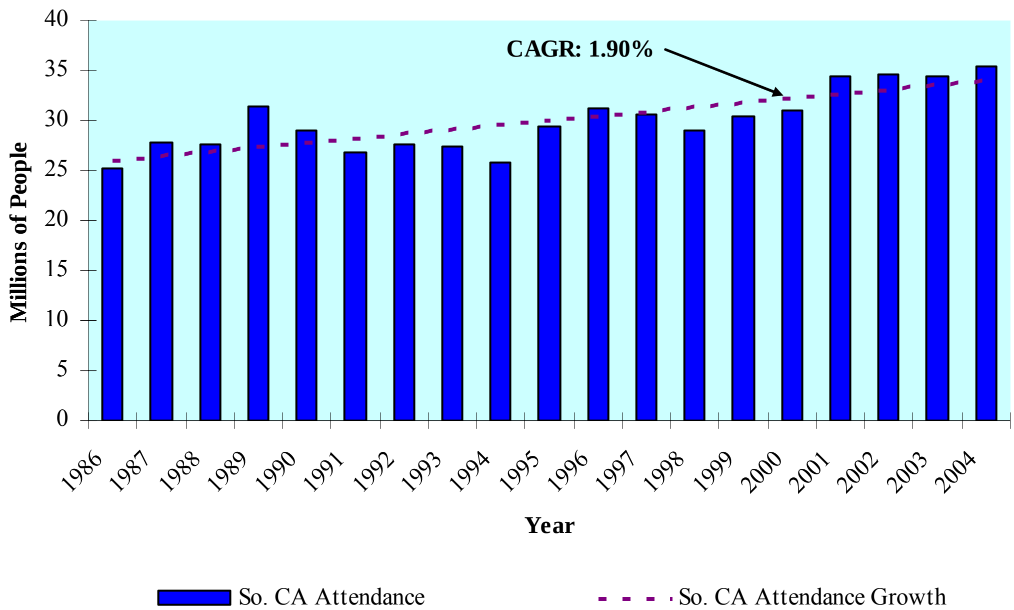
Figure 5: Southern California Theme Park Attendance



The Southern California parks are considered destination parks, entertaining a large number of local visitors while also attracting many out of town tourists. All seven parks are on the list of the top 50 theme parks in North America in terms of attendance.[21] They compete against each other for customers, but also compete with the wide variety of other California attractions such as zoos, aquariums, waterparks, museums and beaches.[22]

Southern California's theme parks have been facing stagnant growth both in terms of attendance and market share. Another reason to focus on this region is that a better understanding of attendance drivers might help the parks to increase growth. Over the past two decades, attendance has had a compound annual growth rate of just 1.9% (see Figure 6.)

Figure 6: Southern California Theme Park Attendance[23]

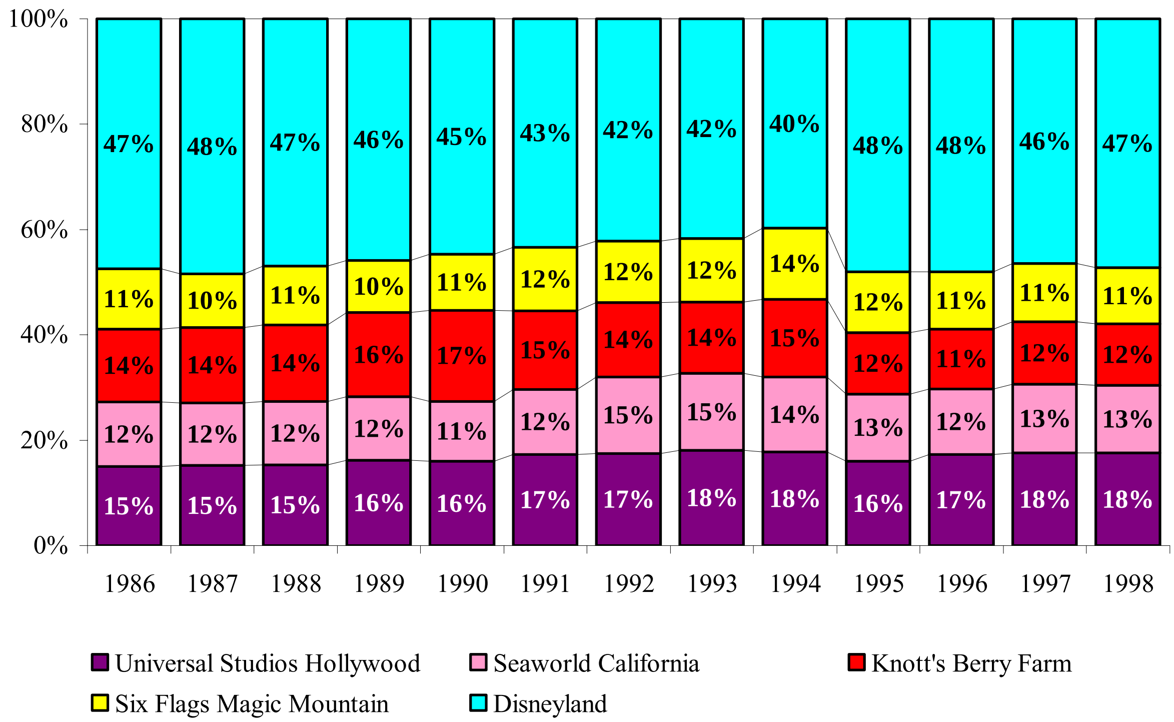


Market shares have also remained surprisingly constant. In the years 1986 through 1998 the region had just five theme parks, and Disneyland captured nearly 50% of market share. The rest of the market was split very evenly among the remaining four companies, with Universal Studios Hollywood doing slightly better than the others. (See Figure 7). The biggest fluctuation in market share occurred in 1995,

[21] Source: *Amusement Business*. See Appendix A for the full list of the top 50 parks.
[22] Although some of these attractions, such as the San Diego Zoo and the Aquarium of the Pacific, attract attendance numbers comparable to theme parks, our study was focused specifically on the theme park industry.
[23] See Appendix D for detailed attendance information and sources.

the year Disneyland opened its popular attraction *Indiana Jones and the Temple of the Forbidden Eye*. Disneyland's market share had been slipping in the early 1990's, and after the debut of the *Indiana Jones* attraction, its market share returned to the levels of the late 1980's.

Figure 7: Market Shares 1986-1988 [24]

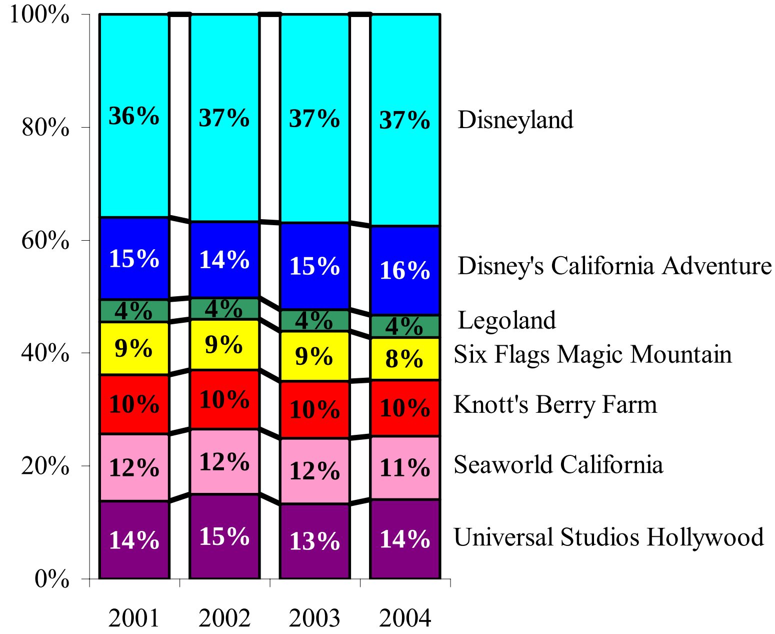


Legoland California opened to guests in 1999, and was soon followed by Disney's California Adventure in 2001. The years these parks opened, overall regional attendance grew, and most of the area's theme parks did not appear to be adversely affected by the increase in competition. The one exception was Disneyland, which had a drop in attendance when Disney's California Adventure opened up next door.

During the recent years with all seven parks in competition (2001 – 2004) market shares have been very consistent, as can be seen in Figure 8. With two parks, Disney now captures just over 50% of total market share. (A great deal of California Adventure's share appears to have come at the expense of Disneyland.) Legoland has consistently received 4% of the regional market, and the remainder of the market is still split fairly evenly among the remaining companies.

[24] Calculated from annual attendance. See Appendix D for attendance data and sources.

Figure 8: Market Shares 2001 - 2004[25]



SUMMARY

Attendance is one of the primary profit drivers for theme parks, and the theme parks in Southern California have been experiencing very slow growth in attendance. For any individual theme park, increases in attendance can come from two sources: from stealing market share from rival parks, or from an increase in regional theme park visits. In Southern California, no theme park has had great success in taking away market share from the others. Regional attendance growth has limited attendance growth for every theme park in the region.

Our project objective was to learn what influences total theme park attendance in Southern California. We used statistical analysis as a tool for analyzing what forces have the strongest impacts on attendance levels. We hope that this research will help the industry by helping to explain the slow growth in attendance.

[25] Market shares are split into Figure 6 and Figure 7 because of the substantial changes to the local theme park market between 1999 and 2001. In the years shown in Figure 7, there are more parks and higher theme park attendance, making it difficult to compare these market shares directly with the years shown in Figure 6.

BACKGROUND RESEARCH AND INTERVIEWS

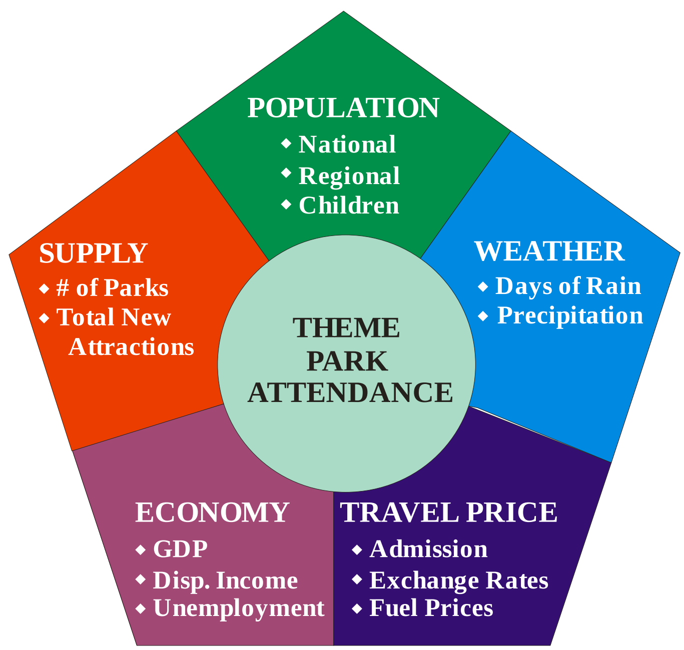
Learning more about the industry was the important first step of the project. Before investigating the influences on theme park attendance, we needed to determine what those influences might be. To familiarize ourselves with the theme park industry we reviewed books, industry periodicals, websites, financial analyst reports and marketing reports. We also looked at some research on the casino industry to see what similarities might exist. A bibliography of useful resources is contained in Appendix C. This research helped us gain a solid understanding of the financial structure of theme parks and the reasons why attendance is so important to profits. We also began generating a list of factors that may affect attendance.

To add to our understanding of the local theme park industry in Southern California, we conducted interviews with managers from Disney, Universal Studios, and Legoland. For each firm we were able to speak to one or two managers in either marketing or operations. We also spoke to two consultants who work for a firm that has done extensive work for theme park owners around the world. (To protect the subjects of our interviews, all of the individuals we spoke to remain confidential.)

The interviews confirmed what we had learned from reading about the overall theme park industry, and helped us to understand the competitive atmosphere of the local theme park industry in California. In every interview, we asked what factors are most important to driving theme park attendance. The factors most commonly cited by theme park managers as being very important to attendance were the state of the economy, weather, and new attractions.

The result of this stage of research was a list of potential factors that might influence theme park attendance. These factors fall into 5 categories: population, weather, travel costs, the state of the economy, and supply-side factors such as new attractions. These potential attendance indicators are summarized in Figure 9.

Figure 9: Potential Factors Influencing Theme Park Attendance



DATA COLLECTION

The next step in the project was to collect data for all of the variables identified. This was the most time consuming stage of the project, because data came from many different sources. This section contains a summary of the data collection effort, and more details are in Appendices D and E.

Attendance

Amusement Business, an industry publication, publishes attendance estimates every December for the top 50 theme parks in North America. This list conveniently includes all seven parks in Southern California. They obtain their data through interviews with contacts at each park, and the result is considered fairly reliable. (Other publications often quote the Amusement Business estimates, including the Wall Street Journal.[26]) Please see Appendix D for more information.

It is unlikely that the attendance estimates published in Amusement Business exactly match actual attendance. Parks may have incentives to exaggerate or deflate their attendance estimates, depending on their individual circumstances. However, it is reasonable to expect that the amount of error in the estimates is fairly random, when considering many parks over a long period of time. As long as the results from the statistical analysis are strong, these random errors in the data will not impact the conclusions.

In the time available for this project, we were only able to obtain complete attendance information for the past 19 years (1986 – 2004).

Demand Factors

Population size, weather, and the economy all may influence the theme park visitation, although these factors are completely uncontrollable by the parks themselves. For all three of these categories of factors, published government data was available. Population information came from the United States Bureau of the Census. Economic data was from the United States Department of Commerce and the United States Department of Labor. Weather data came from the National Climatic Data Center. For full details on all of the data sources, see Appendix E.

Price Factors

To create a measure of the price consumers pay to visit a theme park, adult ticket prices were collected from newspaper articles in Southern California. Local newspapers frequently report on special events or new shows and attractions at the theme parks, and almost always list the admission prices. Many, if not most, theme park visitors do not pay the adult ticket price. Annual pass holders pay less on a

[26] One recent example where the Amusement Business estimate was cited: Hwang, Suein, "Cracking the Code at Disneyland", *Wall Street Journal*, December 23, 2004.

per-visit basis, children pay less than adults, and many visitors are able to use coupons or take advantage of promotions. However, the adult ticket price should be a good proxy for the actual average price paid to enter a park.

Beyond ticket prices, there are some additional costs faced by theme park visitors. The price of fuel affects the transportation cost to get to a park, whether by car or by plane. Exchange rates can be another measure of the cost of a theme park visit. A weak dollar should increase theme park attendance not only by making it cheaper for international visitors to visit the United States, but by also encouraging domestic tourists to remain within the country. (Visiting a theme park becomes "cheaper" than leaving the country.) Fuel price and exchange rate data were obtained from U.S. Department of Energy and the Federal Reserve.

We considered using the Travel Price Index which is published annually by the Travel Industry Association of America. This index takes into account the prices of both transportation and lodging to summarize how the price of taking a vacation changes over time. However, in a preliminary analysis looking at national attendance data, the travel price index had an extremely strong <u>positive</u> correlation with theme park attendance. (See Appendix H for more information on our analysis of national data.) Increased levels of tourism may drive up both theme park attendance and the prices that travel providers (particularly hotels) can charge. In other words, the Travel Price Index probably does not impact theme park attendance, but instead is affected by the same factors which drive theme park attendance.

Detailed information on sources for pricing variables can be found in Appendix E.

Supply Factors

To create a measure of the supply of theme park entertainment available to consumers each year, we collected data on the total number of parks that existed each year, and on the total number of new attractions that opened each year.

The total number of new attractions was used to reflect the appeal of a theme park visit in any given year. During a summer with a lot of brand new attractions, there will be a lot of theme park marketing, and new attractions should increase the number of people who want to visit theme parks.

In an effort to strengthen this factor, we also created a "weighted new attractions" variable. Each new attraction was multiplied by a subjective measure between 1 and 5, based largely on the type of attraction (for example, new thrill rides were weighted higher than new shows.) Weights were also partly determined by attraction ratings published by Theme Park Insider.[27] More details on the New Attractions and Weighted New Attractions variables can be found in Appendix E.

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[27] See www.themeparkinsider.com. This site allows registered members to rate theme park attractions.

ANALYSIS METHODOLOGY

We used statistics to investigate the relationships between independent variables (population, economic, supply, travel prices and weather) and the dependent variable (theme park attendance.) We followed a three-step analysis process, which is detailed below.[28]

STEP ONE: CORRELATIONS ANALYSIS

A correlation statistic measures the tendency of two variables to move together. Positive correlations indicate that when one variable goes up, the other variable usually goes up, and negative correlations indicate that when one variable goes up, the other usually goes down. The magnitude of the statistic measures how closely correlated the variables appear to be. A large value for the correlation statistic tells you that when one variable changes in a large or small way, the other variable changes in a similarly large or small way.

Correlations were a useful way for us to gain a basic understanding of what variables might have the strongest ties to attendance. We used *XL-Stat Pro 7.0* software to calculate a table of correlations relating every possible pair of variables. (An example of the software output can be seen in Appendix F, Table F-1.)

This software also provided us with a table of p-values. These values come from a statistical test that measures how likely it is that a correlation actually exists between two variables. This test takes into account how many individual data points are used, because if there aren't enough data points, there is a strong chance that the correlation is just due to random luck. (Our analysis included 19 years of data, because we could only find full attendance data for 19 years.) An easy way to interpret these p-values is to subtract them from 1 and then convert into a percentage. For example, a p-value of 0.40 would convert to 60%, indicating that you are 60% sure that a correlation actually exists between the two variables (leaving you with a good possibility that your apparent correlation is nothing more than luck.)

STEP TWO: NARROWING DOWN THE LIST OF VARIABLES

Using the results from Step 1, we narrowed down the list of variables within each category. (Without shortening the list of variables, the next step of analysis would have taken much longer.) We considered several different issues while reviewing the variables:

- How strong were the correlations found in step 1?

[28] Special thanks to Professor John Mamer, UCLA Anderson School of Management, Department of Decisions, Operations and Technology Management, for advising us on the analysis stage of our project.

- Which variables are highly correlated with each other? If several variables are strongly related (such as all of the population variables), it isn't necessary to keep all of them on the list. We chose the best two or three.
- What makes the most sense, based on our knowledge of the industry? A small difference in correlation between two variables is not really significant, so we sometimes chose a slightly weaker variable if it should have a stronger tie to attendance.

STEP THREE: REGRESSION ANALYSIS

In the final step of analysis we generated a simple linear model of theme park attendance, using the following basic equation format:

$$\text{Attendance} = \beta_0 + \beta_1 (x_1) + \beta_2 (x_2) + \beta_3 (x_3) \ldots + \beta_n (x_n)$$

Where $\beta_0 \ldots \beta_n$ represent the model coefficients, and $x_1 \ldots x_n$ represent the independent variables.

To design an attendance model, we ran over 25 investigative regressions with *Regress 1.9* software, using different subsets of between 1 and 5 variables. (At most we included one variable per category.) The different potential regressions were compared using the R^2 and Adjusted R^2 statistics. R^2 measures the ability of the model to predict the actual attendance. For example, an R^2 of 0.72 would indicate that the model predicts 72% of the annual variation in attendance.

Better models will have a higher R^2 value; however models that use more variables will tend to have slightly higher R^2 values. To compare models with different numbers of variables, we looked at the Adjusted R^2 statistic, and ultimately the best model was the one with the highest Adjusted R^2.

After finding the model with the best Adjusted R^2, we evaluated additional statistical tests to evaluate the quality of this model. The best model was also reviewed subjectively, to make sure that the variables being used were logical, given our understanding of the dynamics of the industry.

ANALYSIS OF SOUTHERN CALIFORNIA THEME PARK ATTENDANCE

SOUTHERN CALIFORNIA ATTENDANCE MODEL

After collecting data for population, economic, weather, supply and pricing factors, we began exploring whether this data could be used to generate a good model of theme park attendance in Southern California. First we calculated correlation statistics and p-values for each pair of variables. (Full results are in Appendix F.) Using this information the choice of variables was narrowed down, as described below.

Evaluation of Variables Within Each Category

Population: We calculated correlations with five measures of population (See Table 2). All of the population measures are highly interrelated, so only one will be used in the final model. We chose total California population and the California youth population as the best variables to consider for the final model.

We eliminated the regional population variable, which had a correlation level very similar to that of California population. Of these two variables, total California population was the more logical choice because of the large number of local visitors to California's theme parks. We chose California Youth over California Teens because the difference in correlation was only 0.12, and the Youth measure is a better overall choice because some of the local parks are more focused on children than on teenagers.

Table 2: Correlations of Population Variables with Southern California Attendance

Variable[29]	Correlation	P-value	Summary
Total California Population	0.808	0.000	HIGH
Total Regional Population[30]	0.817	0.000	HIGH
California Children (age 0 – 9)	0.438	0.074	Medium
California Teens (ages 10 – 19)	0.841	0.000	HIGH
California Youth (ages 0 – 19)	0.720	0.002	HIGH

[29] See Appendix E for data sources and more information on each variable.
[30] Regional population includes Washington, Oregon, California, Nevada and Arizona.

Economy: The GDP per capita[31] and the disposable income per capita numbers were all strongly correlated with one another and with theme park attendance (See Table 3). Interestingly, these values were also strongly correlated with population[32], with the U.S. economy growing along with the growth in the population. This posed a collinearity problem, forcing us to choose between using one of these economic variables and using one of the population variables. We eliminated the regional disposable income per capita variable from further analysis, because its correlation level was so similar to that of the California variable.

Interestingly, the unemployment measures had a relatively weak correlation with the other economic variables. This means that they also have a weaker correlation with population, and do not pose the collinearity problem of the other economic variables, making them potentially valuable to the final model. Because of this, we chose to keep considering both unemployment measures, despite their relatively lower correlation with attendance. It certainly seems very likely that unemployment would directly impact a consumer's decision whether to visit a theme park.

Table 3: Correlations of Economic Variables with Southern California Attendance

Variable[33]	**Correlation**	**P-value**	**Summary**
U.S. Gross Domestic Product per Capita	0.840	0.000	HIGH
United States Unemployment Rate	(0.479)	0.050	Medium
California Unemployment Rate	(0.396)	0.106	Medium
California Disposable Income per Capita	0.792	0.001	HIGH
Regional Disposable Income per Capita[34]	0.823	0.000	HIGH

[31] Although California Gross State Product (GSP) might have been a better economic factor for our study than United States Gross National Product (GNP), good GSP data is not available. There was a discontinuity in the method of measuring GSP for the years prior to and after 1997. In addition, data is only currently available through 2002, with estimates of the 2003 value. The data is obtained from the U.S. Department of Commerce, Bureau of Economic Analysis, which warns that the data prior to and after 1997 can not be used together.

[32] This appears to be a common phenomenon worldwide. See Delong, Bradford, "Estimating World GDP, One Million B.C. – Present", May 1998.
Available at: www.j-bradford-delong.net/TCEH/1998_Draft/World_GDP/Estimating_World_GDP.html

[33] See Appendix E for data sources and more information on each variable.

[34] Regional number includes Washington, Oregon, California, Nevada and Arizona.

Weather: All of the weather variables had weak or nonexistent correlations with attendance (See Table 4). However, we chose to continue considering weather as a potential variable because it is unrelated to any other factors, and because many people in the industry seem to believe that weather is strongly tied to attendance. We narrowed down the choice of variables to total days of rainfall and annual inches of precipitation.

Table 4: Correlations of Weather Variables with Southern California Attendance

Variable[35]	Correlation	P-value	Summary
Total Annual Precipitation	(0.212)	0.390	low
Total Summer Precipitation	(0.166)	0.501	low
Annual Days of Rainfall	(0.311)	0.206	Medium
Summer Days of Rainfall	(0.002)	0.993	low

Supply: All three supply variables were highly correlated with one another, and only one could be included in the final model. The strongest correlation is with the total number of theme parks (See Table 5). We chose to keep under consideration the number of theme parks and the number of new attractions. Although the weighted new attractions measure showed a slightly higher correlation than the total number of new attractions, we chose to use the more objective measure because the difference in correlation strength was fairly small.

Table 5: Correlations of Supply Variables with Southern California Attendance

Variable[36]	Correlation	P-value	Summary
Number of Theme Parks	0.850	0.000	HIGH
Number of New Attractions	0.353	0.151	Medium
Weighted New Attractions	0.417	0.089	Medium

[35] All weather variables are for weather in Los Angeles, Orange, and San Diego counties. See Appendix E for data sources and more information on each variable.
[36] See Appendix E for data sources and more information on each variable.

Travel Prices: Travel prices would normally be expected to have a negative affect on theme park attendance. However, all of the price factors showed a positive correlation with attendance (See Table 6). This may simply mean that any negative effect of higher prices is relatively small compared to positive effects from other variables, such as population or the economy.

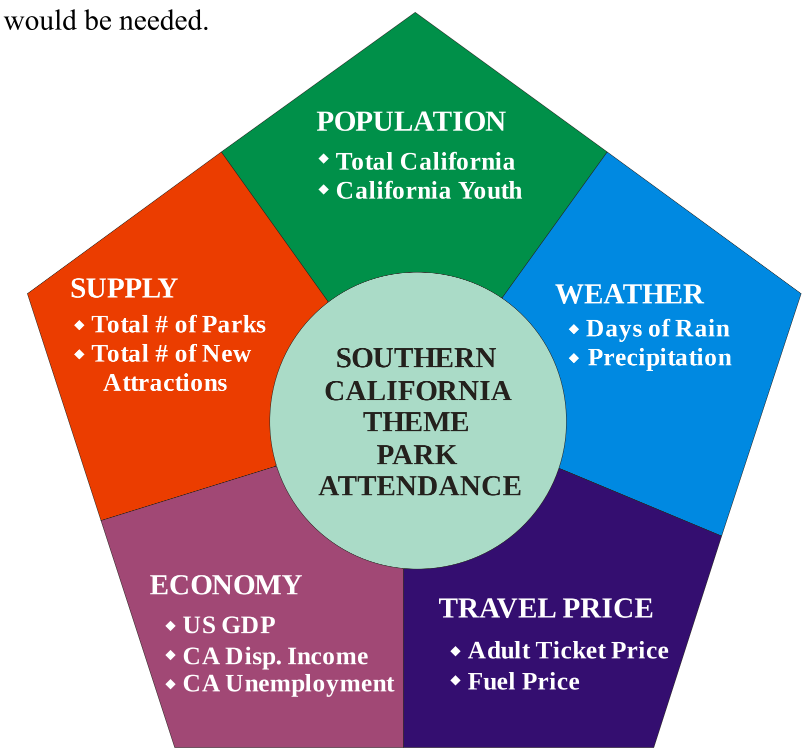
We chose to continue considering the fuel price and adult ticket price variables. This allowed us to use the regression analysis to evaluate whether they have any impact, once the influence of other variables is taken into account. The exchange rate variable was removed from consideration because it is strongly correlated to economic as well as population factors, which would raise issues of collinearity in the model.

Table 6: Correlations of Travel Price Variables with Southern California Attendance

Variable[37]	Correlation	P-value	Summary
Average Adult Ticket Price	0.786	0.001	HIGH
Fuel Price	0.336	0.172	Medium
Exchange Rate index	0.550	0.024	Medium

After finishing this analysis of correlations, we were left with a shorter list of variables to consider in the next stage of analysis (see Figure 10). Narrowing down the list was important because it reduced the number of experimental regressions that would be needed.

Figure 10: Potential Variables Considered for Southern California Attendance Model



[37] See Appendix E for data sources and more information on each variable.

Regression Analysis

In the next step of analysis, we used *Regress 1.9* software to calculate linear regressions on different subsets of variables. The goal of this step was to find the best possible model of theme park attendance in Southern California. We ran experimental regressions with anywhere between one and five variables, using at most one variable from each of the five main categories.

The best attendance model was a three-variable model using California population, California unemployment, and the total number of theme parks. This model has an R^2 value of 0.81, indicating that it successfully predicts 81% of the annual variation in Southern California theme park attendance. Adding weather or pricing variables to the model consistently made it worse, as can be seen in Table 7. Although adding these variables did increase the basic R^2 of the model, they lowered the Adjusted R^2 value. This indicated that these variables are not really improving the model, that instead the slight increase in R^2 was due to using four and five variables instead of just three.

Table 7: Comparison of Regression Results

Variables	R^2	**Adjusted** R^2
CA Population, CA Unemployment, # of Parks	0.810	0.772
CA Population, CA Unemployment, # of Parks, Rain Days	0.819	0.767
CA Population, CA Unemployment, # of Parks, Rain Days, Fuel Prices	0.826	0.759

The best, three-variable model for attendance is:

Attendance (in millions) = 7.8

- 53.6 x California unemployment rate
+ 0.6 x California population (in millions)
+ 1.5 x Total number of theme parks in the region

A variety of issues were considered in evaluating the quality of this model:

<u>T-tests on the coefficients:</u> For each variable in the model, we evaluated a statistical test that checks the level of confidence that any particular coefficient is not actually zero. This allows us to say how confident we are that a particular variable is contributing to the model, given that we are only looking at 19 years of data. The software output for t-statistics and corresponding p-values were checked, and all of the variables look good. The weakest value is for the Number of Parks variable, where we are 91.4% confident that the variable is contributing to the model.

In the 4 variable and 5 variable models, where weather and fuel prices were included, there were a number of poor p-values. This confirmed that these models were weaker than the 3-variable model.

Collinearity: A correlation table was checked to evaluate whether there are issues of collinearity in the model. Two variables that are too highly correlated can weaken the model, because they affect the model in similar ways. The highest level of correlation in the model's variables was between California Population and the Number of Parks. (See Table 8.) The good t-tests on the coefficients for both of these variables reassure us that there is not enough collinearity to cause serious problems with the model.

Table 8: Correlations of Variables in the 4-Variable Attendance Model

	CA Unemployment	CA Population	Number of Parks
CA Unemployment	1.000		
CA Population	-0.074	1.000	
Number of Parks	-0.295	0.820	1.000

Durbin-Watson Test: A final test was to evaluate the Durbin-Watson statistic. In a time-related data series such as ours, it is very possible for delayed reactions to have an effect. For example, high unemployment in one year could lead to lower attendance in the following year, if it affects people's travel plans for the upcoming year. The Durbin-Watson statistic is a measurement that helps us to evaluate whether this problem exists. For the three variable model, the Durbin-Watson Statistic was calculated as 1.57. This value is borderline[38], so we also looked at the calculated measures of autocorrelation for the model, all of which looked fine. We concluded that it is unlikely that a time-shift problem exists.

Regression Interpretation

Although we now have a good model for theme park attendance in Southern California, what use does it have? A natural question to ask about a model such as this one is how important one variable is when compared to another, but this can be hard to determine. For example, in the model unemployment is multiplied by 53.6, while population is multiplied by just 0.6. However, this does not mean that unemployment is 100 times more important than population in driving theme park attendance, because

[38] At 95% certainty, values between 1.68 and 2.32 would be good, while values between 0.97 and 1.68 are unclear. See Aczel, Amir, Complete Business Statistics, San Francisco: McGraw-Hill/Irwin, 2002.

the variables that are input have completely different orders of magnitude. (Unemployment is measured as a percentage, varying from 0.04 to 0.075, while population (in millions) is in the range of 26 to 36.)

Unfortunately, there is no statistically definitive way to state whether a variable is more important than another. However, there are several analysis methods that can provide some helpful insights.

Exploratory Regressions: We calculated a series of regressions in which we progressively removed variables from the regression. Using the same subset of four variables, we looked for the best 1-variable and 2-variable models we could find. The results are summarized in Table 9. Using population alone, a model could explain 65% of the annual variance in attendance. Adding the unemployment variable increased the predictive ability of the model to 77%, and the number of parks variable raised it to 81%. This analysis suggests that population is the most important factor, followed by unemployment and the number of parks.

Table 9: Exploratory Regressions

Model	R^2	Adjusted R^2
CA Population	0.654	0.633
CA Population + CA Unemployment	0.767	0.738
CA Population + CA Unemployment + Number of Parks	0.810	0.772

Partial F-Tests: Calculating partial F-tests can help us to understand the relative significance of each variable in the finished regression equation. To calculate this test, a series of regressions are run, and each time one of the original variables is removed. The partial F-test offers a measurement of how much worse the regression gets when a certain variable is removed. In other words, the larger the partial F-test statistic, the more important the variable is to the model. For the four-variable model of attendance, the partial F-statistics for the variables are listed in Table 10. Population appears the most significant, followed by unemployment and the number of parks.

Table 10: Partial F-Statistics

Variable	Partial-F Statistic
California Population	5.06
California Unemployment	3.91
Number of Parks	3.38

Standardized Regression Coefficients: Another way to assess the relative importance of variables in a regression is to standardize all of the variables before calculating the regression coefficients. Each data point is standardized by subtracting the mean and dividing by the standard deviation. The resulting regression coefficients represent how much attendance changes when a variable changes by one standard deviation. A larger coefficient (absolute value) suggests that a variable is more significant. (See Table 11) Just as before, population is the most important, but this analysis puts the number of parks just above unemployment in importance. This may be partly because there is so little variation in the number of parks – every year there were 5, 6, or 7 parks.

Table 11: Standardized Regression Coefficients

Variable	Coefficient
California Population	.465
Number of Parks	.397
California Unemployment	.245

Summary

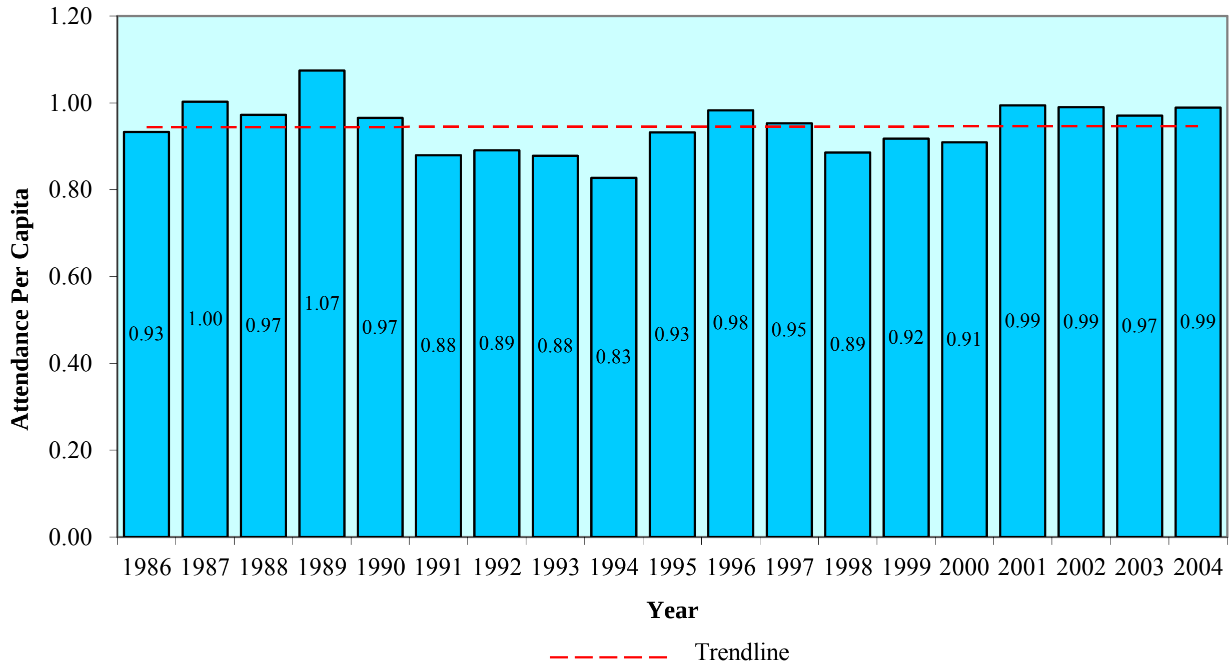
Our analysis suggests strongly that population is the most important factor for predicting Southern California theme park attendance. The second most important factor is unemployment, followed by the number of parks. Weather and price factors are the least important indicators for theme park attendance, and made no significant contribution to the model.

Growth in theme park attendance in Southern California appears to be strongly linked to population growth. Annual fluctuations up and down are influenced by the unemployment rate and the number of parks that are open. There may be unidentified factors that also influence annual attendance, and some of the variation in attendance levels will be due to random fluctuations. However, just three variables (California population, California unemployment and the number of parks) do an excellent job of predicting theme park attendance for each year.

SOUTHERN CALIFORNIA ATTENDANCE-PER-CAPITA MODEL

The Southern California attendance model made it clear that attendance growth has been heavily driven by population growth over the past two decades. A calculation of visitors per capita[39] revealed that attendance has fluctuated around an average of 0.94 visits per person per year, as can be seen in Figure 11. There has been very little change from year to year. (The data has a standard deviation of just 0.058.)

Figure 11: Southern California Theme Park Attendance per Capita



Population growth will always remain slow and fairly predictable, so it would be extremely valuable to the theme park industry to gain an understanding of how to affect the number of visits per capita. It seems unlikely that the industry could obtain much growth without finding a way to encourage consumers to visit theme parks more often. We repeated the analysis using attendance per capita, to see if we could find any insights into this issue.

Correlations Analysis

We began by calculating correlations with attendance per capita and p-values for each variable. None of the variables had a strong correlation. The strongest potential factor was California

[39] Attendance per capita was calculated as Southern California attendance divided by total California population.

Unemployment, with a correlation of -0.589. A summary of the best correlations is included in Table 12, and the full table of correlations is included in Appendix G.

Table 12: Best Correlations with Southern California Attendance per Capita

Variable[40]	Correlation	P-value
California Unemployment	(0.589)	0.015
Annual Rainfall Days	(0.465)	0.057
Annual Precipitation	(0.397)	0.106
Fuel Prices	0.336	0.171
Number of Parks	0.303	0.217

Regression Analysis

Using this list of variables, we looked for the best possible regression model. The results are shown in Table 13. The best model includes just two variables, California unemployment and fuel prices. The best three-variable model we could find adds the total number of rain days. Full statistical reports on these models are included in Appendix G.

Table 13: Exploratory Regressions

Model	R^2	Adjusted R^2
CA Unemployment	0.347	0.308
CA Unemployment + Fuel Prices	0.422	0.350
CA Unemployment + Fuel Prices + Rain Days	0.452	0.343

The best, two-variable model for attendance per capita is:

Attendance per capita = 0.91

- 2.32 x California unemployment rate

+ 0.14 x Fuel price (in 1995 dollars)

This analysis supports the previous finding that population is extremely important to theme park attendance, and that unemployment is also important. It was interesting to find that fuel prices have a positive effect on attendance per capita. This could indicate that higher fuel prices keep people closer to home, increasing attendance from local visitors. However, the t-test for the significance of the fuel price

[40] See Appendix E for data sources and more information on each variable.

variable gives us only an 82% confidence that fuel prices are actually influencing the model, so there is a chance that this result was simply random.

Summary

Unemployment appears to affect attendance per capita, and it seems likely that higher fuel prices have a positive effect. Unfortunately, the best model for attendance per capita is capable of predicting only 42% of the annual variation. This means that the remainder of the fluctuation is affected by factors which we have not been able to identify, or by random fluctuations. Part of the problem with analyzing attendance per capita may be that it has varied very little over the past few decades.

CONCLUSIONS

Our statistical analysis and research allowed us to make four well-supported conclusions:

- Population growth drives attendance growth, while economic factors cause annual variations
- Weather has a minimal impact on attendance
- Prices are not deterring attendance
- The industry has many misconceptions regarding theme park attendance

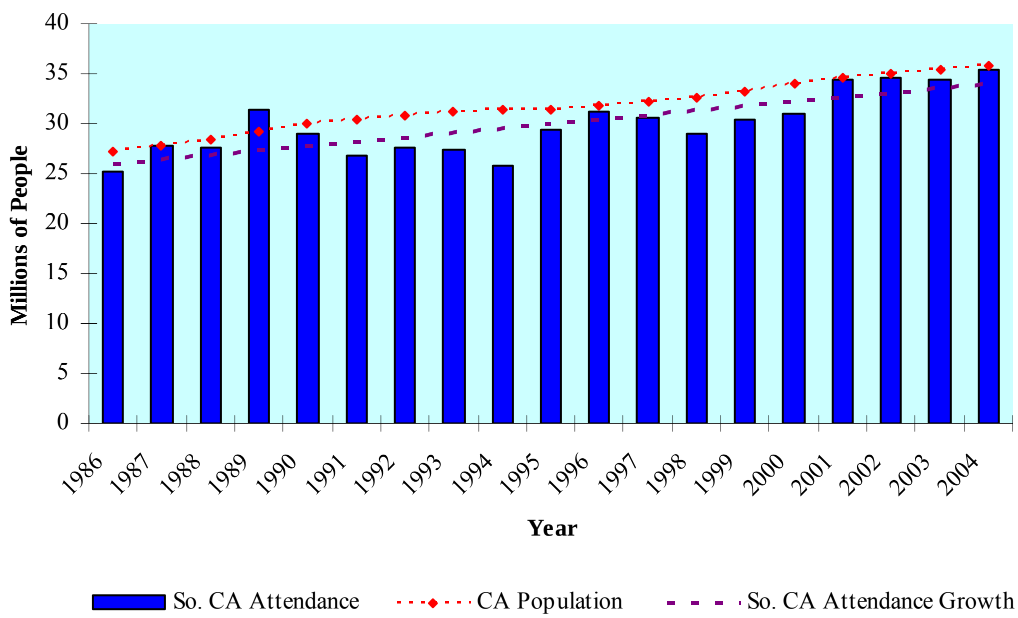
We also noticed some interesting findings during the course of the project, which have less statistical support than our conclusions, but offer interesting insights into the theme park industry. This section discusses our conclusions and findings in detail.

CONCLUSION ONE:

Population Growth drives Attendance Growth, While Economic Factors Cause Annual Variations

The most striking result throughout the analysis is the strong link between population growth and theme park attendance growth. The impact of population size is strong not only in Southern California, but also across the nation, as found in a preliminary look at national theme park attendance (see Appendix H for more information.) Figure 12 illustrates how the growth of Southern California theme park attendance has mirrored California's population growth over the past two decades.

Figure 12: California Population and Theme Park Attendance



For Southern California attendance, just two variables predicted 77% of the annual variation in attendance: the population of California, and the California unemployment rate. For national attendance, a similar pair of variables predicted an astonishing 96% of annual variation: the U.S. youth population and U.S. unemployment.

We conclude that growth in theme park attendance is firmly tied to population growth. Consumers visit theme parks on a periodic basis, with some visiting more frequently than others. The frequency of visits is affected slightly by the state of the economy, with unemployment in particular affecting whether a particular year is relatively good or bad.

This is bad news for the industry, because overall growth is constrained by the slow growth in population. Any faster growth in profits would have to come from increased revenue per customer, or by finding a way to convince people to visit theme parks more frequently.

CONCLUSION TWO:

Weather Has a Minimal Impact on Attendance

- "Traditionally weather is the No. 1 factor in park attendance" – Susie Storey, spokesman for the International Association of Amusement Parks and Attractions.[41]
- "When the rain rain rain comes down down down, the outdoor segment of the out-of-home entertainment industry often sees profits washed down the drain gutter" – James Zoltak, *Amusement Business*[42]
- "… our core season difficulties were a direct result of the aberrant weather we experienced." – Six Flags 2000 Annual Report. [43]
- Bad weather was cited as one of the reasons that Disney's California Adventure had a disappointing first six months after its grand opening.[44]

During interviews with theme park managers, weather repeatedly came up as an important factor affecting attendance, and we ran across a large number of articles linking weather to attendance. Given the certainty within the industry that weather is a major factor, we were surprised to find no evidence that weather affects annual attendance in Southern California.

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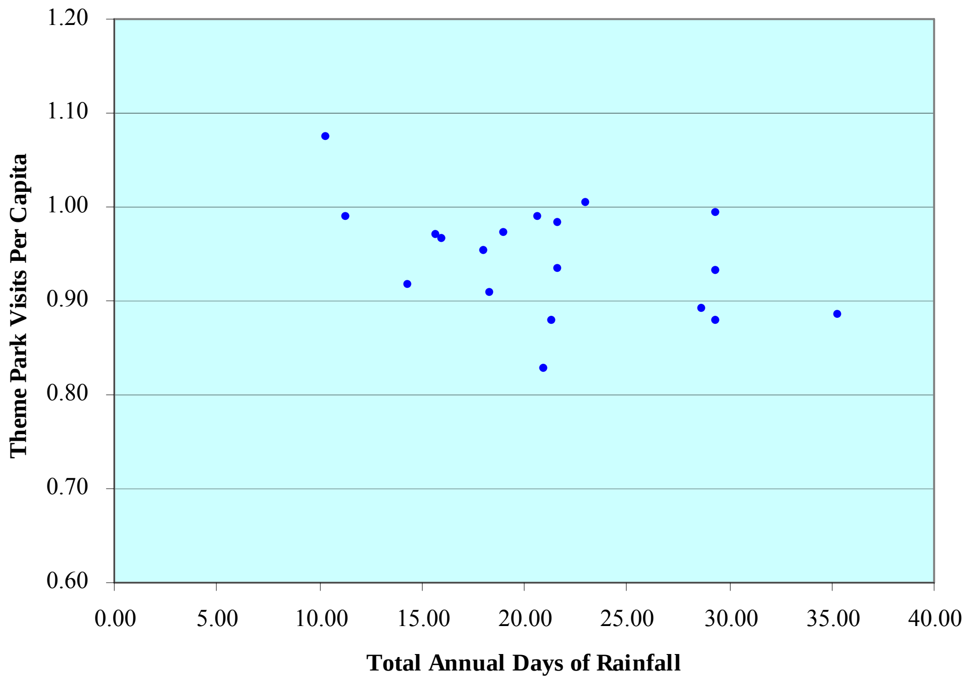
[41] McDowell, Edwin, "Attendance is Lagging at 'Destination' Parks", *The New York Times*, September 2, 2001.
[42] Zoltak, James, "Weather Insurance Provides Some Shelter From the Storms", *Amusement Business* Volume 116 Issue 23, June 2004.
[43] *2000 Annual Report*, Six Flags, Inc.
[44] Emmons, Natasha, "DCA Tackling Slow Economy, Other Woes", *Amusement Business*, August 6, 2001.

In our work to derive a model of theme park attendance, weather made no contribution to either total attendance or attendance per capita. The strongest correlation measure for rainfall was between attendance per capita and total annual days of rain, illustrated in Figure 13. The graph does show a general downward trend, but the relationship is not very clear. Removing just one or two outlying data points would lead to a nearly horizontal trend line, indicating no relationship whatsoever.

Figure 13: Southern California Rainfall and Attendance per Capita, 1986 - 2004



It isn't hard to think of reasons why weather might have a small effect on attendance. Clearly, local visitors are going to stay home on a rainy day – but they can easily reschedule their visit for another day. A rainy season does not necessarily mean that locals will visit theme parks fewer times during the year.

Out-of-town visitors can't reschedule as easily, because they planned their trip well before knowing the weather forecast. But these visitors are likely to "make the most of it" and head into the park even if the weather is bad. They may even have purchased a travel package ahead of time, making it more likely that they will go ahead with their plans.

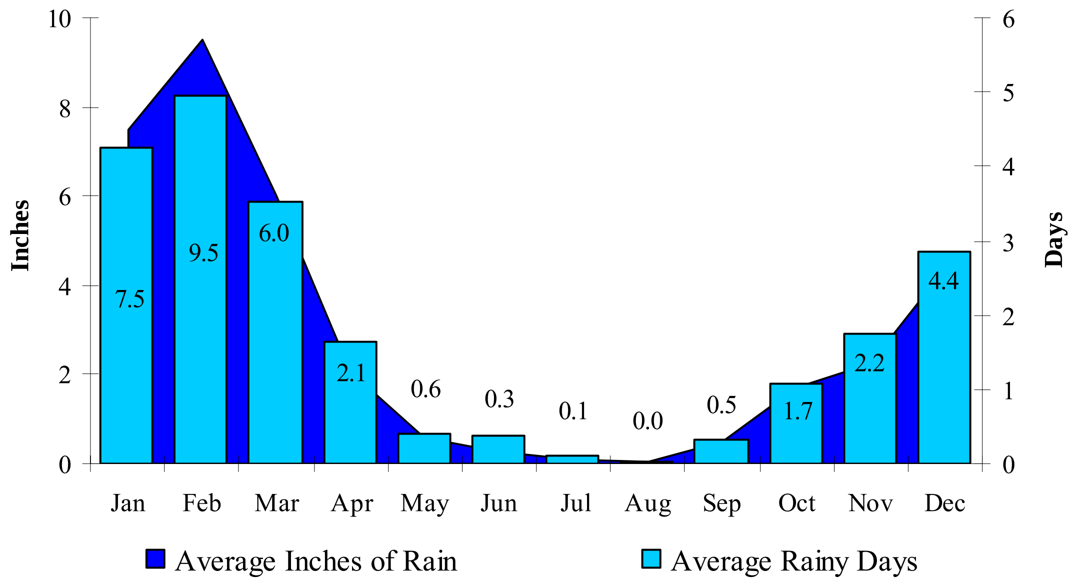
If rainfall has no effect on Southern California's attendance levels, why do so many people in the industry still believe it is important? A simple explanation is that on a rainy day, everyone can see that the parks are very empty. This short-term weather impact convinces everyone that weather is very important.

It is much harder to observe the slight increase in attendance when the sun comes out and the locals return.

We couldn't easily investigate weather effects nationwide, and it is possible that weather has a stronger impact on parks in other regions. Southern California's parks receive a large number of out-of-town visitors, and weather is consistently dry during the peak summer season (see Figure 14). Weather effects might be larger for regional theme parks in areas of the country where peak-season weather is less predictable. However, in October of 2004, *Amusement Business* reported that most parks around the country had a good summer despite poor weather, including Orlando which weathered three hurricanes.[45]

Weather might simply serve as a convenient scapegoat for poor performance, because it is so clearly beyond the control of management. In our research, we did not find any examples where park owners or managers attributed great performance to good weather.

Figure 14: Rainfall Patterns in Southern California, 1986 - 2004



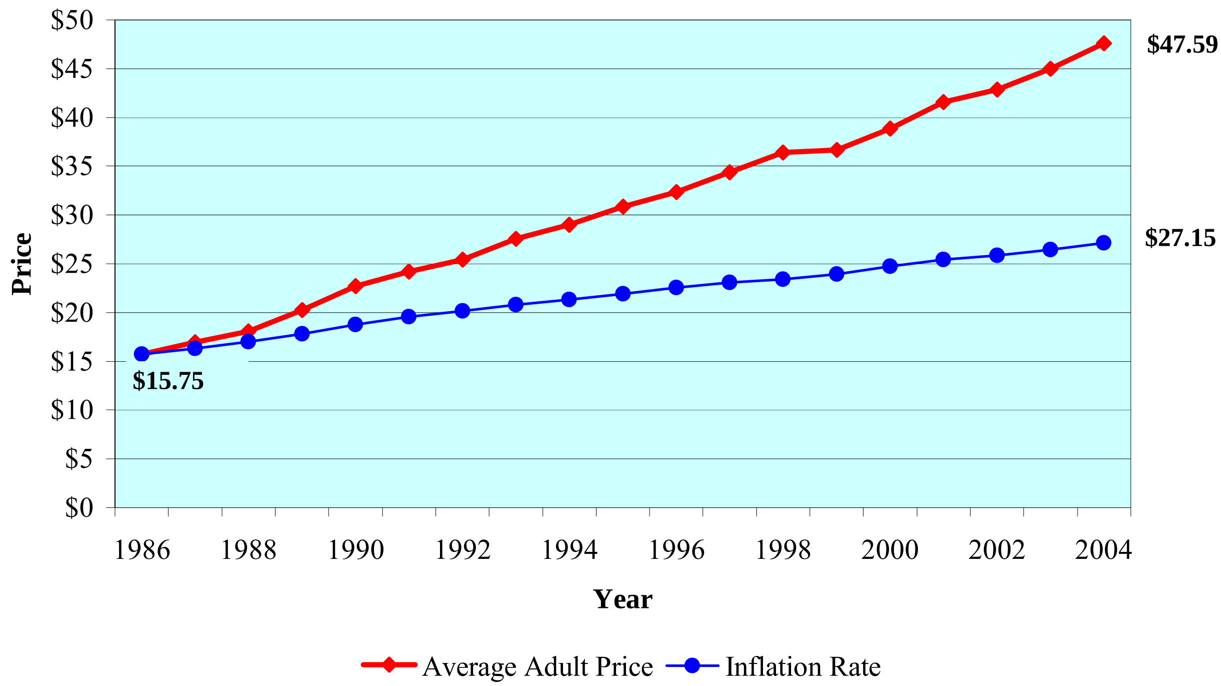
[45] Barbieri, Kelly, "Parks Draw Well Despite Weather Woes", *Amusement Business* Volume 116 Issue 27, October 2004.

CONCLUSION THREE:

Prices are Not Deterring Attendance

Over the past two decades, the price of a theme park ticket in Southern California has risen much faster than inflation. (See Figure 15). In 1986, an average adult theme park ticket cost $15.75. If that price had risen with inflation over the past two decades, today the average adult ticket would cost $27.15 – but the actual average today is $47.59. The parks raise their prices $1 to $2 every year, regardless of attendance patterns or the state of the economy. Ticket increases are lead by Disney, with the other local parks following its lead.[46]

Figure 15: Average Adult Ticket Prices



The L.A. Times reported in 1999 that extensive surveys conducted by Disney and Universal indicated that the high prices of theme park vacations were not deterring visitors.[47] Our research led us to the same conclusion. None of the price factors had an impact on the total Southern California attendance model. When looking at attendance per capita, we found extremely low or nonexistent correlations with price, and none of the correlations were negative (see Table 14.)

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[46] Hirsch, Jerry, "Disney Continues Aggressive Pricing, Raises Admission at Southland Parks", *Los Angeles Times*, January 7, 2003.
[47] Reckard, E Scott, "Theme Parks Find It's Small World After All", *Los Angeles Times*, May 30, 1999.

Table 14: Correlations Between Price Variables and Attendance per Capita

Variable[48]	Correlation	Summary
Average Adult Ticket Price	0.027	low
Fuel Price	0.206	low
Exchange Rate index	0.260	low

Consumers appear fairly insensitive to price when it comes to theme parks, and this has allowed parks to continually raise their prices without affecting attendance. There must eventually be a limit to the price consumers are willing to pay, and a recent survey by *Amusement Business* found that 84% of respondents felt amusement park prices are too high.[49] However, it is rare to find consumers who believe the price of anything is too low, and there is no evidence yet that high ticket prices deter people from visiting theme parks.

For out-of-town visitors, a high level of price insensitivity can be expected with relation to ticket prices, because tickets are a small portion of total vacation costs. However, even fuel prices and exchange rates, which affect the cost to consumers of taking a vacation, apparently have no negative impact on attendance.

Fuel prices, like weather, are commonly believed to be important to the theme park industry. In early 2004, the chief economist for the Los Angeles County Economic Development Corp. expressed concerns that steep fuel prices could reduce the number of tourists that would come to visit the region's theme parks.[50] The Wall Street Journal in 2001 was concerned that high fuel prices, along with other economic factors, would reduce attendance at Disney's new California Adventure theme park.[51] Even published books about the industry cite fuel prices as a problem.[52]

A 1981 study of visitors to Knott's Berry Farm concluded that visitors would visit the park less frequently if the cost of fuel rose,[53] however this conclusion was based on consumer surveys, and not actual consumer behavior. Our statistical analysis of Southern California attendance found no evidence that fuel prices deter theme park visits, and a preliminary analysis of national attendance had the same result (see Appendix H.)

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48 See Appendix E for data sources and more information on each variable.
49 Mooradian, Don, "Survey Respondents Say Park Prices Are Too High", *Amusement Business,* May 10, 2004
50 Douglass, Elizabeth, "Don't Expect Gasoline Prices to Return to Friendlier Levels", *Los Angeles Times*, March 1, 2004.
51 Orwall, Bruce, "Disney's Big California Gamble – Power Crisis, High Fuel Prices, Slowing Economy Will Test Company's New Theme Park", *Wall Street Journal*, January 22, 2001.
52 Page 452; "One year the problem may be high fuel prices…" Vogel, Harold L., Entertainment Industry Economics, New York: Cambridge University Press, 2004.
53 Lee, Christopher Evans, "The Impact of Motor Fuel Prices and Availability on Theme Park Attendance", Dissertation, United States International University, 1981.

Instead, the model of attendance per capita showed a positive relationship between fuel prices and attendance. This may mean that fuel prices have an opposite effect from the conventional wisdom within the industry. As the price of traveling increases, local consumers may be less likely to plan vacations to far-off destinations, and instead choose to stay home and visit their local theme parks. It is also possible that the weakness of the correlation simply means that theme park visitors are insensitive to the price of fuel.

CONCLUSION FOUR:

The Industry has Many Misconceptions of What Drives Attendance Levels

Because attendance drives profits, it is important for theme parks to have a solid understanding of what drives their attendance levels. However, we have shown that two key factors considered important in the industry, weather and fuel prices, don't have the effects that people believe.

If the size of the population is the largest influence on theme park attendance numbers, why did everyone we interviewed in the industry fail to mention it? We also found no articles tying the slow growth of attendance in the industry to the equally slow growth in population. This is surprising, when regional population is considered the most important factor in forecasting attendance for a new theme park that has not yet opened.[54] The planners of new theme parks are aware of the important influence of population size, however most people involved in the day-to-day running of theme parks do not appear aware that population growth is closely tied to attendance growth.

Theme parks frequently focus on short-term attendance concerns, because these concerns drive important ongoing decisions such as staffing levels and inventories. Attendance for any given day at a park can be reliably estimated based on the previous year's attendance, with adjustments for weather and current marketing promotions. A short-term focus appears to have left many people in the industry with misunderstandings as to what drives annual and long-term attendance figures.

FINDINGS

Finding 1: Male teens have the strongest correlation with attendance.

During the project we calculated correlations with a variety of demographic groups, to look for any interesting trends. Males consistently had a more positive correlation with Southern California theme park attendance than females, and that teenagers showed the strongest correlation with attendance (see Table 15). This finding would not be surprising on a national level, where most regional parks focus on attracting youth with thrills and excitement. However, it was surprising to see this result for Southern

[54] Price, Harrison (Buzz), Walt's Revolution! By the Numbers, Orlando, Florida: VP Publishing, 2004.

California, where the industry has a broader focus. Disneyland attracts many families with young children as well as adults without children, and Legoland focuses very specifically on a younger audience.

Table 15: Demographic Correlations with Southern California Attendance

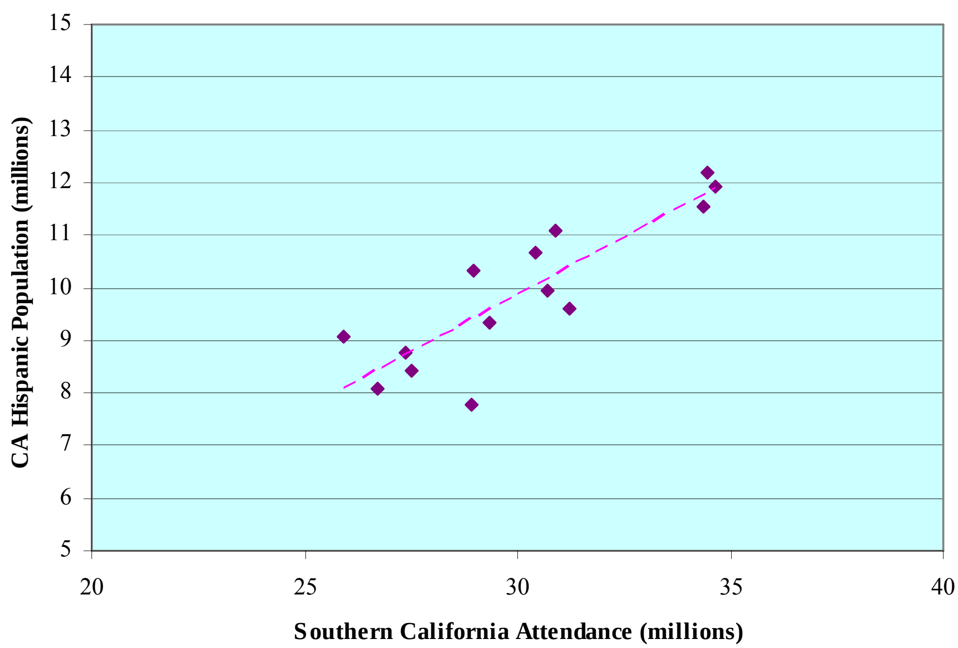
Age Group	Male	Female
0 - 4	0.240	(0.095)
15 - 19	0.843	0.748
25 - 29	(0.249)	(0.741)

This finding suggests that one way theme parks could grow attendance per capita is by reaching out to demographic groups that do not visit parks as frequently.

Finding 2: Strong Links Between Attendance and the Hispanic Population

We could only obtain data on the Hispanic population in California for the years 1990 through 2003, so this factor was not included in the analysis. However, attendance in Southern California was very strongly correlated to the Hispanic population during those years (see Figure 16).

Figure 16: Hispanic Population and Southern California Attendance



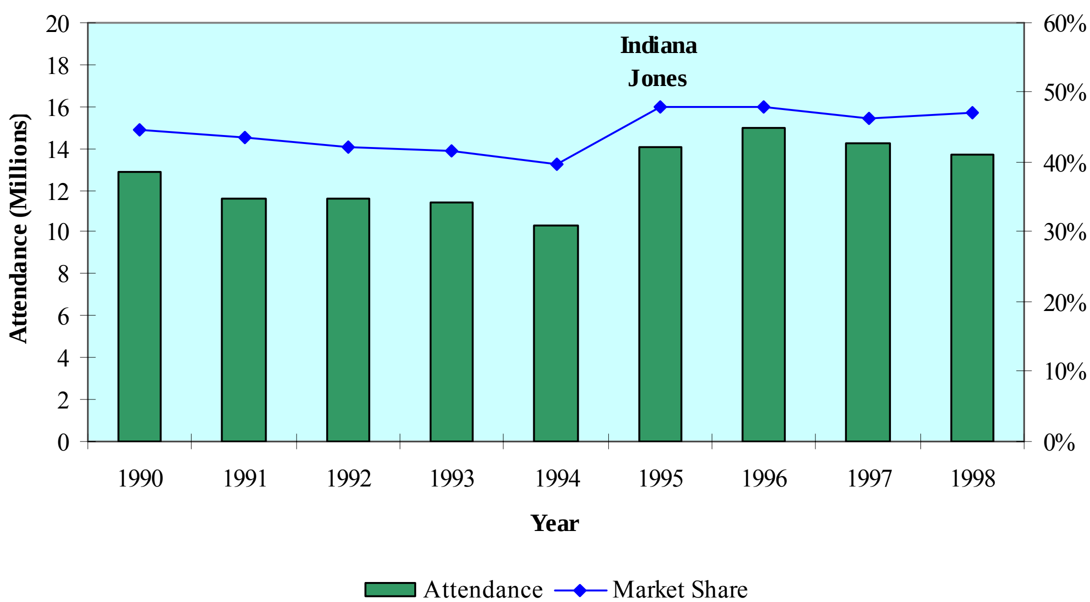
It may be that people with a Hispanic background find theme parks particularly appealing. If so, it would be valuable to the industry to understand why – not because theme parks need to increase their appeal to Hispanics, but because they need to understand why other ethnic groups are less attracted to the parks. Improving attendance per capita relies on learning how to attract groups of consumers who visit theme parks less frequently than others.

However, more research is needed, because there could be another explanation for the strong correlation between Hispanics and attendance. Hispanic population growth may reflect the regional population growth in Southern California, because Southern California is home to more Hispanics than Northern California. This would make the Hispanic population a better attendance predictor for Southern California's parks than the total California population.

Finding 3: New Attractions Seldom Have an Impact

Although the theme parks clearly hope that big new attractions will boost attendance, the data gives no evidence that they have any lasting effect. Throughout our project, only one attraction stood out as having a noticeable impact on a park: *Indiana Jones and the Temple of the Forbidden Eye* at Disneyland. Disneyland attendance was slowly declining in the early 1990's, and the opening of the Indiana Jones attraction in 1995 caused a noticeable and lasting increase in Disneyland's attendance and market share (see Figure 17).

Figure 17: Disneyland Attendance and Market Share, 1990 - 1998



The bad news for the parks is that in the past 19 years only this one attraction appears to have had a significant and lasting effect. Many popular attractions opened during this time with little or no impact:

- In July 1989 Splash Mountain opened as the tallest flume ride in the world. This was a very good year for the park – but also for all of the other parks in the region. Attendance dropped back to normal in the following year.
- In January 1993 Disneyland unveiled Toontown, a whole new land within the park. Attendance for 1993 was lower than in the previous year.
- In June 1996 the Jurassic Park River Adventure debuted at Universal Studios. Attendance went up for a few years, but market share remained flat.
- In March 1997 Magic Mountain opened Superman: The Escape, the first thrill ride ever to top 400 feet, with speeds of 100 miles per hour. Attendance stayed flat.
- In 1998 Disneyland unveiled a completely remodeled Tomorrowland. Attendance went down.
- In 1999 Knott's Berry Farm opened Ghostrider, considered one of the top wooden roller coasters in the world. Attendance went up by 200,000, but just for that one year.

2004 should have been a big year for the industry in Southern California, with the opening of major new thrill attractions at four of the theme parks. (*Tower of Terror* at California Adventure, *Revenge of the Mummy* at Universal Studios, *Journey to Atlantis* at SeaWorld, and *Coastersaurus* at Legoland) However, attendance grew by just 3.1% in Southern California, as compared to 5.1% growth[55] at the Central Florida parks. In Florida the only major new attraction of the year was *Revenge of the Mummy* at Universal Studios, with *Mission Space* at EPCOT still being fairly new, having opened the previous fall. Central Florida also managed this attendance growth despite being hit by a record three hurricanes during the year.

A recent analysis by Buzz Price similarly found no relationship between the level of capital expenditures and attendance. [56] He concluded that the key was in finding the right type of capital expenditure. Theme parks are a form of entertainment, and selling entertainment always involves risk. There is no guarantee that a new attraction will be popular with the public, and a new ride concept can sometimes prove too expensive and problematic to maintain. Some examples of recent failures in Southern California include Disneyland's *Rocket Rods*, which closed after 2½ years due to mechanical problems, and *Superstar Limousine* at Disney's California Adventure, which was open for less than a year and received terrible reviews from customers.

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[55] Calculated from *Amusement Business* year-end attendance figures.
[56] Price, Harrison (Buzz), Walt's Revolution! By the Numbers, Orlando, Florida: VP Publishing, 2004.

What can the theme parks learn from this? We certainly don't recommend that parks stop building new attractions. Consumers expect changes and new entertainment offerings, and ongoing capital expenditures keep the turnstiles spinning. Disneyland's dropping market share in the early 1990's may have been triggered by their failure to open any significant new attractions in 1990 and 1991.

Parks should not think of new attractions as profit or attendance drivers. New attractions should instead be viewed as a type of maintenance, a necessity for upholding the quality of the park and assuring good levels of customer satisfaction. Only very rarely will a park get lucky and open a blockbuster attraction, raising the standing of the park in the mind of the consumer, and causing a permanent increase in market share.

Finding 4: Capacity May Impact Attendance

One interesting finding from the model of Southern California attendance is that the number of parks in the region affects overall attendance levels. The number of parks was right behind total population and unemployment in terms of importance. The model of attendance per capita did not show a reliable impact from the number of parks, but this could be due to the limited amount of data available. From 1986 – 1998, when there were only five parks in the Southern California, attendance per capita averaged 0.94. Since 2001 seven parks have been open, and the average attendance per capita has increased to 0.99. This is consistent with previous studies which found that a great deal of industry growth could simply be attributed to new parks.[57]

It makes sense that capacity would be a big issue. It would be impossible for attendance to grow rapidly, given a fixed number of theme parks, because there simply would be no room for the additional customers. However, adding new parks is not a good solution for growing the size of the regional theme park industry. Construction of additional parks is a huge capital expense, and does not effectively increase the profits for the park owners in the region.

Instead, focusing on the capacity of individual parks might offer some insight toward growing the business. Parks have an effective capacity because once a park becomes crowded, long lines impact the level of customer satisfaction, and this in turn impacts consumers' decisions on when to return to a park. Just as freeway congestion encourages drivers to take alternative routes, theme park congestion can encourage consumers to seek alternative forms of entertainment.

A park's capacity for entertaining guests can be thought of as "turnstile clicks per guest". At a given level of attendance, combined with ride throughputs and operating hours, each guest will average a

[57] See Economic Research Associates, "The Future Role of Theme Parks I nInternational Tourism", June 1995 and Price, Harrison (Buzz), Walt's Revolution! By the Numbers, Orlando, Florida: VP Publishing, 2004.

certain number of attractions during the day. When the park is crowded and lines are long, each individual will average a fewer number of attractions, and will leave less satisfied.

Parks generally aim to have enough capacity to handle expected attendance, with good customer satisfaction, the majority of the time.[58] In other words, parks let their attendance level drive their capacity needs. However, what if capacity impacts attendance?

Theme parks might be able to increase attendance by increasing their capacity to entertain visitors. For example, parks could replace lower-throughput with higher-throughput attractions, or add new attractions without eliminating older ones. These actions would reduce the wait times for attractions, allow consumers to see more attractions during the day, and theoretically encourage more frequent repeat visits.

[58] Price, Harrison (Buzz), Walt's Revolution! By the Numbers, Orlando, Florida: VP Publishing, 2004.

RECOMMENDATIONS

During our research we identified a number of topics that would be interesting for further analysis. Many people in the industry have common misunderstandings about what impacts attendance, and all the parks in Southern California would benefit from a firmer understanding of what influences their growth.

Unfortunately, most of these topics involve data that is confidential to the theme park companies, and we were not able to obtain this data. Therefore, this section concludes with recommendations for how the industry could work together to allow further research to take place.

ISSUES FOR FURTHER STUDY

Look For a Way to Grow Attendance-per-Capita

The growth of attendance at theme parks will continue to be slow unless some way can be found to increase the rate at which people visit parks. An excellent way to build on our research would be to seek ways that the parks might be able to increase attendance per capita. This is not an easy subject to tackle, because attendance per capita has varied so little over the past decades. However, a few clues can be gleaned from our data.

The one thing that happened during the past two decades that appeared to impact attendance per capita was the opening of new theme parks. This suggests that looking into capacity issues might be valuable. Park capacity can be measured in many ways – the simplest being the total number of people a park will allow to enter before cutting off ticket sales. Entertainment capacity could be measured by the total "riders per hour" of all the attractions in a park, or by the total number of riders on all attractions during a year.

Our brief look into population data suggested that teenagers and Hispanics may be major theme park markets. The parks have better demographic data on their customers, and could look into who is visiting theme parks regularly in Southern California. Different parks appeal to different groups of consumers, and there may be demographic groups that currently find none of the parks appealing. Identifying groups of people who are not visiting theme parks regularly will allow the industry to seek ways to target these consumers.

A weakness of our study was the lack of good supply-side data sources. We tried to capture some of this effect by including data on the number of new attractions each year, but it would be far better to consider actual marketing expenditures and actual dollars spend on capital improvements. Marketing expenditures in particular would seem likely to have a potential impact on attendance and attendance per capita.

Finally, clues for improvement in the industry might be found by closely examining the predictions from the attendance models. Although the Southern California model does an excellent job of predicting each year's attendance, there are some years where the prediction was far off (see Table 16.) For example, in 1989 attendance was almost 9% higher than predicted, and every park except for Magic Mountain had a great year. 1996 was also an exceptional year for the parks, particularly Disneyland and Universal Studios. However, the years 1994 and 2000 had significantly lower attendance than the model predicted. Looking more closely into what happened during these four years might lead to some new ideas of what impacts theme park attendance.

Table 16: Southern California Attendance Model Results[59]

Year	Actual Attendance	Predicted Attendance	% Error
2004	35.50	34.67	2.34%
2003	34.44	34.12	0.92%
2002	34.65	33.92	2.09%
2001	34.35	34.34	0.01%
2000	30.91	32.84	6.27%
1999	30.40	32.21	5.96%
1998	28.95	30.12	4.04%
1997	30.70	29.62	3.51%
1996	31.24	28.88	7.56%
1995	29.35	28.44	3.11%
1994	25.90	27.93	7.84%
1993	27.35	27.34	0.02%
1992	27.51	27.28	0.83%
1991	26.74	27.89	4.32%
1990	28.91	28.71	0.69%
1989	31.38	28.62	8.79%
1988	27.69	28.13	1.60%
1987	27.87	27.46	1.47%
1986	25.30	26.58	5.05%

Investigate Relationships between Attendance and Revenues

Some factors may act to shift the balance between local visitors and tourist visitors. For example, economic downturns usually don't have a huge impact on theme park attendance, but they may shift the mix of visitors to include fewer tourists and more local visitors.[60] Similarly, high fuel prices could encourage more local visitors and decrease the number of tourists. This is an important issue for the parks to understand, because tourist visitors spend significantly more during a visit than local visitors. Two

[59] Also see Appendix F, Figure F-3, "Residual Table"
[60] Price, Harrison (Buzz), Walt's Revolution! By the Numbers, Orlando, Florida: VP Publishing, 2004.

years with similar attendance levels could result in very different profit levels for the parks, depending on the customer mix.

There is a lot of data (much of which is confidential to the parks) that could allow insights into this issue:

- Annual revenues
- Actual attendance
- Customer mix (locals, domestic tourists, international tourists)
- Average revenue per customer, for the three categories of visitors
- Detailed pricing and promotions information. (For example, the average price paid by locals, tourists, and annual pass holders)
- International and domestic tourist arrivals in Southern California (during the course of this project, we were not able to obtain enough years of data to include tourist arrivals in this analysis.)

Improve the Research by using Seasonal Data

A weakness of our study is that it covers two decades, and competition for the theme parks has changed significantly over the years. The entertainment choices available to people today are very different from what was available in 1986.

Our study used annual attendance because this data was publicly available. Seasonal or monthly data would have improved the study by allowing a focus on more recent years. (With monthly data, looking at just the past five years would yield 60 separate data points.) It is important to remember that seasonal data would require a more complex analysis, because time-shift issues would be inevitable in the data. For example, high unemployment in April could affect attendance in June.

Research Impacts on Other Local Attractions

Our project focused solely on theme parks in Southern California. However, there are many other attractions in the area that also compete for local and tourist dollars. Some examples include the San Diego Zoo, the Aquarium of the Pacific, Raging Waters waterpark, the Queen Mary, the Huntington Gardens, and the Getty Center.

The theme park industry might find it valuable to have a better understanding of these competitors. When the parks have a good year, do all of the local attractions have good year? When weather is bad, do indoor attractions benefit? How are attendance patterns different for attractions in different price segments? This research might be done in cooperation with local tourism boards, to better understand how entertainment dollars are spent in the region.

FURTHER RESEARCH RELIES ON INDUSTRY COOPERATION

Due to the financial structure of theme parks, with their large fixed costs, attendance levels have a powerful impact on park profits. However, many park managers appear to have a weak understanding of what actually drives attendance, and there are many reasons why:

- Day-to-day park operations require a short-term focus that can make people miss the big picture.
- Articles written about the industry, even in industry magazines, frequently cite factors that aren't actually very important, such as weather and fuel prices.
- There are almost no published studies on theme park attendance.
- Parks can not easily learn from other parks' experiences because so much data is confidential.

Although we have shed some light onto the issues theme parks face, a lot more could be learned if additional data were available. The problem is that although more research would clearly benefit theme park owners, the data needed is confidential and can't be shared with competitors. A solution could be for the theme parks in California to work through a third party. Imagine an agreement where park owners would share the cost of research, provide a third party with data, and receive a report on the findings of the research. Each company's data could remain confidential, and the entire industry would benefit.

This third party could be a government organization, such as a tourism board. Another choice might be an academic institution, where there are many people who are highly experienced in data analysis. A consulting firm, particularly with industry experience, would also be an excellent solution. An industry group could also be formed to do the research, however this approach could raise concerns of unfair cooperation in an industry that is already close to an oligopoly.

We hope that our project will encourage others to continue to investigate ways to strengthen the theme park industry. A strong theme park industry in Southern California not only benefits the theme park owners, but also benefits the entire region by attracting tourist dollars and boosting the economy. A strong theme park industry also benefits everyone who lives in Southern California by entertaining us with exciting and fun experiences that can't be found anywhere else.

APPENDICES

Appendix A: Top 50 parks in North America and Globally by 2004 Attendance

Appendix B: Southern California Theme Parks

Appendix C: Bibliography

Appendix D: Attendance Data Sources

Appendix E: Data Sources

Appendix F: Southern California Analysis

Appendix G: Southern California Attendance-per-Capita Analysis

Appendix H: National Attendance Analysis

APPENDIX A

Top 50 Global and North American Theme Parks

The following tables list the top 50 theme parks in North America and worldwide, as ranked by 2004 attendance levels. The parks in Southern California have been highlighted with bold type.

Source: *Amusement Business*, December 2004.

Figure A-1: Top 50 Parks in North America, 2004

Table A-1: Top 50 North American Theme Parks

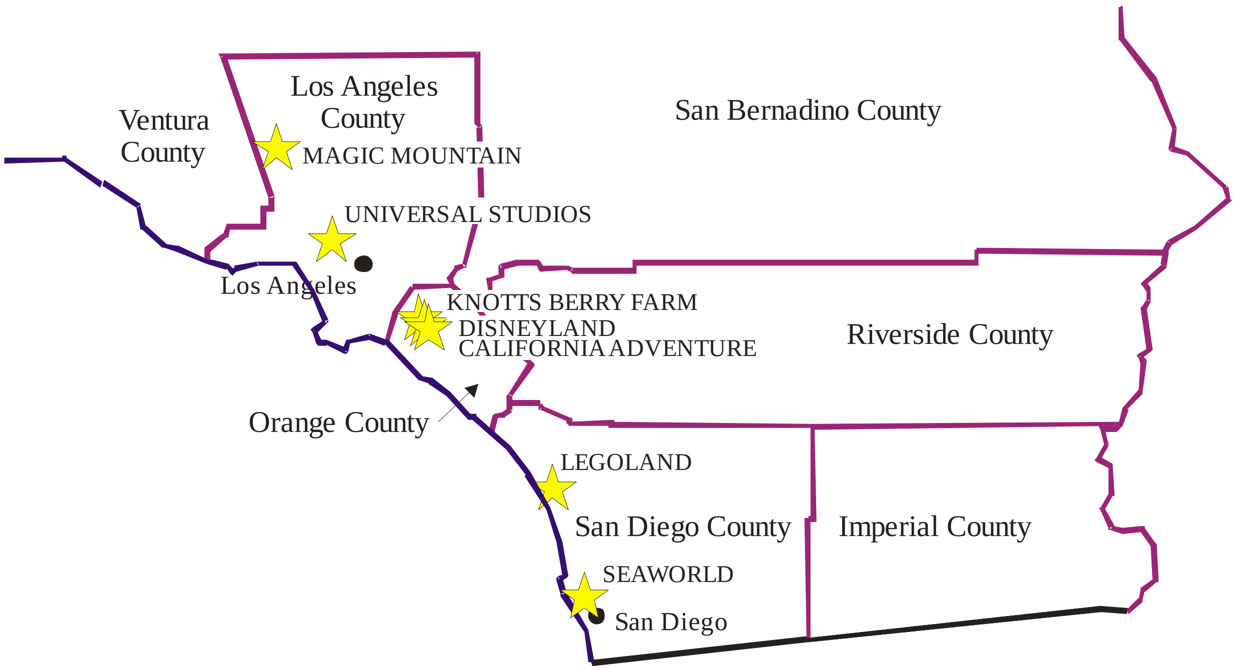
Rank	Park	Owner	State	2004 Attendance
1	The Magic Kingdom	Disney	Florida	15,170,000
2	**Disneyland**	**Disney**	**California**	**13,360,000**
3	EPCOT	Disney	Florida	9,400,000
4	Disney MGM Studios	Disney	Florida	8,260,000
5	Disney's Animal Kingdom	Disney	Florida	7,820,000
6	Universal Studios	General Electric	Florida	6,700,000
7	Islands of Adventure	General Electric	Florida	6,300,000
8	**Disney's California Adventure**	**Disney**	**California**	**5,630,000**
9	Seaworld Florida	Anheuser Busch	Florida	5,600,000
10	**Universal Studios Hollywood**	**General Electric**	**California**	**5,000,000**
11	Adventuredome	Mandalay Resort Group	Nevada	4,400,000
12	Busch Gardens Tampa Bay	Anheuser Busch	Florida	4,100,000
13	**Seaworld California**	**Anheuser Busch**	**California**	**4,000,000**
14	**Knott's Berry Farm**	**Cedar Fair**	**California**	**3,580,000**
15	Paramount King's Island	Paramount	Ohio	3,510,000
16	Paramount Canada's Wonderland	Paramount	Ontario	3,420,000
17	Cedar Point	Cedar Fair	Ohio	3,170,000
18	Morey's Piers	Morey's Piers	New Jersey	3,100,000
19	Santa Cruz Beach Boardwalk	Santa Cruz Seaside Company	California	3,000,000
20	Six Flags Great Adventure	Six Flags	New Jersey	2,800,000
21	**Six Flags Magic Mountain**	**Six Flags**	**California**	**2,700,000**
22	Camp Snoopy	Cedar Fair	Minnesota	2,590,000
23	Hersheypark	Hershey	Pennsylvania	2,500,000
24	Busch Gardens The Old Country	Anheuser Busch	Virginia	2,400,000
25	Six Flags Great America	Six Flags	Illinois	2,300,000
26	Six Flags Over Texas	Six Flags	Texas	2,200,000
27	Paramount King’s Dominion	Paramount	Virginia	2,180,000
28	Dollywood	Dollywood	Tennessee	2,100,000
29	Paramount's Carowinds	Paramount	North Carolina	2,010,000
30	Six Flags Over Georgia	Six Flags	Georgia	1,950,000
31	Paramount's Great America	Paramount	California	1,930,000
32	Silver Dollar City	Silver Dollar City	Missouri	1,800,000
33	Seaworld Texas	Anheuser Busch	Texas	1,800,000
34	Casino Pier	Jenkinson's	New Jersey	1,580,000
35	Six Flags New England	Six Flags	Massachusetts	1,500,000
36	Six Flags Marine World	Six Flags	California	1,450,000
37	**Legoland California**	**Lego**	**California**	**1,430,000**
38	Dorney Park	Cedar Fair	Pennsylvania	1,430,000
39	Six Flags Fiesta Texas	Six Flags	Texas	1,400,000
40	Six Flags Astroworld	Six Flags	Texas	1,400,000
41	Six Flags St. Louis	Six Flags	Missouri	1,350,000
42	Wild Adventures	Wild Adventure Parks	Georgia	1,350,000
43	Kennywood	Kennywood	Pennsylvania	1,330,000
44	Six Flags Darien Lake	Six Flags	New York	1,250,000
45	Knoebels Amusement Resort	Knoebels	Pennsylvania	1,250,000
46	La Ronde	Six Flags	Quebec	1,200,000
47	Lagoon	Lagoon Corp	Utah	1,170,000
48	Six Flags America	Six Flags	Maryland	1,150,000
49	Six Flags Elitch Gardens	Six Flags	Colorado	1,050,000
50	Valleyfair	Cedar Fair	Minnesota	1,040,000

Table A-2: Top 50 Global Theme Parks

Rank	Park	Country	2004 Attendance
1	The Magic Kingdom	United States	15,170,000
2	**Disneyland**	**United States**	**13,360,000**
3	Tokyo Disneyland	Japan	13,200,000
4	Tokyo Disney Sea	Japan	12,200,000
5	Disneyland Paris	France	10,200,000
6	Universal Studios Japan	Japan	9,900,000
7	Epcot	United States	9,400,000
8	Disney-MGM Studios	United States	8,260,000
9	Lotte World	South Korea	8,000,000
10	Disney's Animal Kingdom	United States	7,820,000
11	Everland	South Korea	7,500,000
12	Universal Studios Florida	United States	6,700,000
13	Islands of Adventure	United States	6,300,000
14	Blackpool Pleasure Beach	England	6,200,000
15	**Disney's California Adventure**	**United States**	**5,630,000**
16	Seaworld Florida	United States	5,600,000
17	Yokohama Hakkeijima Sea Paradise	Japan	5,100,000
18	**Universal Studios Hollywood**	**United States**	**5,000,000**
19	Adventuredome	United States	4,400,000
20	Tivoli Gardens	Denmark	4,240,000
21	Busch Gardens Tampa Bay	United States	4,100,000
22	**Seaworld California**	**United States**	**4,000,000**
23	Ocean Park	China	3,800,000
24	Nagashima Spaland	Japan	3,800,000
25	**Knott's Berry Farm**	**United States**	**3,580,000**
26	Paramount King's Island	United States	3,510,000
27	Paramount Canada's Wonderland	Canada	3,420,000
28	Europa Park	Germany	3,300,000
29	De Efteling	Netherlands	3,200,000
30	Cedar Point	United States	3,170,000
31	Morey's Piers	United States	3,100,000
32	Port Aventura	Spain	3,100,000
33	Gardaland	Italy	3,100,000
34	Liseberg	Sweden	3,000,000
35	Santa Cruz Beach Boardwalk	United States	3,000,000
36	Six Flags Great Adventure	United States	2,800,000
37	Huis Ten Bosch	Japan	2,750,000
38	**Six Flags Magic Mountain**	**United States**	**2,700,000**
39	La Feria De Chapultepec	Mexico	2,700,000
40	Suzuka Circuit	Japan	2,600,000
41	Camp Snoopy	United States	2,590,000
42	Bakken	Denmark	2,500,000
43	Hersheypark	United States	2,500,000
44	Alton Towers	England	2,400,000
45	Busch Gardens The Old Country	United States	2,400,000
46	Six Flags Great America	United States	2,300,000
47	Seoul Land	South Korea	2,250,000
48	Walt Disney Studios	France	2,200,000
49	Six Flags Over Texas	United States	2,200,000
50	Six Flags Mexico	Mexico	2,150,000

APPENDIX B

Southern California Theme Parks



Disneyland

Location:	1313 Harbor Boulevard, Anaheim, CA
Year Opened:	1955
2004 Attendance:	13,300,000
Owner:	The Walt Disney Company

Notes: Disneyland is one of the world's top theme parks, and was #2 in the world in attendance in 2004.[1] The park is very family-oriented, with a focus on attractions that all ages can enjoy together. One of its greatest strengths is the popularity of the Disney brand and characters.

Disney's California Adventure

Location:	1313 Harbor Boulevard, Anaheim, CA
Year Opened:	2001
2004 Attendance:	5,600,000
Owner:	The Walt Disney Company

Notes: California Adventure was opened as a sister park to Disneyland, with both parks sharing the same entrance plaza. Although it has high attendance compared to other theme parks in California, it has the least attendance of any of Disney's six parks in North America.

[1] *Amusement Business*, December 2004. Also see Appendix D.

Universal Studios Hollywood

Location:	100 Universal City Plaza, Universal City, CA
Year Opened:	1964
2004 Attendance:	5,000,000
Owner:	NBC Universal (A Division of General Electric)

Notes: Universal Studios Hollywood is best known for its Tram Tour of the actual working Universal Studios movie lot. The park also offers shows that demonstrate special effects techniques used in filmmaking. Of all the Southern California parks, Universal Studios probably attracts the largest ratio of tourists as opposed to local visitors.

SeaWorld San Diego

Location:	500 SeaWorld Drive, San Diego, CA
Year Opened:	1964
2004 Attendance:	4,000,000
Owner:	Anheuser-Busch

Notes: SeaWorld is unique among Southern California parks in that it has a strong focus on actual living animals. However, this is no aquarium – the for-profit park has a number of rides, including a brand new roller coaster, and has a strong entertainment focus.

Knott's Berry Farm

Location:	8039 Beach Boulevard, Buena Park, CA
Year Opened:	1940
2004 Attendance:	3,500,000
Owner:	Cedar Fair, L. P.

Notes: Knott's Berry Farm is considered by some to be the first theme park in the world, as their themed "Ghost Town" opened 15 years before Disneyland. The park offers a number of major thrill rides, as well as a large area of children's attractions. It has an adjoining waterpark. The park licenses Snoopy characters for their children's area.

Six Flags Magic Mountain

Location:	26101 Magic Mountain Parkway, Valencia, CA
Year Opened:	1971
2004 Attendance:	2,700,000
Owner:	Six Flags

Notes: Magic Mountain is one of the world's top roller-coaster parks, with fourteen roller coasters. The park focuses on thrills, but does offer an area for children. It also makes use of licensing, using Loony Tunes characters for the children's area, and Batman and Superman for some of the thrill rides.

Legoland California

Location:	1 Lego Drive, Carlsbad, CA
Year Opened:	1999
2004 Attendance:	1,400,000
Owner:	The Lego Group

Notes: Legoland has focused primarily on families with children under the age of 10. Attractions are very interactive and hands-on. In the past few years they appear to have been working to expand the age group they appeal to, with faster rides and roller coasters.

APPENDIX C

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APPENDIX D

Attendance Data

Table D-1: Southern California Theme Park Attendance : 1986 - 2004

Year	Disneyland	Disney's California Adventure	Universal Studios Hollywood	Seaworld California	Knott's Berry Farm	Six Flags Magic Mountain	Legoland California	Total	Growth
1986	12,000,000		3,800,000	3,100,000	3,500,000	2,900,000		25,300,000	
1987	13,500,000		4,240,000	3,300,000	4,000,000	2,828,000		27,868,000	10.2%
1988	13,000,000		4,240,000	3,350,000	4,000,000	3,100,000		27,690,000	-0.6%
1989	14,400,000	(Opened	5,100,000	3,780,000	5,000,000	3,100,000	(Opened	31,380,000	13.3%
1990	12,900,000	in 2001)	4,625,000	3,282,040	5,000,000	3,100,000	in 1999)	28,907,040	-7.9%
1991	11,610,000		4,625,000	3,300,000	4,000,000	3,200,000		26,735,000	-7.5%
1992	11,600,000		4,800,000	4,006,000	3,900,000	3,200,000		27,506,000	2.9%
1993	11,400,000		4,950,000	4,000,000	3,700,000	3,300,000		27,350,000	-0.6%
1994	10,300,000		4,600,000	3,700,000	3,800,000	3,500,000		25,900,000	-5.3%
1995	14,100,000		4,700,000	3,750,000	3,400,000	3,400,000		29,350,000	13.3%
1996	15,000,000		5,400,000	3,890,000	3,550,000	3,400,000		31,240,000	6.4%
1997	14,250,000		5,400,000	3,990,000	3,656,500	3,400,000		30,696,500	-1.7%
1998	13,680,000		5,100,000	3,700,000	3,400,000	3,070,000		28,950,000	-5.7%
1999	13,450,000		5,100,000	3,600,000	3,600,000	3,200,000	1,450,000	33,400,000	5.0%
2000	13,900,000		5,200,000	3,600,000	3,456,000	3,300,000	1,450,000	30,906,000	-7.5%
2001	12,350,000	5,000,000	4,732,000	4,100,000	3,589,000	3,200,000	1,375,000	34,346,000	11.1%
2002	12,720,500	4,700,000	5,200,000	4,000,000	3,624,890	3,100,000	1,300,000	34,645,390	0.9%
2003	12,720,000	5,311,000	4,576,000	4,000,000	3,479,895	3,050,000	1,300,000	34,436,895	-0.6%
2004	13,300,000	5,600,000	5,000,000	4,000,000	3,500,000	2,700,000	1,400,000	35,500,000	3.1%

Source: *Amusement Business*

Notes: This data was taken from the attendance tables that were published each December in Amusement Business Magazine. Amusement Business reports attendance estimates in mid to late December of each year. They gather their information through inside sources within each park, and their estimates are generally considered by the industry to be quite accurate.

Table D-2: Total Attendance at the Top 50 Theme Parks in North America, 1994 – 2004.

Year	Total Attendance	Annual Growth
1994	145,030,941	
1995	155,127,784	7.0%
1996	160,366,480	3.4%
1997	167,253,500	4.3%
1998	165,336,500	-1.1%
1999	170,503,359	3.1%
2000	175,100,149	2.7%
2001	173,978,900	-0.6%
2002	170,761,186	-1.8%
2003	167,973,384	-1.6%
2004	169,110,000	0.7%

Notes:

This data was taken from articles that were published each December in Amusement Business Magazine. Amusement Business reports attendance estimates in mid to late December of each year. They gather their information through inside sources within each park, and their estimates are generally considered by the industry to be quite accurate.

The total attendance at the top 50 parks in North America was used as a proxy for total theme park attendance in the United States. Although the attendance article for 1994 was not available, the attendance total for 1994 was referenced in the 1995 article.

Sources:

O'Brien, Tim, "Attendance Climbs 7% at Top North American Parks", *Amusement Business* Volume 107 Issue 51, December 18, 1995.

O'Brien, Tim, "Top 50 Parks Post 160.3 Mil", *Amusement Business* Volume 108 Issue 51, December 16, 1996.

O'Brien, Tim, "North American Parks Experience 4% Growth", *Amusement Business* Volume 109 Issue 51, December 22, 1997.

O'Brien, Tim, "Attendance Holds the Line at Major U.S. Parks in '98", *Amusement Business* Volume 110 Issue 51, December 28, 1998.

O'Brien, Tim, "Top North American Parks Set New Attendance Mark", *Amusement Business* Volume 111 Issue 51, December 27, 1999.

O'Brien, Tim, "Parks Reach New Heights in Attendance", *Amusement Business* Volume 112 Issue 51, December 25, 2000.

O'Brien, Tim, "North American Parks Finish 2001 On Par with Last Year", *Amusement Business* Volume 113 Issue 51, December 24, 2001.

O'Brien, Tim, "2002: Third Best Season Ever for North American Amusement Parks", *Amusement Business* Volume 114 Issue 51, December 23, 2002.

O'Brien, Tim, "North American Parks Down Slightly From 2002", *Amusement Business* Volume 115 Issue 51, December 22, 2003.

Zoltak, James, "After Two Years of Decline, Parks Up 4%", *Amusement Business* Volume 116 Issue 29, December 2004.

APPENDIX E

Data Sources

1. Population Data

A. National and State Population Totals

Sources: “Total Population Estimates in U.S. States,” RAND California (See ca.rand.org/stats/popdemo/popdemo.html)

“Annual Estimates of the Population for the United States and States, and for Puerto Rico: April 1, 2000, to July 1, 2004,” United States Bureau of the Census (See www.census.gov/popest/states/NST-ann-est.html)

Notes:

Population estimates for 1986 – 2003 was obtained from RAND California, which provides population summaries via their website. Their data source is the United States Bureau of the Census. (Although the title of the service is “Population Estimates in U.S. States,” there is also an option to view the total national population.)

Population estimates for 2004 were obtained directly from the U.S. Bureau of the Census.

We obtained data for California, Washington, Nevada, Arizona and Oregon, and these numbers were added to achieve a total regional population for the western United States.

B. Population Breakdowns by Age, Gender, and Ethnicity

Sources: “Population in U.S. States by Race/Ethnicity and Age Group,” RAND California. (See ca.rand.org/stats/popdemo/popdemo.html)

“Annual Estimates of the Population by Sex and Age for California: April 1, 2000 to July 1, 2004,” United States Bureau of the Census.
(See www.census.gov/popest/states/asrh/SC-est2004-02.html)

Notes:

Age, gender, and ethnicity estimates for populations between 1986 and 2003 were obtained from RAND California, which provides population summaries via their website. Their data source is the United States Bureau of the Census.

Estimates for 2004 were obtained directly from the U.S. Bureau of the Census.

C. International Visitors (used only in the National model)

Sources: "Economic Impact of Travel on Georgia: 2003 Profile," Travel Industry Association of America, May 2004.
(See www.georgia.org/tourism/market_ga/research/)

"The Economic Impact of Travel on Louisiana Parishes: 2000," Travel Industry Association of America, July 2001.
(See www.latour.lsu.edu/reports.html)

"2004 Nebraska Tourism Industry Development Plan," Nebraska Travel and Tourism Division
(See www.visitnebraska.org/developmentplan/index.htm)

Notes:

The Travel Industry Association (TIA) publishes annual data on the number of international visitors visiting the United States, however we were not able to obtain the data directly from TIA. Instead we were able to obtain the data from references in state reports. The data for 2001-2003 was from the Georgia report, the data for 1996 – 2000 from the Louisiana report, and the data for 1994 – 1995 from the Nebraska report.

2. Economic Data

A. United States Gross Domestic Product

Source: "Current-Dollar and 'Real' Gross Domestic Product," U.S. Department of Commerce, Bureau of Economic Analysis.
(See www.bea.doc.gov/bea/dn/home/gdp.htm)

Notes:

We used the Current-Dollar GDP figures and adjusted them for inflation using the Consumer Price Index. We followed this procedure to stay consistent with other monetary variables in our analysis, all of which were adjusted using the same index.

This data was then divided by the United States population to determine the Gross Domestic Product per capita.

B. United States Unemployment

Source: "Employment Status of the Civilian Noninstitutional Population, 1940 to Date," United States Department of Labor, Bureau of Labor Statistics.
(See www.bls.gov/cps/home.htm)

C. Disposable Income

Source: "Disposable Personal Income," United States Department of Commerce, Bureau of Labor Statistics (See www.bea.gov/bea/regional/spi/)

Notes:

Disposable Income data for both the United States and for individual states was obtained from the Bureau of Labor Statistics. The data was adjusted for inflation to 1995 dollars using the Consumer Price Index, and divided by total population to reach a measure of disposable income per capita.

We calculated disposable income per capita for California, Washington, Nevada, Arizona and Oregon. From these, a weighted average was calculated, using population as the weight for each state.

D. California Gross State Product (not used due to problems with the data)

Source: "Gross State Product," U.S. Department of Commerce, Bureau of Labor Statistics. (See www.bea.gov/bea/regional/gsp/)

Notes:

The Bureau of Labor Statistics has a cautionary note attached to their Gross State Product data. It states that there is a discontinuity in the data between 1997 and 1998, and that users of the data are strongly cautioned against appending the two data series.

For this reason, we were not able to use Gross State Product data for our analysis.

E. California Unemployment

Source: "Local Area Unemployment Statistics: California, Seasonally Adjusted," United States Department of Labor, Bureau of Labor Statistics.
(See data.bls.gov/cgi-bin/surveymost?la+06)

Notes:

The data obtained was for month-by-month unemployment rates. From these monthly rates an average was calculated for each year.

F. Consumer Price Index

Source: "Consumer Price Index – All Urban Consumers, U.S. All Items," United States Department of Commerce, Bureau of Labor Statistics.
(See data.bls.gov/cgi-bin/surveymost?cu)

Notes:

The base data was converted into an index using 1995 as the base year. This means that by dividing by the index, all of our monetary variables were converted into 1995 dollars.

G. Travel Service Import and Export (used only in the National model)

Sources: "Commercial service exports (current US$)," World Development Indicators Online, The World Bank Group.

"Commercial service imports (current US$)," World Development Indicators Online, The World Bank Group.

"Travel services (% of commercial service exports)," World Development Indicators Online, The World Bank Group.

"Travel services (% of commercial service imports)," World Development Indicators Online, The World Bank Group.

(See devdata.worldbank.org/dataonline/ - requires subscription. Also see www.worldbank.org/data/onlinedatabases/onlinedatabases.html)

Notes:

Travel Service Import and Export values were calculated by multiplying the data for commercial service by the data on the percentage of commercial service that was for travel services. This dollar amount was then adjusted for inflation using the Consumer Price Index. This put all of the prices into the equivalent of 1995 dollars.

Travel Service Import refers to the amount of money that was "imported" when international visitors visited the United States and spent money on travel services such as hotels and attractions. Travel Service Export measures the opposite; the amount that United States citizens spend while they are traveling in foreign countries.

3. Weather Data

A. Days of Rainfall and Inches of Precipitation

Sources: "Climatological Data: California," United States Department of Commerce, National Climatic Data Center, January 1986 through October 2004.
(see www5.ncdc.noaa.gov/pubs/publications.html)

"Preliminary Climatology Data," National Weather Service Forecast Office, November 2004 through December 2004.
(see www.wrh.noaa.gov/climate/index.php?wfo=lox and www.wrh.noaa.gov/climate/index.php?wfo=sgx)

Notes:

The following weather stations were used to represent Los Angeles, Orange, and San Diego Counties: Los Angeles Civic Center, Newport Beach Harbor, and San Diego Airport. These weather stations were chosen at the advice of James Murakami, Staff

Meteorologist, UCLA Department of Atmospheric and Oceanic Sciences. For a few of the months in the data set, information was not available for the chosen weather station, and in these cases a nearby weather station was used instead.

The days of rainfall and inches of precipitation data for each county were averaged for each year. The data for May, June, July and August were similarly averaged to determine summer weather data. Note that "Days of Rainfall" refers to days with a minimum of 0.10 inches of rain. There is sometimes measurable rainfall on days that are not recorded as being "days of rain".

4. Travel Costs Data

A. Average Adult Theme Park Ticket Price

Sources:

Anonymous, "Fourth of July Events," *Los Angeles Times*, July 2, 2000.

Anonymous, "Get a Jump on a Creepy Halloween" *The Orange County Register*, October 18, 1996.

Anonymous, "Get in Touch With SeaWorld's Animals," *Los Angeles Times*, July 26, 1998.

Anonymous, "Halloween Festivities: Parties and Benefits," *Los Angeles Times*, October 29, 1994.

Anonymous, "The Crème de L.A. Crème," *Los Angeles Times*, August 10, 2000.

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Anonymous, "Where They'll Light Up the Sky for the Fourth," *Los Angeles Times*, July 4, 2002.

Berkman, Leslie, "Knott's Reverses Children's Height Admission Policy," *Los Angeles Times*, February 27, 1993.

Berkman, Leslie, "Tooth Fairy Must Leave a Bit More for Magic Kingdom Pass," *Los Angeles Times*, September 18, 1987.

Crowe, Jerry, "Magic Mountain Reaches Out to the Wet Set," *Los Angeles Times*, May 21, 1995.

Cummer, Willson, "Knott's Will cut Price for Southland Residents," *Los Angeles Times*, June 18, 1993.

Diamond, S. J., "Theme Parks: Customers Get Crowded Out," *Los Angeles Times,* July 19, 1991.

Dickerson, Marla, "Admission Fee is Raised Again at Disneyland," *Los Angeles Times*, February 8, 1996.

Donna, Ray Ott, "Cetacean Centers Season for Viewing Whales to Open Soon," *Los Angeles Times*, December 15, 1988.

Dretzka, Gary, "A Look Backstage at Sea World," *The Orange County Register*, December 29, 1996.

Flocken, Corinne, "EggMazeMent at Knott's Will Leave You Lost, Found, and A-Mazed," *Los Angeles Times*, April 6, 1995.

Flocken, Corinne, "Helping the Herd: Beleaguered Manatees – Also Known as Sea Cows – Get Tanked at SeaWorld," *Los Angeles Times,* April 16, 1998.

Grady, Sean, "The Crush is On at Theme Parks, Museums," *Los Angeles Times*, June 7, 1987.

Griffith, Mary Go, "Water, Water Everywhere, and Not a Stunt to Sink," *The Orange County Register*, October 20. 1995.

Griffith, Mary Jo, "A Scary Slate of Halloween Fun," *The Orange County Register*, October 31, 1997.

Griffith, Mary Jo, "Easter Egg-citement," *The Orange County Register*, June 30, 1997.

Griffith, Mary Jo, "Holiday Events Mark a Season of New Life," *The Orange County Register*, April 2, 1999.

Harris, Lee,"Theme Parks Ready to Celebrate Halloween with Tricks, Treats," *Los Angeles Times*, October 15, 1998.

Himmelberg, Michele, "Primed For Spring: Theme Parks Take Advantage of Season to Show Off Crop of New Attractions," *The Orange County Register*, April 3, 2004.

Himmelberg, Michele, "Theme Park Makes Bold Discount Move," *The Orange County Register*, January 6, 2004.

Hirsch, Jerry, "Universal Studios Raises Admission," *Los Angeles Times*, January 22, 2003.

Hughes, Bill, "Find Special Choices in Variety of Offerings," *Los Angeles Times,* March 2, 1986.

Nakano, Craig, "New Theme Park Rides Pass Muster Again ! And Again!" *Los Angeles Times*, June 20, 2004.

Niles, Robert, "It Has Its Ups and Downs," *Los Angeles Times,* April 17, 2003.

Niles, Robert, "It's Scream Season," *Los Angeles Times*, October 10, 2002.

Perez, Daniel, "Hot Times in the Summertime" *Los Angeles Times*, June 15, 1986.

Reckard, E. Scott, "Disneyland Boosts Admission by $1; Knott's Stands Pat," *Los Angeles Times,* January 5, 1999.

Reckard, E. Scott, "Disneyland Ups Prices: Adults, $41; Kids, $31," *Los Angeles Times*, January 5, 2000.
Rose, Jeff, "Disney Additions Bring Higher Admission Price, *The Orange County Register*, June 5, 1992.
Schenden, Laurie K., "New Attractions for Theme Park Lovers," *Los Angeles Times*, May 25, 2000.
Schenden, Laurie, "Theme Parks Buffing Up," *Los Angeles Times*, May 24, 2001.
Sipchen, Bob, "Good Times… to Panic," *Los Angeles Times,* May 27, 2004.
Uhlenbrock, Tom, "Speed Thrills: Summer Brings on Faster Coasters, Bargains at Theme Parks," *San Diego Union-Tribune*, July 6, 2003.
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Valdespino, Anne, "Knott's Offers Sledding in a 'Winter Wonderland," *The Orange County Register*, December 27, 1989.
Velazquez, Joe, "90's Theme Parks: A Ride on the Wild Side," *Los Angeles Times*, May 27, 1990.
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Wharton, David, "High Anxiety at Magic Mountain," *Los Angeles Times*, April 25, 1992.
Wharton, David, "Souls' Music in the Park," *Los Angeles Times*, March 26, 1993.
Young, Ricky, "Stay Late with Gorillas, Explore the Bermuda Triange and Watch Those Kangaroos," *The Orange County Register*, July 10, 1994.

Notes:

When there was a price change during the year, the price during the busy summer season was used. (Most price increases occur during the offseason; in the spring or fall.) In a few cases, the gate price for a park could not be determined, and the price was estimated based on the pricing trend exhibited by the park in surrounding years. These estimated prices are highlighted in the table E-1.

The average ticket price was adjusted for inflation using the Consumer Price Index. This put all of the prices into the equivalent of 1995 dollars.

Table E-1: Adult Ticket Prices, 1986 – 2004

YEAR	Disneyland	California Adventure	Universal Studios	Seaworld	Magic Mountain	Legoland	Knott's Berry Farm	Average	Adjusted
2004	$49.75	$49.75	$49.75	$49.95	$47.00	$43.95	$43.00	$47.59	$38.40
2003	$47.00	$47.00	$47.00	$44.95	$45.00	$41.95	$42.00	$44.99	$37.26
2002	$45.00	$45.00	$45.00	$42.95	$42.00	$39.95	$40.00	$42.84	$36.29
2001	$43.00	$43.00	$43.00	$41.95	$40.99	$39.00	$40.00	$41.56	$35.77
2000	$41.00		$41.00	$40.00	$39.00	$34.00	$38.00	$38.83	$34.37
1999	$39.00		$39.00	$38.00	$36.00	$32.00	$36.00	$36.67	$33.54
1998	$38.00		$38.00	$35.95	$36.00		$34.00	$36.39	$34.02
1997	$36.00		$36.00	$32.95	$35.00		$31.95	$34.38	$32.64
1996	$34.00		$34.00	$30.95	$33.00		$29.95	$32.38	$31.45
1995	$33.00		$33.00	$29.95	$30.00		$28.50	$30.89	$30.89
1994	$31.00		$31.00	$27.95	$28.00		$26.95	$28.98	$29.80
1993	$30.00		$29.00	$25.95	$27.00		$25.95	$27.58	$29.09
1992	$28.75		$27.00	$23.95	$24.50		$22.95	$25.43	$27.62
1991	$27.50		$24.50	$22.95	$24.00		$21.95	$24.18	$27.06
1990	$25.50		$22.00	$21.95	$23.00		$21.00	$22.69	$26.46
1989	$23.50		$19.00	$19.95	$19.95		$19.00	$20.28	$24.92
1988	$21.50		$15.95	$17.95	$18.00		$16.95	$18.07	$23.28
1987	$20.00		$14.95	$16.95	$17.00		$15.95	$16.97	$22.77
1986	$17.95		$14.95	$14.95	$15.95		$14.95	$15.75	$21.90

B. Fuel Prices

Source:
"Motor Gasoline Retail Prices, U.S. City Average," U.S. Department of Energy, Energy Information Administration.
(See www.eia.doe.gov/emeu/mer/prices.html)

Notes:
We used the average retail price of gasoline, including tax. The numbers were adjusted for inflation using the Consumer Price Index. This put all of the prices into the equivalent of 1995 dollars.

C. Exchange Rates

Sources: "Nominal Broad Dollar Index,"
(See www.federalreserve.gov/releases/H10/summary/)

Notes:

The monthly data for each year was used to calculate an annual average.

D. Travel Price Index (Only used in the National model)

Sources: "Economic Impact of Travel on Georgia: 2003 Profile," Travel Industry Association of America, May 2004.
(See www.georgia.org/tourism/market_ga/research/)

"The Economic Impact of Travel on Louisiana Parishes: 2000," Travel Industry Association of America, July 2001.
(See www.latour.lsu.edu/reports.html)

"2004 Nebraska Tourism Industry Development Plan," Nebraska Travel and Tourism Division
(See www.visitnebraska.org/developmentplan/index.htm)

Notes:

The Travel Industry Association (TIA) publishes an annual Travel Price Index, however we were not able to obtain the index directly from TIA. Instead we were able to obtain the data from references in state reports. The data for 2001-2003 was from the Georgia report, the data for 1996 – 2000 from the Louisiana report, and the data for 1994 – 1995 from the Nebraska report.

The data was adjusted for inflation using the Consumer Price Index. This put all of the prices into the equivalent of 1995 dollars.

E. Air Travel Price Index (used only in the National model)

Source: "National-Level ATPI Series," Bureau of Transportation Statistics, United States Department of Transportation
(See www.bts.gov/xml/atpi/src/index.xml)

Notes:

We used the Quarterly Averaged Full-Scope Air Travel Price Index, which measures changes in airfares for both flights originating in the United States (domestic and international flights) as well as flights originating internationally with a U.S. destination.

The data was adjusted for inflation using the Consumer Price Index. This put all of the prices into the equivalent of 1995 dollars.

5. Supply-Side Data

A. Total Number of Parks

Sources: None

Notes:

Legoland California opened in 1999 and Disney's California Adventure in 2001. The remaining five parks in the region have been in existence for the full duration of our study.

B. Total New Attractions

Sources: *The Los Angeles Times*, various articles. (See listing above under "Average Adult Ticket Price"

Schultz, Jason, "Disneyland Timeline," JustDisney.com
(See www.justdisney.com/disneyland/timeline/index.html)

"A Brief History of Magic Mountain"
(See members.tripod.com/heylownine/mm_his.htm)

Park websites

"The Roller Coaster Database," www.rcdb.com

Notes:

A list of attractions that opened at each park in each year was generated from a wide variety of sources, primarily online. In some cases detailed park timelines existed. For other parks, the list was generated by looking for news releases about new park attractions in each year, or by searching for the opening year of rides that are known to be currently in operation.

Table E-2: Number of New Attractions, 1986 – 2004

Year	Disneyland	California Adventure	Universal Studios	Seaworld	Magic Mountain	Knott's Berry Farm	Legoland	Total
2004	2	1	1	1	0	1	3	9
2003	1	3	1	1	1	2	2	11
2002	0	5	2	2	1	1	1	12
2001	1	18	3	1	2	0	1	26
2000	3		1	2	1	2	0	9
1999	2		1	1	2	3	21	30
1998	7		0	3	1	2		13
1997	2		1	1	1	1		6
1996	2		1	1	1	1		6
1995	2		2	1	1	1		7
1994	2		2	1	1	1		7
1993	7		2	1	1	1		12
1992	1		1	2	1	1		6
1991	0		2	0	1	0		3
1990	0		0	1	1	1		3
1989	1		0	0	1	2		4
1988	0		1	1	2	1		5
1987	1		1	1	1	2		6
1986	3		1	1	3	1		9

C. Weighted New Attractions

Source: *Theme Park Insider* (www.themeparkinsider.com)

Notes:

To create a weighted list of new attractions, each new attraction at a park was given a subjective rating between 1 and 5. The rating was based partly on the nature of the attraction. For example, a new large roller coaster received a rating of 5, while a new parade (simply replacing an old parade) received a rating of 1.

In weighting the attractions, the attraction ratings published by *Theme Park Insider* were also taken into consideration. Registered members of this website rate the attractions at theme parks they have visited. Higher-rated attractions were assumed to have more general appeal to the public, and were given more weight.

Table E-3: Weighted New Attractions, 1986 – 2004

Year	Disneyland	California Adventure	Universal Studios	Seaworld	Magic Mountain	Knott's Berry Farm	Legoland	Total
2004	3	5	5	5	0	3	7	28
2003	2	6	5	3	5	5	4	30
2002	0	5	4	3	5	5	3	25
2001	1	48	4	3	7	0	4	67
2000	3		1	5	5	9	0	23
1999	3		5	5	6	8	44	71
1998	13		0	7	5	6		31
1997	4		2	5	5	4		20
1996	7		5	2	1	3		18
1995	6		5	3	3	3		20
1994	6		2	1	5	2		16
1993	9		7	3	5	1		25
1992	5		2	5	4	1		17
1991	0		5	0	4	0		9
1990	0		0	3	5	5		13
1989	5		0	0	5	4		14
1988	0		3	1	7	5		16
1987	5		2	3	5	6		21
1986	5		3	1	10	2		21

APPENDIX F

Southern California Attendance Analysis

This appendix contains the output from the statistical software used for our analysis of theme park attendance in Southern California.

In the regression outputs, there are some key statistics we looked for. In the table of Regression Statistics, the “R Square” number indicates the amount of variation that is predicted by the model. The “Adj.RSqr” number is the best number for comparing the quality of models with different numbers of variables.

The Summary Table contains the actual coefficients for the variables in the model. Also in this table, the p-values indicate the level of confidence that each variable is contributing to the model. Smaller p-values are better, and anything larger than 0.1 indicates a weak variable.

In the Analysis of Variance, there is another p-value that summarizes the likelihood that the overall model is useful. This p-value should ideally be very close to zero. Also in this table are two numbers that were used in calculating the partial F-test statistics: the “Residual Sum Sqrs” is the sum of squares for error (SSE) for the model, and the “Residual Mean Sqr” is the mean square error (MSE) of the model.

The Durbin-Watson statistic is listed in the Residual Statistics table. The Residual Table contains information on how well the model predicts each year of data. (Case 1 is 2004; Case 19 is 1986.)

Table F-1: Correlations and P-Values Matrix

Correlation Matrix: Entries are Pearson's Correlation Coefficient

	CA Attendance	CA Population	Regional Population	CA Youth Population	CA Child Population	CA Teen Population	Real US GDP/Capita	US Unem-ployment	CA Unem-ployment	CA DIPC	Regional DIPC	Exchange Rate	Fuel Price	Gate Price	Summer Precip.	Annual Precip.	Annual Rainfall Days	Summer Rainfall Days	Number of Parks	Rated New Attractions	No. of New Attractions
CA Attendance	1.000	0.808	0.817	0.720	0.438	0.841	0.840	-0.479	-0.396	0.792	0.823	0.550	0.336	0.786	-0.166	-0.212	-0.311	0.002	0.850	0.417	0.353
CA Population	0.808	1.000	0.998	0.973	0.796	0.982	0.972	-0.444	-0.074	0.731	0.828	0.522	0.158	0.989	0.008	0.019	-0.050	0.100	0.820	0.474	0.471
Regional Population	0.817	0.998	1.000	0.971	0.780	0.991	0.981	-0.466	-0.104	0.746	0.843	0.553	0.149	0.992	-0.004	0.019	-0.051	0.099	0.831	0.488	0.484
CA Youth Population	0.720	0.973	0.971	1.000	0.903	0.946	0.937	-0.492	-0.003	0.584	0.708	0.458	0.012	0.985	0.060	0.088	0.038	0.147	0.690	0.473	0.480
CA Child Population	0.438	0.796	0.780	0.903	1.000	0.714	0.705	-0.372	0.265	0.222	0.374	0.144	-0.160	0.824	0.176	0.225	0.198	0.207	0.342	0.306	0.332
CA Teen Population	0.841	0.982	0.991	0.946	0.714	1.000	0.993	-0.520	-0.205	0.804	0.891	0.636	0.140	0.980	-0.035	-0.026	-0.088	0.083	0.864	0.538	0.530
Real US GDP/Capita	0.840	0.972	0.981	0.937	0.705	0.993	1.000	-0.584	-0.268	0.805	0.893	0.610	0.138	0.973	-0.023	-0.056	-0.116	0.062	0.840	0.537	0.523
US Unemployment	-0.479	-0.444	-0.466	-0.492	-0.372	-0.520	-0.584	1.000	0.746	-0.458	-0.522	-0.474	0.183	-0.495	-0.041	0.279	0.167	-0.121	-0.301	-0.502	-0.451
CA Unemployment	-0.396	-0.074	-0.104	-0.003	0.265	-0.205	-0.268	0.746	1.000	-0.499	-0.448	-0.489	-0.108	-0.082	0.140	0.522	0.418	0.054	-0.295	-0.342	-0.254
CA DIPC	0.792	0.731	0.746	0.584	0.222	0.804	0.805	-0.458	-0.499	1.000	0.986	0.813	0.112	0.678	-0.042	-0.320	-0.316	0.054	0.917	0.503	0.502
Regional DIPC	0.823	0.828	0.843	0.708	0.374	0.891	0.893	-0.522	-0.448	0.986	1.000	0.820	0.035	0.789	-0.016	-0.268	-0.263	0.090	0.923	0.549	0.553
Exchange Rate	0.550	0.522	0.553	0.458	0.144	0.636	0.610	-0.474	-0.489	0.813	0.820	1.000	-0.052	0.526	-0.162	-0.218	-0.148	0.055	0.704	0.607	0.629
Fuel Price	0.336	0.158	0.149	0.012	-0.160	0.140	0.138	0.183	-0.108	0.112	0.035	-0.052	1.000	0.071	-0.337	-0.192	-0.283	-0.276	0.365	-0.231	-0.318
Gate Price	0.786	0.989	0.992	0.985	0.824	0.980	0.973	-0.495	-0.082	0.678	0.789	0.526	0.071	1.000	0.066	0.075	0.008	0.156	0.770	0.492	0.490
Summer Precipitation	-0.166	0.008	-0.004	0.060	0.176	-0.035	-0.023	-0.041	0.140	-0.042	-0.016	-0.162	-0.337	0.066	1.000	0.513	0.513	0.764	-0.239	-0.068	-0.041
Annual Precipitation	-0.212	0.019	0.019	0.088	0.225	-0.026	-0.056	0.279	0.522	-0.320	-0.268	-0.218	-0.192	0.075	0.513	1.000	0.919	0.613	-0.200	-0.011	0.008
Annual Rainfall Days	-0.311	-0.050	-0.051	0.038	0.198	-0.088	-0.116	0.167	0.418	-0.316	-0.263	-0.148	-0.283	0.008	0.513	0.919	1.000	0.695	-0.259	0.097	0.107
Summer Rainfall Days	0.002	0.100	0.099	0.147	0.207	0.083	0.062	-0.121	0.054	0.054	0.090	0.055	-0.276	0.156	0.764	0.613	0.695	1.000	-0.024	0.226	0.204
Number of Parks	0.850	0.820	0.831	0.690	0.342	0.864	0.840	-0.301	-0.295	0.917	0.923	0.704	0.365	0.770	-0.239	-0.200	-0.259	-0.024	1.000	0.560	0.538
Rated New Attractions	0.417	0.474	0.488	0.473	0.306	0.538	0.537	-0.502	-0.342	0.503	0.549	0.607	-0.231	0.492	-0.068	-0.011	0.097	0.226	0.560	1.000	0.983
No. of New Attractions	0.353	0.471	0.484	0.480	0.332	0.530	0.523	-0.451	-0.254	0.502	0.553	0.629	-0.318	0.490	-0.041	0.008	0.107	0.204	0.538	0.983	1.000

p values for the test of zero correlation:

	CA Attendance	CA Population	Regional Population	CA Youth Population	CA Child Population	CA Teen Population	Real US GDP/Capita	US Unem-ployment	CA Unem-ployment	CA DIPC	Regional DIPC	Exchange Rate	Fuel Price	Gate Price	Summer Precip.	Annual Precip.	Annual Rainfall Days	Summer Rainfall Days	Number of Parks	Rated New Attractions	No. of New Attractions
CA Attendance	0.000	0.000	0.000	0.002	0.074	0.000	0.000	0.050	0.106	0.001	0.000	0.024	0.172	0.001	0.501	0.390	0.206	0.993	0.000	0.089	0.151
CA Population	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.070	0.762	0.003	0.000	0.032	0.522	0.000	0.973	0.938	0.839	0.684	0.000	0.053	0.054
Regional Population	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.057	0.673	0.002	0.000	0.023	0.546	0.000	0.987	0.940	0.835	0.687	0.000	0.046	0.048
CA Youth Population	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.044	0.989	0.020	0.004	0.062	0.962	0.000	0.807	0.721	0.878	0.551	0.004	0.053	0.050
CA Child Population	0.074	0.001	0.001	0.000	0.000	0.003	0.003	0.129	0.281	0.382	0.140	0.560	0.516	0.000	0.475	0.361	0.422	0.401	0.164	0.213	0.176
CA Teen Population	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.033	0.404	0.001	0.000	0.008	0.570	0.000	0.888	0.915	0.721	0.737	0.000	0.027	0.030
Real US GDP/Capita	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.016	0.276	0.001	0.000	0.012	0.576	0.000	0.926	0.819	0.637	0.801	0.000	0.027	0.032
US Unemployment	0.050	0.070	0.057	0.044	0.129	0.033	0.016	0.000	0.002	0.070	0.038	0.053	0.458	0.043	0.869	0.257	0.497	0.622	0.221	0.040	0.066
CA Unemployment	0.106	0.762	0.673	0.989	0.281	0.404	0.276	0.002	0.000	0.048	0.076	0.046	0.660	0.739	0.570	0.032	0.088	0.828	0.231	0.164	0.301
CA DIPC	0.001	0.003	0.002	0.020	0.382	0.001	0.001	0.070	0.048	0.000	0.000	0.001	0.658	0.006	0.867	0.207	0.213	0.832	0.000	0.046	0.046
Regional DIPC	0.000	0.000	0.000	0.004	0.140	0.000	0.000	0.038	0.076	0.000	0.000	0.001	0.889	0.001	0.950	0.292	0.300	0.723	0.000	0.029	0.028
Exchange Rate	0.024	0.032	0.023	0.062	0.560	0.008	0.012	0.053	0.046	0.001	0.001	0.000	0.834	0.031	0.510	0.376	0.547	0.822	0.003	0.012	0.009
Fuel Price	0.172	0.522	0.546	0.962	0.516	0.570	0.576	0.458	0.660	0.658	0.889	0.834	0.000	0.772	0.171	0.434	0.249	0.263	0.138	0.349	0.196
Gate Price	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.043	0.739	0.006	0.001	0.031	0.772	0.000	0.787	0.760	0.973	0.526	0.001	0.044	0.045
Summer Precipitation	0.501	0.973	0.987	0.807	0.475	0.888	0.926	0.869	0.570	0.867	0.950	0.510	0.171	0.787	0.000	0.036	0.036	0.001	0.332	0.782	0.868
Annual Precipitation	0.390	0.938	0.940	0.721	0.361	0.915	0.819	0.257	0.032	0.207	0.292	0.376	0.434	0.760	0.036	0.000	0.000	0.011	0.416	0.964	0.975
Annual Rainfall Days	0.206	0.839	0.835	0.878	0.422	0.721	0.637	0.497	0.088	0.213	0.300	0.547	0.249	0.973	0.036	0.000	0.000	0.004	0.293	0.693	0.665
Summer Rainfall Days	0.993	0.684	0.687	0.551	0.401	0.737	0.801	0.622	0.828	0.832	0.723	0.822	0.263	0.526	0.001	0.011	0.004	0.000	0.921	0.357	0.408
Number of Parks	0.000	0.000	0.000	0.004	0.164	0.000	0.000	0.221	0.231	0.000	0.000	0.003	0.138	0.001	0.332	0.416	0.293	0.921	0.000	0.021	0.027
Rated New Attractions	0.089	0.053	0.046	0.053	0.213	0.027	0.027	0.040	0.164	0.046	0.029	0.012	0.349	0.044	0.782	0.964	0.693	0.357	0.021	0.000	0.000
No. of New Attractions	0.151	0.054	0.048	0.050	0.176	0.030	0.032	0.066	0.301	0.046	0.028	0.009	0.196	0.045	0.868	0.975	0.665	0.408	0.027	0.000	0.000

Figure F-1: Regression Output; 1-variable model (CA population)

Dependent Variable: attendance
Independent Variables: pop_CA

Descriptive Statistics

Variable	Variance	Coef.Var	Std.Err.	Maximum	Minimum	Count
pop_CA	6.583	0.081	0.589	35.893799	27.102237	19
attendance	9.482	0.103	0.706	35.5	25.3	19

Correlation Matrix

Variable	attendance	pop_CA
attendance	1.000	
pop_CA	0.808	1.000

Regression Statistics

R	R Square	Adj.RSqr	Std.Err.	# Cases	#Missing	Deg.Free	t(2.5%,17)
0.808	0.654	0.633	1.865	19	0	17	2.110

Summary Table

Variable	Coeff.	Std.Err.	t Stat.	P-value	Lower95%	Upper95%
Intercept	-0.811	5.450	-0.149	0.883	-12.310	10.687
pop_CA	0.970	0.171	5.662	0.000	0.609	1.332

Analysis of Variance

Source	df	Sum Sqrs	Mean Sqr	F	P-value
Regression	1	111.535	111.535	32.062	0.000
Residual	17	59.138	3.479		
Total	18	170.673			

Residual Statistics

Durbn-Watsn	#Res.>0	#Res.<=0	1st Auto	2nd Auto	4th Auto	7th Auto	12th Auto
1.060	10	9	0.451	0.076	-0.313	0.014	0.005

Residual Table

Case	Actual	Predicted	Residual	% Error	Std.Res.
1	35.5	34.011	1.489	4.19%	0.798
2	34.436895	33.614	0.823	2.39%	0.441
3	34.64539	33.146	1.499	4.33%	0.804
4	34.346	32.691	1.655	4.82%	0.887
5	30.906	32.174	-1.268	4.10%	-0.680
6	30.4	31.345	-0.945	3.11%	-0.507
7	28.95	30.896	-1.946	6.72%	-1.044
8	30.6965	30.445	0.251	0.82%	0.135
9	31.24	30.021	1.219	3.90%	0.653
10	29.35	29.742	-0.392	1.34%	-0.210
11	25.9	29.571	-3.671	14.18%	-1.968
12	27.35	29.407	-2.057	7.52%	-1.103
13	27.506	29.143	-1.637	5.95%	-0.878
14	26.735	28.695	-1.960	7.33%	-1.051
15	28.90704	28.245	0.662	2.29%	0.355
16	31.38	27.535	3.845	12.25%	2.061
17	27.69	26.804	0.886	3.20%	0.475
18	27.868	26.137	1.731	6.21%	0.928
19	25.3	25.482	-0.182	0.72%	-0.098
		Average Predictive Error:		5.02%	

Figure F-2: Regression Output; 2-variable model (CA population and CA unemployment)

Dependent Variable: attendance
Independent Variables: econ_CAun pop_CA

Descriptive Statistics

Variable	Variance	Coef.Var	Std.Err.	Maximum	Minimum	Count
econ_CAunemployment	0.000	0.210	0.003	0.0954	0.0496	19
pop_CA	6.583	0.081	0.589	35.893799	27.102237	19
attendance	9.482	0.103	0.706	35.5	25.3	19

Correlation Matrix

Variable	attendance	econ_CAur	pop_CA
attendance	1.000		
econ_CAunemployment	-0.396	1.000	
pop_CA	0.808	-0.074	1.000

Regression Statistics

Multiple R	R Square	Adj.RSqr	Std.Err.	# Cases	#Missing	Deg.Free	t(2.5%,16)
0.876	0.767	0.738	1.576	19	0	16	2.120

Summary Table

Variable	Coeff.	Std.Err.	t Stat.	P-value	Lower95%	Upper95%
Intercept	5.098	5.069	1.006	0.329	-5.648	15.845
econ_CAunemployment	-74.064	26.524	-2.792	0.013	-130.292	-17.837
pop_CA	0.940	0.145	6.473	0.000	0.632	1.248

Analysis of Variance

Source	df	Sum Sqrs	Mean Sqr	F	P-value
Regression	2	130.912	65.456	26.340	0.000
Residual	16	39.761	2.485		
Total	18	170.673			

Residual Statistics

Durbn-Watsn	#Res.>0	#Res.<=0	1st Auto	2nd Auto	4th Auto	7th Auto	12th Auto
1.458	11	8	0.250	-0.154	-0.268	0.139	0.030

Residual Table

Case	Actual	Predicted	Residual	% Error	Std.Res.
1	35.5	34.223	1.277	3.60%	0.810
2	34.436895	33.394	1.043	3.03%	0.662
3	34.64539	33.036	1.609	4.64%	1.021
4	34.346	33.536	0.810	2.36%	0.514
5	30.906	33.383	-2.477	8.01%	-1.571
6	30.4	32.365	-1.965	6.46%	-1.246
7	28.95	31.404	-2.454	8.48%	-1.557
8	30.6965	30.634	0.062	0.20%	0.040
9	31.24	29.535	1.705	5.46%	1.082
10	29.35	28.879	0.471	1.60%	0.299
11	25.9	28.151	-2.251	8.69%	-1.428
12	27.35	27.310	0.040	0.15%	0.026
13	27.506	27.173	0.333	1.21%	0.211
14	26.735	27.939	-1.204	4.50%	-0.764
15	28.90704	28.991	-0.084	0.29%	-0.054
16	31.38	28.748	2.632	8.39%	1.670
17	27.69	27.943	-0.253	0.91%	-0.160
18	27.868	26.897	0.971	3.48%	0.616
19	25.3	25.566	-0.266	1.05%	-0.169
			Average Predictive Error:	3.82%	

Figure F-3: Regression Output; 3-variable model (CA population, CA unemployment, No. of Parks)

Dependent Variable: attendance
Independent Variables: econ_CAun pop_CA supply_numparks

Descriptive Statistics

Variable	Variance	Coef.Var	Std.Err.	Maximum	Minimum	Count
econ_CAunemployment	0.000	0.210	0.003	0.0954	0.0496	19
pop_CA	6.583	0.081	0.589	35.893799	27.102237	19
supply_numparks	0.708	0.152	0.193	7	5	19
attendance	9.482	0.103	0.706	35.5	25.3	19

Correlation Matrix

Variable	attendance	econ_CAur	pop_CA	supply_numparks
attendance	1.000			
econ_CAunemployment	-0.396	1.000		
pop_CA	0.808	-0.074	1.000	
supply_numparks	0.850	-0.295	0.820	1.000

Regression Statistics

Multiple R	R Square	Adj.RSqr	Std.Err.	# Cases	# Missing	Deg.Free	t(2.5%,15)
0.900	0.810	0.772	1.471	19	0	15	2.131

Summary Table

Variable	Coeff.	Std.Err.	t Stat.	P-value	Lower95%	Upper95%
Intercept	7.827	4.957	1.579	0.135	-2.738	18.391
econ_CAunemployment	-53.640	27.124	-1.978	0.067	-111.452	4.173
pop_CA	0.558	0.248	2.248	0.040	0.029	1.087
supply_numparks	1.452	0.790	1.839	0.086	-0.231	3.135

Analysis of Variance

Source	df	Sum Sqrs	Mean Sqr	F	P-value
Regression	3	138.227	46.076	21.301	0.000
Residual	15	32.446	2.163		
Total	18	170.673			

Residual Statistics

Durbn-Watsn	# Res.>0	# Res.<=0	1st Auto	2nd Auto	4th Auto	7th Auto	12th Auto
1.570	12	7	0.181	-0.278	-0.270	0.274	0.059

Residual Table

Case	Actual	Predicted	Residual	% Error	Std.Res.
1	35.5	34.671	0.829	2.34%	0.564
2	34.436895	34.121	0.316	0.92%	0.215
3	34.64539	33.921	0.724	2.09%	0.492
4	34.346	34.341	0.005	0.01%	0.003
5	30.906	32.844	-1.938	6.27%	-1.317
6	30.4	32.211	-1.811	5.96%	-1.232
7	28.95	30.120	-1.170	4.04%	-0.796
8	30.6965	29.620	1.077	3.51%	0.732
9	31.24	28.877	2.363	7.56%	1.607
10	29.35	28.438	0.912	3.11%	0.620
11	25.9	27.932	-2.032	7.84%	-1.381
12	27.35	27.344	0.006	0.02%	0.004
13	27.506	27.278	0.228	0.83%	0.155
14	26.735	27.889	-1.154	4.32%	-0.785
15	28.90704	28.709	0.198	0.69%	0.135
16	31.38	28.622	2.758	8.79%	1.875
17	27.69	28.132	-0.442	1.60%	-0.301
18	27.868	27.459	0.409	1.47%	0.278
19	25.3	26.579	-1.279	5.05%	-0.869
			Average Predictive Error:	3.50%	

Figure F-4: Regression Output; 4-variable model (CA pop., CA unemp., No. of Parks, Rain Days)

Dependent Variable: attendance

Independent Variables: econ_CAun pop_CA supply_num weather_raindays

Descriptive Statistics

Variable	Variance	Coef.Var	Std.Err.	Maximum	Minimum	Count
econ_CAunemployment	0.000	0.210	0.003	0.0954	0.0496	19
pop_CA	6.583	0.081	0.589	35.893799	27.102237	19
supply_numparks	0.708	0.152	0.193	7	5	19
weather_raindays	44.522	0.314	1.531	35.333333	10.333333	19
attendance	9.482	0.103	0.706	35.5	25.3	19

Correlation Matrix

Variable	attendance	econ_CAur	pop_CA	supply_num	weather_raindays
attendance	1.000				
econ_CAunemployment	-0.396	1.000			
pop_CA	0.808	-0.074	1.000		
supply_numparks	0.850	-0.295	0.820	1.000	
weather_raindays	-0.311	0.418	-0.050	-0.259	1.000

Regression Statistics

Multiple R	R Square	Adj.RSqr	Std.Err.	# Cases	# Missing	Deg.Free	t(2.5%,14)
0.905	0.819	0.767	1.486	19	0	14	2.145

Summary Table

Variable	Coeff.	Std.Err.	t Stat.	P-value	Lower95%	Upper95%
Intercept	7.977	5.012	1.591	0.134	-2.774	18.727
econ_CAunemployment	-46.265	28.817	-1.605	0.131	-108.071	15.542
pop_CA	0.601	0.256	2.347	0.034	0.052	1.150
supply_numparks	1.278	0.825	1.550	0.144	-0.491	3.048
weather_raindays	-0.050	0.060	-0.829	0.421	-0.178	0.079

Analysis of Variance

Source	df	Sum Sqrs	Mean Sqr	F	P-value
Regression	4	139.747	34.937	15.815	0.000
Residual	14	30.926	2.209		
Total	18	170.673			

Residual Statistics

Durbn-Watsn	# Res.>0	# Res.<=0	1st Auto	2nd Auto	4th Auto	7th Auto	12th Auto
1.737	11	8	0.098	-0.300	-0.277	0.098	0.063

Residual Table

Case	Actual	Predicted	Residual	% Error	Std.Res.
1	35.5	34.593	0.907	2.56%	0.610
2	34.436895	34.317	0.120	0.35%	0.081
3	34.64539	34.302	0.343	0.99%	0.231
4	34.346	33.715	0.631	1.84%	0.424
5	30.906	32.879	-1.973	6.38%	-1.328
6	30.4	32.430	-2.030	6.68%	-1.365
7	28.95	29.504	-0.554	1.91%	-0.373
8	30.6965	29.875	0.821	2.68%	0.553
9	31.24	29.001	2.239	7.17%	1.507
10	29.35	28.207	1.143	3.89%	0.769
11	25.9	28.163	-2.263	8.74%	-1.522
12	27.35	27.222	0.128	0.47%	0.086
13	27.506	27.166	0.340	1.24%	0.229
14	26.735	28.001	-1.266	4.74%	-0.852
15	28.90704	28.917	-0.010	0.03%	-0.007
16	31.38	29.035	2.345	7.47%	1.578
17	27.69	28.092	-0.402	1.45%	-0.271
18	27.868	27.231	0.637	2.28%	0.428
19	25.3	26.457	-1.157	4.57%	-0.778
		Average Predictive Error:		3.44%	

Figure F-5: Regression Output; 5-variable model
(CA pop., CA unemp., No. of Parks, Rain Days, Fuel Prices)

Dependent Variable:	attendance					
Independent Variables:	cost_fuel	econ_CAun	pop_CA	supply_nun	weather_raindays	

Descriptive Statistics

Variable	Variance	Coef.Var	Std.Err.	Maximum	Minimum	Count
cost_fuel	0.012	0.086	0.025	1.5514304	1.0424908	19
econ_CAunemployment	0.000	0.210	0.003	0.0954	0.0496	19
pop_CA	6.583	0.081	0.589	35.893799	27.102237	19
supply_numparks	0.708	0.152	0.193	7	5	19
weather_raindays	44.522	0.314	1.531	35.333333	10.333333	19
attendance	9.482	0.103	0.706	35.5	25.3	19

Correlation Matrix

Variable	attendance	cost_fuel	econ_CAur	pop_CA	supply_nun	weather_raindays
attendance	1.000					
cost_fuel	0.336	1.000				
econ_CAunemployment	-0.396	-0.108	1.000			
pop_CA	0.808	0.158	-0.074	1.000		
supply_numparks	0.850	0.365	-0.295	0.820	1.000	
weather_raindays	-0.311	-0.283	0.418	-0.050	-0.259	1.000

Regression Statistics

Multiple R	R Square	Adj.RSqr	Std.Err.	# Cases	# Missing	Deg.Free	t(2.5%,13)
0.909	0.826	0.759	1.510	19	0	13	2.160

Summary Table

Variable	Coeff.	Std.Err.	t Stat.	P-value	Lower95%	Upper95%
Intercept	4.348	7.037	0.618	0.547	-10.854	19.549
cost_fuel	2.737	3.662	0.747	0.468	-5.174	10.649
econ_CAunemployment	-49.358	29.573	-1.669	0.119	-113.247	14.531
pop_CA	0.650	0.268	2.422	0.031	0.070	1.230
supply_numparks	1.027	0.903	1.137	0.276	-0.925	2.979
weather_raindays	-0.041	0.062	-0.668	0.516	-0.175	0.092

Analysis of Variance

Source	df	Sum Sqrs	Mean Sqr	F	P-value
Regression	5	141.021	28.204	12.365	0.000
Residual	13	29.652	2.281		
Total	18	170.673			

Residual Statistics

Durbn-Watsn	# Res.>0	# Res.<=0	1st Auto	2nd Auto	4th Auto	7th Auto	12th Auto
1.810	11	8	0.073	-0.318	-0.253	0.087	0.032

Residual Table

Case	Actual	Predicted	Residual	% Error	Std.Res.
1	35.5	35.183	0.317	0.89%	0.210
2	34.436895	34.294	0.143	0.41%	0.094
3	34.64539	33.851	0.794	2.29%	0.526
4	34.346	33.696	0.650	1.89%	0.431
5	30.906	33.188	-2.282	7.38%	-1.511
6	30.4	31.926	-1.526	5.02%	-1.010
7	28.95	29.178	-0.228	0.79%	-0.151
8	30.6965	29.870	0.826	2.69%	0.547
9	31.24	29.045	2.195	7.03%	1.453
10	29.35	28.159	1.191	4.06%	0.789
11	25.9	28.019	-2.119	8.18%	-1.403
12	27.35	27.193	0.157	0.57%	0.104
13	27.506	27.275	0.231	0.84%	0.153
14	26.735	28.202	-1.467	5.49%	-0.971
15	28.90704	29.334	-0.427	1.48%	-0.282
16	31.38	29.070	2.310	7.36%	1.530
17	27.69	27.988	-0.298	1.07%	-0.197
18	27.868	27.228	0.640	2.30%	0.424
19	25.3	26.409	-1.109	4.39%	-0.735
		Average Predictive Error:		3.38%	

APPENDIX G

Southern California Attendance per Capita Analysis

This appendix contains the output from the statistical software used for our analysis of theme park attendance in Southern California.

In the regression outputs, there are some key statistics we looked for. In the table of Regression Statistics, the “R Square” number indicates the amount of variation that is predicted by the model. The “Adj.RSqr” number is the best number for comparing the quality of models with different numbers of variables.

The Summary Table contains the actual coefficients for the variables in the model. Also in this table, the p-values indicate the level of confidence that each variable is contributing to the model. Smaller p-values are better, and anything larger than 0.1 indicates a weak variable.

In the Analysis of Variance, there is another p-value that summarizes the likelihood that the overall model is useful. This p-value should ideally be very close to zero. Also in this table are two numbers that were used in calculating the partial F-test statistics: the “Residual Sum Sqrs” is the sum of squares for error (SSE) for the model, and the “Residual Mean Sqr” is the mean square error (MSE) of the model.

The Durbin-Watson statistic is listed in the Residual Statistics table. The Residual Table contains information on how well the model predicts each year of data. (Case 1 is 2004; Case 19 is 1986.)

Table G-1: Correlations and P-Values Matrix

Correlation Matrix: Entries are Pearson's Correlation Coefficient

	CA Attendance Per Capita	Real US GDP/Capita	US Unem-ployment	CA Unem-ployment	CA DIPC	Regional DIPC	Exchange Rate	Fuel Price	Gate Price	Summer Precip.	Annual Precip.	Annual Rainfall Days	Summer Rainfall Days	Number of Parks	Rated New Attractions	No. of New Attractions
Att. Per Capita	1.000	0.092	-0.229	-0.589	-0.122	-0.134	0.214	0.336	-0.026	-0.282	-0.397	-0.465	-0.133	0.303	0.058	-0.048
Real US GDP/Capita	0.092	1.000	-0.584	-0.268	-0.272	-0.246	0.610	0.138	0.973	-0.023	-0.056	-0.116	0.062	0.840	0.537	0.523
US Unemployment	-0.229	-0.584	1.000	0.746	-0.053	-0.072	-0.474	0.183	-0.495	-0.041	0.279	0.167	-0.121	-0.301	-0.502	-0.451
CA Unemployment	-0.589	-0.268	0.746	1.000	-0.023	-0.018	-0.489	-0.108	-0.082	0.140	0.522	0.418	0.054	-0.295	-0.342	-0.254
CA DIPC	-0.122	-0.272	-0.053	-0.023	1.000	0.999	0.204	-0.568	-0.246	0.159	-0.177	-0.042	0.185	-0.248	0.065	0.124
Regional DIPC	-0.134	-0.246	-0.072	-0.018	0.999	1.000	0.214	-0.579	-0.217	0.163	-0.170	-0.034	0.193	-0.237	0.081	0.140
Exchange Rate	0.214	0.610	-0.474	-0.489	0.204	0.214	1.000	-0.052	0.526	-0.162	-0.218	-0.148	0.055	0.704	0.607	0.629
Fuel Price	0.336	0.138	0.183	-0.108	-0.568	-0.579	-0.052	1.000	0.071	-0.337	-0.192	-0.283	-0.276	0.365	-0.231	-0.318
Gate Price	-0.026	0.973	-0.495	-0.082	-0.246	-0.217	0.526	0.071	1.000	0.066	0.075	0.008	0.156	0.770	0.492	0.490
Summer Precipitation	-0.282	-0.023	-0.041	0.140	0.159	0.163	-0.162	-0.337	0.066	1.000	0.513	0.513	0.764	-0.239	-0.068	-0.041
Annual Precipitation	-0.397	-0.056	0.279	0.522	-0.177	-0.170	-0.218	-0.192	0.075	0.513	1.000	0.919	0.613	-0.200	-0.011	0.008
Annual Rainfall Days	-0.465	-0.116	0.167	0.418	-0.042	-0.034	-0.148	-0.283	0.008	0.513	0.919	1.000	0.695	-0.259	0.097	0.107
Summer Rainfall Days	-0.133	0.062	-0.121	0.054	0.185	0.193	0.055	-0.276	0.156	0.764	0.613	0.695	1.000	-0.024	0.226	0.204
Number of Parks	0.303	0.840	-0.301	-0.295	-0.248	-0.237	0.704	0.365	0.770	-0.239	-0.200	-0.259	-0.024	1.000	0.560	0.538
Rated New Attractions	0.058	0.537	-0.502	-0.342	0.065	0.081	0.607	-0.231	0.492	-0.068	-0.011	0.097	0.226	0.560	1.000	0.983
No. of New Attractions	-0.048	0.523	-0.451	-0.254	0.124	0.140	0.629	-0.318	0.490	-0.041	0.008	0.107	0.204	0.538	0.983	1.000

p values for the test of zero correlation:

	CA Attendance Per Capita	Real US GDP/Capita	US Unem-ployment	CA Unem-ployment	CA DIPC	Regional DIPC	Exchange Rate	Fuel Price	Gate Price	Summer Precip.	Annual Precip.	Annual Rainfall Days	Summer Rainfall Days	Number of Parks	Rated New Attractions	No. of New Attractions
Att. Per Capita	0.000	0.709	0.352	0.015	0.620	0.586	0.384	0.171	0.916	0.251	0.106	0.057	0.589	0.217	0.814	0.846
Real US GDP/Capita	0.709	0.000	0.016	0.276	0.269	0.318	0.012	0.576	0.000	0.926	0.819	0.637	0.801	0.000	0.027	0.032
US Unemployment	0.352	0.016	0.000	0.002	0.829	0.770	0.053	0.458	0.043	0.869	0.257	0.497	0.622	0.221	0.040	0.066
CA Unemployment	0.015	0.276	0.002	0.000	0.925	0.941	0.046	0.660	0.739	0.570	0.032	0.088	0.828	0.231	0.164	0.301
CA DIPC	0.620	0.269	0.829	0.925	0.000	0.000	0.408	0.019	0.316	0.519	0.471	0.865	0.452	0.313	0.791	0.615
Regional DIPC	0.586	0.318	0.770	0.941	0.000	0.000	0.384	0.017	0.379	0.507	0.491	0.890	0.434	0.336	0.743	0.569
Exchange Rate	0.384	0.012	0.053	0.046	0.408	0.384	0.000	0.834	0.031	0.510	0.376	0.547	0.822	0.003	0.012	0.009
Fuel Price	0.171	0.576	0.458	0.660	0.019	0.017	0.834	0.000	0.772	0.171	0.434	0.249	0.263	0.138	0.349	0.196
Gate Price	0.916	0.000	0.043	0.739	0.316	0.379	0.031	0.772	0.000	0.787	0.760	0.973	0.526	0.001	0.044	0.045
Summer Precipitation	0.251	0.926	0.869	0.570	0.519	0.507	0.510	0.171	0.787	0.000	0.036	0.036	0.001	0.332	0.782	0.868
Annual Precipitation	0.106	0.819	0.257	0.032	0.471	0.491	0.376	0.434	0.760	0.036	0.000	0.000	0.011	0.416	0.964	0.975
Annual Rainfall Days	0.057	0.637	0.497	0.088	0.865	0.890	0.547	0.249	0.973	0.036	0.000	0.000	0.004	0.293	0.693	0.665
Summer Rainfall Days	0.589	0.801	0.622	0.828	0.452	0.434	0.822	0.263	0.526	0.001	0.011	0.004	0.000	0.921	0.357	0.408
Number of Parks	0.217	0.000	0.221	0.231	0.313	0.336	0.003	0.138	0.001	0.332	0.416	0.293	0.921	0.000	0.021	0.027
Rated New Attractions	0.814	0.027	0.040	0.164	0.791	0.743	0.012	0.349	0.044	0.782	0.964	0.693	0.357	0.021	0.000	0.000
No. of New Attractions	0.846	0.032	0.066	0.301	0.615	0.569	0.009	0.196	0.045	0.868	0.975	0.665	0.408	0.027	0.000	0.000

Figure G-1: Regression Output; 1-variable model (CA unemployment)

Dependent Variable:	attendance_percap
Independent Variables:	econ_CAunemployment

Descriptive Statistics

Variable	Variance	Coef.Var	Std.Err.	Maximum	Minimum	Count
econ_CAunemployment	0.000	0.210	0.003	0.0954	0.0496	19
attendance_percap	0.003	0.062	0.013	1.0739895	0.8270221	19

Correlation Matrix

Variable	attendance	econ_CAunemployment
attendance_percap	1.000	
econ_CAunemployment	-0.589	1.000

Regression Statistics

R	R Square	Adj.RSqr	Std.Err.	# Cases	# Missing	Deg.Free	t(2.5%,17)
-0.589	0.347	0.308	0.049	19	0	17	2.110

Summary Table

Variable	Coeff.	Std.Err.	t Stat.	P-value	Lower95%	Upper95%
Intercept	1.108	0.056	19.934	0.000	0.991	1.225
econ_CAunemployment	-2.446	0.815	-3.003	0.008	-4.165	-0.727

Analysis of Variance

Source	df	Sum Sqrs	Mean Sqr	F	P-value
Regression	1	0.021	0.021	9.017	0.008
Residual	17	0.040	0.002		
Total	18	0.061			

Residual Statistics

Durbn-Watsn	# Res.>0	# Res.<=0	1st Auto	2nd Auto	4th Auto	7th Auto	12th Auto
1.515	11	8	0.228	-0.148	-0.243	0.147	0.021

Residual Table

Case	Actual	Predicted	Residual	% Error	Std.Res.
1	0.9890288	0.956	0.033	3.37%	0.686
2	0.9704784	0.941	0.029	3.03%	0.606
3	0.9898121	0.944	0.046	4.60%	0.938
4	0.9945833	0.975	0.019	1.94%	0.397
5	0.9090032	0.987	-0.078	8.56%	-1.603
6	0.9171787	0.980	-0.063	6.82%	-1.288
7	0.8857872	0.962	-0.077	8.64%	-1.577
8	0.9527835	0.951	0.001	0.15%	0.030
9	0.9829825	0.929	0.054	5.53%	1.120
10	0.9319376	0.916	0.016	1.72%	0.331
11	0.8270221	0.897	-0.070	8.50%	-1.447
12	0.8780883	0.875	0.003	0.38%	0.068
13	0.890856	0.879	0.012	1.37%	0.251
14	0.8790327	0.918	-0.039	4.47%	-0.809
15	0.9651731	0.967	-0.002	0.24%	-0.048
16	1.0739895	0.982	0.092	8.55%	1.891
17	0.9727992	0.979	-0.006	0.64%	-0.127
18	1.0032704	0.966	0.037	3.74%	0.772
19	0.9335023	0.943	-0.009	0.99%	-0.191
		Average Predictive Error:		3.85%	

Figure G-2: Regression Output; 2-variable model (CA unemployment and Fuel Price)

Dependent Variable: attendance_percap
Independent Variables: cost_fuel econ_CAunemployment

Descriptive Statistics

Variable	Variance	Coef.Var	Std.Err.	Maximum	Minimum	Count
cost_fuel	0.012	0.086	0.025	1.5514304	1.0424908	19
econ_CAunemployment	0.000	0.210	0.003	0.0954	0.0496	19
attendance_percap	0.003	0.062	0.013	1.0739895	0.8270221	19

Correlation Matrix

Variable	attendance	cost_fuel	econ_CAunemployment
attendance_percap	1.000		
cost_fuel	0.336	1.000	
econ_CAunemployment	-0.589	-0.108	1.000

Regression Statistics

Multiple R	R Square	Adj.RSqr	Std.Err.	# Cases	# Missing	Deg.Free	t(2.5%,16)
0.649	0.422	0.350	0.047	19	0	16	2.120

Summary Table

Variable	Coeff.	Std.Err.	t Stat.	P-value	Lower95%	Upper95%
Intercept	0.914	0.145	6.290	0.000	0.606	1.221
cost_fuel	0.146	0.101	1.443	0.168	-0.068	0.360
econ_CAunemployment	-2.322	0.795	-2.922	0.010	-4.006	-0.638

Analysis of Variance

Source	df	Sum Sqrs	Mean Sqr	F	P-value
Regression	2	0.026	0.013	5.836	0.012
Residual	16	0.035	0.002		
Total	18	0.061			

Residual Statistics

Durbn-Watsn	# Res.>0	# Res.<=0	1st Auto	2nd Auto	4th Auto	7th Auto	12th Auto
1.803	11	8	0.096	-0.272	-0.197	0.159	-0.030

Residual Table

Case	Actual	Predicted	Residual	% Error	Std.Res.
1	0.9890288	0.995	-0.006	0.60%	-0.127
2	0.9704784	0.953	0.018	1.83%	0.378
3	0.9898121	0.936	0.054	5.45%	1.146
4	0.9945833	0.979	0.015	1.52%	0.321
5	0.9090032	1.000	-0.091	10.01%	-1.932
6	0.9171787	0.954	-0.037	4.06%	-0.791
7	0.8857872	0.927	-0.041	4.66%	-0.877
8	0.9527835	0.943	0.009	0.99%	0.200
9	0.9829825	0.925	0.058	5.85%	1.222
10	0.9319376	0.907	0.025	2.71%	0.537
11	0.8270221	0.889	-0.062	7.54%	-1.324
12	0.8780883	0.872	0.006	0.66%	0.122
13	0.890856	0.884	0.007	0.75%	0.143
14	0.8790327	0.928	-0.049	5.62%	-1.049
15	0.9651731	0.987	-0.022	2.25%	-0.460
16	1.0739895	0.984	0.090	8.40%	1.915
17	0.9727992	0.972	0.001	0.11%	0.022
18	1.0032704	0.966	0.038	3.76%	0.802
19	0.9335023	0.945	-0.012	1.26%	-0.249
			Average Predictive Error:	3.58%	

Figure G-3: Regression Output; 3-variable model (CA unemployment, Fuel Price and Rain Days)

Dependent Variable: attendance_percap
Independent Variables: cost_fuel econ_CAun weather_raindays

Descriptive Statistics

Variable	Variance	Coef.Var	Std.Err.	Maximum	Minimum	Count
cost_fuel	0.012	0.086	0.025	1.5514304	1.0424908	19
econ_CAunemployment	0.000	0.210	0.003	0.0954	0.0496	19
weather_raindays	44.522	0.314	1.531	35.333333	10.333333	19
attendance_percap	0.003	0.062	0.013	1.0739895	0.8270221	19

Correlation Matrix

Variable	attendance	cost_fuel	econ_CAur	weather_raindays
attendance_percap	1.000			
cost_fuel	0.336	1.000		
econ_CAunemployment	-0.589	-0.108	1.000	
weather_raindays	-0.465	-0.283	0.418	1.000

Regression Statistics

Multiple R	R Square	Adj.RSqr	Std.Err.	# Cases	# Missing	Deg.Free	t(2.5%,15)
0.673	0.452	0.343	0.047	19	0	15	2.131

Summary Table

Variable	Coeff.	Std.Err.	t Stat.	P-value	Lower95%	Upper95%
Intercept	0.961	0.155	6.199	0.000	0.631	1.292
cost_fuel	0.120	0.105	1.143	0.271	-0.104	0.345
econ_CAunemployment	-1.997	0.874	-2.284	0.037	-3.860	-0.134
weather_raindays	-0.002	0.002	-0.915	0.375	-0.006	0.002

Analysis of Variance

Source	df	Sum Sqrs	Mean Sqr	F	P-value
Regression	3	0.028	0.009	4.130	0.025
Residual	15	0.034	0.002		
Total	18	0.061			

Residual Statistics

Durbn-Watsn	# Res.>0	# Res.<=0	1st Auto	2nd Auto	4th Auto	7th Auto	12th Auto
1.921	12	7	0.038	-0.284	-0.221	0.007	-0.005

Residual Table

Case	Actual	Predicted	Residual	% Error	Std.Res.
1	0.9890288	0.988	0.001	0.14%	0.029
2	0.9704784	0.961	0.010	0.98%	0.201
3	0.9898121	0.955	0.035	3.54%	0.741
4	0.9945833	0.960	0.034	3.44%	0.724
5	0.9090032	0.997	-0.088	9.66%	-1.856
6	0.9171787	0.966	-0.049	5.32%	-1.031
7	0.8857872	0.906	-0.020	2.30%	-0.431
8	0.9527835	0.950	0.003	0.34%	0.069
9	0.9829825	0.928	0.055	5.64%	1.171
10	0.9319376	0.898	0.034	3.61%	0.711
11	0.8270221	0.898	-0.071	8.57%	-1.498
12	0.8780883	0.869	0.009	1.08%	0.201
13	0.890856	0.880	0.011	1.26%	0.237
14	0.8790327	0.930	-0.051	5.83%	-1.083
15	0.9651731	0.989	-0.024	2.51%	-0.513
16	1.0739895	0.997	0.077	7.14%	1.620
17	0.9727992	0.972	0.001	0.07%	0.015
18	1.0032704	0.960	0.044	4.36%	0.924
19	0.9335023	0.944	-0.011	1.17%	-0.230
		Average Predictive Error:		3.52%	

APPENDIX H

National Attendance Analysis

Before beginning our analysis of attendance in Southern California, we took a brief look at national data. This helped us in developing our analysis methodology, and also gave us some initial insights into what factors might be important to theme park attendance in Southern California.

However, this analysis has some inherent weaknesses. Actual total attendance data is difficult to obtain, so we used the attendance at the top 50 parks in North America as a proxy for total U.S. theme park attendance. (See Appendix D for attendance data sources.) It would be extremely hard to quantify national weather data in a meaningful way, and supply-side factors (such as the total number of parks) are difficult to obtain. Additionally, given time restraints, we were only able to collect national data for the past ten years.

CORRELATIONS

We calculated correlations with national attendance for variables in three categories: population, economics, and price of travel.

Population

All population variables showed a very strong correlation with total theme park attendance, with the exception of the international tourism variable. The youth population had a stronger correlation than overall population, with male youth as the most highly correlated population variable we considered.

The number of international tourists visiting the United States did not appear to be correlated to theme park attendance. This is expected, because most theme parks and amusement parks in the United States cater to local visitors.

Table H-1: Correlations between Population Variables and Attendance

Variable[1]	Correlation	P-value	Summary
Total U.S. Population	0.826	0.014	HIGH
Youth Population (age 0 -14)	0.902	0.005	HIGH
Female Youth (age 0 – 14)	0.883	0.007	HIGH
Male Youth (age 0 – 14)	0.910	0.004	HIGH
International Tourists	0.148	0.684	low

[1] See Appendix E for data sources and more information on each variable.

Economics

The measures of GDP per Capita and Disposable Income per Capita showed a strong correlation with theme park attendance, while unemployment had a moderate negative correlation with attendance.

Extremely strong correlations were found with travel service import and export. These factors measure the amount of travel expenditures by international tourists visiting the United States and by United States tourists visiting foreign countries. However, it does not make sense that theme park attendance in the United States would be affected by the number of Americans choosing to leave the country to travel. Additionally, this contrasted with our finding that the number of foreign tourists has little, if any, correlation with theme park attendance.

We concluded that despite the strong correlation levels, these measures are not a good indicator of theme park attendance. The factors that encourage people to attend theme parks probably encourage people to travel more in general. In short, the strong correlation with travel service indicates that travel service is a good proxy for theme park attendance, not that there is a cause and effect relationship.

Table H-2: Correlations between Economic Variables and Attendance

Variable[2]	Correlation	P-value	Summary
U.S. Unemployment	(0.651)	0.067	Medium
GDP per Capita	0.869	0.008	HIGH
Disposable Income per Capita	0.803	0.019	HIGH
Travel Service Import	0.944	0.002	HIGH
Travel Service Export	0.942	0.002	HIGH

[2] See Appendix E for data sources and more information on each variable.

Travel Pricing

Surprisingly, for every variable we considered, the price of travel was positively related to theme park attendance. When the price of taking a vacation rises, attendance also rises. Our conclusion is that the demand for travel in the United States probably affects travel prices more than the prices affect travel demand. It is likely that when the economy is strong, people want to take more vacations, and they are willing to pay more for transportation and hotels. This conclusion is supported by a strong correlation between the travel price index and the national GDP.

Table H-3: Correlations between Pricing Variables and Attendance

Variable[3]	Correlation	P-value	Summary
Travel Price Index	0.869	0.008	HIGH
Airfare Price Index	0.787	0.022	HIGH
Fuel Prices	0.620	0.083	Medium
Exchange Rates	0.836	0.013	HIGH

REGRESSION ANALYSIS

We used *Regress* software to calculate a series of experimental regressions using our data. We found that a 1-variable model using the U.S. youth population was capable of predicting 81% of the annual variation in theme park attendance. The best model we could calculate was a 2-variable model using U.S. youth population and U.S. unemployment. This model predicts an impressive 96.2% of the annual variation in attendance.

A weakness of our models is the fact that only 10 years of data are included, and the quality of the models may be due partly to luck. However, the strength of the statistical measures (the R^2 values and the p-values on the coefficients) suggest that the model has a great deal of merit.

CONCLUSIONS

Our analysis of national theme park attendance led us to understand that the size of the population and the status of the economy have a strong effect on attendance levels. Pricing factors, such as fuel

[3] See Appendix E for data sources and more information on each variable.

prices, exchange rates, and airfare prices, appear to have no measurable influence on the demand for theme parks.

Based on what we learned from this model, we decided that in our analysis of Southern California's attendance, we would consider both total attendance as well as attendance-per-capita, due to the apparently large effect of population size. We decided that in our Southern California analysis we would not consider travel import or export variables or the travel price index. It appears very likely that these variables are influenced by the same factors that influence theme park attendance. We also noted that many variables are highly tied to the state of the economy, and that we would need to be careful to avoid collinearity in our modeling efforts.

Table H-4 : Correlations and P-Values Matrix

Correlation Matrix: Entries are Pearson's Correlation Coefficient

	National Attendance	US Population	Population 0-14	Female 0-14	Male 0-14	Intn'l Tourist	Unem-ployment	Travel Service Export	Travel Service Import	GDP per Capita	Disp. Inc. per Capita	Travel Price Index	Airfare Price Index	Fuel Prices	Exchange Rates
National Attendance	1.000	0.826	0.902	0.883	0.910	0.148	-0.651	0.942	0.944	0.869	0.803	0.869	0.787	0.620	0.836
Population	0.826	1.000	0.959	0.983	0.932	-0.353	-0.206	0.700	0.855	0.984	0.998	0.988	0.974	0.796	0.849
Population 0-14	0.902	0.959	1.000	0.994	0.997	-0.261	-0.328	0.784	0.857	0.946	0.944	0.951	0.919	0.734	0.796
Female 0-14	0.883	0.983	0.994	1.000	0.982	-0.297	-0.286	0.761	0.865	0.969	0.973	0.974	0.949	0.765	0.824
Male 0-14	0.910	0.932	0.997	0.982	1.000	-0.232	-0.357	0.796	0.844	0.920	0.914	0.925	0.889	0.704	0.767
International Tourists	0.148	-0.353	-0.261	-0.297	-0.232	1.000	-0.767	0.376	0.148	-0.198	-0.366	-0.236	-0.380	-0.282	-0.076
Unemployment	-0.651	-0.206	-0.328	-0.286	-0.357	-0.767	1.000	-0.777	-0.653	-0.351	-0.181	-0.299	-0.119	-0.010	-0.404
Travel Service Export	0.942	0.700	0.784	0.761	0.796	0.376	-0.777	1.000	0.925	0.786	0.684	0.771	0.656	0.543	0.740
Travel Service Import	0.944	0.855	0.857	0.865	0.844	0.148	-0.653	0.925	1.000	0.920	0.847	0.901	0.807	0.612	0.913
GDP per Capita	0.869	0.984	0.946	0.969	0.920	-0.198	-0.351	0.786	0.920	1.000	0.980	0.987	0.941	0.761	0.867
Disp. Inc. per Capita	0.803	0.998	0.944	0.973	0.914	-0.366	-0.181	0.684	0.847	0.980	1.000	0.988	0.981	0.815	0.852
Travel Price Index	0.869	0.988	0.951	0.974	0.925	-0.236	-0.299	0.771	0.901	0.987	0.988	1.000	0.978	0.837	0.878
Airfare Price Index	0.787	0.974	0.919	0.949	0.889	-0.380	-0.119	0.656	0.807	0.941	0.981	0.978	1.000	0.891	0.849
Fuel Prices	0.620	0.796	0.734	0.765	0.704	-0.282	-0.010	0.543	0.612	0.761	0.815	0.837	0.891	1.000	0.615
Exchange Rates	0.836	0.849	0.796	0.824	0.767	-0.076	-0.404	0.740	0.913	0.867	0.852	0.878	0.849	0.615	1.000

p values for the test of zero correlation:

	National Attendance	US Population	Population 0-14	Female 0-14	Male 0-14	Intn'l Tourist	Unem-ployment	Travel Service Export	Travel Service Import	GDP per Capita	Disp. Inc. per Capita	Travel Price Index	Airfare Price Index	Fuel Prices	Exchange Rates
National Attendance	0.000	0.014	0.005	0.007	0.004	0.684	0.067	0.002	0.002	0.008	0.019	0.008	0.022	0.083	0.013
Population	0.014	0.000	0.001	0.000	0.002	0.332	0.572	0.047	0.010	0.000	0.000	0.000	0.000	0.020	0.011
Population 0-14	0.005	0.001	0.000	0.000	0.000	0.473	0.368	0.023	0.010	0.002	0.002	0.001	0.003	0.036	0.020
Female 0-14	0.007	0.000	0.000	0.000	0.000	0.415	0.432	0.028	0.009	0.001	0.000	0.000	0.001	0.027	0.015
Male 0-14	0.004	0.002	0.000	0.000	0.000	0.525	0.326	0.020	0.012	0.003	0.004	0.003	0.006	0.046	0.027
International Tourists	0.684	0.332	0.473	0.415	0.525	0.000	0.027	0.302	0.685	0.587	0.315	0.517	0.297	0.439	0.835
Unemployment	0.067	0.572	0.368	0.432	0.326	0.027	0.000	0.024	0.067	0.335	0.620	0.413	0.743	0.977	0.266
Travel Service Export	0.002	0.047	0.023	0.028	0.020	0.302	0.024	0.000	0.003	0.022	0.053	0.026	0.065	0.132	0.034
Travel Service Import	0.002	0.010	0.010	0.009	0.012	0.685	0.067	0.003	0.000	0.003	0.011	0.005	0.018	0.088	0.004
GDP per Capita	0.008	0.000	0.002	0.001	0.003	0.587	0.335	0.022	0.003	0.000	0.000	0.000	0.002	0.028	0.008
Disp. Inc. per Capita	0.019	0.000	0.002	0.000	0.004	0.315	0.620	0.053	0.011	0.000	0.000	0.000	0.000	0.016	0.010
Travel Price Index	0.008	0.000	0.001	0.000	0.003	0.517	0.413	0.026	0.005	0.000	0.000	0.000	0.000	0.013	0.007
Airfare Price Index	0.022	0.000	0.003	0.001	0.006	0.297	0.743	0.065	0.018	0.002	0.000	0.000	0.000	0.006	0.011
Fuel Prices	0.083	0.020	0.036	0.027	0.046	0.439	0.977	0.132	0.088	0.028	0.016	0.013	0.006	0.000	0.086
Exchange Rates	0.013	0.011	0.020	0.015	0.027	0.835	0.266	0.034	0.004	0.008	0.010	0.007	0.011	0.086	0.000

Figure H-1: Regression Output; 1-variable model (U.S. Youth Population)

Dependent Variable: Attendance
Independent Variables: Population_Youth

Descriptive Statistics

Variable	Variance	Coef.Var	Std.Err.	Maximum	Minimum	Count
Population_Youth	0.953	0.016	0.309	60.797	57.518	10
Attendance	86.404	0.056	2.939	175.10015	145.03094	10

Correlation Matrix

Variable	Attendance	Population_Youth
Attendance	1.000	
Population_Youth	0.902	1.000

Regression Statistics

R	R Square	Adj.RSqr	Std.Err.	# Cases	# Missing	Deg.Free	t(2.5%,8)
0.902	0.813	0.790	4.261	10	0	8	2.306

Summary Table

Variable	Coeff.	Std.Err.	t Stat.	P-value	Lower95%	Upper95%
Intercept	-346.595	86.712	-3.997	0.004	-546.552	-146.638
Population_Youth	8.587	1.455	5.902	0.000	5.232	11.941

Analysis of Variance

Source	df	Sum Sqrs	Mean Sqr	F	P-value
Regression	1	632.408	632.408	34.837	0.000
Residual	8	145.225	18.153		
Total	9	777.633			

Residual Statistics

Durbn-Watsn	# Res.>0	# Res.<=0	1st Auto	2nd Auto	4th Auto	7th Auto	12th Auto
0.837	5	5	0.359	-0.211	-0.180	-0.068	0.000

Residual Table

Case	Actual	Predicted	Residual	% Error	Std.Res.
1	167.97338	175.447	-7.474	4.45%	-1.754
2	170.76119	173.489	-2.728	1.60%	-0.640
3	173.9789	171.532	2.447	1.41%	0.574
4	175.10015	169.583	5.518	3.15%	1.295
5	170.50336	167.316	3.188	1.87%	0.748
6	165.3365	165.057	0.279	0.17%	0.066
7	167.2535	162.808	4.446	2.66%	1.043
8	160.36648	160.567	-0.200	0.12%	-0.047
9	155.12778	158.343	-3.215	2.07%	-0.755
10	145.03094	147.292	-2.261	1.56%	-0.531
		Average Predictive Error:		1.91%	

Figure H-2: Regression Output; 2-variable model (U.S. Youth Population and U.S. Unemployment)

Dependent Variable: Attendance
Independent Variables: Population_` Unemployment

Descriptive Statistics

Variable	Variance	Coef.Var	Std.Err.	Maximum	Minimum	Count
Population_Youth	0.953	0.016	0.309	60.797	57.518	10
Unemployment	0.000	0.149	0.002	0.061	0.04	10
Attendance	86.404	0.056	2.939	175.10015	145.03094	10

Correlation Matrix

Variable	Attendance	Population	Unemployment
Attendance	1.000		
Population_Youth	0.902	1.000	
Unemployment	-0.627	-0.285	1.000

Regression Statistics

Multiple R	R Square	Adj.RSqr	Std.Err.	# Cases	# Missing	Deg.Free	t(2.5%,7)
0.981	0.962	0.951	2.056	10	0	7	2.365

Summary Table

Variable	Coeff.	Std.Err.	t Stat.	P-value	Lower95%	Upper95%
Intercept	-256.314	45.267	-5.662	0.001	-363.355	-149.274
Population_Youth	7.494	0.733	10.230	0.000	5.762	9.226
Unemployment	-491.246	93.934	-5.230	0.001	-713.363	-269.128

Analysis of Variance

Source	df	Sum Sqrs	Mean Sqr	F	P-value
Regression	2	748.038	374.019	88.466	0.000
Residual	7	29.595	4.228		
Total	9	777.633			

Residual Statistics

Durbn-Watsn	# Res.>0	# Res.<=0	1st Auto	2nd Auto	4th Auto	7th Auto	12th Auto
2.307	6	4	-0.210	-0.478	0.059	-0.113	0.000

Residual Table

Case	Actual	Predicted	Residual	% Error	Std.Res.
1	167.97338	169.813	-1.839	1.10%	-0.895
2	170.76119	169.087	1.674	0.98%	0.814
3	173.9789	172.782	1.197	0.69%	0.582
4	175.10015	174.519	0.581	0.33%	0.282
5	170.50336	171.559	-1.055	0.62%	-0.513
6	165.3365	168.114	-2.778	1.68%	-1.351
7	167.2535	164.186	3.068	1.83%	1.492
8	160.36648	159.774	0.593	0.37%	0.288
9	155.12778	156.850	-1.722	1.11%	-0.838
10	145.03094	144.749	0.282	0.19%	0.137
		Average Predictive Error:		0.89%	