

Impact of the 2003 Illinois Gaming Tax Rate Increase on Marketing Spending

*Mikael B. Ahlgren, Ph.D.
Sarah Tanford, Ph.D.
Ashok Singh, Ph.D.*

Abstract

The purpose of this research is to investigate a potential consequence related to the 2003 Illinois Gaming Tax rate restructuring. Specifically, did the assessment of a higher gaming tax rate in the state of Illinois negatively impact promotional spending by an Illinois riverboat operator in an attempt to limit revenues and avoid incurring a higher tax rate? Data were contributed by a major Illinois riverboat operator and the researchers utilized an Autoregressive Integrated Moving Average (ARIMA) method for analysis of the data. The findings demonstrate that this particular operator reduced promotional spending when confronted with increases in gaming tax rates. These results suggest that legislators have a cause for concern when considering increases in a state's gaming tax rate. This study confirms that operators may reduce their effort to attract gaming volume in response to gaming tax increases, and opens the door to questioning whether their business volume is diverted elsewhere to generate gaming revenues and the resulting gaming tax receipts.¹

Introduction

On July 1, 2003, the Illinois Gaming Tax increased to a maximum of 70% on annual gaming revenues in excess of \$250 million (American Gaming Association, 2004). This represented the peak of a gradual upward trend in gaming taxation that began seven years after Illinois legalized riverboat gaming in 1991. When the state first legalized riverboat gambling, commercial gaming operators agreed to and were subject to a flat tax rate of 20% of annual adjusted gross receipts (AGR) or gaming win. The commercial gaming tax rate initially began the upward trend in 1998 when legislators decided to transition from the flat tax to a graduated rate. The graduated tax began at 15% for the lowest tier and stepped up to 35% of AGR for the highest tier. The tax receipts were supplemented with a two dollar admission fee per patron that was split between the state and the local government serving as the hosting jurisdiction. The next major increase occurred in 2002 when the top tier was increased to 50% of AGR and the admissions tax increased to three dollars. Table 1 displays the progression of tax rates from 1999 to 2005.

Acknowledgments: The authors would like to recognize the generous and confidential data contribution by a major commercial casino operator in Illinois. In the interest of respecting the company's desire to protect their anonymity and competitive strategies, the authors also agreed to refrain from publishing descriptive data that could be used to identify the sponsor.

Mikael B. Ahlgren, Ph.D.
Instructor
The School of Hospitality
Management
The Pennsylvania State
University
201 Mateer Building
University Park, PA 16802
Email: mba13@psu.edu

Sarah Tanford, Ph.D.
Assistant Professor
William F. Harrah College of
Hotel Administration
University of Nevada, Las Vegas
4505 S. Maryland Parkway
Las Vegas, NV 89154
Email: sarah.tanford@unlv.edu

Ashok Singh, Ph.D.
Professor
William F. Harrah College of
Hotel Administration
University of Nevada, Las Vegas
4505 S. Maryland Parkway
Las Vegas, NV 89154

Table 1 1999 – 2005 Illinois Gaming Tax Rates and Admission Tax

| Year | Graduated Tax Rate | Admissions tax per patron |
|-------------|--|---------------------------|
| 1999 - 2001 | 15% to 35% of gross gaming revenue (GGR) | \$2 |
| 2002 | 15% to 50% of GGR | \$3 |
| 2003 - 2004 | 15% to 70% of GGR | \$3-\$5 |
| 2005 | 15% to 50% of GGR | \$2-\$3 |

Note. Gaming Taxation Rates were retrieved from Illinois Gaming Commission Annual Reports from 1999 to 2005.

The casino industry vociferously objected to the 2003 Illinois changes, in part arguing that the state erroneously believed that the gaming industry was immune to generally accepted economic laws. The gaming industry’s stakeholders have argued that lawmakers consider increasing gaming taxes a safe target in an effort to generate state revenues. Gaming’s advocates believe there is a general misconception that the industry is hyper profitable compared to other businesses and is capable of paying whatever is necessary to balance state budgets (Christiansen, 2005).

Despite the industry protest, the top tier of the Illinois Gaming Tax rate was increased to 70% on July 1, 2003. All other tiers, with exception of the lowest, were also increased by 5% to 7.5%. In addition, the schedule determining the applicable tax tier was shifted to the state’s favor. Casinos with the same adjusted gross revenue could both shift to a higher tier and be subject to a higher rate within each tier. For example, a riverboat with adjusted gross revenues of just over \$25 million dollars would pay a gaming tax of 27.5% of AGR in 2003 compared to the 22.5% of AGR prior to the increase. If the riverboat reached \$37.5 million, the higher tax rate took effect, whereas prior to the increase it did not do so until revenues reached \$50 million. Table 2 provides a detailed account of the various steps to Illinois’ gaming tax structure before and after the 2003 increase.

Table 2 Overview of 2003 Illinois Gaming Tax Increase

| Gaming Tax Rate as percentage of Adjusted Gross Receipts or Gaming Win | |
|---|---|
| 2002 | 2003 (post July 1) |
| 15% of AGR up to and including \$25 million | 15% of AGR up to and including \$25 million |
| 22.5% of AGR in excess of \$25 million but not exceeding \$50 million | 27.5% of AGR in excess of \$25 million but not exceeding \$37.5 million |
| 27.5% of AGR in excess of \$50 million but not exceeding \$75 million | 32.5% of AGR in excess of \$37.5 million but not exceeding \$50 million |
| 32.5% of AGR in excess of \$75 million but not exceeding \$100 million | 37.5% of AGR in excess of \$50 million but not exceeding \$75 million |
| 37.5% of AGR in excess of \$100 million but not exceeding \$150 million | 45% of AGR in excess of \$75 million but not exceeding \$100 million |
| 45% of the AGR in excess of \$150 million but not exceeding \$200 million | 50% of the AGR in excess of \$100 million but not exceeding \$250 million |
| 50% of AGR in excess of \$200 million | 70% of AGR in excess of \$250 million |
| Admissions Tax | |
| 2002 | 2003 |
| \$3 per patron | \$3 per patron for licensees that admitted fewer than one million persons in the previous calendar year. \$4 per patron for licensees that admitted more than one million persons but fewer than 2.3 million persons in the previous calendar year. \$5 per patron for licensees that admitted more than 2.3 million persons in the previous calendar year. |

Note. Gaming Taxation Rates were retrieved from Illinois Gaming Commission Annual Reports from 2003.

Research indicates that the 2003 Illinois gaming tax rate increase was associated with decreased aggregate gaming demand across the Illinois riverboat market (Ahlgren, Dalbor, & Singh, 2009). Using regression modeling, the authors demonstrated that the tax increase was associated with a \$136 million decrease in the state's slot volume. That said, the question of why demand decreased was left unanswered. Riverboat casino patrons did not experience the tax increase directly, since they did not pay gaming taxes to the state. However, since gaming patrons reduced their volume of play, one can surmise that they were affected in some way by the changes. One potential explanation for the decrease in gaming demand is that operators withheld or decreased their marketing/promotional expenditures in order to reduce revenues. The tax policy created an incentive to reduce revenues, especially for the higher performing operators whose revenues qualified for the 70% tax rate. The reduction in marketing and promotions would impact casino player's club members who are accustomed to receiving complimentary offerings and benefits. This could induce them to choose other options for their entertainment related discretionary spending. Customers' responses might include visiting casinos in other states that offer more competitive promotional/complimentary programs and/or engaging in non-gaming entertainment offerings.

Deutsch Bank gaming analyst and journalist Falcone (2003a) predicted that the

three boats in the Illinois marketplace that had the potential to hit the 70 percent gaming tax threshold would attempt to direct their operations to reduce revenues. He also forecasted that all operators would engage in layoffs, restrict comps, rely on fewer table games, and close ancillary facilities such as restaurants and hotels (Falcone, 2003b).

This study seeks to answer the question: What was the mechanism that directly impacted the behavior of Illinois gamblers? Although there are other potential explanations, this study postulates that the customers were reacting to reduced marketing and promotions. Thus, the research question becomes: Did Illinois riverboat operators change their promotional related comp policies and marketing related expenditures in response to gaming tax rate changes?

Literature Review

Illinois Overview

The Midwestern State of Illinois ratified the Riverboat Gambling Act in February of 1990. In so doing, Illinois became the second of the United States to legalize riverboat gambling, the first state being Iowa. Additionally, the Riverboat Gambling Act created the Illinois Gaming Board, which was immediately authorized to award up to ten commercial casino licenses. Approximately a year and a half later in September of 1991, the first riverboat in Alton began operation. Illinois awarded all ten of its licenses by 1996 to operators in the subsequent communities: Alton, Aurora, East Dubuque, East St. Louis, Elgin, Joliet, Metropolis, Peoria, and Rock Island (Illinois Riverboat, 1990).

Supporters of the legislation believed that riverboats would bring numerous benefits to the state. These benefits included stimulating the economies of Illinois riverboat towns, generating tax revenues, promoting job growth, and increasing tourism. Supporters also recognized that much of Iowa's already legal riverboat business was generated from Illinois residents and were interested in keeping those tax revenues in Illinois (Marbach, 1999).

Five members, appointed by the Governor and approved by the Senate, comprised the Illinois Gaming Board. Besides licensing riverboats, the Gaming Board was tasked with administering the tax collection and the regulatory system for Illinois riverboat casino operations. Ultimately the Board is responsible for safeguarding the integrity of the state's commercial gaming operations in part by conducting criminal and financial background investigations on applicants for casino licensure.

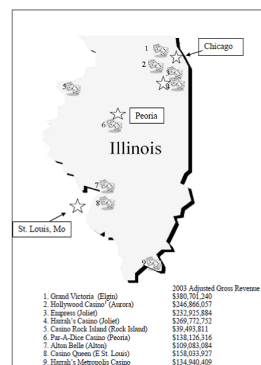


Figure 1. 2003 Illinois Gaming Taxation Rates as reported by each riverboat. Adapted from Illinois Gaming Board (2003) 2003 Annual Report

A gaming license enables each riverboat operator in Illinois to provide up to 1,200 gaming positions. The gaming positions may be comprised of a combination of electronic gaming devices and table games. The number of gamblers playing at a particular riverboat is determined by the number of positions. The positions in Illinois are determined in the following manner: positions for electronic device games such as slots make up 90 percent of the total devices offered. The remainders of positions are consumed by a number of games. For example, a craps table is considered to have ten gaming positions, and table games using live dealers are counted as offering five gaming positions (Illinois Gaming Board Staff, 2000). Electronic gaming devices (EGD's) include as previously mentioned slots but also Video Lottery Terminals (VLT's), pull-tab machines and video poker. Although initially the riverboats were obligated to conduct cruises, by amending the Illinois Gambling Act in 1999, Illinois permitted operators to remain permanently moored at their docksites (Illinois Riverboat, 1990).

The Illinois Riverboat Gaming Act directly expresses that the legislative intent behind the legalization of commercial gaming is to assist economic development, to promote tourism, and to increase revenues available for assisting and supporting education. The Act also recognizes the importance of providing regulatory provisions to ensure the credibility and maintenance of public confidence related to gaming operations. Specifically, the regulatory process is designed to provide oversight of facilities, persons, associations and practices associated with the operation of commercial gaming facilities (Illinois Riverboat, 1990). Figure 1 provides an overview of the Illinois Casino industry showing the location of riverboats.

Gaming Taxation

States adopt gaming for several reasons: gaming tax revenues, political feasibility, intra-state competitiveness, and local and state economic development (Furlong, 1998). Illinois and other riverboat states followed the "New Jersey" model, whereby gaming was legalized with the objective of generating economic expansion in a set number of locales (NCISC, 1999). The benefit sought were growth in employment opportunities, capital investment, tax revenue and enhanced tourism. Taxes raised from commercial gaming are often dedicated to either state or local governments for particular purposes. In the case of Illinois, a portion a portion of collected gaming taxes is funneled to education and another portion goes to local governments serving as host communities;

However, states following this model may not develop structures that maximize revenues for the state. Research suggests that raising taxes beyond a certain point reduces annual gaming tax revenue by diminishing the marginal return on revenue (Ozurumba & Kim, 2009). The researchers used a Laffer curve to identify the revenue-maximization tax rates for states that host commercial gaming. It was posited that when a tax rate is raised beyond a certain threshold, operators respond by reducing payoffs, adjusting hours of operation, and decreasing salaries (Ozurumba & Kim, 2009). The results of the analysis indicated that the states fell into one of four categories: states that overtaxed but were simultaneously close to revenue-maximizing level, states that under-taxed but were close to revenue-maximizing levels, and finally, states that under-taxed. Illinois was the lone state to occupy the first category described as "overtaxing states" (Ozurumba & Kim, 2009). A similar approach was applied by Garrett (2009) to determine the optimal tax rate to maximize revenues generated by state lotteries.

Monetary policy and fiscal policy are the two main tools of macroeconomic management. Monetary policy, controlled by the central bank, influences the economy by setting the money supply. Fiscal policy refers to both government expenditures and taxation. This research reflects the aspect of taxation fiscal policy that tax rates are the partial determinants of the prices with which both businesses and individuals

are confronted in markets. It is via this relationship that incentives and behavior are correlated to tax rates (Samuelson & Nordhaus, 1989).

An example of the relationship between taxation and demand was provided by Samuelson and Nordhaus (1989) by referencing the Tax Reform Act of 1986. The Act included a provision making equipment more expensive on a relative basis which in turn deterred businesses from investing in such items. The result of the provision contributed to decreased business investment and was shown to have a negative impact on GNP.

Tax Rate Changes Affecting the Hospitality Industry

In the lodging segment, occupancy taxes reflect dynamics that are similar to gaming taxation. Occupancy taxes are funds emitted by a lodging company to a tax collecting authority such as the Las Vegas Convention and Visitors Authority or various municipalities. Occupancy taxes are sourced from a percentage of guest room revenue (Ninemeier, Perdue, & Ninemeier, 2008). Researchers and stakeholders of the lodging industry have protested that legislators looking to generate revenues often rely on either implementing or increasing occupancy taxes due to the relative political safety of such a change. Since occupancy rates primarily affect out-of-state travelers who are not constituents of the legislators enacting the rate increases, the assumption is that politicians will not be punished by their electorate (Hiemstra & Ismail, 1992). Hoekstra and Ismail (1992) analyzed the effects of room taxes on various segments of lodging operations in the United States. The researchers concluded that the elimination of occupancy taxes of 9.8 % would result in a 3 % increase in occupancy rates. In a follow-up effort the same researchers discovered that most of the room tax is borne by guests with approximately one dollar out of seven being absorbed by the lodging industry. The industry is affected due to the reduction in the number of rooms sold compared to a scenario where the room tax was eliminated (Hiemstra & Ismail, 1993).

Profit Maximization Theory

Profit maximization is the concept that describes what is generally accepted as one of the primary objectives of a firm. Profit is defined as the measure of total revenue of a firm minus its total costs. Hence, profit maximization describes identifying a level of output where the difference between total costs and revenues is the greatest (Becker, 2005). Evidence suggests that individuals in a firm do not always pursue profit maximizing behaviors; instead they direct their actions to maximize sales, employees, and equipment beyond profit maximization ideals (Alchian, 1965). It is noteworthy that the literature does not account for the behavior of management or owners of firms faced with disincentives such as a stepped tax structure that rewards reducing revenues.

In the case of the Illinois tax increase, legislators went beyond the maximization point and experienced diminishing returns. It has been argued that operators faced with an elevated taxation schedule adjusted their operations in order to avoid incurring the higher tax rates (Falcone, 2004). They decreased their marketing budgets and capital expenditures in order to maintain profitability (Falcone, 2004). Inevitably, these reductions were passed on to customers in the form of reduced benefits and comps. This argument provides a reasonable explanation for the failure of the tax increase to yield the expected returns; however, it has not been established empirically. Studies have found an inverse relationship between tax rates and various favorable indicators such as capital expenditures and employees, but have not investigated their relationship with marketing (Christiansen, 2005). The current research evaluates this relationship using data from an Illinois casino operator before and after the tax increase.

Impact of Government Regulations on Gaming Demand

Research has demonstrated that the Illinois tax increase was followed by reduced demand in the form of gaming volume (Ahlgren et al., 2009), admissions and revenues (Falcone, 2004). Using a time series linear regression model Ahlgren et al. were able to estimate the magnitude of this decline to be \$1.36 million per month. Their methodology had the advantage of controlling for other variables that could affect demand, and using ARIMA modeling to eliminate problematic autocorrelation. A similar method has been used to evaluate the impact of other government regulations on gaming demand (Repetti, 2011). Studies have found that a smoking ban significantly reduced gaming revenues (Garrett & Pakko; Lal & Siahpush, 2008; Pakko, 2008; Thalheimer & Ali, 2008a) in several jurisdictions including Illinois (Garrett & Pakko, 2010). Government-imposed betting limits and boarding hours were negatively related to gaming revenue (Thalheimer & Ali, 2008b), while an increase to 24-hour operations did not increase revenue (Nichols, 1998). The current study uses the ARIMA approach that has been successfully applied in other gaming legislation contexts to evaluate the impact of the Illinois tax increase on marketing expenditures.

Hypotheses

It is hypothesized that the restructuring of the Illinois Gaming Tax in 2003 caused a negative reaction in marketing spending by a commercial gaming operator in the state of Illinois. The term “2003 70% tax and overall tax restructuring” represents the predictor or independent variable for the gaming tax rate change.

The null hypothesis states that marketing constant by the sponsoring company spending increased or remained constant during the Illinois tax restructuring. The null is expressed by the equation:

$$H_0: \text{Coefficient of “2003 Illinois Gaming Tax Restructuring”} \Rightarrow 0$$

The research hypothesis predicts that there would be a decrease in marketing spending by the sponsoring company after the Illinois tax restructuring:

$$H_1: \text{Coefficient of “2003 Illinois Gaming Tax Restructuring”} < 0$$

Methodology

Data Collection

Secondary data for this study was provided by one major riverboat operator in the Chicagoland area of Illinois. These data were sourced from the company’s internal records over a seven year period from January 2000, through December 2006. The property competes with several other casinos in relative close proximity. The particular riverboat casino which the study examines primarily serves a customer that lives within convenient driving distance to the location and who is typically referred to as a “local.” The riverboat could also be accurately classified as a repeater market casino, that is, a casino which features a concentration of patrons that are characterized by their frequent visitation. Typical of Illinois riverboat commercial gaming operations, the casino generates over 80% of its adjusted gross revenue from the wagers of slot players. Marketing costs as a percentage of adjusted gross revenues for the operator averaged 12.2% before and after the tax increase and fell to 10.2% during the period that they higher rate was in effect.

Data Analysis

The time-series regression analysis (see, for example, Bowerman et al., 2005) was

conducted using R (R Core Team, 2012), an open source statistical software package. The hypotheses were first examined by simultaneous multiple regression at the 0.05 alpha level. Due to the likelihood of serial correlation in time series hospitality data sets, the residuals were tested.

As mentioned above, the analysis began with fitting a simultaneous linear regression, to a single dependent variable or response variable (Y) as a function of several independent or predictor variables (x).

For the main research question investigating a single Illinois casino's marketing spending, the regression model can be expressed as:

$$Y_t = \beta_0 + \beta_1g(t) + \beta_2Feb + \beta_3Mar + \beta_4Apr + \beta_5May + \beta_6June + \beta_7July + \beta_8Aug + \beta_9Sept + \beta_{10}Oct + \beta_{11}Nov + \beta_{12}Dec + \beta_{13}70\%tax + \epsilon_t$$

where Y_t = marketing spending by sponsoring riverboat operator.

In the regression model, the unknown parameters were found by minimizing the error of the sum of squares. The regression equation describes the average value of y when the predictors are set at (X_1, X_2, \dots, X_n) .

A binary or dummy variable was used in the model to represent the 70% tax level and the overall 2003 Illinois tax restructuring = {1 if period with tax hike, 0 otherwise}. Additionally, the "g(t)" variable represented the trend component which is used in a time-series regression analysis to de-trend the data, i.e., convert the time-series into a first order stationary process, which is required for ARIMA modeling. The months February-December were treated as seasonal dummy variables. For example: {1 if period t is February, 0 otherwise}. These "control variables" correspond to those used in other research that evaluates the impact of a single event in time (represented by a dummy variable) on gaming performance (e.g. Ahlgren et al., 2009; Lucas & Tanford, 2010).

In time series regression modeling, residuals should be tested for autocorrelation. Autocorrelation occurs when error terms are not random and positive terms tend to be followed by positive terms and negative terms tend to be followed by negative terms. In the presence of autocorrelation, the t-tests for significance of regression coefficients are theoretically incorrect; in addition, the predictive value of the model is compromised.

Because of the seasonal nature of hospitality and gaming, it is often necessary to include a seasonal component in the time series regression model (Eisendrath, Bernhard, Lucas, & Murphy, 2008, Ahlgren et al., 2009, Lucas & Tanford, 2010). One method of addressing seasonality is through the use of dummy variables as described. The main advantage of including the dummy variable approach is that it results in a regression equation that visibly reveals the impact of statistically significant seasonal trend and the impact of the predictor variable simultaneously. Error terms were assessed graphically for autocorrelation by analyzing autocorrelation function chart and the partial autocorrelation chart if warranted. If autocorrelation is a significant factor, then the correct procedure is to continue the analysis with autoregressive and/or moving-average terms in order to address the autocorrelation and hence the violation of the assumption that error terms are independent and normally distributed with mean 0 and a common unknown variance sigma squared. Diagnostic tests for serial correlation determined that the residuals from the regression model were autocorrelated and therefore an ARIMA analysis was used. Further diagnostic tests were performed on residuals from regression-ARIMA model to confirm that the final residuals were not autocorrelated.

Results

Figure 2 describes the marketing expenditures of the contributing Illinois operator from the years 2000 to 2006. The severe drop depicted in the graph occurs at month 43 and represents July 2003 which is the month the Illinois Gaming Tax was altered. The graph also suggests different rates of growth or trend prior to the 43 month intervention, indicating the presence of interaction between the dummy tax increase variable and the trend component. This graphical representation supports both the inclusion of an additional trend variable and the intervention variable at month 43.

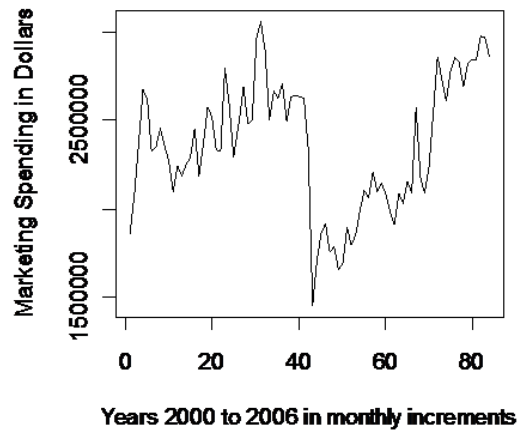


Figure 2. Marketing spending of the riverboat operator before and after the 2003 gaming tax restructuring (month 43) in Illinois.

The average monthly promotional expense for the contributing riverboat operator between January 2000 and December 2006, was \$2,361,602 with a standard deviation of \$368,342.

Table 3 presents the final predictor variables that were then incorporated into the ARIMA model. In addition, multicollinearity was tested by assessing the variance inflation factors (VIF) of each predictor variable and as such, was not deemed to be an issue.

Table 3 Summary of Final (Insignificant Variables Removed) Multiple Linear Regression Analysis to Estimate Effect of the 2003 Illinois Gaming Tax Restructuring on Promotional Spending of Illinois Riverboat Operator

| Variable | B | SE B | t-value | P-value | VIF |
|---------------------------------------|---------|--------|---------|---------|------|
| Intercept | 2532273 | 25086 | 100.95 | 0.000 | |
| July | 145103 | 74686 | 1.94 | 0.056 | 1.01 |
| 2003 Tax Increase | -883407 | 79432 | -11.12 | 0.000 | 3.12 |
| Cubic Trend | 73716 | 10742 | 6.86 | 0.000 | 1.01 |
| Interaction of Trend and Tax Increase | 525562 | 127917 | 4.11 | 0.000 | 3.13 |

Subsequently, the model was assessed for autocorrelation by plotting the residuals on both the autocorrelation function (ACF) and the partial autocorrelation function (PACF) maps shown in Figure 3. Spikes at lag one on both maps indicated that autocorrelation was a factor. Autocorrelation was addressed by fitting an ARIMA (0,0,1) with independent variables. The results of the ARIMA (0,0,1) are presented in Table 5.

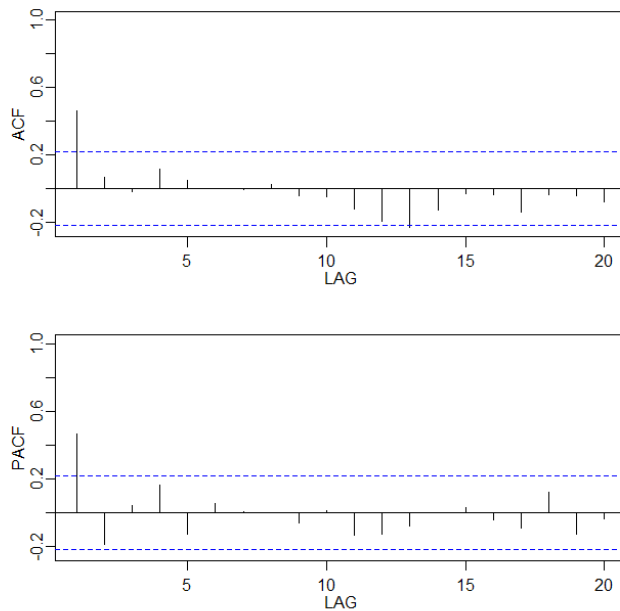


Figure 3. Initial autocorrelation and partial autocorrelation plots of residuals from final regression analysis estimating the effect of the 2003 Illinois Gaming Tax restructuring on the promotional spending of an Illinois riverboat operator.

Table 4 Summary of ARIMA to Estimate Effect of the 2003 Illinois Gaming Tax Restructuring on Promotional Spending of Illinois Riverboat Operator

| Variable | B | SE B | t-value | P-value |
|---------------------------------------|------------|----------|---------|---------|
| July | 111541.50 | 54636.76 | 2.04 | 0.037 |
| 2003 Tax Increase | -920094.00 | 94697.16 | -9.72 | 0.000 |
| Cubic Trend | | | 5.64 | 0.000 |
| Interaction of Trend and Tax Increase | 74043.95 | 13118.22 | 4.22 | 0.000 |
| MA1 | 0.48 | 0.08 | 6.11 | 0.000 |

Note. AIC = 2265.29

The ARIMA model estimating the effect of the 2003 Illinois Gaming Tax restructuring on promotional spending, found four variables that were significant at the .05 alpha level. Cubic trend was a significant component of the final model as promotional spending increased by \$107,666 on a monthly basis. In addition, July was characterized by a \$270,000 increase in promotional spending. The interaction between trend and the tax increase was also significant. The results were again assessed for autocorrelation by assessing the residuals from the ARIMA plotted on both the autocorrelation function (ACF) and the partial autocorrelation function (PACF) maps. The ACF and PACF plots confirmed that the spikes, at all lags, were not significant.

Final Illinois Promotional Spending Results

The omnibus F statistic was significant at the .05 alpha level, $F = 59.5$ with $df = 4, 79$ and $p < .001$. The model produced an R^2 of .75 and an adjusted R^2 of .74. The null hypothesis of no linear relationship was rejected in this model. Supporting the main hypothesis, the restructuring of the Illinois Gaming Tax in 2003 is associated with a significant and negative effect on marketing spending by a commercial gaming operator in the state of Illinois; $t = -9.72$ with $df = 79$ and $p < .001$. The change in the Illinois Gaming Tax in July of 2003 resulted in a \$920,094 decrease in promotional spending by riverboat contributing the data for this study. The moving average (MA) terms appears in the results of the model and was incorporated to counteract the biasing effects of serial correlation evident in the error terms. An ARIMA (0,0,1) with independent variables seemed to provide better ACF/PACF. Next Ljung-Box tests were run on residuals from the ARIMA (0,0,1) for lags 1 - 20. The smallest P-value over 20 lags was $0.11 > .05$, hence it was concluded that the time series regression model with ARIMA (0,0,1) term yielded uncorrelated residuals.

Discussion

The analysis supported the hypothesis that the 2003 Illinois Gaming Tax restructuring's significantly reduced promotional spending of an Illinois riverboat operator. The final model rejected the null hypothesis and in doing so explained over 75% of the variance in the dependent variables, and demonstrated that the gaming tax increase resulted in a \$920,094 decrease in monthly promotional spending by the riverboat operator. The model also suggested that seasonality was a factor, with the month of July bringing an \$111,541 increase in the operator's

promotional expenditures. Finally, the model indicated the presence of a trend as well as an interaction between the overall trend and the tax restructuring.

The findings are generally supportive of profit maximization theory. Managers of the Illinois riverboat appear to have withdrawn promotional and complimentary offerings in response to the 2003 gaming increase. Despite the marginal nature of the gaming tax, it must be remembered that gaming taxes are assessed directly on adjusted gross revenues. Therefore, the operator must cover all fixed and variable expenses related to the operation after the state receives its portion which reached 70 cents of every dollar the casino generated in revenues at the highest Illinois gaming tax rate. Therefore, in an effort to maximize profits, an operator may conclude that actually discouraging additional revenues in order to prohibit the attainment of revenue totals that would incur the higher rate is in management's best interest. The results of the analysis combined with confidential interviews with the executive management and marketing staff of the contributing riverboat operator suggest that it appears as if management may have adopted this approach. It should be noted that other possible explanations for the decrease in gaming demand besides the reduction in marketing spend are plausible. For example, it is possible that operators in neighboring states improved their service delivery or adopted a game mix that was more attractive to customers.

Implications

The findings of this study are significant for legislators considering the legalization of commercial gaming as well as for state governments considering adjustments to gaming tax rates. Gaming tax rates are shown to impact the promotional effort that operators exert in the interest of drawing patrons and generating revenues. Legislators would be wise to recognize that the gaming taxes they collect are produced in part via the marketing efforts of their operators and tax structures that serve as a disincentive to the operator have the potential to impact the state's budget.

The implications of the findings for both operators and state government are unclear in two respects: Do gaming customers disappointed by reduced promotions and complimentary take their gaming wallet across state lines? Do operators in surrounding states react in a predatory manner and increase promotional spending in the effort to encourage cross-state substitution? If the first scenario was shown to be true, then Illinois' gaming tax rate increase resulted in an increase in the collection of gaming taxes for surrounding states. Furlong (1998) stated that two of the main reasons states legalize commercial gaming are the collection of gaming taxes and inter-state competitiveness. If Furlong's two justifications are assumed to be in a state's best interest it is then logical to conclude that a gaming tax rate increase of the magnitude that Illinois implemented in 2003 is not in their best interest. Future research is necessary to clarify this question.

Limitations

A limitation of this research is the collection of data from a single Illinois operator. This is in part a reflection of the inherent difficulty of obtaining data from commercial gaming operators, who are typically extremely reluctant to share data outside of their company. Although operators are required to share revenues with state regulators and public companies must share certain aggregate financial data with the Securities and Exchange Commission, monthly promotional data from a particular operator is only available directly from the source. As such, the results of this study are not necessarily generalizable to other Illinois operators, or to other gaming jurisdictions. The findings are instructive in that they inform the legislators in Illinois that a major operator within their state decreased promotional spending in reaction to their gaming tax rate increase.

It is conceivable that other changes to the budgetary activities of the contributing

operator impacted the results and were not brought to the attention of the researchers. However, the company executive responsible for nationwide marketing efforts for the company indicated that Illinois' implementation of the new gaming tax rate schedule was the primary motivation for changes to the promotional spending budgets.

Lastly, the innate methodological limitations of time series analysis as it pertains to this study should be acknowledged. That is, exploratory time series analysis has certain limitations: (i) generalizing the results from a single study in which data from a certain time period has been collected over other properties and for all time periods, (ii) problems with identifying all the right variables, and (iii) problems with correctly identifying the model, and (ii) going from correlation to causation.

Future Research

Of particular value to this area of research would be a future investigation into the behavior of Illinois gaming customers in relation to the gaming tax increase. As previously mentioned, Ahlgren et al. (2009) demonstrated that the gaming tax increase resulted in lowered demand for casino gaming in Illinois. Future research is necessary to investigate whether these casino patrons reacted only by withholding the discretionary spending from the casino product completely or whether they continued frequenting casinos in more favorable jurisdictions. That is, did these gaming customers cross state lines and spend their gaming budgets in the surrounding states of Indiana, Iowa, and Missouri that compete with Illinois for the region's gaming customers. Other studies might investigate whether other recreational alternatives that compete for discretionary spending of a state's citizens experienced increased demand in association with the 2003 Illinois gaming tax increase.

A final suggestion for future research is the investigation into whether operators in neighboring states actively behaved in an increased predatory manner when they became aware of the Illinois casino patrons who were denied previously received perks and complimentaries. One could speculate that casino operators in the "Chicagoland" region of Indiana might have attempted to draw Illinois gamers across state lines with lucrative marketing offers. A number of companies owned riverboat casinos both in Illinois and the surrounding states. Some observers have suggested that operators diverted marketing budgets from Illinois to its riverboats in competing states that enjoyed lower gaming taxes. Although no operators have acknowledged shifting business to competing states, it is conceivable that they may have taken such an approach if it was feasible. When questioned, a marketing executive for a major casino company, that operated boats in multiple riverboat state markets, strongly objected to this suggestion and alluded to warnings issued by the Illinois gaming commission of unpleasant consequences, for any operator who might pursue such a strategy.

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