The Impact of Online Casinos on Commercial Casino Revenues: A Study of New Jersey

James Pai
65223067
James_pai88@hotmail.com

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Abstract

Internet gambling is still a recent phenomenon which continues to grow at a rapid pace. Due to the difficulties in monitoring and regulating the internet, policy makers in the U.S. have outlawed the establishment of online casino companies within the domestic borders of the United States. Looking at the revenues of commercial casinos in New Jersey from 1978-2008, this paper attempts to empirically assess the impact of offshore online casinos on the revenues of New Jersey casinos. Results show that it may be plausible for policy makers in New Jersey to consider the establishment of online casinos within the state.

I. Introduction

The U.S. commercial casino industry is currently growing at a rapid pace, earning $32.5 billion USD in revenues in 2008. Compared with a decade before that, this was an increase of over $10 billion USD from 1999. With the emergence of the internet followed by the continuous advances in technology, firm owners were able to capitalize on these technological improvements and quickly establish online casinos. According to the American Gaming Association the first online casino launched in August 1995 and it is currently estimated that there are over 2,000 online gambling websites around the world today. In 2008, it was estimated that $21 billion USD in revenues was generated from players worldwide, with $5.9 billion USD from U.S. players alone and these figures continue to rise. With the simple click of a button from within the comfort of their own homes, casino players are able to play their favorite games online at any time they wish and also at any location around the world. On the firm's side, the low start up costs of online casinos makes it a very attractive investment and is certainly a primarily reason for the rapid entry of firms since its launch. And thus one of the first questions this essay will attempt to answer is whether or not the growth of online gambling will have an effect on the revenues of land based commercial casinos in New Jersey.

Motivation

Due to the ambiguities involved in regulating the internet, it is currently illegal to operate online casino companies within the United States. However, it is legal for U.S. citizens to play in online casinos which are all based offshore, most of which are primarily in the United Kingdom. As previously stated, over $5.9 billion USD in revenues were generated from U.S. players from offshore online casinos in 2008. With such minimal start up costs compared to the expenses incurred in constructing luxurious

resort casinos, it seems puzzling that online casino operations are outlawed within the U.S. yet players are free to play anywhere offshore. Current major casinos in the U.S. could even take up this project and create their own online casinos as a branch of their enterprise which would allow players access to their favorite games at any time of the day, generating additional revenues for the casino. Following the question of to what extent online casinos affect commercial casino revenues in New Jersey, the primary motivation and objective of this paper seeks to answer whether or not there may be possible policy implications on the legalization of online casinos within New Jersey.

Introduction to Casinos

In short, commercial casinos are another term for land based casinos and in terms of the U.S. they can be currently found within twelve states – Colorado, Illinois, Indiana, Iowa, Louisiana, Michigan, Mississippi, Missouri, Nevada, New Jersey, Pennsylvania, and South Dakota. With respect to New Jersey, it is currently the second largest as well as the second oldest commercial casino state after Nevada, earning over $4.5 billion USD in 2008. Apart from the variety of games that Casinos offer, their revenues are also generated through various sources. For example many casinos are also resorts and provide accommodations, entertainment, restaurants, spas, gift shops, nightclubs, and attractions such as aquariums and so forth. With respect to the games, there are two main types of games – slot machines and table games. While slot machines are self-explanatory, there are two main types of table games that are played in casinos. The first type is games that are against the house where the player is playing against the dealer and these are games such as Blackjack. When the player loses, the casino makes money and vice versa. The second type is games that are played against other players and the dealer

is simply there to deal cards and does not participate. How the casinos make money here is through a fee called the "Rake" which is collected through the winning player. One way to look at this would be a tax, or a service fee. The casino simply extracts a certain amount of money from the winning player's winnings.

Background Literature

Unfortunately, the literature concerning the economics of commercial casinos is very limited and narrow in their scope according to a study by Benar and Jenkins (2008, p63). As they explain, most of the "literature has been institutional in nature focusing on the potential of casinos to generate economic development in a region… and the control of money laundering" Benar and Jenkins (2008, p63-4). This isn't surprising since out of the twelve states that have commercial casinos, only Nevada and New Jersey have been in operation for more than two decades. Nevada was the first state in the U.S. to legalize gambling and opened its first casino in 1931. It would be over four decades until New Jersey opened its first casino in 1978. The remaining ten states are still relatively new and so by looking at the dates of the opening of the first casino in the state, it isn't surprising to find the lack of economic literature on the economics on casinos. The dates are as follows: Colorado – 1991; Illinois – 1991; Indiana – 1995; Iowa – 1991; Louisiana – 1993; Michigan – 1999; Mississippi – 1992; Missouri – 1994; Pennsylvania – 2007; South Dakota – 1989. Since an overwhelming majority of the states are still in its early stages of operating commercial casinos, any industry-wide empirical studies would certainly have its difficulties and limitations. However, we can certainly examine Nevada and New Jersey separately or together since they are the leading earners in commercial casino revenues across the United States. And so apart from the positive externalities

generated by commercial casinos in stimulating local economies, there are also studies on the negative externalities such as problem gambling, crime, and bankruptcy.

Another dominant topic is concerned with the regulation of online gambling within the United States. As William R. Eadington (2004, p.216) explains, the current "philosophic dilemma that is confronting the United States and many other countries with respect to online gambling is whether to pursue a strategy of prohibition, with the specific intent to marginalize the activity by not giving major corporate organizations the opportunity to participate and evolve the product and thus by discouraging consumers who might otherwise be interested." In another study by Clarke and Dempsey (2001, p.127), they explain that "beyond economies of scale and scope, the virtualization of gambling is likely to result in changes to society, generating new externalities, as well as exacerbating existing social problems." And thus as we can see here, U.S. policy makers are strongly concerned with the negative externalities generated by the legalization of online casinos which have prompted their conservative approach to this issue. Although Eadington (2004, p.218) concludes that the "future of online gambling remains clouded," he does highlight the increasing popularity of online gambling in offshore companies and explains that "in the long run, it is increasingly likely that online gambling will become a substantial presence in the United States, whether it is formally legal or not" and therefore it would be in the interest of policy makers to anticipate its rapid progression.

II. Methodology

As previously mentioned, due to the lag in legalization of commercial casinos across the United States, only Nevada and New Jersey have been established long enough to be capable of conducting an empirical analysis on. Ideally, a study of Nevada is

preferable due to its popularity as perhaps the 'gambling capital' of the world with over 266 casinos and earning over $11.5 billion USD in 2008 which accounts for approximately one-third of total commercial gaming revenues. However, historical empirical data for Nevada only go as far back as 1990 which seems odd considering the fact that the first casino opened in 1931. Nevertheless, New Jersey is currently the second largest commercial casino state, earning over $4.5 billion USD with just twelve casinos and with 31 observations (30 with lagged variable) it is sufficient and worthwhile to run empirical tests on.

Regression Equations

- $Ln(NJCNR) = \alpha + \beta_1 ln(NJCNRLAG(t-1)) + \beta_2 ln(NJCPE) + \beta_3 ln(USGDP) + \beta_4 ln(USPOP) + \beta_5 ln(OCNR) + \beta_6(OCD) + \beta_7(OCD2) + ln(e)$ (1)

- $Ln(VCGR) = \alpha + \beta_1 ln(VCLAG(t-1)) + \beta_2 ln(VCTAX) + \beta_3 ln(USGDP) + \beta_4 ln(USPOP) + \beta_5 ln(OCNR) + \beta_6(OCD) + \beta_7(OCD2) + ln(e)$ (2)

The OLS method will be used for the above equations. Equation (1) will serve as the main regression of this paper, looking specifically at the impacts on the net revenues of New Jersey Casinos. Equation (2) will be a supplementary regression which examines the impacts on the gross revenues of Nevada casinos. Unfortunately due to the lack of data in Nevada casinos as previously mentioned, this regression will only be useful to speculate and compare with the findings in Equation (1).

Variable Transformations

Both regressions use a natural logarithmic transformed function and they were selected in response to the overwhelming figures of the USGDP figures which may distort the regression. Thus, three different types of regression equations were tested for

New Jersey and due to minimal differences in results the natural logarithmic transformation was preferred for its high adjusted R^2 value of 0.993 as seen in Table 1.1 in the appendix. This was compared to the original non-transformed linear regression which yielded an adjusted R^2 value of 0.971 as seen in Table 1. The adjusted R^2 value of Equation (1) was also compared to a regression with natural logarithmic transformations on the variables USGDP and OCNR which yielded an adjusted R^2 value of 0.972 as shown in Table 1.2 in the appendix. The same test was applied for the second regression in Equation (2) and similar results were found and thus the natural logarithmic function was selected with an adjusted R^2 value of 0.941 as seen in Table 1.3 in the appendix.

Conversion of Nominal to Real Values

All variables excluding the GDP of the U.S. (which was already in real 2005 dollars), dummy variables and the population of the U.S. were initially in nominal terms. Following the GDP standard of using 2005 as the base year, the conversion of variables into real 2005 dollars was achieved by using the GDP deflator and the following equation:

Real 2005 value = Current Value * (GDP Deflator 2005 / Current GDP Deflator) (i)

Although CPI and GDP deflator are widely used and argued to be interchangeable, GDP deflator was used for this essay due to the availability of data and the flexibility it has in accordance to consumers' consumption and investment patterns. Since the GDP deflator is not based on a fixed basket of goods and services, it may be better suited for the casino industry since revenues are easily subjected to fluctuations.

Dataset

The dataset of this paper consists of an annual time series data from 1978 to 2008 with 31 observations, two dependent variables, two lagged dependent variables, five independent variables, and two dummy variables.

Dependent Variables

Net Revenues of New Jersey Casinos ln(NJCNR)

This is the main dependent variable and it is measured in billions USD in real 2005 dollars of twelve casinos in New Jersey collected from the New Jersey Casino Control Commission's Financial and Statistical Information which shows net revenues generated from New Jersey Casinos from 1978 to 2008. Unfortunately, this is the only form of revenues available for New Jersey casinos. Since net revenues takes deductions for expenses and taxes into account, I am unable to include tax as a separate independent variable to strengthen regression (1). The twelve casinos are as follows: Atlantis, AC Hilton, Bally's Park Place, Caesars, Claridge, Harrah's, Resorts, Sands, Showboat, Tropicana, Trump Marina, and Trump Plaza.

Gross Revenues of Nevada Casinos ln(VCGR)

Licensed in 1931, there are currently over 266 casinos in Nevada that are earning over $1 million USD in revenues annually as reported by the American Gaming Association. As previously mentioned, this is the dependent variable for the supplementary regression which examines the gross revenues generated by Nevada casinos between 1990 and 2008. The values are measured in billions USD in real 2005 dollars and were collected from the Nevada Gaming Control Board. Gross revenue simply measures the total sales/income of a company and does not take deductions such

as expenses and taxes into account. Therefore a tax variable was included for regression (2) to measure its impacts.

Lagged Dependent Variables

Lagged Net Revenues of New Jersey Casinos (NJCNRLAG(t-1))

Due to the nature of the dataset which consists of annual time series data, a lagged dependent variable is added to measure whether there are any effects of lag. Table 2.1 in the appendix shows the regression results for Equation (1) without the lagged dependent variable and comparing this to Table 2 in the appendix we can see that the lagged variable should be kept since it significantly alters the coefficients of variables USGDP and USPOP, reversing them from positive to negative and vice versa.

Lagged Gross Revenues of Nevada Casinos (VCLAG(t-1))

The reasons for adding this variable are the same as mentioned above. Table 3.1 in the appendix shows the regression of equation (2) without the lagged variable and compared with Table 3, the inclusion of the lagged dependent variable changes the coefficients of four variables – VCTAX, OCD, OCNR, OCD2 – from positive to negative and vice versa. And thus the lagged variable is included to account for those changes.

Independent Variables

Promotional Expenses of New Jersey Casinos ln(NJCPE)

Measured in billions USD in real 2005 dollars, this variable shows the advertising expenditure by New Jersey casinos from 1978-2008 collected from the New Jersey Casino Control Commission. An interesting trend here is that there was a steady annual increase in expenses from 1978 to 2000 and was followed by a large decline in expenditure in 2002 to approximately one-sixth of the expenditure in 2000. In 2008, the

advertising expenditure was approximately less than one-third of the expenditure in 2000. One possible explanation could be the U.S. recession in 2001 and another one could be that the growth of the online casinos has somehow positively affected casino attendance rates, and subsequently revenues in New Jersey and thus advertising expenditure was reduced.

Furthermore, the American Gaming Association reports that "In June 1999, the U.S. Supreme Court struck down the advertising restriction on the commercial casino industry in its decision in the case Greater New Orleans Broadcast Association v. United States. Until then, the Communications Act of 1934 had prohibited all television ads that showed gambling activity by commercial casinos."

Nevada Casino Tax Collections ln(VCTAX)

Measured in billions USD in real 2005 dollars, this variable shows the annual tax collections for Nevada casinos from 1990 to 2008 and was collected from the Nevada Gaming Control Board. As previously explained, since Nevada casino reports in gross revenues, taxes are exogenous and was therefore included in regression (2).

Real GDP of the United States ln(USGDP)

Measured in billions USD in real 2005 dollars, GDP is included since we would expect a positive relation between GDP and gambling. This variable was collected from a website called Measuring Worth which consists of various databases on GDP, population, CPI, wages, and so on for the U.S., U.K., China, and Japan. The observations were also confirmed by the U.S. Bureau of Economic Analysis.

Population of the United States ln(USPOP)

Measured in billions of people, this variable shows the total U.S. populations from 1978-2008 collected from Measuring Worth. This variable was chosen because it can be expected that as the population increases there should be, on average, more people who are of legal age which would positively contribute to the revenues of casinos.

Net Revenues of Online Casinos ln(OCNR)

Measured in billions USD in real 2005 dollars, this variable shows the net revenues of a random sample of 31 online casino companies from 2000-2008 collected from the ORBIS database which provides information for over 50,000 publicly traded companies and 5 million private companies worldwide. Although it is missing five observations, a dummy variable explained below is used to solve this discrepancy. The value 0 is assigned to all the years prior to 2000 for this variable.

Online Casino Dummy Variable (OCD)

This dummy variable was chosen to measure the effects since the introduction of online casinos. The value 0 will represent the years 1978-1994 which were the years when there were no online casinos. The value 1 will represent the years with online casinos from 1995-2008.

Missing Years Dummy Variable (OCD2)

Due to the missing data in net revenues of online casino variable (OCNR), this dummy variable is included to examine if there were any significance to those five missing years from 1995-1999. 1 will represent 1995-1999, otherwise 0. If there was an impact in the revenues in these years on the dependent variable, then this will allow us to place more caution in analyzing the results of the OCNR variable.

Basic Descriptive Statistics

For the basic descriptive statistics, all monetary values are measured in billions USD, otherwise in billions as the standard unit. Table 1.1 in the appendix shows the basic statistics of Equation (1). The main thing to note here is in the difference between the mean and standard deviations of the USGDP and OCNR before and after the transformation. For the mean and standard deviations of USGDP, we see a reduction from 9041 to 9.07, and 2503 to 0.28 respectively. For the mean and standard deviation of OCNR, we see a reduction from 16.88 to 2.67 and 10.91 to 0.56 respectively. For the NJCNR variable, the mean and standard deviation are 1.32 and 0.57 respectively. For NJCPE, the mean and standard deviation are -1.49 and 2.20 respectively. For USPOP, the mean and standard deviation are -1.35 and 0.10 respectively. For OCNR, the mean and standard deviation are 0.78 and 1.27 respectively.

Table 1.3 shows the basic statistics for Equation (2). For VCGR, the mean and standard deviation are 2.32 and 0.15 respectively. For VCTAX, the mean and standard deviation are -0.35 and 0.29 respectively. For USGDP, the mean and standard deviation are 9.26 and 0.18 respectively. For USPOP, the mean and standard deviation are -1.28 and 0.06 respectively. For OCNR, the mean and standard deviation are 2.67 and 0.56 respectively.

Predictions

Equation (1)

I would expect to see that GDP would have a positive effect on the revenues of New Jersey casinos since even if the consumers aren't spending money on gambling, there are still tourist attractions that these casino resorts have. I think that it would be harder to determine the effects of the population since one effect may be negative due to

concentration of age groups that play at casinos. One possible interpretation here is that if we assume that the majority of casino players are over the age of 40 and thus as the population grows and more people are of legal age to play, there would be no significant changes and instead it is possible to witness a decrease in the relation between the population and casino attendance, which subsequently affects revenue. Advertising expenditures should also play a role in the revenues of casinos since as mentioned before, the advertising restrictions were removed in 1999.

Perhaps the most important variables to consider now are the dummy variables and the online casino net revenues (OCNR) variable. I hope to see that at least the OCD or the OCNR variable will be statistically significant and have a positive effect on the dependent variable.

Equation (2)

Although it is Nevada, the data collected is not representative and will therefore be subjected to many limitations. However, I hope to see that at least GDP or USPOP will be statistically significant since Nevada and especially Las Vegas is considered the gambling capital of the world. Therefore, whether seeking for a holiday destination or to gamble, Las Vegas is at the forefront when compared with New Jersey.

In regards to taxes, I think that there would be a negative effect on revenues. And in terms of the dummy variables and OCNR, it would be great to see one variable as statistically significant at the 10% level or below. This is because I would expect that players who gamble online would be attracted to Las Vegas for two reasons: gambling and travelling since online players are not exclusive to the U.S. alone and are from all locations around the world.

III. Results

Equation (1)

- $Ln(NJCNR) = \alpha + \beta_1 ln(NJCNRLAG(t-1)) + \beta_2 ln(NJCPE) + \beta_3 ln(USGDP) + \beta_4 ln(USPOP) + \beta_5 ln(OCNR) + \beta_6 (OCD) + \beta_7 (OCD2) + ln(e)$ (1)

Null hypothesis: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = 0$; and so if we do not have enough evidence to reject the null hypothesis at the chosen significance levels, then the variable is said to have no effect on the revenues of New Jersey casinos (NJCNR). Null hypothesis can be rejected if p-value of the chosen variable is lower than a significance level of 10%, 5%, or 1%.

Table 2 – Equation (1) Regression Results

Variable	Coefficients	t Stat	P-value
Intercept	-6.564454814	-1.805658907	0.084675
NJCNRLAG(t-1)	0.508103666	10.80757499	2.89E-10
NJCPE	0.035370418	3.781847673	0.001025
USGDP	0.604126204	2.099455559	0.04747
USPOP	-1.385475362	-1.703000158	0.102656
OCD	-0.160989155	-2.091130265	0.048281
OCNR	0.054676649	2.503626105	0.020206
OCD2	0.188165883	2.87059672	0.008884

As we can see from Table 2 above, we have evidence to reject the null hypothesis for all independent variables at a 5% significance level with the exception of the USPOP variable. For the lagged dependent variable and NJCPE we can make a further deduction to reject the null hypothesis at a 1% significance level.

Equation (2)

- $Ln(VCGR) = \alpha + \beta_1 ln(VCLAG(t-1)) + \beta_2 ln(VCTAX) + \beta_3 ln(USGDP) + \beta_4 ln(USPOP) + \beta_5 ln(OCNR) + \beta_6 (OCD) + \beta_7 (OCD2) + ln(e)$ (2)

Again, null hypothesis: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = 0$; if p-values of the variables are lower than the significance levels of 10%, 5% or 1%, we have evidence to reject the null hypothesis and speculate that the variable will have an impact on the gross revenues of Nevada casinos (VCGR).

Table 3 – Equation (2) Regression Results

Variable	Coefficients	t Stat	P-value
Intercept	-35.42810947	-3.268329696	0.008454
VCLAG(t-1)	0.840688653	1.277889381	0.230155
VCTAX	0.04221161	0.634392458	0.540065
USGDP	2.818126619	3.620794959	0.004683
USPOP	-7.648841807	-2.856538178	0.017058
OCD	-0.199028459	-0.995242674	0.34309
OCNR	0.039454215	0.958020029	0.360641
OCD2	0.167144537	1.077283347	0.306655

From Table 3 above, we have evidence to reject the null hypothesis at a 5% significance level for the variables USGDP and USPOP.

IV. Discussion of Results

Equation (1)

The results show that all variables excluding USPOP are statistically significant at a 5% significance level or below. The significance of including the lagged dependent variable is verified once again as we have evidence to reject the null hypothesis at a 1% significance level. As expected, we are able to reject the null hypothesis for the advertising variable NJCPE at a 1% significance level and so we find a positive relation that displays a $1 increase in advertising expenditures leads to an increase of $0.035 increase in net revenues. The USGDP variable is also statistically significant with enough evidence to reject the null hypothesis at a 5% significance level and as predicted,

this may very well be due to tourism, casino games, or a combination of both in which a $1 increase in real GDP results in a $0.60 increase in net revenues.

Although we do not have enough evidence to reject the null hypothesis for the population variable USPOP, it is interesting to see the negative coefficient since as previously predicted one possible scenario of the population's effects on the revenues of casinos may be that an increase in population may not necessarily increase revenues since the concentration of age groups of casino players may be static. And thus although the increase of legalized gamblers may increase, this new generation of casino players may not be willing to play at casinos. Perhaps with an increased size in observations, we will be able to accurately observe the true effects of population on casino revenues.

With respect to the dummy variables, we find enough evidence to reject the null hypothesis at a 5% significance level with the variable OCD and OCD2. We also find enough evidence to reject the null hypothesis for the variable OCD2 at a 1% significance level. In terms of the online casino net revenue variable OCNR, we have enough evidence to reject the null hypothesis at a 5% significance level. And so it is very interesting to see that all three variables are statistically significant for the casinos in New Jersey.

Moving on to coefficients, the results indicate a positive impact by the variable OCD2 which accounts for the missing five years of online casino revenues with a coefficient of 0.188. This means that we will have to consider these effects when examining the results for the online casino net revenue variable OCNR which shows a positive coefficient of 0.055. And so for the variable OCNR, online casinos contributed to a $0.055 increase in the revenues of New Jersey casinos for every dollar generated

from players worldwide from 2000-2008. Factoring the results of the variable OCD2, we can assume that the coefficient for the variable OCNR is subject to a positive increase when the data for those missing years become available.

While evidence thus far points to a positive relationship between online casinos and New Jersey casinos, the variable OCD which measures the impact of online casinos before and after their establishment on the revenues of New Jersey casinos shows a negative coefficient which becomes inconsistent with our findings thus far. The variable essentially tells us that there is a negative effect of online casinos on the net revenues of New Jersey casinos. To account for this inconsistency, there are a few possible explanations. The first is the obvious issue of the sample of the OCNR variable. Online casinos are still a relatively new industry, and the fact that there are five observations missing may alter the results when they are factored in. The sample size itself, although random, may also not be representative since it is a small sample of the thousands of online casinos available today. Secondly, there is the issue of game selection. It is very possible that the growth of online casinos have been concentrated on table games rather than slot machines. And so the sample of online casino net revenues collected may not reflect that possibility. Lastly, there is the issue of consumer behavior and preferences. Casino players may simply prefer the lively atmosphere of commercial casinos rather than playing their favorite games at home by themselves. This factor is apparent with slot machines and also pertains to table games since players may enjoy the social interaction and conversations at a commercial casino. By playing online, players are entitled to entrusting their money to digital software which may be subjected to technical problems at any given moment. This idea is shared by William R. Eadington (2004, p.215) who

explains that “Online gambling sites might be able to overcome these concerns by identifying themselves with trustworthy brands” in order to allow the consumers to have some confidence since they are entrusting their money to a well known brand. And thus it’s very likely that some players may prefer commercial casinos over online venues since they’ll be able to have a better control over their money.

Equation (2)

The first thing that must be acknowledged before interpreting the results is the lack of observations in this particular regression. With a time series from 1990-2008, our results are widely subjected to limitations. While we only have evidence to reject the null hypothesis for the variables USGDP and USPOP, there are a few notable results we can examine. Although there is no evidence to reject the null hypothesis for the lagged dependent variable, its inclusion in the regression has been discussed previously. In regards to the tax variable, it’s interesting that the p-value would be so high and accompanied with a positive coefficient. Compared to the prediction of a negative coefficient for the tax variable, it is possible to note here that perhaps the tax collections are reimbursed back to the Nevada casino industry in some form. However, this would certainly require more observations to determine the true effects.

The significance and positive relationship the GDP variable has is not surprising due to the popularity of Las Vegas as a holiday destination. The population variable is interesting since it follows the same pattern as the results in Equation (1) and its p-value indicates that the null hypothesis can be rejected at a 5% significance level. The negative coefficient confirms the negative pattern seen in the New Jersey casinos and therefore it would certainly be interesting to observe changes when more data becomes available.

Lastly, when we compare the coefficients side by side in both regressions, it's very interesting that all the coefficients have the exact same impacts in terms of the signs on the coefficients. And although we can not reject the null hypothesis for the variables OCD, OCNR, and OCD2, this similarity in coefficients between the two regressions deserve some attention. The positive coefficients of the OCNR and OCD2 variables tell us that there may be an effect of online casino revenues on the gross revenues of Nevada casinos. The negative coefficient tells us the same contradicting results as previously discussed but the lack of observations may lead to a difference in results. Ultimately, we would expect that online casinos would have a large positive effect on the gross revenues of Nevada casinos since it would not be farfetched to assume that online casino players would be more attracted to travel and play at Las Vegas over New Jersey when given the choice.

VI. Concluding Remarks

The present paper attempted to empirically assess the impact of online casinos on the net revenues of New Jersey casino. Perhaps the most important result is illustrated by the significance of the OCNR variable and its coefficient. Accompanied by the significance and positive coefficient of the OCD2 variable which accounted for the five years of data that were unable to be attained for the OCNR variable, the results indicate that online casino revenues have a positive impact on the net revenues of New Jersey casinos. And thus it may be plausible for New Jersey policy makers to consider legalizing online gambling companies. One way of achieving this would be to allow the current casinos in New Jersey to establish online casinos under their enterprise which would generate additional revenues for those commercial casinos. To further stimulate the

establishment of online casinos within New Jersey, policy makers could also impose a higher tax on revenues generated by players from offshore online casinos. This would act as a tariff which would give domestic U.S. players an incentive to play their favorite casino games online in one of the domestic companies.

Unfortunately, the dataset in the present essay contained many limitations. Although 31 observations were sufficient to run an OLS regression, a greater number of observations would certainly allow for a more detailed look into the impacts. Since the internet gambling industry is still relatively new, not only are the observations available scarce in number, much of the analyses on this industry can only project short-term effects. It would also be great to have access to the historical dataset of Nevada casinos which span all the way back into the early 1930s. In terms of future research, it would be great to examine the entire U.S. commercial casino industry when the data becomes available since many states are still currently in its initial phases as previously mentioned. Lastly, I have alluded to the possibility of the specific growth in the online casino industry which may in fact be heavily concentrated solely in table games. Therefore, a possible topic for future research is to examine the effects of online table games such as Poker and Omaha on the revenues of casinos. The gambling industry continues to grow and with the rapid expansion of online casinos, long term trends in the relation between these two industries will play a great role in the future of online gambling in the United States.

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Appendix

Table 1 – New Jersey Before transformations

Regression Statistics	
Multiple R	0.98911846
R Square	0.978355328
Adjusted R Square	0.971468387
Standard Error	0.176934766
Observations	30

NJCNR		*NJCNRLAG(t-1)*		*NJCPE*	
Mean	4.130854458	Mean	3.997722322	Mean	0.375679625
Standard Error	0.223155861	Standard Error	0.259915487	Standard Error	0.042783922
Median	4.595876997	Median	4.595876997	Median	0.378460439
Mode	#N/A	Mode	#N/A	Mode	0
Standard Deviation	1.242479251	Standard Deviation	1.447148183	Standard Deviation	0.238210798
Sample Variance	1.543754688	Sample Variance	2.094237864	Sample Variance	0.056744384
Kurtosis	3.037787239	Kurtosis	2.041982647	Kurtosis	-1.200805586
Skewness	-1.907656264	Skewness	-1.740203945	Skewness	0.021013877
Range	4.808455933	Range	5.19427524	Range	0.74261283
Minimum	0.385819307	Minimum	0	Minimum	0
Maximum	5.19427524	Maximum	5.19427524	Maximum	0.74261283
Sum	128.0564882	Sum	123.929392	Sum	11.64606837
Count	31	Count	31	Count	31

USGDP		*USPOP*		*Column1*	
Mean	9041.254839	Mean	0.261707484	Mean	16.88272056
Standard Error	449.5459572	Standard Error	0.004588203	Standard Error	3.637122035
Median	8523.4	Median	0.260282	Median	13.69699635
Mode	#N/A	Mode	#N/A	Mode	#N/A
Standard Deviation	2502.96596	Standard Deviation	0.025546035	Standard Deviation	10.9113661
Sample Variance	6264838.596	Sample Variance	0.0006526	Sample Variance	119.0579103
Kurtosis	-1.235037963	Kurtosis	-1.316240096	Kurtosis	1.729183568
Skewness	0.291999816	Skewness	0.129618061	Skewness	1.534052172
Range	7634.6	Range	0.081901	Range	32.07504282
Minimum	5677.6	Minimum	0.222629	Minimum	8.097385905
Maximum	13312.2	Maximum	0.30453	Maximum	40.17242872
Sum	280278.9	Sum	8.112932	Sum	151.944485
Count	31	Count	31	Count	9

Table 1.1 – New Jersey Descriptive Statistics (After Transformation)

Regression Statistics	
Multiple R	0.997180255
R Square	0.994368461
Adjusted R Square	0.992576607

Standard Error	0.033295925
Observations	30

NJCNR		*NJCNRLAG(t-1)*		*NJCPE*	
Mean	1.32027999	Mean	1.274551794	Mean	-1.488893581
Standard Error	0.101959692	Standard Error	0.110409425	Standard Error	0.394820577
Median	1.525159597	Median	1.525159597	Median	-0.79454876
Mode	#N/A	Mode	#N/A	Mode	#N/A
Standard Deviation	0.567687539	Standard Deviation	0.614733663	Standard Deviation	2.19826794
Sample Variance	0.322269142	Sample Variance	0.377897476	Sample Variance	4.832381938
Kurtosis	9.290245283	Kurtosis	5.834374861	Kurtosis	20.65479129
Skewness	-2.995390688	Skewness	-2.473099112	Skewness	-4.277795872
Range	2.59994324	Range	2.59994324	Range	12.29591335
Minimum	-0.952386136	Minimum	-0.952386136	Minimum	-12.29591335
Maximum	1.647557104	Maximum	1.647557104	Maximum	0
Sum	40.92867968	Sum	39.51110561	Sum	-46.155701
Count	31	Count	31	Count	31

USGDP		*USPOP*		*OCNR*	
Mean	9.071992968	Mean	-1.345137747	Mean	2.672894316
Standard Error	0.050265897	Standard Error	0.017532625	Standard Error	0.187550839
Median	9.050570601	Median	-1.34598962	Median	2.617176564
Mode	#N/A	Mode	#N/A	Mode	#N/A
Standard Deviation	0.27986867	Standard Deviation	0.097617527	Standard Deviation	0.562652518
Sample Variance	0.078326472	Sample Variance	0.009529182	Sample Variance	0.316577856
Kurtosis	-1.301629388	Kurtosis	-1.329731863	Kurtosis	-0.25506642
Skewness	-0.010940923	Skewness	0.025888502	Skewness	0.796480149
Range	0.8521523	Range	0.313262896	Range	1.601639626
Minimum	8.644283887	Minimum	-1.50224857	Minimum	2.091541282
Maximum	9.496436187	Maximum	-1.188985675	Maximum	3.693180908
Sum	281.231782	Sum	-41.69927017	Sum	24.05604885
Count	31	Count	31	Count	9

Table 1.2 – New Jersey ln(USGDP) & ln(OCNR) regression

Regression Statistics	
Multiple R	0.989406048
R Square	0.978924327
Adjusted R Square	0.972218432
Standard Error	0.17459363
Observations	30

Table 1.3 – Nevada after transformation

Regression Statistics	
Multiple R	0.982528798
R Square	0.965362839
Adjusted R Square	0.941116827

Standard Error	0.034952285
Observations	18

VCGR		*VCLAG(t-1)*		*VCTAX*	
Mean	2.232119304	Mean	2.10985592	Mean	-0.352267804
Standard Error	0.034999338	Standard Error	0.122223698	Standard Error	0.067283935
Median	2.291439659	Median	2.209345392	Median	-0.24900023
Mode	#N/A	Mode	#N/A	Mode	#N/A
Standard Deviation	0.152558579	Standard Deviation	0.53276075	Standard Deviation	0.293283875
Sample Variance	0.02327412	Sample Variance	0.283834017	Sample Variance	0.086015432
Kurtosis	-1.055694763	Kurtosis	15.56535259	Kurtosis	2.172682094
Skewness	-0.26592982	Skewness	-3.789371408	Skewness	-1.381379735
Range	0.476202268	Range	2.457830988	Range	1.139280712
Minimum	1.98162872	Minimum	0	Minimum	-1.158892101
Maximum	2.457830988	Maximum	2.457830988	Maximum	-0.019611388
Sum	42.41026677	Sum	40.08726249	Sum	-6.693088269
Count	19	Count	19	Count	19

USGDP		*USPOP*		*OCNR*	
Mean	9.255043086	Mean	-1.280379644	Mean	2.672894316
Standard Error	0.040373073	Standard Error	0.014035098	Standard Error	0.187550839
Median	9.285429291	Median	-1.27536856	Median	2.617176564
Mode	#N/A	Mode	#N/A	Mode	#N/A
Standard Deviation	0.175982145	Standard Deviation	0.061177572	Standard Deviation	0.562652518
Sample Variance	0.030969715	Sample Variance	0.003742695	Sample Variance	0.316577856
Kurtosis	-1.404130073	Kurtosis	-1.157533494	Kurtosis	-0.25506642
Skewness	-0.166676304	Skewness	-0.190206753	Skewness	0.796480149
Range	0.507353645	Range	0.196584949	Range	1.601639626
Minimum	8.989082542	Minimum	-1.385570623	Minimum	2.091541282
Maximum	9.496436187	Maximum	-1.188985675	Maximum	3.693180908
Sum	175.8458186	Sum	-24.32721324	Sum	24.05604885
Count	19	Count	19	Count	9

Table 2 – Equation (1) Regression Results

Variable	Coefficients	t Stat	P-value
Intercept	-6.564454814	-1.805658907	0.084675
NJCNRLAG(t-1)	0.508103666	10.80757499	2.89E-10
NJCPE	0.035370418	3.781847673	0.001025
USGDP	0.604126204	2.099455559	0.04747
USPOP	-1.385475362	-1.703000158	0.102656
OCD	-0.160989155	-2.091130265	0.048281
OCNR	0.054676649	2.503626105	0.020206
OCD2	0.188165883	2.87059672	0.008884

Table 2.1 – Equation (1) Regression Results (no lag variable)

	Coefficients	*t Stat*	*P-value*
Intercept	28.20275625	0.733554823	0.470326
NJCPE	0.059942639	1.661441582	0.109634
USGDP	-1.228973115	-0.41584378	0.681219
USPOP	11.32778971	1.289876181	0.209385
OCD	-1.448252828	-1.84622059	0.07723
OCNR	0.131815771	0.539935527	0.594217
OCD2	0.90027327	1.266442251	0.217509

Table 3 – Equation (2) Regression Results

Variable	**Coefficients**	**t Stat**	**P-value**
Intercept	-35.42810947	-3.268329696	0.008454
VCLAG(t-1)	0.840688653	1.277889381	0.230155
VCTAX	0.04221161	0.634392458	0.540065
USGDP	2.818126619	3.620794959	0.004683
USPOP	-7.648841807	-2.856538178	0.017058
OCD	-0.199028459	-0.995242674	0.34309
OCNR	0.039454215	0.958020029	0.360641
OCD2	0.167144537	1.077283347	0.306655

Table 3.1 – Equation (2) Regression Results (no lag variable)

	Coefficients	*t Stat*	*P-value*
Intercept	-16.4033361	-1.73169	0.10893
VCTAX	-0.017913297	-0.24132	0.813378
USGDP	1.665212879	2.203273	0.047855
USPOP	-2.491856109	-1.25918	0.231909
OCD	0.043653173	0.393292	0.701002
OCNR	-0.003826515	-0.14247	0.889073
OCD2	-0.001194627	-0.013	0.989843