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Tribal and commercial casinos in the midwestern United States: effect on county unemployment

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TRIBAL AND COMMERCIAL CASINOS IN THE MIDWESTERN UNITED STATES: EFFECT ON COUNTY UNEMPLOYMENT

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Abstract

The subject of casinos is constantly surrounded by debate. The proponents of casinos frequently say that casinos bring jobs, and therefore, they will reduce the unemployment rate. This study quantitatively analyzes this claim. Furthermore, previous research looked at either tribal or commercial casinos. This study looks at both tribal and commercial casinos so a comparison can be made between the impacts of the two types of casinos. The sample analyzed is a set of commercial and tribal casinos in eight Midwestern states. The findings are that a commercial casino entering a county is significantly negatively correlated with the unemployment rate, and a tribal casino entering a county is significantly positively correlated with the unemployment rate. However, the amount that the unemployment rate changes when a casino enters a county is so small that one wonders whether or not the effect on the unemployment rate should even be a consideration when deciding if a casino should open in a county.

I. Introduction

Where's the Gold? Quest for Riches. Wheels of Cash! These are just a few names of slot machines at many casinos in the United States. In the past few decades the number of casinos throughout the U.S. has increased dramatically. Some are tribal casinos, owned by Indian tribes, and others are commercial casinos, owned by private or large public corporations. All are on their own quest for riches. The quest has led some to wheels of cash and others wondering, where's the gold?

Many studies have analyzed the effect casinos have on the community around them in areas such as crime, addiction, cannibalization of other entertainment industries, per capita income (PCI), and unemployment. Some of the studies compare and contrast commercial and tribal casinos for a paragraph or two, but the empirical portion of their paper focuses on just one type of casino, either commercial or tribal. The differences between the two casinos, such as how they are taxed and where they can be located, could cause major differences in the impact that they have on their community. For a previous paper, I looked at the impact that commercial casinos have on the county unemployment rate for counties in eight states in the Midwestern United States. For this paper I collect the data for the tribal casinos in the same eight Midwestern states for which I collected the commercial casino data. I complete the same statistical analyses in order to compare the impact of commercial and tribal casinos on the county unemployment rate.

Because of the differences between commercial and tribal casinos, the hypothesis is that tribal casinos will reduce the unemployment rate by more than commercial casinos. The findings of this study contradict the hypothesis. I find that a commercial casino entering an area is significantly correlated with a reduction in the unemployment rate. The model predicts that a commercial casino entering a county should result in a .2854% decrease in the county

unemployment rate. However, for tribal casinos, the results differ. A tribal casino entering an area is significantly correlated with an increase in the unemployment rate. The model predicts that when a tribal casino enters a county, the county unemployment rate will increase by 0.2525%. An impact of -0.2854% and +0.2525% are so small that the results make one wonder whether the impact to the unemployment rate should even be a consideration when deciding whether or not a casino should open in a county. This paper will explain the history of casinos, highlight the past literature in this area, present the model which is used, and interpret the results of the statistical analysis.

II. History of Casinos

The first commercial casinos in the United States were located in the states which today are the major gambling centers of the country: Nevada (Las Vegas) and New Jersey (Atlantic City). In 1931, Nevada became the first state to legalize gambling (Laxalt 1952, 44). In 1976, New Jersey followed suit.

In the early 1980s, the first tribal casinos appeared. In 1984 the Bay Mills Ojibwe Tribe opened the first tribally operated blackjack casino in the United States: Kings Casino. Today the casino has over 250 gaming machines and is still in its original location in Brimley, Michigan. As a result of the success of Kings Casino, in 1995 the Bay Mills Ojibwe Tribe opened a second casino, a few miles away, called the Bay Mills Resort and Casino ("Bay Mills Resort & Casino" 2014, 1). According to the Minnesota Indian Affairs Council (2006, 39), another tribe, the Prairie Island Indians, also saw the potential revenue from gaming and began a bingo operation in 1984 in Welch, Minnesota. This casino has been very successful and has expanded; it is now called the Treasure Island Resort & Casino and has 2400 gaming machines (Miller and Washington 2013, 70).

As more and more tribes opened casinos, problems occurred and a need for regulation arose. As a result, on October 17, 1988 the Indian Gaming Regulatory Act (IGRA) was created. It requires that each tribal casino be approved by the state in which it resides. According to the Salem Press Encyclopedia, the IGRA, includes provisions about "the application of state and criminal laws directly related to gaming, the allocation of jurisdiction between the state and the tribe, state assessments to defray the costs of regulations, standards of operation and maintenance of the gaming facility, and other subjects related to gaming activity" (Barrett 2014, 200). The IGRA clears up grey areas in regards to who has jurisdiction over casino matters and sets requirements for cleanliness and maintenance within the casinos. Since the IGRA, the number of tribal casinos has increased greatly. As of July 6, 2011 there were 460 tribal casinos recognized by the National Indian Gaming Association (2011, 1). The National Indian Gaming Association is an organization that represents those who are involved in tribal gaming.

As more and more casinos opened, more companies and public officials saw the revenue that was being generated by commercial casinos in Nevada and New Jersey and the tribal casinos. As a result many states began legalizing commercial casinos. The first commercial casino outside of Nevada and New Jersey to open was the Dubuque Casino Belle in Dubuque, Iowa. The casino is now named the Rhythm City Casino. According to the Rhythm City Casino's website, its first day of operation was over twenty-three years ago on June 1, 1991. As of December 31, 2012 there were twenty-three states with legalized commercial casinos (American Gaming Association 2013, 2).

III. Comparing Tribal and Commercial Casinos

Tribal and commercial casinos have an impact on the communities around them. The degree of impact is influenced by five major differences between tribal and commercial casinos:

location, tax on revenue, revenue expenditures, the economic state of the community prior to the casino entering the area, and the size of the casinos. The first difference between commercial and tribal casinos is where the casinos can be located. The IGRA specified that tribal casinos may be located on either reservation land or land that is held in trust for the tribes by the federal government. In contrast, commercial casinos can be located in any state where commercial gambling is legalized and in any community where zoning laws allow a casino to be built.

The second major difference is how revenue is taxed. According to the National Indian Gaming Association, Indian tribes are considered to be government entities, and are therefore exempt from federal income tax. Commercial casinos are owned by private or large public companies and are therefore not government entities. As a result they must pay federal income tax on their gaming revenue. The American Gaming Association (AGA) is the overseeing organization for all commercial casinos. On page two of a report they released in 2012, they say, "The commercial casino industry pays more in taxes than most industries. The industry directly paid nearly $16 billion in taxes in 2010. Its effective tax rate totaled 32 percent, significantly higher than the economy-wide total tax burden of 27 percent." This means that companies which own commercial casinos have discretion over a smaller proportion of their revenue than tribes which run tribal casinos.

A third major difference between tribal and commercial casinos is how they can spend their revenue. The National Indian Gaming Association (2014, 3) outlines five items that tribal revenue can be spent on: to "fund tribal or government operations or programs, provide for the general welfare of the Indian tribe and its members, promote tribal economic development, donate to charitable organizations, and help fund operations of local government agencies." This differs greatly from commercial casinos. Since commercial casinos are owned by private or large

public companies, the revenue goes to those owners. These owners may not even live in the state in which the casino is located, so much of the revenue may be spent outside of the state in which the casino is located.

One caveat of where commercial casino revenue goes is that in some cases the companies who are trying to open new commercial casinos will appeal to the state legislation by promising to put money back into the community in which they are located. For example, the Black Hawk County Gaming Association (BHCGA) is a corporation that is given revenue from the Isle of Capri Casino in Cedar Falls, Iowa. After receiving money from the Isle of Capri Casino, they accept applications for funding from community members in Black Hawk County (where the casino is located) and six surrounding counties. They then pick the applications with the most beneficial projects and award grants to these applicants. On the "About BHCGA" section of the BHCGA's website, they say that they, "benefit the Cedar Valley by providing property tax relief to cities and counties, funding capital improvements, and making charitable contributions." When the Isle of Capri Casino was applying for a gaming license in 2007, they applied in conjunction with the Black Hawk County Gaming Association.

The fourth major difference between the two types of casinos is the beginning state of the economy in the community where the casinos are located. The national average for poverty-levels and unemployment rates is much higher for American Indians than the national average (Huyser 2013, 133). This means that the tribal casinos have a larger potential impact than commercial casinos. On tribal lands, there are more people unemployed and more people in poverty than on other land in the United States.

The fifth and final major difference between commercial and tribal casinos is their size. Tribal casinos vary a lot in size. Some tribal casinos are very small, just an extension of a

convenience store. Many tribal casinos started very small in the 1980s and have since expanded to be huge operations. Studies in the past have shown that the impact from these small casinos is negligible. Robin J. Anderson (2011, 291) finds that "smaller casinos do not have a significant relationship with income or poverty." In comparison, where many of the first tribal casinos were very small, even the first commercial casinos were very large. The commercial casinos must be large in order to be profitable enough to cover the tax expense and start-up expense. Here is an example of the major start-up expense. In Massachusetts, after the governor proposed the legalization of commercial casinos in 2007, the Greater Boston Chamber of Commerce hired UHY Advisors FLVS, Inc. to complete a "fiscal, economic, and social analysis" (2007, 1) of commercial casino legalization in Massachusetts. In their research, they noted that, "The experience of other states indicates that the minimum $200 million up-front license payment in the Governor's proposal should not be a barrier to bidders. Illinois recently auctioned a license for a casino in the Chicago area. The highest of the seven bids was over $500 million" (Greater Boston Chamber of Commerce and UHY Advisors FLVS, Inc. 2007, 6). Any figure between $200 and $500 million would not be a feasible start-up cost for a small tribal casino, but was a requirement for a commercial casino to open.

IV. The Literature on Crime, Cannibalization, and Pathological Gambling

While this paper focuses on the impact casinos have on unemployment and per capita income (PCI), it is important to also note other effects that have been found to occur as a result of casinos. Three areas are frequently focused on by opponents of casinos: crime, cannibalization, and pathological gambling.

The first negative attribute casinos are given is that they increase crime in the area which surrounds them. Some empirical research does support this. Hyclack (2011, 33) found

significantly more car thefts and robberies on college campuses within ten miles of a casino. Grinols and Mustard (2006, 26) completed an extensive study with data from 1977 to 1996 of every county in the United States. They found that "casinos increased all crimes except murder." Contrasting these studies, Moellman and Mitra (2013, 64) completed a study of all tribal casinos in Oklahoma. They chose to look only at Oklahoma because it is a major center for tribal casinos. Oklahoma has more Native Americans than any other state. The study found that as the number of gaming tables in a county rises, the crime rate falls. These findings contrasted the studies by Hyclack, and Grinols and Mustard because Moellman and Mitra found that casinos are actually correlated with a reduction in crime, whereas the other two studies found that casinos are correlated with an increase in crime.

The second negative impact of casinos that is frequently mentioned is cannibalization. The term "cannibalization" is used to describe the idea that when a casino comes to an area, it will take away or cannibalize business from other businesses. For example, instead of going to the movies and out to dinner, someone may go to the casino to gamble and eat. As a result, they are taking away or cannibalizing business from both the movie theater and the restaurant to which the person would have otherwise gone. Siegel and Anders (1999, 118) looked at time-series data for eleven casinos in Missouri. They found that casinos are a substitute for other entertainment industries which is support for the cannibalization theory. Grinols and Omorov (1996, 11) also found cannibalization of other industries after a casino enters an area: "We have found that casinos are associated with a drop in general merchandise and miscellaneous retail and wholesale trade within 10 miles of the casino averaging $367 per $1000 increase in casino revenues." Contrasting these two studies, Wiley and Walker (2009, 112) found the effect of commercial casinos on retail property value in the Detroit area to have a statistically positive

effect on the value of retail land nearby. Furthermore, they argued, "There is no evidence to support the hypothesis that a substitution effect exists whereby casinos merely absorb spending that might have taken place at other businesses" (Wiley and Walker 2009, 113).

The final and perhaps most detrimental impact of casinos is pathological gambling. Lesieur completed a very thorough literature review of pathological gambling. His study covered a wide range of negative impacts as a result of pathological gambling: bankruptcy, family disruption, inability to focus at work, insomnia of spouses of pathological gamblers, illegal activities as a last resort to obtain money to gamble. The list went on and on. Lesieur (1992, 49) said that surveys found that one to two percent of adults are pathological gamblers. In 1998, Lesieur completed another study of pathological gambling. Upon reviewing four other studies about gambling addiction and job loss, Lesieur (1998, 156) concluded that between 21 and 36 percent of pathological gamblers have lost a job as a result of their addiction. Koo, Rosentraub, and Horn (2007, 367) completed a regression with data from three states with casinos: Michigan, Indiana and West Virginia. They found no correlation between a casino's presence and bankruptcy. This means that empirically, they did not find evidence that casinos cause more people to go through bankruptcy.

V. The Literature on Unemployment and Per Capita Income

While the opponents of casinos cite the crime, cannibalization, and pathological gambling, proponents boast of the jobs and tax revenue the casinos will bring, which as a result should decrease unemployment and increase PCI. The literature about the actual effect casinos have on PCI and unemployment is mixed. As mentioned previously, studies focus on either tribal or commercial casinos. I will summarize the results of three analyses of commercial casinos and three analyses of tribal casinos.

Because the American Gaming Association (AGA) is the main organization that advocates for commercial casinos, every year they release data about the economic impact of commercial casinos in a report called the "State of States." In the "2013 State of States" (2013,7), they stated that, "more than 332,000 people were employed by commercial casinos in 2012", and that, "during 2012, commercial casinos employees earned $13.2 billion in wages, benefits, and tips." However, if cannibalization is occurring then although commercial casinos created 332,000 jobs, they may also have destroyed jobs in these communities.

One of the earliest studies of the impact of commercial casinos on the unemployment rate was completed in 1994 by Grinols. The sample of casinos for his analysis was eight commercial casinos in Illinois. Grinols ran an analysis to look at the past trend of unemployment in these counties. He then looked at the unemployment trend after a casino entered a county. Grinols (1994, 11) found that, "none of the riverboats [. . .] showed a significant effect [. . .] on employment." Grinols also found that total employment increases by only 26% of the 7806 jobs that were created by the casinos. This supports the idea of cannibalization; this "indicates that a substantial number of jobs were lost elsewhere in the affected markets so the net jobs were a small or zero percent of direct employment on riverboats" (Grinols 1994, 11). It is important to note that this was a very short-term study; it was completed in 1994 and the earliest opening date for a casino in Grinol's study was 1991. His study was a study of the immediate impact that casinos have on unemployment.

The second academic study I looked at is an analysis of six counties in the Midwest that have casinos. Garrett looked at past unemployment trends in these counties to predict what the future unemployment trend should be. He then compared this prediction to what the actual unemployment trend was. He said that the net difference between these two lines is the effect of

casinos on the unemployment rate. Garrett (2004, 21) found that there was a distinct difference in the effect on unemployment between rural and urban counties; in the rural counties, casinos caused a reduction in the unemployment rate and in urban counties no discernible impact on unemployment was found. This conclusion makes sense because if the two casinos are the same size then the casino is going to make up a larger portion of the economy in a rural area than in an urban area.

A very comprehensive study of commercial casinos and unemployment was written by Chad Cotti in 2008. Cotti realized that other studies focused on a very small geographical area, and he wanted to broaden the study to include a large geographical area; Cotti's (2008, 39) study included all 161 counties in which commercial casinos had opened in the United States between 1990 and 1996. Cotti (2008, 29) also noted that an important component that he added that past studies do not include is a county-specific trend variable. Cotti (2008, 39) found that, "casinos lead to more employment and in some instances higher earnings, and as such likely due [sic] lead to some economic growth."

The three studies just summarized focus on commercial casinos. The next three focus on tribal casinos. The most cited study of tribal casinos and unemployment is "The Social and Economic Impact of Native American Casinos" by Evans and Topoleski. They used a differences-in-differences method to compare the state of the local economy before a casino is present to the state of the economy when the casino is present. Evans and Topoleski (2002, 13) noted that Indian reservations have historically had much higher poverty and unemployment rates: "Compared to the United States as a whole, Native Americans on reservations have 60 percent lower incomes and nearly five times the poverty rate. Much of the lower income can be traced to lower force participation rates and higher unemployment rates among this group."

Important findings of their study as listed in the paper's abstract were that, "four years after tribes open casinos, employment has increased by 26 percent, and tribal population has increased by about 12 percent. [. . .] The fraction of adults who work but are poor has declined by 14 percent" (Evans and Topoleski 2002, abstract). Their study not only found that employment improved, but also that the overall health of the communities improved from casinos: "mortality has fallen by 2 percent in a county with a casino and an amount half that in counties near a casino" (Evans and Topoleski 2002, abstract).

Robin J. Anderson used reservation information from the 1990 and 2000 census to see if there was a notable impact from tribal casinos on PCI, family poverty, and child poverty. The method for his study was to compare the 1990 and 2000 numbers between reservations which opened a casino in the 1990s and those that did not. He found that on the reservations which opened casinos, all three variables have positive outcomes: "having a tribal casino increases PCI by 7.4%, reduces the family poverty rate by 4.9 percentage points, and reduces the child poverty rate by 4.6 percentage points" (Anderson, 2011, 298).

A third study of tribal casinos and unemployment was the aforementioned study by Moellman and Mitra. They analyzed data from all of Oklahoma's tribal casinos. Their results agreed with Anderson's results. They found that as the number of gaming tables in a county increases, the PCI increases and the unemployment decreases (2013, 64).

Each of these studies focused on either tribal or commercial casinos. My analysis looks at tribal and commercial casinos separately but for the same time period and geographical area. As a result, a direct comparison can be made between the impact that tribal and commercial casinos have on the county unemployment rate.

V. Model & Data

For the analysis an ordinary least squares regression is run with data from thirty-five counties where tribal casinos are located in eight Midwestern states between 1990 and 2012. I then compare these results to the results of the previous study I completed, the commercial casino study. The commercial casino study used data from the same time period (1990-2012) and the same eight Midwestern states, but looked at fifty-six casinos instead of thirty-five.

The first step in collecting data is to determine how many tribal casinos are located in the eight Midwestern states in my study. For these states there are a total of fifty-nine casinos. The number of tribal casinos in each state is Illinois (0), Indiana (0), Iowa (3), Michigan (18), Minnesota (16), Missouri (0), Ohio (0), and Wisconsin (22). As a result of data collection problems, which are explained in detail later, twenty-four casinos are excluded from the study. The final sample that is used for the analysis is thirty-five tribal casinos: Illinois (0), Indiana (0), Iowa (3), Michigan (12), Minnesota (7), Missouri (0), Ohio (0), and Wisconsin (13).

Figure 1: The location of the 35 tribal casinos in this study.

A list of the thirty-five tribal casinos included in this study is in appendix A. The twenty-four tribal casinos which are excluded as well as the reasons for exclusion are included as appendix B.

Economists Oded Izraeli and Kevin J. Murphy (2003, 3) analyzed the effect of industrial diversity on a state's unemployment rate. Because the dependent variables in the current model and Izraeli and Murphy's model are both unemployment rates, the independent variables should also be similar. Since my study is looking at county unemployment rather than state unemployment, the independent variables must be adjusted to be county-level data rather than state-level data. Table 1 lists Izraeli and Murphy's variables for their industrial diversity study in the left column and the current study's corresponding variables in the right column.

Table 1. Description of Variables

Industrial diversity study	Casino study
U – is the state unemployment rate	COUNTY_UNEMP – is the county unemployment rate
USU – is the national unemployment rate	STATE_UNEMP– is the state unemployment rate
RPIC – is state per capita income (in 1982 dollars)	REAL_PCI – is the county per capita income (in 1982 dollars)
NWT – is percent of working-age population that is non-white	WHITE– is percent of the county's working-age population (15-65 years of age) that is white
TEEN – is percent of working-age population that is 16–19 years of age	TEEN – is percent of the county's working age population (15-65 years of age) that is 15-19 years of age
OVER65 – is the percent of the population 65 years and older	OVER65 – is the percent of the county population 65 years and older
DEN – is population density	POP_DENSITY – is the county population density
POP – is the state population	COUNTY_POP – is the county population
POPCH – is the rate of population growth in a state	POP_CHANGE – is the rate of population growth in a county
DIV – is a measure of the degree of industrial diversity	CASINO_DUM – is an indicator of whether or not there is a casino in a county

Source: Data adapted from Izraeli and Murphy 2003, 3.

The resulting model for this study is:

$$COUNTY\_UNEMP = \alpha_0 + \beta_1 STATE\_UNEMP + \beta_2 REAL\_PCI + \beta_3 WHITE + \beta_4\ TEEN + \beta_5\ OVER65 + \beta_6 POP\_DENSITY + \beta_7 COUNTY\_POP + \beta_8 POP\_CHANGE + \beta_9 CASINO\_DUM + \varepsilon$$

The data for the COUNTY_UNEMP and STATE_UNEMP variables are collected from the Bureau of Labor Statistics website. This is where I run into my first data collection problem. My plan is to collect data for each variable from 1980 to 2012 so that I have "before casino" and "after casino" data for every county. However, I find that there is no county unemployment data before 1990. As a result, I exclude all casinos that opened in the 1980s because there is no "before casino" data.

For the next variable, REAL_PCI, I collect the nominal PCI data from the website of the Federal Reserve Bank of St. Louis. I then multiply these values by the consumer price index values from the Bureau of Labor Statistics in order to obtain values for the real county per capita income.

Collecting the data for the WHITE, TEEN, and OVER65 variables proved to be very time-intensive. The files for these variables are very large and require a large amount of manipulation to obtain the data needed for this study. The files are obtained from the United States Census Bureau's website.

The data for the COUNTY_POP, POP_DENSITY, and POP_CHANGE variables are collected from the United States Census Bureau website. The variable COUNTY_POP is the population of the county in thousands. POP_DENSITY is calculated by taking the county population in thousands and dividing by the land area of the county in square miles. The variable POP_CHANGE equals the yearly percentage population change for each county.

The other data which takes a very long time to collect is the data needed for the CASINO_DUM variable. CASINO_DUM is a dummy variable so it can equal either 0 or 1. The range of the analysis is data from 1990-2012. Therefore, the CASINO_DUM variable will be 0 for all years before a casino opens, and 1 during the year it opens and all years after. For example, Ho-Chunk Gaming Nekoosa opened in 1993 under the name Rainbow Casino, so for the variable CASINO_DUM, the value is 0 for years 1990-1992 and 1 for years 1993-2012. No one source is available for finding the opening dates for these casinos. I scour through the casinos' websites and other gaming websites and even call some of the casinos. This is where the second exclusion of casinos occurs. I have to exclude nine casinos because I cannot find the opening date, and this is vital to the goal of this analysis. All but one of these nine are casinos that were opened as the second branch of an existing casino. This is why the opening date is much more difficult to find; on their websites, the casino operators list the opening date of their first branch but do not list the opening dates of the other branches. Appendix C lists the sources for all of the opening dates that I find.

Table 2 shows the descriptive statistics of these variables. From these measurements, important comparisons can be made between commercial and tribal casinos. The average county unemployment rate is more than a percent higher for the tribal casino dataset, 5.734 for the commercial casino dataset compared to 6.765 for the tribal casino dataset. Two other variables that are very different between the two datasets are POP_DENSITY and COUNTY_POP. The mean population density for the tribal casino dataset is 0.195, and the mean population density for the commercial casino dataset is much higher at 0.673. The mean county population is also much higher for the commercial casino dataset: 88.07 for tribal casinos and 369.02 for commercial casinos.

Table 2. Variable Sources, Measurement, and Descriptive Statistics-Tribal and Commer				
Variable Notation	Source	Measurement	Tribal Casinos Mean (St. Dev.)	Commercial Casinos Mean (St. Dev.)
COUNTY_UNEMP	U.S Bureau of Labor Statistics	Percent	6.765 (2.554)	5.734 (2.205)
STATE_UNEMP	U.S Bureau of Labor Statistics	Percent	5.628 (2.22)	5.480 (1.9127)
REAL_PCI	U.S. Census Bureau	Thousands of dollars	13.48 (2.34)	15.628 (2.870)
WHITE	U.S. Census Bureau	Percent	88.21 (15.6)	86.824 (12.037)
TEEN	U.S. Census Bureau	Percent	11.35 (1.45)	11.086 (1.023)
OVER65	U.S. Census Bureau	Percent	15.402 (3.797)	13.722 (2.800)
POP_DENSITY	U.S. Census Bureau	Thousands per square mile	0.195 (0.647)	0.673 (0.883)
COUNTY_POP	U.S. Census Bureau	Thousands	88.07 (167.88)	369.02 (503.5)
POP_CHANGE	U.S. Census Bureau	Percent	0.557 (4.956)	0.441 (6.524)
CASINO_DUM	See Appendix C	Integer (0 or 1)	0.585 (0.493)	0.592 (0.492)

The next step in determination of the model is completing forward selection, backward elimination, and stepwise selection to decide if any variables should be removed from the model. Forward selection includes all variables except TEEN. Backward elimination removes the variables TEEN and POP_CHANGE. Stepwise selection also removes TEEN and POP_CHANGE. These methods indicate that TEEN and POP_CHANGE are not significantly correlated with COUNTY_UNEMP. Therefore, these two variables are removed from the model. Therefore the final model is:

$$COUNTY\_UNEMP = \alpha_0 + \beta_1 STATE\_UNEMP + \beta_2 REAL\_PCI + \beta_3 WHITE + \beta_4 OVER65 + \beta_5 POP\_DENSITY + \beta_6 COUNTY\_POP + \beta_7 CASINO\_DUM + \varepsilon$$

VI. Results

To draw conclusions, the coefficients of the variables of the current study of tribal casinos must be compared to the coefficients of the variables in the study of commercial casinos. The coefficients are shown in Table 3.

Table 3: Coefficients and Standard Errors of Variables

	Tribal Data		Commercial Data	
Variable	Coefficient	Standard Error	Coefficient	Standard Error
Intercept	8.96489	0.43455	10.0967	3.9194
STATE_UNEMP	0.82342	0.02269	0.9452	0.0335
REAL_PCI	-0.29346	0.02949	-0.0184	0.0471
WHITE	-0.04165	0.0036	-0.1238	0.0303
TEEN	Removed	Removed	0.0743	0.0866
OVER65	0.06017	0.01599	0.1679	0.0941
POP_DENSITY	1.25425	0.25396	1.4617	2.1321
COUNTY_POP	-0.00598	0.00107	-0.0028	0.0025
POP_CHANGE	Removed	Removed	0.0005	0.0028
CASINO_DUM	0.25788	0.1111	-0.2854	0.1115

The results show that for all variables except CASINO_DUM, if the variable's coefficient was positive when using the commercial data, it is also positive for the tribal data. If

the variable's coefficient was negative with the tribal data, it is negative for the commercial data. This comparison indicates that the data is correct since the sign of the coefficients are consistent between the two sets.

Three variables, REAL_PCI, WHITE, and COUNTY_POP, are negatively correlated with county unemployment for both datasets. The first of these variables is REAL_PCI. For the tribal casino data, a 1% increase in real PCI is correlated with a 0.29% decrease in county unemployment; similarly, for the commercial casino data, a 1% increase in real PCI is correlated with a .02% decrease in county unemployment. As the amount of money a person can earn (real PCI) increases, the number of people not working (county unemployment) falls.

The second variable that is negatively correlated with county unemployment is WHITE. When running the model with the tribal data, a 1% increase in the percentage of residents in a county who are white is correlated with a 0.04% decrease in county unemployment. For the commercial casino data, the reduction in county unemployment is slightly higher at .12%. This finding is consistent with past studies which included the percentage white as an independent variable.

The third variable that is negatively correlated with county unemployment is COUNTY_POP. Although the coefficients on COUNTY_POP are negative for both the tribal and casino data, the coefficients are very small, indicating that the county population has very little effect on the county unemployment. The change in the county unemployment as a result of an increase in the county population by 1000 people is -.006% for the tribal data and -.0028% for the commercial data.

Three variables are positively correlated with county unemployment for both datasets. The first variable is STATE_UNEMP. For the tribal casino data, our model says that a 1%

increase in the state unemployment is correlated with a .823% increase in the county unemployment, and for the commercial casino data, the increase in county unemployment is .9452%. These coefficients show that the state unemployment and county unemployment are close to a 1 for 1 relationship, which is what is expected.

The second variable that is positively correlated with county unemployment is OVER65. This coefficient for the tribal dataset says that as the percentage of the population that is over 65 increases by 1%, the county unemployment should increase by .6%, and for the commercial casino data, a 1% increase in the percentage over 65 is correlated with a .17% increase in county unemployment.

The third variable that is positively correlated with county unemployment is the county population density. The model indicates that for every increase of 1000 people per square mile, the county unemployment rate will increase by 1.25% for counties with a tribal casino and 1.46% for counties with a commercial casino.

The variable of interest, CASINO_DUM, is the only variable for which the sign of the coefficient doesn't match between the commercial and tribal data. The location of a commercial casino in a county is correlated with a .2854% reduction in county unemployment. Conversely, the location of a tribal casino in a county is correlated with a .258% increase in county unemployment.

VII. Further Research

A few items could be adjusted within the current study to continue this research. The first would be finding the casino opening dates for those which were not found. Finding these dates would make the dataset more comprehensive. The second adjustment that could be made would be to go back to the first study, the study of commercial casinos, and complete all of the selection

methods (forward, backward, and stepwise) in order to be more confident in the comparison between the coefficients resulting from the two studies. The final adjustment that could be made to this study would be to complete a different statistical analysis than an ordinary least squares regression.

Other possible branches off the current study would require additional data collection. One possible branch is to look at a different geographical region of the United States and compare the results to the results of the current study. The results of this study may be unique to the Midwest. Another branch would be to use the same years and the same region, but instead of county unemployment, focus on any of the other variables that casinos are said to affect such as crime, cannibalization, and pathological gambling.

VIII. Conclusion

The result of this study is contrary to the hypothesis when this study began. I find that the location of a commercial casino in a county is correlated with a .2854% reduction in county unemployment, and the location of a tribal casino in a county is correlated with a .258% increase in county unemployment. The hypothesis was that tribal casinos would reduce county unemployment by more than commercial casinos because the tribes are required to put the income back into their community, and the tribes are taxed less.

Two possible reasons surface as to why the hypothesis is incorrect. The first is that although the tribal casinos put more money back into the community and pay less taxes, this does not affect the number of people that are employed by the casino. The second possible reason that the commercial casinos are correlated with a reduction in unemployment and the tribal casinos are not is because commercial casinos have more choice over where they are located, so they may be more successful and be larger. The final possible reason that the

hypothesis is incorrect is that commercial casinos are criticized more by the media and realize that they need to employee a lot of people, so they can boast about this number when they are criticized.

Overall, the impact of both commercial and tribal casinos on unemployment is very minimal. -0.2854% and 0.258% are so small that the conclusion of this study is that unemployment is probably not affected very much by the presence or lack of presence of a casino in a county.

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Appendix A: List of Casinos Included in Study

Number	Casino Name	State	County	City	Opening Year
1	Casino Omaha (Blackbird Bend Casino)	Iowa	Monona	Onawa	1992
2	Meskwaki Casino	Iowa	Tama	Tama	1992
3	WinnaVegas	Iowa	Woodbury	Sloan	1992
4	Bay Mills Resort & Casino	Michigan	Chippewa	Brimley	1995
5	FireKeepers Casino	Michigan	Calhoun	Battle Creek	2009
6	Four Winds New Buffalo Casino	Michigan	Berrien	New Buffalo	2008
7	Four Winds Dowagiac Casino	Michigan	Cass	Dowagiac	2013
8	Four Winds Hartford Casino	Michigan	Van Buren	Hartford	2011
9	Gun Lake Casino	Michigan	Allegan	Bradley	2011
10	Island Resort & Casino	Michigan	Menominee	Harris	1998
11	Little River Casino Resort	Michigan	Manistee	Manistee	1999
12	Odawa Casino Resort	Michigan	Emmet	Petoskey	2007
13	Ojibwa Casino	Michigan	Marquette	Marquette	1994
14	Saganing Eagles Landing	Michigan	Arenac	Standish	2008
15	Turtle Creek Casino	Michigan	Grand Traverse	Williamsburg	1996
16	Black Bear Casino	Minnesota	Carlton	Carlton	1993
17	Grand Casino Hinckley	Minnesota	Pine	Hinckley	1992
18	Grand Casino Mille Lacs	Minnesota	Mille Lacs	Onamia	1991
19	Mystic Lakes Casino	Minnesota	Scott	Prior Lake	1992
20	Shooting Star Casino	Minnesota	Mahnomen	Mahnomen	1992
21	Seven Clans Casino	Minnesota	Beltrami	Red Lake	2009
22	White Oak Casino	Minnesota	Itasca	Deer River	2000
23	Bad River Casino	Wisconsin	Ashland	Ashland	1991
24	Ho-Chunk Gaming Madison	Wisconsin	Dane	Madison	1999
25	Ho-Chunk Gaming Nekoosa	Wisconsin	Wood	Nekoosa	1993
26	Ho-Chunk Gaming Tomah (Whitetail Crossing)	Wisconsin	Monroe	Tomah	2004
27	Ho-Chunk Gaming Wittenberg	Wisconsin	Shawano	Wittenberg	2008
28	Lake of the Torches Resort & Casino	Wisconsin	Vilas	Lac Du Flambeau	1996
29	Legendary Waters Resort & Casino	Wisconsin	Bayfield	Bayfield	2011
30	Mole Lake Casino	Wisconsin	Forest	Crandon	1991
31	Oneida Main Casino	Wisconsin	Brown	Green Bay	1993
32	Potawatomi Bingo Casino	Wisconsin	Milwaukee	Milwaukee	1991
33	St. Croix Casino Danbury	Wisconsin	Burnett	Danbury	2010
34	St. Croix Casino Turtle Lake	Wisconsin	Barron	Turtle Lake	1992
35	Thunderbird Mini-Casino	Wisconsin	Menominee	Keshena	2011

Appendix B: List of Casinos Excluded from Study

Number	Casino Name	State	County	City	Opening Year	Reason for Exclusion
1	Kewadin Casino	Michigan	Chippewa	Sault Ste Marie	1985	Opened in 80s
2	Kings Club Casino	Michigan	Chippewa	Brimley	1984	Opened in 80s
3	Lac Vieux Desert Casino	Michigan	Gogebic	Watersmeet	1987	Opened in 80s
4	Leelanau Sands Casino	Michigan	Leelanau	Suttons Bay	1988	Opened in 80s
5	Ojibwa Casino	Michigan	Baraga	Baraga	1985	Opened in 80s
6	Soaring Eagle Casino Resort	Michigan	Isabella	Mount Pleasant	1989	Opened in 80s
7	Fond Du Luth Casino	Minnesota	St. Louis	Duluth	1986	Opened in 80s
8	Fortune Bay Resort Casino	Minnesota	St. Louis	Tower	1986	Opened in 80s
9	Grand Portage Lodge & Casino	Minnesota	Cook	Grand Portage	1990	Opened in 80s
10	Jackpot Junction Casino	Minnesota	Renville	Morton	1988	Opened in 80s
11	Little Six Casino	Minnesota	Scott	Prior Lake	1985	Opened in 80s
12	Treasure Island Resort & Casino	Minnesota	Goodhue	Welch	1984	Opened in 80s
13	Ho-Chunk Gaming Black River Falls	Wisconsin	Jackson	Black River Falls	1987	Opened in 80s
14	Menominee Nation Casino	Wisconsin	Menominee	Keshena	1987	Opened in 80s
15	Mohican North Star Casino	Wisconsin	Shawano	Bowler	1986	Opened in 80s
16	Northern Lights Casino	Minnesota	Cass	Walker		Opening Date Not Found
17	Prairie's Edge Casino Resort	Minnesota	Yellow Medicine	Granite Falls		Opening Date Not Found
18	Seven Clans Casino	Minnesota	Pennington	Thief River Falls		Opening Date Not Found
19	Ho-Chunk Gaming Wisconsin Dells	Wisconsin	Sauk	Baraboo		Opening Date Not Found
20	Dejope Bingo and Entertainment	Wisconsin	Dane	Madison		Opening Date Not Found
21	Oneida Mason Street Casino	Wisconsin	Brown	Green Bay		Opening Date Not Found
22	Lac Courte Orielles Casino	Wisconsin	Sawyer	Hayward		Opening Date Not Found
23	Irene Moore Activity Center	Wisconsin	Brown	Green Bay		Opening Date Not Found

24	Potawatomi Carter Casino Hotel	Wisconsin	Forest	Carter	Opening Date Not Found

Appendix C: Sources of Casino Opening Dates		
Casino Name	Website Name	Website URL
Bay Mills Resort & Casino	LinkedIn	https://www.linkedin.com/company/bay-mills-resort-&-casino
Black Bear Casino	500 Nations	http://500nations.com/news/Minnesota/20080125.asp
Casino Omaha (Blackbird Bend Casino)	Blackbird Bend Casino	http://www.blackbirdbendcasinos.com/about-blackbird-bend-casino
FireKeepers Casino	FireKeepers Casino	http://www.firekeeperscasino.com/news/firekeepers-casino-hotel-celebrates-fifth-anniversary
Fond Du Luth Casino	Zenith City Archive	http://zenithcity.com/zenith-city-history-archives/duluth-architecture/sears-building/
Fortune Bay Resort Casino	State of Minnesota Indian Affairs Council	http://archive.leg.state.mn.us/docs/2006/Mandated/060513.pdf
Four Winds Dowagiac Casino	500 Nations	http://500nations.com/casinos/miFourWindsDowagiac.asp
Four Winds Hartford Casino	MLive Media Group	http://www.mlive.com/news/kalamazoo/index.ssf/2011/08/post_184.html
Four Winds New Buffalo Casino	Casino Southland	http://casinosouthland.com/uploads/Market_Theft_Reported_by_Illinois_Casinos.pdf
Grand Casino Hinckley	The Wichita Eagle	http://www.kansas.com/news/local/article1016891.html
Grand Casino Mille Lacs	Felt Jungle	http://www.feltjungle.com/us/casinos/colorado/grandcasino-millelacs
Grand Portage Lodge and Casino	State of Minnesota Indian Affairs Council	http://archive.leg.state.mn.us/docs/2006/Mandated/060513.pdf
Gun Lake Casino	Match-E-Be-Nash-She-Wish Band of Pottawatomi	http://www.mbpi.org/PDF/News/Press%20Releases/PR_Revenue_Sharing_Announcement_11-27-12.pdf

Ho-Chunk Gaming Black River Falls	Indian Gaming	http://www.indiangaming.com/istore/Jun12_TLR.pdf
Ho-Chunk Gaming Madison	Ho-Chunk Gaming	http://www.ho-chunkgaming.com/madison/about-us.html
Ho-Chunk Gaming Nekoosa	500 Nations	http://500nations.com/casinos/wiHoChunkGaming Nekoosa.asp
Ho-Chunk Gaming Tomah (Whitetail Crossing)	Casino City Times	http://adams.casinocitytimes.com/article/bits-and-pieces-from-indian-country-june-2004-13329
Ho-Chunk Gaming Wittenberg	Ho-Chunk Gaming	http://www.ho-chunkgaming.com/wittenberg/about-us.html
Island Resort & Casino	Sales-Fax News	http://www.sales-fax.com/j/index.php/ovabnews/3263-island-resort-casino-promotes-as-qyour-total-experienceq-utilizing-spot-tv-local-cable-spot-radio-social-media-outdoor-local-newspapers-and-local-magazines
Jackpot Junction Casino	Mankato Free Press	http://www.mankatofreepress.com/archives/dakota -valley-history-altered-in/article_89bea54f-f57e-5562-9ebb-eecde86bbacc.html
Kewadin Casino	Kewadin Casinos	http://www.kewadin.com/news/p/item/1149
Kings Club Casino	LinkedIn	https://www.linkedin.com/company/bay-mills-resort-&-casino
Lac Vieux Desert Casino	Central Michigan University	https://www.cmich.edu/library/clarke/Research Resources/Native_American_Material/Treaty_Rights/Contemporary_Issues/Casino_Gambling/Pages/Beginning-of-Indian-Casinos-in-Michigan.aspx
Lake of the Torches Resort & Casino	Roadside America	http://www.roadsideamerica.com/hotels_motels/hotelinfo/144860.html

Leelanau Sands Casino	Better Business Bureau	http://www.bbb.org/western-michigan/business-reviews/casinos/leelanau-sands-casino-and-lodge-in-suttons-bay-mi-38079918
Little River Casino Resort	Market Wired	http://www.marketwired.com/press-release/newave-continues-winning-streak-with-system-replacement-contract-little-river-casino-1601240.htm
Legendary Waters Resort & Casino	Bayfield	http://business.bayfield.org/list/member/legendary-waters-resort-casino-1596
Little River Casino Resort	Market Wired	http://www.marketwired.com/press-release/newave-continues-winning-streak-wit
Little Six Casino	Indian Gaming	http://www.indiangaming.com/istore/Nov06_Shakopee.pdf
Menominee Nation Casino	Leisure and Hospitality International	http://lhimagazine.com/index.php/sections/being-there/2074-menominee-casino-resort%201987
Meskwaki Casino	Casino City Times	http://www.casinocitytimes.com/news/article/iowa-seeks-new-gaming-compact-120861
Mohican North Star Casino	Indian Country	http://indiancountrytodaymedianetwork.com/2009/05/03/mohicans-new-casino-thrives-despite-recession-83487
Mole Lake Casino	The Northwood River News	http://www.rivernewsonline.com/main.asp?SectionID=6&SubSectionID=47&ArticleID=48536
Mystic Lakes Casino	Indian Gaming	http://www.indiangaming.com/istore/Nov06_Shakopee.pdf
Odawa Casino Resort	Up North Live	http://www.upnorthlive.com/news/story.aspx?id=548061#.VKSMPivF_X9

Ojibwa Casino-Baraga County	Central Michigan University	https://www.cmich.edu/library/clarke/Research Resources/Native_American_Material/Treaty_Rights/ Contemporary_Issues/Casino_Gambling/Pages/ Beginning-of-Indian-Casinos-in-Michigan.aspx
Ojibwa Casino-Marquette County	The Wizard of Vegas	http://wizardofvegas.com/forum/off-topic/general/ 8928-casino-chip-of-the-day/359/
Oneida Main Casino	Indianz	http://www.indianz.com/IndianGaming/2014/027988.asp
Potawatomi Bingo Casino	Lumino Magazine	http://www.luminomagazine.com/afterhours/ milwaukee/0204/potawatomipf.html
Saganing Eagles Landing	MLive Media Group	http://www.mlive.com/business/mid-michigan/ index.ssf/2013/02/saganing_eagles_landing_casino.html
Seven Clans Casino	Minnesota Casino Guide	http://www.minnesotacasinoguide.com/ seven-clans-casino-red-lake/
Shooting Star Casino	Indianz	http://www.indianz.com/IndianGaming/2005/009817.asp
Soaring Eagle Casino Resort	Soaring Eagle Casino	http://www.soaringeaglecasino.us/
St. Croix Casino Danbury	Security Info Watch	http://www.securityinfowatch.com/news/10489896/ wisconsin-casino-deploys-ip-based-surveillance-system
St. Croix Casino Turtle Lake	Rice Lake Online	http://www.ricelakeonline.com/main.asp? SectionID=9&SubSectionID=96&ArticleID=22974
Treasure Island Resort & Casino	State of Minnesota Indian Affairs Council	http://archive.leg.state.mn.us/docs/2006/ Mandated/060513.pdf
Turtle Creek Casino	Record-Eagle	http://archives.record-eagle.com/2001/oct/12band.htm
White Oak Casino	Explore Minnesota	http://www.exploreminnesota.com/things-to-do/ 4301/white-oak-casino
WinnaVegas	Winnebago Tribe of Nebraska	http://www.winnebagotribe.com/enterprise.html

This study by: Amber Irlmeier

Entitled: Tribal and Commercial Casinos in the Midwestern United States: Effect on County Unemployment

has been approved as meeting the thesis or project requirement for the Designation

University Honors

Jan 2, 2015

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