THE EFFECT OF CASINOS ON LOCAL LABOR MARKETS: A COUNTY LEVEL ANALYSIS

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The economic outcomes surrounding the dramatic spread of "Las Vegas" style casinos in the United States has become a point of great interest and inquiry both politically and academically. Prior research has tended to focus on regional studies and provided uniform conclusions regardless of differences in the nature of the community. Moreover, much of the previous empirical work fails to account for local level trends during estimation. By using a comprehensive data set on employment and earnings from across the US, and by including county-specific trends, this research hopes to alleviate these earlier concerns, as well as help reconcile differences in the early literature surrounding casino effects on related industrial sectors. Basic findings suggest that counties experience an increase in employment after a casino opens, but there seems to be no measurable effect on average earnings. More detailed analysis reveals that the effect on industries related to casinos is somewhat mixed, but in general mildly positive, as casinos provide a positive employment and earnings spillovers into the surrounding local community. Intertemporal estimation suggests that the casino effect changes over time, but also finds that time effects vary across sectors. Estimates of how overall effects vary across different population sizes find that employment growth is inversely related to county population. Finally, additional estimation finds little impact on employment levels in neighboring counties, although there are some small effects in certain industries.

1 INTRODUCTION

There has been a dramatic increase and spread of "Las Vegas style" casinos in the United States over the last 20 years. Many communities see casinos as the best option for strong economic growth and development. Yet the impact of casino entry on local communities and surrounding areas is unclear and has become a point of much debate across the country. Do casinos create jobs and growth, or do they simply replace jobs in other industries (such as entertainment)? Are the effects consistent across all communities, or does the size of the community seem to affect the economic payoff? These are questions that have not been fully addressed in the literature surrounding the effect of casinos on local economies. Moreover, much of the earlier research on the issue has tended to focus on case studies and has also failed to account for local level trends during estimation; in both cases these weaknesses could lead to false conclusions about the effects of casinos on economic growth and local labor market activity. From the perspective of local and state policy markers, having an accurate understanding of the nature of the economic effects of casinos is particularly important, especially when one considers recent literature, which

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finds evidence that casinos may lead to increases in local crime, bankruptcy, and assortment of other social problems, such as suicide or divorce.

In this paper I attempt to add to this discussion by comparing changes in countywide and industry specific employment in counties where casinos have opened (or in counties that are adjacent to a county where a casino has opened) to changes in counties without a casino. Understanding how casino introduction affects employment in the community as a whole, and, maybe more importantly, in related industries, is key to evaluating the general impact of a casino on a local economy. Further, an evaluation of how these effects may vary across heterogeneous communities will provide a deeper insight into causal relationships and should lead to a better understanding of previous research. This paper makes use of a national sample of county level data in order to more comprehensively add to this on going discussion.

The primary finding is that casino introduction increases aggregate employment in host counties relative to counties without a casino. As anticipated, analysis of related industries suggests that these positive effects are primarily focused in the entertainment sector of a local economy, of which the casino is a part. Further estimation done at an even more disaggregated or sub-sector level of the local economy provides additional insight into how the impact of casinos varies across potentially related industries. Separation of the treatment counties by population indicates that the increase in employment is strongest in low-population rural areas, while aggregate employment in counties neighboring jurisdictions with casinos seems to be affected very little, although there are some mild spillover effects that are noteworthy.

Lastly, while a difference-in-difference or fixed-effects technique is an effective estimation method commonly used in casino studies, without careful consideration there exists the possibility that location specific trends will bias empirical outcomes. Many studies do identify this as a concern and attempt to test for the presence of a trending problem in a number of ways, but, rather than simply test for the presence of a trending bias, this study includes county-specific trends to directly account for any potential bias that may be caused by unobservable location-specific correlations.

Section II discusses the recent history of casinos in the US, as well as the existing literature that evaluates their impact on surrounding communities. Section III discusses the methodology and summarizes the data. Section IV presents the results and discusses the findings. Section V concludes.

2 BACKGROUND

A. Legislation

With the exception of Nevada since the 1930's and Atlantic City, NJ since 1978, casinos had no presence in the United States until Congress passed the Indian Gaming Regulatory Act (IGRA) in 1988. The IGRA formally recognized that, because tribes are sovereign bodies, states have limited regulatory

authority to govern them. Further, the IGRA opened the door for formalized Indian casinos by defining regulations that allowed for three classes of gaming to exist on tribal lands. Class I gaming permits traditional Indian games only. Class II allows for bingo or similar gaming to be operated by a tribe as long as the gaming takes place within a state that already permits that type of gaming for any purpose. Class III allows for the management and establishment of full-scale "Las-Vegas" style casinos with the negotiated permission to allow these games within the state.[1] The significance of the IGRA can't be understated in this discussion. As of 2003, tribal casinos existed in 25 states across the country; ranging from one location in Nebraska and Wyoming, to dozens of establishments in California and Oklahoma (Ader, 2003). Clearly, the IGRA has had a major effect on the landscape of the gaming industry in the United States.

The second major shift in legislative politics began in the early late 1980s and early 1990s with the legalization of commercial casinos in several states. Beginning with Deadwood, SD in 1989, and riverboat casinos that opened in the state of Iowa in 1991, new casino provisions have led to an influx of commercial casinos throughout the country. Excluding Nevada, by 2003 there were well over 150 state regulated commercial casinos operating in over a dozen states. Taken collectively, it is obvious that casino style gaming has become a widespread phenomenon in the United States and requires comprehensive analysis.

B. Predictions

Due to the status quo illegality that characterizes organized gambling, market entry by a casino is subject to governmental approval and, as such, very political by nature. The typical motivation used in support of opening a casino, whether it is tribal or commercial, is economic development. Strong supporters of casinos claim that casinos create jobs, spur economic development, increase the standard of living, and may even lower crime in surrounding areas. Specifically, they feel that the opening of a casino will create a new entertainment center for their community that will attract consumers from a wide range of surrounding areas, which, subsequently, will generate new jobs, promote the construction of infrastructure, and energize the local economy. In particular, it is easy to suspect that the hospitality industry may benefit from a positive business spillover. For example, casinos began opening in Tunica County, MS in 1991, and in subsequent years employment levels grew noticeably. In particular, the service sector in Tunica grew over 1000% from 1992–2001 (Garrett, 2004). The Tunica story highlights the potential for new jobs and the creation of tourism, which is the primary advantage to local communities cited by proponents of casino introduction, whether it is tribal or otherwise. Tribal casinos may also generate large employment gains, as according to the 2004 Report on Indian Gambling, tribal casinos now employ nearly a quarter million people in the US nationwide (Meister, 2004).

Those in opposition to casinos feel that they will increase several societal ills, such as crime, bankruptcy, divorce, gambling addiction, and other domestic problems. Moreover, opponents feel that, rather than creating more jobs, casinos act as a substitute to other pre-existing forms of entertainment. Thus, casinos may not actually create more jobs, but instead they may "cannibalize" jobs from other related sectors of the local economy. It is not difficult to imagine that a casino opens and several of the existing service/entertainment establishments, such as bars, restaurants, theaters, bowling centers, etc., lose business and therefore jobs through substitution and increased competition for disposable income.

Overall, it is unclear what outcome to anticipate. Employment could increase following casino entry, reflecting positive impacts on communities. Alternatively, total employment may not change very much at all, as certain sectors of the economy see reductions in employment. Moreover, outcomes may differ for urban and rural areas. The introduction of a casino into a predominantly rural area may spur more development and job creation then in urban areas because such casinos may act as a "destination" and draw people to a location that previously had very little tourist appeal. Hence, following a casino's opening one might expect an increase in demand for hotels, bars, and restaurants that would not have otherwise existed, such as been observed in Tunica County, MS. That said, in urban areas the entertainment and hospitality sectors may already be substantial, and a casino may provide little noticeable benefit for a community as a whole. Further, it might be the case that in urban areas a larger portion of the casino patrons will likely come from the existing residents of the community. Thus, a net positive flow of dollars into a city may be less obvious. For example, in Detroit, MI casino openings in the late 1990s led to 6000 new jobs (Sabar, 2004), but it is unclear that this growth didn't simply represent money flowing into the casino that otherwise would have gone to other establishments in the hospitality or entertainments sectors. Moreover, even if these new jobs represent a net increase in employment, 6000 additional jobs are a much smaller piece of the overall labor market in Detroit then they would be to a community similar to Tunica and, hence, would have a substantially smaller effect on the local economy overall. Regardless, it is clear that research on both the effects of casinos on related industries and how the "casino effect" differs between urban and rural areas is needed.

C. Past Research

There is a strong body of empirical research that evaluates the economic and social effects of casinos on their surrounding communities; the majority of which come from case studies of particular regions.[2] Most of the earlier work has analyzed employment and focuses on commercial casinos only, with mixed results. I will mention a few of these earlier papers to provide context to the discussion.

An early study by Grinols (1994) finds that casino introduction in Illinois had little effect on overall employment in the area, and suggested that casino entry played a small role in economic development at any level. However, work by Garrett (2004) investigates employment effects in six counties from the Midwest and Mississippi using a forecasting model. This analysis predicts what the level of household employment would have been in these casino counties if a casino had not opened and then compares it to the observed household employment following the casino opening. He finds that in most counties casino introduction resulted in increased employment, although these results seem to be much stronger in rural areas. On the other hand, Siegel and Anders (1999) find empirical evidence that riverboat gambling in Missouri acted as a substitute to the entertainment and services industries, supporting the concept that casinos "cannibalize" jobs from other industries and therefore provide very little job creation. The differences in outcomes between these studies highlights the need for comprehensive analysis of casino effects on employment for the county overall, as well as the for disaggregated sub-sectors.

Two more recent studies of casinos effects on local communities are Grinols and Mustard (2006) and Evans and Topoleski (2002). The Evans and Topoleski paper focuses on both the economic and social impacts of casinos on tribal communities and the surrounding area. They employ a difference-in-difference fixed effects analysis using data encompassing all native tribes in the lower 48 states. Their results are somewhat mixed, finding an increase in jobs per adult and a decrease in county level mortality rates. Both outcomes are indicative of a positive impact on the local community. They also isolate negative social outcomes, such as increased violent crime, larceny, and auto theft.[3]

Grinols and Mustard (2006) primarily focus on social effects of casinos. Specifically, they address how several different measures of crime (assault, robbery, burglary, etc.) are related to casino openings.[4] Their findings indicate that casino introduction dramatically increases most forms of crime, particularly noting that the negative impact of crime increases over time. That said, it should be noted, that recent preliminary research by Navin and Sullivan (2006) find evidence that the effects of crime on a community are not consistent across urban and rural areas.

I add to the discussion of the economic impact of casinos by undertaking a comprehensive empirical study of how casino entry affects local labor markets. Specifically, I estimate the impact of casinos on employment and earnings for the county as a whole, industries that might be related to the casino (e.g. the entertainment and hospitality sectors), as well as if the magnitude of these effects change over time. All issues which have not been studied in a comprehensive manner to this point in the existing literature. Moreover, this paper also endeavors to obtain detailed estimates of how the nature of these outcomes may vary across urban and rural communities, as well as if the impacts spillover into neighboring jurisdictions. Both results which are

of paramount importance to policymakers as they consider the pros and cons associated with casino entry for their municipalities.

3 DATA AND STATISTICAL METHODOLOGY

A. Data

The primary data source for the estimation the model is the Bureau of Labor Statistics' Quarterly Census of Employment and Wages (QCEW). The QCEW reports quarterly county-level payroll data on private employment and earnings for narrowly defined industries. These data are collected from paperwork employers file in conjunction with the unemployment insurance program. All firms with workers subject to state and federal unemployment insurance laws are represented in the data, which, according to the Bureau of Labor Statistics (BLS), covers 99.7 percent of all wage and salary civilian employment. The industrial sector of all firms in the data is coded according to the North American Industrial Coding System (NAICS), and aggregations of the data by county, industry, and quarter are available to users, beginning with the initial data collection for the first quarter of 1990.

The data found within the QCEW survey has many advantages over other employment surveys. It provides census (rather than sample) observations of employment and earnings for detailed industrial specifications within a large number of narrowly defined geographic regions. The county-level of aggregation provides a reasonable approximation of a labor market, especially for disaggregated sectors such as the restaurant and bar sector. Even in metropolitan areas with several counties, the large number of employers in this sector within a county (lowering the necessity of long commutes) suggests that potential employees would typically look to nearby establishments as a source of employment.

That said, the QCEW does have its limitations. Unfortunately, the survey doesn't distinguish between part-time and full time employees, nor is there a measure of hours worked or the average wage. The only earnings measure available is data on the average quarterly payroll of establishments by sector in the county, which I divide by total employment in the corresponding sector to construct a measure of average earnings per worker.[5] Nevertheless, the QCEW does provide accurate and comprehensive measures of employment and earnings in highly disaggregated markets, and represents a new data source that has not been utilized in research examining impacts of casinos on employment.

The dependent variables taken from the QCEW are formed from an extract of 28 quarterly observations of county-level employment and earnings for several industrial sectors between the years 1990–1996. Data on sectors and sub-sectors of interest, with respect to the effect of casinos on business outcomes, were isolated. The inclusion of analysis on potentially related industries permits a more detailed understanding of the overall impact of a

casino on a community and has frequently been left out of earlier studies. Specifically, the analysis in this paper utilizes employment and earnings data for each county as a whole, counties' aggregate entertainment (Arts, entertainment, and recreation) and hospitality (Accommodation and food services) sectors, as well as sub-sectors of these which include: Performing arts and spectator sports; Museums, zoos, and parks; Other recreation (which includes golf, skiing, marinas, fitness centers, and bowling); Accommodations; Food service and drinking places; Full service restaurants; Limited service eating places; Drinking places; and Hotels/motels, excluding casino hotels. Overall, this sample contained over 600,000 quarterly observations on county-level sectors. Table 1 reports summary statistics for all U.S. counties in this primary sample.

The BLS does censor sector-specific observations on employment and earnings if the number of establishments in the county is below a certain level.[6] Due to the relatively high number of county-level establishments in the county as a whole and for the two primary "super-sectors" under investigation (e.g. entertainment and hospitality), this problem is a relatively minor concern for this project. I also estimate models for sub-sectors of the hospitality and entertainment sectors, so, as the level of industrial disaggregation increases, the rate of censoring also increases.[7]

Information on the timing and location of casino introduction from 1990–1996 was obtained from Earl Grinols, Baylor University, and David Mustard, University of Georgia, who gathered the information by contacting state gaming authorities and by consulting both *Casino: The International Casino Guide* and select casino websites, such as www.casinocity.com. During this time period in the 1990's a total of 161 counties had casino open within their borders, including both commercial and tribal casinos.[8] These 161 counties make up the principle treatment group for this analysis. A secondary treatment group of neighbor counties, defined as all counties that border a county with a casino, was also identified. Atlantic County, NJ and all counties in Nevada were excluded from the analysis due to the unique nature of the casino industry in these areas.

B. Methodology

In order to estimate the impact of casinos on any measure of interest (e.g. employment, earnings, crime, property values, etc.) many different methods can be utilized. As I have panel data a fixed effects regression is employed. This standard methodology compares a measure of interest, say employment, in counties before and after a casino opens (the treatment group) with the employment over the same period in counties where a casino did not open (the control group). The basic econometric model is as follows:

(1) $\qquad Y_{it} = \alpha_i + \tau_t + \beta C_{it} + \gamma' X_{it} + \varepsilon_{it}$

TABLE 1
SUMMARY STATISTICS: COUNTY LEVEL 1990–1996

	Mean	Std. Dev.
Sectoral Employment		
Total County (NAICS 10)	28,967	111,304
Entertainment (NAICS 71)	903	2,792
Hospitality (NAICS 72)	4,256	11,460
Performing Arts/Spec. Sports (NAICS 711)	1,279	2,819
Museums/Zoos/Parks (NAICS 712)	406	708
Other Recreation (NAICS 7139)	676	1,430
Accommodations (NAICS 721)	980	2,645
Hotels, non-casino (NAICS 72111)	1,158	3,081
Bars and Restaurants (NAICS 722)	2,685	8,289
Full Service Restaurant (NAICS 7221)	1,357	3,953
Limited Service Restaurant (NAICS 7222)	1,351	3,721
Bars (NAICS 7224)	446	787
Sectoral Weekly Earnings per Worker (in US $)		
Total County (NAICS 10)	366	101
Entertainment (NAICS 71)	217	118
Hospitality (NAICS 72)	151	39
Performing Arts/Spec. Sports (NAICS 711)	431	409
Museums/Zoos/Parks (NAICS 712)	313	77
Other Recreation (NAICS 7139)	203	57
Accommodations (NAICS 721)	192	62
Hotels, non-casino (NAICS 72111)	194	64
Bars and Restaurants (NAICS 722)	137	34
Full Service Restaurant (NAICS 7221)	143	37
Limited Service Restaurant (NAICS 7222)	135	30
Bar Employment (NAICS 7224)	147	40
Other Variables		
Unemployment Rate	6.46	2.96
Population	141,352	391,482
Percent Population Female	50.87	1.54
Percent Population Male	49.13	1.54
Percent Population White	86.29	16.00
Percent Population Non-White	13.72	16.00

Notes: Data on employment come from the Quarterly Census of Employment and Wages (QCEW). All employment statistics are for private employment only. For very fine levels of sectoral disaggregation (e.g. 4 digits or lower), employment in very rural counties maybe suppressed by the BLS for confidentiality, and, hence, not included in the summaries of these very small sub-sectors. County population estimates are from the U.S. Census, while county unemployment rates were collected from the Local Area Unemployment Statistics at BLS.gov.

where Y_{it} is the dependent variable (log employment or log earnings), in county i during quarter t; α is a vector of county dummy variables (county-fixed effects); τ is a vector of quarter dummy variables (quarter-fixed effects); X is a vector of county-specific characteristics; C_{it} is a casino dummy that is equal to one if county i has a casino in operation at time t and zero otherwise; and ε_{it} is the idiosyncratic error term. The county effect should control for

any fixed aspects of the county that might affect the labor market, including any persistent differences in institutional, economic, or demographic characteristics of counties that might affect employment or earnings. The quarter effect should control for any national-level macroeconomic effects. Controls included in X, then, are intended to reflect how a county's labor market might vary over time in a manner that differs from other counties.

The inclusion of fixed effects is imperative in this context and helps alleviate concerns that differences in employment (or earnings) across counties and time, which are unrelated to the casino and other control variables, will bias estimates. For example, if a community has a higher employment level, it should not be attributed to casino entry, because it may due to some unobserved, constant feature of the county. Thus, the county-fixed effect controls for persistent differences between counties. The quarter-fixed effects function in much the same way. For example, employment is generally higher during later periods in the panel. These higher levels of employment are not necessarily the result of casino entry, which occurs at some point during the sample period, but instead could be due to some unobserved feature that is consistent across all counties. The net result of the county- and quarter-fixed effects is to focus attention on changes in employment over time within particular counties. So, casino effects on employment are only identified if changes in employment within counties are significantly associated with casino entry.

While the use of fixed-effects deals with many of the problems that may be caused by differences in county characteristics that are unchanging over the sample period, the inclusion of further controls is needed to capture the effects of other factors that may influence employment or earnings and change across the sample over time. In attempting to measure county-specific time-varying supply and demand factors that might influence employment and earnings, the depth of the QCEW survey is again useful. Specifically, besides using data on total county employment and average weekly earnings in all industries to measure the effects of casino entry for the county overall, the inclusion of the log of total county employment and earnings in all estimations of specific industries helps to control for changes in the county-level status of the labor market. In particular, the average earnings variable reflects whether or not supply-and-demand factors tend to lead to high wages in general in that county, suggesting that the competitive wage in any sector is likely to be higher. The log of population in the county is also included and was obtained from the U.S. Census Bureau. This variable may reflect both supply influences in the labor market – a larger population shifting out supply – and demand influences from a larger population increasing the demand for output. Another measure of the county-level status of the labor market that I use is the unemployment rate from the Local Area Unemployment Survey (LAUS). Finally, U.S. Census Bureau data on population distributions by race and sex were included to control for possible unobserved county-specific demographic effects.

Although the models are estimated by ordinary least squares, a few statistical issues still arise. First, the inclusion of fixed county effects and fixed

time effects does not prevent correlation in the equation (1) error term, ε, within counties over time, or across counties at a point in time (for example, see Arellano (1987)). Ignoring this correlation can lead to severe biases in the standard errors, especially when the level of aggregation varies across the variables included in the model (see Bertrand et al. (2004)). In the reported estimates, all standard errors are calculated allowing for any type of correlation structure among the error terms for a given county. This approach to calculating standard errors is also robust to any possible heteroskedasticity pattern in ε, including when using ordinary least squares estimates. Although the use of "clustered" standard errors has become common place in panel-data analysis, it has not always not been addressed in earlier employment studies (including those involving casino effects).

Second, as mentioned above, I use a logarithmic specification for each of my dependent variables. Blackburn (2007) argues that estimated models that utilize the logarithm of a variable as the dependent variable will only provide consistent estimates of percentage effects on the underlying variable if the error term is distributed independently of the regressors. For example, if the variance of the error terms is related to the value of the regressors, estimates of the logarithmic model will be inconsistent as estimates of percentage effects. Blackburn suggests estimating exponential regression models with the level of the variable as the dependent variable as an alternative, although this approach turns out to be impractical in my case given the large number of fixed effects I wish to incorporate in my estimation. As an alternative, it is possible to examine if there is the potential of a large inconsistency in the estimates by examining the degree of heteroskedasticity in the data. For the basic models, I used the residuals to estimate skedastic functions in which the variance is allowed to vary linearly with all of the regressors in the model. The results did not suggest an important influence of casino entry on this variance, suggesting the concern over using logarithmic dependent variables is likely not an issue of concern in interpreting regression estimates.

4 RESULTS

A. Basic Estimates

As a first examination of the correlation in the data, I estimated the basic effects of casino entry on total county employment and average weekly earnings, where the dependent variables are the log of employment and the log of average weekly earnings, for the county as a whole, as well as two super-sectors: the arts, entertainment, and recreation super-sector, which are referred to as entertainment, and the accommodation and food services super-sector, which is referred to as hospitality.[9] The employment effects for the county as a whole are reported in the first column of Table 2, and provide a statistically significant positive effect of casino entry on total county employment. Since these estimates are in logs they indicate that total county employment in a typ-

TABLE 2
ESTIMATED EFFECTS OF CASINO ENTRY ON EMPLOYMENT AND EARNINGS

	County, Total (NAICS 10)		Entertainment (NAICS 71)		Hospitality (NAICS 72)	
	Ln Employment	Ln Earnings	Ln Employment	Ln Earnings	Ln Employment	Ln Earnings
Casino	0.0821**	0.0079**	0.5053**	0.1911**	−0.0155	0.0347**
	(0.0155)	(0.0040)	(0.0607)	(0.0213)	(0.0177)	(0.0101)
County Population	0.9267**	0.1238**	0.6283**	−0.1124	0.2150	−0.0441
	(0.0579)	(0.0292)	(0.1914)	(0.1151)	(0.1511)	(0.0527)
Total County Employment	—	−0.0002	1.0942**	0.0302	0.8836**	0.1178**
		(0.0193)	(0.1150)	(0.0350)	(0.0554)	(0.0320)
Countywide Average Weekly Earnings	−0.0004	—	−0.3881**	0.3829**	−0.3355**	0.2278**
	(0.0375)		(0.1052)	(0.0495)	(0.0546)	(0.0521)
Unemployment Rate	−0.0180**	−0.0014**	−0.0135**	−0.0012	−0.0030	0.0006
	(0.0008)	(0.0005)	(0.0042)	(0.0017)	(0.0019)	(0.0008)
Percentage of Population White	0.0007**	0.0005**	0.0040**	−0.0002	−0.0002	0.0001
	(0.0002)	(0.0001)	(0.0010)	(0.0004)	(0.0003)	(0.0002)
Percentage of Population Female	0.0168**	0.0005	0.0685**	−0.0019	0.0003	0.0007
	(0.0051)	(0.0026)	(0.0329)	(0.0134)	(0.0083)	(0.0040)
N	86,788	86,788	43,049	43,049	50,794	50,794

Note: Each column of estimates is from a separate regression. The standard errors in parentheses are corrected to allow for possible non-independence of observations within a county. All regressions included fixed-effects for county and quarter. Robust standard errors are reported in parentheses. **, * denote statistical significance at the .05 and .10 levels, respectively.

ical county increased 8.21 percent relative to the control group. The estimates in the second column of the table show that average weekly earnings also increases in the county overall after a casino opens, although only small amount (0.79 percent). Obviously, at this highest level of aggregation the dependent variable of either total county employment or average weekly earnings can't be included on the right-hand side of the model as well. So, when necessary, the aggregate county measure is excluded. When addressing the estimates of the remaining covariates, I find, not surprisingly, that increases in the log of county population tend to be associated with increases in county employment and earnings. Also consistent with expectations there is evidence, at least at this more macro-level, that the percentage of the population that is white has a positive effect on employment and earnings, while unemployment rates effect negatively on both measures. This unemployment rate measure is indicative of higher unemployment rates shifting out supply, shifting in demand, or some combination of the two. Nevertheless, the significant positive estimates from this fixed-effects model suggests that, on average, casinos play a significant

role in increasing both employment, earnings, and promoting economic development in a county. Of course it needs to be pointed out that both of these results, although demonstrating real growth, may be picking up only growth directly attributed to the casino industry itself, and, hence, does not provide any information about internal tradeoffs or complementary effects that may exist.

From a policy and economic growth perspective, it is critical that an analysis of the effects of casinos should address the potential spillover effects of casino introduction on related industries. Previous studies have found that casinos "cannibalize" jobs from other forms of entertainment and recreation, while providing little economic benefit to the surrounding hotel and restaurant industries (Siegel & Anders, 1999; NGISC, 1999). Still other research finds results that casinos may promote growth in other industries, such as hotels, restaurants, bars, and other forms of entertainment (e.g. Taylor *et al*, 2000). As discussed earlier, one goal of this research is to comprehensively isolate how casino introduction impacts related industries.

Analysis of the entertainment and hospitality industries find results in favor of a generally neutral or positive spillover story. Estimates in the third column of Table 2 suggest that casinos increase employment in the entertainment sector by over 50 percent relative to the control group. This is definitely a significant increase, but these results are again tempered when one considers that the casino itself is captured in these estimates, and a great deal of casinos locate in rural counties which typically have very few entertainment jobs to speak of prior to the casino opening (over 30% have fewer than 200 workers in the entertainment sector prior to casino entry).[10] That said, results in the fourth column show a statistically significant increase in earnings of over 19 percent. While this may exclusively represent earnings from casino employees, this increase may not be as susceptible to population differences. Nevertheless, this result is consistent with a strong increase in the demand for labor in the entertainment industry. Estimates of effects on employment in the hospitality sector show a statistically insignificant negative point estimate of approximately 1.55 percent, while earnings effects turn out to be positive and significant. This result demonstrates that, even though there may not be positive spill-over effects into the hospitality industry in terms of job growth, there may be positive effects for existing employees that is reflecting increased demand.

B. County-Specific Trends

The empirical specification to this point controls for variation in included observable covariates (population, etc.) and controls for systematic differences in sector specific employment determination across counties, but only differences that are stable over time. When using panels over a moderate to long period, it may be doubtful whether this assumption of stable county effects is appropriate. One straightforward way to generalize this specification

of county effects is to also allow for a systematic change in the county-specific effect over time, were the degree of change can differ across counties. This incorporation of unit-specific trends in the error term of the model has become increasingly common in studies using panels (as examples, see Heckman and Hotz, 1989; Jacobsen, LaLonde, and Sullivan, 1993; Friedberg, 1998, and Drewianka and Johnson, 2007). The benefit of the inclusion of these trends is that it controls for the possibility that employment growth is trending differently in counties that opened a casino compared to counties that did not. Moreover, the inclusion of trends will also help to alleviate endogenous location concerns.

I modify the basic empirical model (equation 1) to include county-specific trends:

$$(2) \qquad Y_{it} = \alpha_i + \tau_t + \beta C_{it} + \gamma' X_{it} + \lambda_i t + \varepsilon_{it}$$

where λ_i is a trend coefficient that varies across counties. Wooldridge (2002, pp. 315–322) discusses the estimation of this model.[11] The approach analogous to the fixed-effects estimator is to directly control for the county-specific constants and trends in the estimation. While an estimation of two nuisance parameters per county would be effective, it is impractical. That said, it is possible to sweep out the county-specific constant and trend in equation (2) from the other variables in the model. In this case, it entails estimating a simple linear trend model for each variable in the equation, and using the residuals from these trend models to estimate the parameters of interest.[12] OLS estimation using these detrended variables is then appropriate. Estimates using detrended data are reported in Table 3.

After controlling for local trends, in general the estimated effects of casino entry on both employment and earnings across all three levels of aggregation are the same in sign and significance to those in Table 2, but much smaller in magnitude. The two exceptions being the estimate of total county earnings, which is much lower both in terms of the point estimate and statistical significance, and employment effects in the hospitality industry, which is the one casino estimate which moves in the positive direction. While overall these estimates tell the same story as earlier estimates, they indicate that (with the possible exception of employment in the hospitality sector) employment and earnings in these sectors tend to exhibit a upward long-term trend in counties that have opened a casino *relative* to casino that have not, thus biasing fixed-effects estimation toward finding a larger positive effect. It also suggests that studies that use variation in casino treatment across the county to identify employment or earnings effects need to worry about the role of spatial trends in their estimation.

Overall, this aggregate level estimation still suggests that, in general, casino provide employment growth in the entertainment sector and for the county overall, and, although there is not enough evidence to conclude that there are employment gains in the aggregate hospitality sector, there is sufficient

TABLE 3
ESTIMATED EFFECTS OF CASINO ENTRY ON EMPLOYMENT AND EARNINGS; CONTROLING FOR COUNTY-SPECIFIC TRENDS

	County, Total (NAICS 10)		Entertainment (NAICS 71)		Hospitality (NAICS 72)	
	Ln Employment	Ln Earnings	Ln Employment	Ln Earnings	Ln Employment	Ln Earnings
Casino	0.0312**	0.0035	0.2237**	0.0724**	0.0171	0.0226**
	(0.0121)	(0.0040)	(0.0365)	(0.0188)	(0.0157)	(0.0092)
County Population	0.3868**	0.1368**	0.2698	−0.0553	0.2409*	−0.2037*
	(0.0624)	(0.0418)	(0.3047)	(0.1553)	(0.1409)	(0.1162)
Total County Employment	—	−0.0938**	1.3973**	−0.0042	1.0737**	0.1059**
		(0.0251)	(0.1106)	(0.0421)	(0.0972)	(0.0407)
Countywide Average Weekly Earnings	−0.1393**	—	−0.2093**	0.3986**	−0.2139**	0.2413**
	(0.0363)		(0.0981)	(0.0649)	(0.0620)	(0.0589)
Unemployment Rate	−0.0143**	−0.0021**	0.0076**	−0.0008	0.0061**	−0.0012
	(0.0007)	(0.0007)	(0.0036)	(0.0017)	(0.0019)	(0.0008)
Percentage of Population White	0.0000	0.0002**	0.0011	0.0001	−0.0008**	−0.0004**
	(0.0001)	(0.0001)	(0.0008)	(0.0004)	(0.0003)	(0.0001)
Percentage of Population Female	0.0084**	0.0021	0.0233	−0.0133	−0.0071	−0.0020
	(0.0039)	(0.0026)	(0.0304)	(0.0135)	(0.0081)	(0.0066)
N	86,788	86,788	43,049	43,049	50,794	50,794

Note: Each column of estimates is from a separate regression. The standard errors in parentheses are corrected to allow for possible non-independence of observations within a county. All regressions included fixed-effects for county and quarter. Robust standard errors are reported in parentheses. **, * denote statistical significance at the .05 and .10 levels, respectively.

evidence to conclude that earnings in this industry are rising after a casino opens. It is worth noting that the estimated employment effects are net changes, not gross changes. Even if casino entry seems positive, there may be displacement in some more narrowly defined industries. Hence, this aggregate level analysis is insufficient to identify if there are complimentary or cannibalizing effects of the casino entry on effected sectors, an issue that is taken up in detail later in the paper.

C. Robustness Checks

Before moving on, I wanted to test the sensitivity of the results to some of the empirical assumption that have been made. Although I view my empirical decisions thus far as reasonable, I recognize there several alternatives could have employed. In order to verify that the results are not sensitive to these choices, I engaged in a series of robustness checks for each estimate from

Table 3, which I summarize in Table 4. For comparison, row (1) repeats the primary results from Table 3.

The first robustness check tests whether the broad control group I have been using is unduly influencing the results. Specifically, I restrict the control group to only those states that had a casino open during the sample period. From the perspective of cultural or regional norms, the non-casino counties in casino states (states that have at least one casino in place) may provide a better control group.[13] The results of this test are reported in the second row. Despite the smaller sample size the story from Table 3 remains basically the same.

Next I test for the robustness of my choice of sample. Estimates to this point are calculated using an unbalanced panel. While unbalanced panels do utilize as much of the data as possible, they do potentially suffer from problems

TABLE 4

ROBUSTNESS OF THE RESULTS

	County, Total (NAICS 10)		Entertainment (NAICS 71)		Hospitality (NAICS 72)	
	Ln Employment	Ln Earnings	Ln Employment	Ln Earnings	Ln Employment	Ln Earnings
(1) Detrended Specification (repeated from Table 3)	0.0312** (0.0121)	0.0035 (0.0040)	0.2237** (0.0365)	0.0724** (0.0188)	0.0171 (0.0157)	0.0226** (0.0092)
(2) Alternative Control Group Only counties from a state with a casino	0.0272** (0.0125)	0.0066 (0.0046)	0.2514** (0.0348)	0.0744** (0.0195)	0.0057 (0.0120)	0.0153** (0.0075)
(3) Alternative Sample Balanced Panel	0.0303** (0.0121)	0.0039 (0.0041)	0.2062** (0.0339)	0.0763** (0.0201)	0.0245* (0.0143)	0.0215** (0.0093)
(4) Alternative Clustering State Level (instead of county)	0.0312** (0.0131)	0.0035 (0.0044)	0.2237** (0.0449)	0.0724** (0.0262)	0.0171 (0.0180)	0.0226** (0.0097)

Note: Each estimate is from a separate regression. The standard errors in parentheses are corrected to allow for possible non-independence of observations within a county. All regressions included fixed-effects for county and quarter, as well as county specific-trends, total county employment, average weekly wages, county unemployment rates, and county percentage white and female. Robust standard errors are reported in parentheses. **, * denote statistical significance at the .05 and .10 levels, respectively.

with counties entering and leaving the sample because of the number of es-
tablishments varying above and below the censoring threshold. To consider
the sensitivity of the results to this decision, I also estimated models using a
balanced panel that included only counties with a sufficient number of estab-
lishments in each sector to avoid censoring in the QCEW public use files. The
results of this test are presented in row (3) and suggest similar conclusions to
the comparable unbalanced-panel estimates. One noteworthy difference, the
estimated employment elasticity for the hospitality sector is now statistically
significant.

Finally, I recognize that the decision to allow a casino to open and operate
is typically controlled and determined by state legislations, either through tribal
gaming compacts or state regulated dictate. So, in row (4) of Table 4 all of the
standard errors are adjusted to allow for correlation between all observations
from the same state through clustering on state rather than county. Although
this might be overdoing it because it allows for non-independence between ob-
servations from counties in the same state that could reasonably be considered
independent observations, the estimates remain statistically significant.

Overall, the results detailed in Table 4 provide me with a broader and more
comprehensive picture of the nature of the measured effects. Under the alter-
natives tested estimated effects are largely unchanged. Although in the few
instances the size or significance a particular estimate did change slightly.

D. Intertemporal Effects

To this point all the models utilized implicitly assumed that casino entry
has a constant effect over time. Yet, it is possible that the effect may be tem-
porary and dynamic. Specifically, it is easy to anticipate that there may be a
large increase in economic outcomes shortly after a casino opens, which then
dissipate over time. Conversely, it may take a few years before the full effect
of casino entry may be realized. For example, consumers need to be informed,
casino management needs time to ascertain how to best market their product,
a consumer base needs to be established, and, particularly in rural areas, an in-
frastructure to support the casino must be developed. In an attempt to capture
any intertemporal effects of casinos entry on employment or earnings, equa-
tion (2) has been modified slightly to include one year lead and five years of
lags.[14] Since county-trends have been removed, I do not anticipate a signifi-
cant lead effect from casino openings, yet the presence of one could indicate
the presence of an anticipatory casino effect. This intertemporal method is
common practice in similar works that investigate casino related outcomes
(e.g. Evans and Topoleski, 2002; Grinols and Mustard, 2006). Coefficient es-
timates and standard errors for this specification are detailed in Table 5.

For the county overall, results indicate that employment grows moder-
ately for a few years before tapering off. Point estimates on earnings follow a
similar pattern, but fail to reach statistical significance at any point. Employ-
ment estimates from the entertainment industry increase dramatically in the

TABLE 5
INTERTEMPORAL EFFECTS OF CASINO ENTRY

	County, Total (NAICS 10)		Entertainment (NAICS 71)		Hospitality (NAICS 72)	
	Ln Employment	Ln Earnings	Ln Employment	Ln Earnings	Ln Employment	Ln Earnings
Lead 1	0.0009	−0.0020	−0.0238	−0.0269	−0.0053	0.0029
	(0.0060)	(0.0032)	(0.0329)	(0.0171)	(0.0088)	(0.0069)
Open	0.0166	0.0017	0.1442**	0.0327	0.0174	0.0177*
	(0.0116)	(0.0049)	(0.0440)	(0.0259)	(0.0131)	(0.0096)
Lag 1	0.0432**	0.0039	0.3918**	0.0986**	0.0111	0.0306**
	(0.0197)	(0.0063)	(0.0576)	(0.0345)	(0.0230)	(0.0132)
Lag 2	0.0437**	0.0085	0.4435**	0.1013**	0.0210	0.0291*
	(0.0202)	(0.0075)	(0.0630)	(0.0397)	(0.0286)	(0.0151)
Lag 3	0.0171	0.0088	0.3919**	0.0800*	0.0158	0.0304*
	(0.0191)	(0.0081)	(0.0642)	(0.0440)	(0.0284)	(0.0169)
Lag 4	−0.0138	0.0077	0.3599**	0.0730	0.0427	0.0044
	(0.0179)	(0.0085)	(0.0704)	(0.0487)	(0.0295)	(0.0171)
Lag 5 +	−0.0484	−0.0034	0.2702**	0.0553	0.0718**	0.0018
	(0.0359)	(0.0109)	(0.0329)	(0.0490)	(0.0366)	(0.0196)
N	86,620	86,620	43,049	43,049	50,774	50,774

Note: Each column of estimates is from a separate regression. The standard errors in paren-
theses are corrected to allow for possible non-independence of observations within a
county. All regressions included fixed-effects for county and quarter, as well as
county specific-trends, total county employment, average weekly wages,
county unemployment rates, and county percentage white and female.
Robust standard errors are reported in parentheses. **, * denote
statistical significance at the .05 and .10 levels, respectively.

first few years, begin to slow, and even decline after a few years, although
they remain positive and significant throughout. While in contrast, the effects
on employment in the hospitality sector are quite small and insignificant early
in the treatment, but then begin to become much more pronounced after four
or five years. In evaluating the earnings outcomes, in both the entertainment
and hospitality sector earnings increase quickly and then and then fall off
towards the end. Overall, the growth in total county employment observed in
the static estimates (Table 3) is indicative of the type of development many
communities cite when promoting the benefits of casinos for local economies.
Yet, the effects do seem to fade over time.

From an observational stand point the estimates in Table 5 also provide
suggestive information about the nature of labor market activity and poten-
tial spill-over effects following casino entry. Specifically, in the hospitality
industry a pattern of initial earnings growth, which fades over time, only to
be replaced with employment growth, is consistent with economic theory sur-
rounding an increase in labor demand in this industry. For example, if we as-
sume a casino opens and there is a strong positive spill-over effect in demand

for services in the hospitality industry (consistent with the Tunica story), this should induce an increase in the demand for labor, which initially could show up in employee earnings as there should be shortage of workers present. Yet over time the quantity of workers supplied to this competitive labor market should increase, dissipating increases in earnings, and resulting in increases in employment.

E. Differences by County Size

The basic effects thus far are generated from a nationwide sample, but the data allow us to say more about how the outcomes may differ across regions. Particularly, several past studies have remarked that the effects of casino introduction may vary by the size of the community (e.g. Evans and Topoleski, 2002), while other research has casually observed that rural communities seemed to realize greater gains than urban areas (e.g. Garrett, 2005). There has been little work done with a large scope, however, that provides empirical results to speak to a how effects might differ by population. Moreover, since casinos frequently locate in very rural areas, the estimates reported in Table 3 could be heavily weighted toward the effects of casinos in such places, and thus mask the effects in larger communities. It is important to capture such differences in order to truly assess the policy implications of the results to this point.

Table 6 presents results, estimated in the same method as the result in Table 3 except the sample has been separated into thirds according to county population. As expected, the estimates demonstrate that employment effects are strongest in the low population counties, with a 10.53 percent increase

TABLE 6
EFFECTS OF CASINO ENTRY ON COUNTIES STRATIFIED BY POPULATION

	County, Total (NAICS 10)		Entertainment (NAICS 71)		Hospitality (NAICS 72)	
	Ln Employment	Ln Earnings	Ln Employment	Ln Earnings	Ln Employment	Ln Earnings
Bottom Third	0.1053**	0.0184	0.2874**	0.0674	0.0310	0.0459
	(0.0497)	(0.0144)	(0.1031)	(0.0419)	(0.0588)	(0.0301)
Middle Third	0.0240	0.0010	0.2246**	0.0770**	0.0288**	0.0210
	(0.0147)	(0.0060)	(0.0626)	(0.0382)	(0.0154)	(0.0143)
Top Third	0.0028	−0.0012	0.1758**	0.0789**	0.0065	0.0110
	(0.0048)	(0.0028)	(0.0390)	(0.0243)	(0.0122)	(0.0086)

Note: Each estimate is from a separate regression. The standard errors in parentheses are corrected to allow for possible non-independence of observations within a county. All regressions included fixed-effects for county and quarter, as well as county specific-trends, total county employment, average weekly wages, county unemployment rates, and county percentage white and female. Robust standard errors are reported in parentheses. **, * denote statistical significance at the .05 and .10 levels, respectively.

in total county employment, versus a statistically insignificant 0.28 percent change in highest population group. The large disparity between groups suggests that casinos have a much stronger positive effect on a county, as a whole, if they are located in a rural area. The findings are relatively consistent for the entertainment sector; as the employment effects are much stronger in the lowest population group, although they are significant across population sizes. Differences in the hospitality sector are also noteworthy, as there is clear evidence of employment gains in the middle third sample. I suspect employment gains are also present in hospitality industry in the most rural counties as well, but, as a result of the high variability of the estimates in the low population counties, these estimates are much less precisely measured then the higher population estimates. For example, outcomes observed in total county employment for the lowest population sample are still highly statistically significant even in the presence of such low precision in the estimation, evidence that provides further support in concluding that there are large differences in casino outcomes across county population size.[15] Overall the results presented in Table 6 show that the economic effects of casinos vary dramatically by the size of the community impacted.[16] An outcome which seems consistent with the idea that casinos provide some range of fixed employment growth that is not strongly correlated with the population base, and therefore, will provide *relatively* more growth to rural communities.

F. Sub-Sector Analysis

Although the aggregate level estimation provided to this point does suggest that casinos stimulate growth in general, the within sector effects are still unclear. In order to more accurately differentiate if there is a positive effect within the related super-sectors, rather than an internal tradeoff, a detailed analysis of more disaggregated sectors within the entertainment and hospitality industries was also conducted. Table 7 provides the results of this analysis, and overall these results address questions about how casino entry may compliment or substitute consumer demand for related sub-sectors of the local economy.

The top half of Table 7 focuses on sub-sectors of the entertainment supersector. These estimates don't provide any strong evidence of a decline in employment in any of the three non-gambling related entertainment sub-sectors (NAICS code 711, 712, and 7139).[17] To the contrary, estimates from the performing arts and spectator sport sector show an increase in employment of approximately 10.9 percent. Of course, it is likely the case that this estimate captures increases in employment directly associated with the performing arts activities at the casino itself. Moreover, it is unclear if such gains are present in the pre-existing or non-casino related performing arts industry. As is the case in many sectors, further estimation at finer levels of sectoral disaggregation (below 3 digit NAICS classification) would be useful, but is unattainable in this case due to data suppression. Estimates from analysis of both

TABLE 7
ESTIMATED EFFECTS OF CASINO ENTRY ON RELATED SUB-SECTORS

Sector	Ln Employment	Ln Earnings	Sample Size
Performing Arts/Spec. Sports	0.1090*	0.0021	5,895
(NAICS 711)	(0.0599)	(0.0450)	
Museums/Zoos/Parks	0.0622	−0.0203	3,682
(NAICS 712)	(0.0432)	(0.0212)	
Amusement, Gambling, & Recreation	0.2753**	0.1235**	25,075
(NAICS 713)	(0.0560)	(0.0244)	
Other Recreational Industries	0.0334	0.0208	20,116
(NAICS 7139)	(0.0275)	(0.0147)	
Accommodations	0.0535**	0.0089	37,370
(NAICS 721)	(0.0258)	(0.0103)	
Hotels, non-casino	0.0243	0.0169*	20,420
(NAICS 72111)	(0.0194)	(0.0100)	
Bars and Restaurants	−0.0098	0.0014	67,321
(NAICS 722)	(0.0075)	(0.0042)	
Full Service Restaurant	0.0084	0.0008	57,127
(NAICS 7221)	(0.0115)	(0.0058)	
Limited Service Restaurant	−0.0026	0.0086	59,160
(NAICS 7222)	(0.0150)	(0.0063)	
Bars	−0.0338	0.0029	19,284
(NAICS 7224)	(0.0211)	(0.0089)	

Note: Each estimate is from a separate regression. The standard errors in parentheses are cor-
rected to allow for possible non-independence of observations within a county. All
regressions included fixed-effects for county and quarter, as well as county
specific-trends, total county employment, average weekly wages, county
unemployment rates, and county percentage white and female. Robust
standard errors are reported in parentheses. **, * denote statistical
significance at the .05 and .10 levels, respectively.

the museum, zoos, and parks sector, as well as the other recreational centers
sector (which includes golf courses, skiing resorts, marinas, fitness centers,
and bowling alleys) do not show the presence of a strong casino effect, as es-
timates are insignificantly different from zero. That said, it is noteworthy that
in both cases they have non-trivial positive coefficients. So one can conclude
that there is stronger evidence of a complementary casino effect present then
there is of any business-stealing effect within the entertainment industry.

Turning to the hospitality industry, aforementioned earlier research has
found largely neutral effects of casino entry on this industry, but it is pos-
sible that the effects vary dramatically with this sector as substitution or com-
plimentary effects of casinos may differ across sub-sectors cancelling each
other out in the more aggregated results. Results of this estimation, detailed
in the bottom half of Table 7, seem to suggest that casinos have little effect in
these sub-sectors. For example, there is strong growth in the accommodations
sector, with a more than 5 percent increase in employment, but, due to the
frequency of casino-owned hotels, it is difficult to determine if these results
actually reflect gains to firms outside of the casino complex itself. An analysis

of the hotel/motel industry excluding casino hotels is necessary to determine if a true spillover benefit is present. Fortunately the QCEW data contains sufficient detail and observations to separate casino hotels from the rest of the hotel/motel sector and allow for a more detailed analysis. Estimates on employment for the hotel industry, excluding casino hotels, show no statistically obvious gains, although a marginally significant 1.69 percent increase in earnings is estimated, indicative that the surrounding accommodation industry may see some spill-over benefit from the casino's presence. Moreover, although not show in Table 7, estimation on employment in the non-casino owned hotel industry yields a highly statistically significant point estimate of 0.0362 when the sample is restricted to the lower half of the counties by population, which again reflects that positive spill-over effects likely exist, at least for rural populations.

Even though complementary effects are measured in the accommodations sector, similar industry level estimation of the bar and restaurant industry provides no evidence of a large impact on employment levels. Yet there are consistent negative point estimates throughout the bar and restaurant sector, which may suggest a mild amount of demand substitution between bars/ restaurants and casinos may be present.[18] That said, overall, the findings in Table 7 provide no statistical evidence to suggest that casinos harm related industries through substitution, and, further, they indicate that certain industries may benefit from casino introduction.

G. Neighbor Effects

In their study on crime, Grinols and Mustard (2006) test the hypothesis that crime could be attracted to the casino county from neighboring border counties, and, hence, casinos may not actually create "new" crime. This hypothesis is also worth investigating with regard to employment and earnings. For example, if casinos cause an increase employment in the "casino county", but lead to significant job loss in the surrounding counties, then the benefit of the casino could be over-stated. In order to identify how casinos affect counties that border counties with casinos, an analysis consistent with estimates in Table 3 was undertaken. All counties that border counties with casinos are considered "neighbors" and defined as the treatment group, all non-border non-casino counties are utilized as the control, and all casino counties excluded.

Results of this analysis are detailed in Table 8 and they demonstrate that the effect of casino entry on overall employment in neighboring counties is insignificant and basically zero, but this is not to say that there is no fringe effect. The entertainment industry in a neighboring county realizes a strong increase in employment. It is interesting to note that this positive effect on employment in the entertainment sector in near by communities is suggestive that, minus the direct effects of the casino itself, host counties are also likely to see non-casino gains in employment in the entertainment industry. Analysis

TABLE 8
ESTIMATED EFFECTS OF CASINO ENTRY IN BORDER COUNTIES

Sector	Ln Employment	Ln Earnings	Sample Size
County, Total	−0.0013	0.0004	86,788
(NAICS 10)	(0.0033)	(0.0021)	
Entertainment	0.0474**	0.0038	43,049
(NAICS 71)	(0.0174)	(0.0077	
Hospitality	0.0010	0.0054	50,794
(NAICS 72)	(0.0061)	(0.0034)	
Accommodations	0.0127	−0.0020	37,370
(NAICS 721)	(0.0106)	(0.0055)	
Bars and Restaurants	0.0032	0.0000	67,321
(NAICS 722)	(0.0055)	(0.0031)	

Note: Each estimate is from a separate regression. The standard errors in parentheses are cor-
rected to allow for possible non-independence of observations within a county. All
regressions included fixed-effects for county and quarter, as well as county
specific-trends, total county employment, average weekly wages, county
unemployment rates, and county percentage white and female. Robust
standard errors are reported in parentheses. **, * denote statistical
significance at the .05 and .10 levels, respectively.

of the hospitality industry in border counties provides no evidence that this
sector is affected. All estimates are both statistically insignificant, and, except
for accommodation, inconsequential.

Overall, the results in Table 8 are largely suggestive that employment in
neighboring counties is, on the whole, not largely affected. Although, they do
indicate that there are strong gains in the entertainment sector, which is con-
sistent with the notion that casinos lead to more tourism in an area. That said,
there is little to support the notion that employment gains in the host county
are coming at the expense of neighboring border counties.

5 CONCLUSION

The debate over the value of a casino on localized communities is on go-
ing and important to many policymakers across the country. In order to help
understand the outcomes surrounding this debate, this paper sought to employ
a comprehensive data set and a statistically appropriate methodology to ob-
tain estimates of the effect of casino openings on employment and earnings in
host counties, as well as in several related industries. Furthermore, this analy-
sis also sought estimates on how these results varied by population and for
neighboring communities. Overall the hope is that these estimates will pro-
vide a broader picture of the impact of casino enrty on municipal-level labor
markets, which might be used to improve future public policy decisions.

The main finding of the study is that, overall, casinos lead to more em-
ployment and in some instance higher earnings, and as such, likely due lead to

some economic growth. Moreover, the results do not provide strong evidence to suggest that this increase in jobs is offset through substitution of jobs in other related industries, as has been suggested in prior research. To the contrary, some related industries see an increase in employment, which could be indicative that these firms benefit from some complementary demand, maybe through increased tourism etc. Intertemporal analysis tells a similar story, but indicates that this effect differs over time.

Further investigation on how the impact of casinos varied across population size found that, across the board, low population areas benefit much more than high population areas. This outcome is an important finding for policymakers to consider as they decide whether to utilize a casino as a means of spurring economic growth in their communities. If urban communities see a much smaller increase in jobs per capita, then the overall effectiveness of casinos as an economic stimulus measure is questionable. Moreover, exploration into how employment in neighboring counties was affected by the introduction of a casino suggests that overall employment and earnings is not impacted, but there is evidence to suggest mild positive spillovers in the entertainment industries.

Overall the findings in this paper indicate that casinos provide an economic boost to smaller communities, with few negative affects on employment or earnings. Of course, this is not to say that casinos have no down side. From a policy perspective, any gains in employment, earnings, or economic development need to be balanced against the previously documented increases in crime, gambling addiction, divorce, suicide, and bankruptcy that communities tend to see following a casino opening. Ultimately, as is evident by their strong revenues, casinos are supplying an important product to consumers, and, hence, are not going to be a passing fad in American culture. For this reason the economic and social effects of casinos on local communities will continue to be an important issue of future research.

NOTES

1. For a more detailed summary into the Indian Gaming Regulatory Act please see cited work by Evans and Topoleski (2002).
2. There also exists a slew of non-peer reviewed reports and analysis from consulting firms, policy groups, and government agencies, which provides a great deal of information and construct to the discussion that is not formally reviewed in detail here.
3. These results are consistent with the contemporary study by Grinols and Mustard (2006).
4. Their treatment group included both tribal and commercial casinos.
5. This measure includes most wage-like compensation, including tips, bonuses, stock options, and employer contributions to retirement plans.
6. BLS withholds publication of data when necessary to protect the identity and data of cooperating employers. Since QCEW gets reports from every employer in the United States, in certain industries there are many cases where QCEW detailed data could consist of a single employer. These data are withheld or "suppressed" in QCEW publications. Totals at the industry level for the States and the Nation include the nondisclosable data suppressed within the detailed tables.
7. For example, there may be an insufficient number of establishments in limited-service restaurants for the BLS to report an employment total in a certain county, even though there are a sufficient number in the general restaurant and bar sector overall.

8. Since American Indian casinos take on several different classes of operation, Indian casinos are treated as opening when they receive a Class III license, which is the level of operation most consistent with typical "Las Vegas" style casinos.
9. Employment and earnings from casino-owned hotels are included in hospitality sector measures, while the casino operations themselves are consider part of the entertainment industry.
10. Employment effects are explained in greater detail later in the paper.
11. Wooldridge notes that this is often referred to as a random growth model when a logarithmic dependent variable is used.
12. This includes detrending the quaterly dummies included in the model. This detrending process is essentially the extension of the de-meaning process used to estimate fixed-effects models.
13. For these estimates I exclude counties from states such as South Carolina, which do not have any casinos during the sample time frame.
14. Unlike the other lags, which correspond to the number of years since the year the casino opened, lag 5 indicates five years or more.
15. Standard errors are ten times larger in the bottom-third employment outcomes for the county as a whole.
16. As an alternative to stratifying the sample, an interactive approach between the casino variable and county population was also undertaken. Estimates utilizing this method were consistent with the intuition provided in Table 6.
17. An analysis of the gambling sector specifically (NAICS 7132) would be insightful, but such estimation is prevented by suppression of the data in industries where a small number of establishments are present in any county, such as gambling.
18. These estimates are somewhat consistent with earlier analysis of casino effects in Missouri conduct by Seigel and Anders (1999).

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