

The National Evidence on the Socioeconomic Impacts
of American Indian Gaming on Non-Indian Communities

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Abstract

Based on statistical analysis of a national sample of 100 communities across the United States, 24 of which experienced the introduction of a nearby non-Indian casino and 16 of which experienced the introduction of an Indian casino, we find that Indian casinos have substantial beneficial economic and social impacts on surrounding communities. Moreover, the positive economic and social impact of Indian casinos is measurably greater on surrounding communities than the impact of non-Indian casinos. Further analysis reveals that this effect is driven by the fact that Indian casinos are more likely to be located in relatively economically depressed areas displaying lower average incomes prior to casino introduction. No evidence of harmful economic or social impacts due to Indian casino introduction is discernible in our 30 indicators of economic and social health.

I. Introduction

Indian casino gaming remains a policy controversy in several states around the country. Notwithstanding the fact that the legal and legislative frameworks underlying Indian gaming have remained largely in place since 1988, policy debates rage on in states where tribes are located. The Cabazon decision (California v. Cabazon and Morongo Bands of Mission Indians, 1987) and the Indian Gaming Regulatory Act (1988), which together specify tribes' authority to own and operate casinos and the terms under which Indian gaming must be negotiated with the states, remain the essential underpinnings of Indian gaming policy.² To be sure, the balance of negotiating power between states and tribes has been substantially altered by the Seminole decision (Seminole Tribe of Florida v. Florida, 1996) which virtually eliminates the tribes' powers to sue states for breach of "good faith" obligations to negotiate gaming agreements. However, the basic controversies over Indian gaming continue to center on whether Indian gaming has a detrimental net effect on states, and if so, what are appropriate public policy instruments that may be used to address the negative consequences. California just witnessed a spectacularly costly ballot initiative battle—the most costly in its history—over the issue of Indian gaming. New Mexico tribes have been in contentious negotiations with the state regarding how gaming will proceed and how much revenue will have to be shared with the state. The Narragansetts of Rhode Island and the Wampanoags of Massachusetts struggled for the better part of a decade to obtain a satisfactory arrangement under which gaming could proceed and still have nothing

to show for their efforts. From Portland, Oregon, to the Catskills of New York, tribes and states are debating the economic and social consequences of establishing Indian casinos both within and at some distance from their reservation lands.

At the core of these debates are social and economic impacts. Opponents of Indian gaming assert a number of detrimental economic and social consequences of Indian gaming. On the economic side, they argue, Indian casinos, with their blandishments of cheap food and drink tied to a “monopoly product,” bring unfair competition to the hoteliers and restaurateurs of the region (e.g., Meyer, 1993). Incumbent lottery and pari-mutuel operators further argue that they cannot compete with the Las Vegas-style Indian casinos. On the social side, it is alleged that Indian gaming exports the burden of pathological gamblers to the states, introduces the opportunity for organized money laundering or actually brings unorganized crime, and disrupts the “cultural integrity” and political stability of the tribes (Anders, 1998).

On the other side of the debate, the tribes frequently refer to casinos as the “new buffalo,” i.e., the new source of sustenance for their communities that have long been deprived of the wherewithal to address grinding reservation poverty and its consequences. The tribes point to repaired infrastructure; diversifying economies; rising employment; augmented health, housing, education, and social program budgets; greater indigenous language retention; and generally renewed community vitality.

To date, the academic research tallying these costs and benefits has been empirically limited. The bulk of the evidence on the impact of Indian gaming has come from the policy conflicts themselves, i.e., from the participants for and against Indian casinos. Moreover, the evidence marshaled typically focuses on a limited dimension of what amounts to a complex interaction of tribal, state, and national policy: the studies address a handful of tribes, a single state, or a single measure of impact.³ To date, little evidence has been compiled on a national scale covering the panoply of impacts.

There are a number of good reasons the evidence is so incomplete. Generally speaking, the tribes are unwilling to share what they view as proprietary information about their commercial operations, and they are often unable to come to agreement among themselves about what non-proprietary data they will gather for their own purposes, e.g., for their trade associations. Moreover, systematic government data on Indian tribes are often poor in quality and lacking in quantity. The data collection efforts of the Bureau of Indian Affairs (BIA) have declined substantially over the last two decades as the BIA's role has changed from federal overseer of the reservations to technical assistance provider and as budgets have shrunk. In addition, the Bureau of the Census gathers very little information about reservation Indians between the decennial censuses. In short, a systematic, national assessment of the social and economic consequences of Indian gaming has heretofore been very difficult to achieve.

This paper takes advantage of a comprehensive dataset constructed by the National Opinion Research Center (NORC) at the University of Chicago on behalf of the National Gambling Impact Study Commission (NGISC) (Gerstein, Volberg, Harwood, and Christansen, 1999). The dataset was originally constructed to assess the effect of casino introductions on communities of 10,000 persons or larger which witnessed a casino introduction of any kind within 50 miles. We analyze the data to determine whether differential effects can be measured for communities that witnessed Indian casino introductions, in particular. Because of the aforementioned data issues, none of the 100 communities studied are Indian communities; nonetheless, our statistical analysis affords preliminary answers to empirical questions raised in policy debates around the country, particularly regarding the exportation of harmful social consequences to non-Indian communities.

Our analysis begins in the next section with a brief classification of impacts to motivate the analysis of the NORC data. We then review the NORC methods and results in Section III. Section IV explains how we have extended the NORC research. Section V presents our results and discussion, and Section VI concludes.

II. An Overview of the Indian Gaming Impacts

Economic Impacts

The economic impacts of Indian casinos are helpfully divided into five categories. Table 1 lists them and presents their expected effect on the reservation economy and the economy surrounding the reservation.⁴

Table 1

Categories of Indian Casino Economic Impacts

	<u>Expected effect on the</u>	
	<u>Reservation</u>	<u>Surrounding Community</u>
Destination Effects	positive	positive
Substitution Effects	positive	negative
Cannibalization Effects	positive	negative
Multiplier Effects	modest or none	positive
Intensity Effects	positive	positive

Given that many Indian reservations are in relatively remote areas, creating an Indian casino has the potential to make the region more attractive to in-state and out-of-state tourists. This destination effect has the potential thereby to improve the fortunes both of the tribes (under IGRA all Indian casinos must be tribally owned) and of the surrounding communities, as out-of-region casino patrons spend their money at hotels, gas stations, and other establishments in the region.

However, the potential exists that the establishment of an Indian casino would create competition with local entertainment establishments and the restaurant and hotel sector and that, therefore, the jobs created by a casino are not net new jobs that encourage migration or decrease the ranks of the unemployed (Grinols, 1995). The aforementioned blandishments offered to casino patrons are a regular feature of Nevada and New Jersey casinos, and a number of Indian casinos have offered the same, possibly pulling custom from other establishments in the area. As a result, the potential exists that Indian casinos have a substitution effect on the local leisure and hospitality sector that improves tribal fortunes at the expense of the off-reservation economy (see, e.g., Meyer).⁵

This substitution effect on surrounding communities could be exacerbated by a cannibalization effect, depending on the availability of other gambling opportunities within the region of analysis. If tribal casinos cause gamblers to substitute their products for another locally available gambling product (e.g., dog tracks, non-Indian casinos, or lotteries), then tribal casinos would exert a negative,

or cannibalization, effect on the off-reservation economy to the benefit of the tribal economy.⁶

Combining the three aforementioned effects results in a net direct impact on the regional, off-reservation economy. That net direct effect is associated with additional multiplier effects that ripple outward through the economy. If a tribal casino introduces a net increase in the consumption of food, bedding, labor, and asphalt, the gross regional product of the regions supplying the goods will potentially rise. These indirect effects are properly attributed to the casino and, generally speaking, will favor the off-reservation economy more as tribes are not generally capable of autarky—economic self-sufficiency and non-reliance on imports (see, e.g., Gazel, 1998). Thus, the multiplier effects are likely to be de minimis on the reservation and substantial off the reservation.

Finally, there is an intensity effect that captures the impact of the casino on consumer decisions to alter their spending in the leisure sector. A casino may prompt consumers to shift spending from non-leisure categories (e.g., a second car) toward the leisure category.⁷ Much of this shift is likely to be a benign change in consumer behavior, and as such, the introduction of the casino improves consumer wellbeing by increasing the diversity of spending choices. The intensity effect may also be associated with pathology, for example with a shift away from spending on children's clothing. Nonetheless, so long as the social costs are also tallied and weighed against the economic effects, it is proper here to add an estimate of the intensity effect to the economic side of the cost-benefit analysis.

Of course, relative to creating this classification, the task of accurately measuring the effects is quite difficult. Heretofore, most research has approached the task from the bottom upwards—i.e., from the casino level. Typically, the studies tally jobs created, construction multipliers, tax withholdings, restaurant closings, and the like. However, very little of this research employs techniques that can conclusively assert that the effects would not have taken place, but for the introduction of the casino. Thus, for example, assertions that restaurants have closed because of the introduction of an Indian casino have not really been approached with dispositive evidence one way or the other. The problem is even more acute on the social side.

Social Impacts

Often in debates on the merits of introducing non-Indian casinos, the social side of the impacts question focuses entirely on costs. From these debates, one could get the impression that on the one side there are economic benefits and on the other, social costs. However, the status of reservation Indians as America's poorest minority—a group also suffering from a multitude of social pathologies associated with poverty—means that Indian casino introductions also bring potentially substantial social gains. Thus, analysis of the social impacts in the context of Indian casino introductions properly takes into account both social benefits and social costs.

The largest social benefits of Indian casinos redound to the tribes themselves. The casinos operate on the Indian society by raising employment in the most chronically poor class of Americans—on-reservation Indians. Moreover, tribal ownership of the casinos implies that casino profits are a source of fiscal strength for tribal governments. To be sure, there is a great deal of heterogeneity of tribal spending policies (just as among states); however, the general pattern across Indian Country is that these fiscal resources go to strengthening tribal community. Tribes have invested in economic development; basic infrastructure; police, fire, and emergency services; health, housing, and social programs; education; natural resource management; language retention; Indian material and cultural heritage; land base re-acquisition; and individual member incomes (Cornell et al., 1998; Taylor, Grant, Jorgensen, and Krepps, 1999). Indications are that this social investment is beginning to turn around the fortunes of Indians across such diverse measures of community health as ambulance response times (Taylor et al.), migration back to the reservation, and Indian language retention among high school students (Harvard Project, 1999). Off-reservation, there are frequently community benefits where tribes contribute to charitable and civic organizations ranging from the little league, to the Victory Games for the Disabled, to local government treasuries (Cornell et al.).

Balanced against these social benefits are social costs. On the reservations, casino revenues have raised the stakes of political discourse, occasionally with deleterious consequences to the reservation community. A relatively benign feature

of the strengthening of tribal treasuries has been the migration of members who had to leave in the past to find employment. This reversal of earlier emigration—particularly when combined with the issuance of large per capita revenue distributions—has heightened the tension over the question of who is and who is not appropriately a member of the tribe. Moreover, by effectuating a quantum change in tribal governmental discretion over spending, gaming revenue has intensified political debates within tribes.⁸ Among a handful of tribes, political tensions have surpassed the capacity of tribal institutions of governance to contain and resolve conflict, and in those tribes, what had been a relatively modest social friction erupted into civil violence (Goldberg-Ambrose, 1997; Henderson, 1997).

On the off-reservation social cost side, the primary focus of attention has been pathological or compulsive gambling. Indian casinos may induce both Indian and non-Indian customers to gamble to a level that is detrimental to themselves and to others. Thus, a summation of the associated costs of their compulsive or pathological gambling (e.g., the cost of bankruptcy, child neglect, suicide) is properly weighed against the social benefits and net economic benefits in the overall cost-benefit analysis.

As on the economic side, the evaluators of Indian casino social benefits and costs have generally approached the problem from the micro level. Indian gaming benefits have been studied at the tribal and state level and across only one national sample of five tribes (Cornell et al.). Thus, on the benefits side, little comprehensive national data exist on tribal employment and spending patterns or their effects.

Similarly, pathological gambling cost analysis typically began (until recently) with the basic arithmetic of multiplying the measured costs of an individual pathological gambler by estimates of the number of problem gamblers. This bottom-up approach to social benefits and costs is one of the major shortcomings of these policy debates. The Indian data are impressionistic, and the gambling pathology analysis focuses on proximate measures of social cost (the prevalence of the problem gambler) rather than ultimate consequences (rates of suicide, bankruptcy, etc.). A much more fruitful approach, particularly in the realm of Indian gambling (where pathologies such as suicides could as easily be decreasing due to community development⁹ as increasing due to problem gambling), would entail a comprehensive top-down approach to ultimate social consequences with controls to measure departures from the counterfactual but-for-the-casino world. Until the NORC report (Gerstein et al.), no such analysis was possible.

III. The NORC Research

Gerstein et al., were commissioned by the NGISC to undertake an analysis of 100 communities across the country over the period 1980-1997 to uncover any systematic relationships between the introduction of a nearby casino and various social and economic indicators (NGISC, 1997). They gathered a random sample of 100 communities, of which 40 saw a casino introduced within 50 miles by the end of the period,¹⁰ and then tested the association of a casino introduction with the movement of 32 measures of social and economic status. These indicators include

various categories of bankruptcy, crime, unemployment, infant mortality, income, and earnings.

In particular, Gerstein et al. applied the techniques of multilevel regression, which allow the measurement of effects on two levels, say, for a school and for pupils within a school (Goldstein, 1995). In this case, the technique allows a comparison of (a) communities that witnessed a nearby casino introduction with those that did not, and (b) years before and after a casino introduction in communities that witnessed one during the period (Gerstein et al., 65).¹¹ Each of the 32 socioeconomic variables (and per capita casino spending) was a response variable in a pair of multi-level regressions—in their paper, “Model 2” and “Model 3.”¹² Their Model 2 assumes that the log of the response variable is a linear function of a community-specific intercept and a set of dummy (0-1) variables for each of the years in the period. Their Model 3 adds to Model 2 a dummy variable for the presence of a casino.¹³ Thus, they report results comparing the explanatory power of Model 2 and Model 3, and results assessing the effect of a casino by evaluating the coefficient on the casino variable in Model 3.

Table 2 reproduces the statistically significant results from Gerstein et al. (Table 22). They find no statistically significant impact of casinos on such social cost outcomes as bankruptcy filings, crime, and infant mortality. As they note, there is a marked reduction in unemployment (nearly a whole point) and a reduction in personal income derived from income maintenance, unemployment insurance, and other transfer programs. Interestingly, retail trade employment, local government

employment, and private earnings in the restaurant and bar sector decline, yet total income is statistically unchanged by a casino introduction (not shown in Table 2). Gains are made in construction employment and earnings and in hotel/lodging and recreation/amusement earnings. Gerstein et al. conclude:

The net picture in the economic...data is on the positive side, but not in an overwhelming way. There appears to be more of a shift in the types and locations of work, and perhaps the overall number of workers, than a rise in per capita earnings. (70)

While we concur generally, we also note that while total income is statistically unchanged by casinos, the reductions in unemployment and welfare income lend some credence to the widely held notion that casinos are a useful economic development strategy for reducing poverty. As we show in the next section, these effects are even more pronounced for the communities that witness the introduction of an Indian casino.

Table 2
 Results of the NORC Study on Casino Introductions
 Significant Casino Effects Reported by Gerstein et al. Only

<u>Response Variable</u>	<u>Baseline Level^a</u>	<u>Casino Effects^b</u>
Per capita casino spending	\$29	+237%
% unemployed	6.5%	-12%
% employed local government	8.9%	-2%
% employed construction	6.1%	+1%
% employed retail trade	18.8%	-3%
Income maintenance	\$157	-13%
Transfer payments	\$2,094	-3%
Unemployment insurance	\$70	-17%
Private earnings: construction	\$679	+18%
Private earnings: restaurants, bars	\$241	-19%
Private earnings: hotels & lodging	\$64	+43%
Private earnings: recreation & amusement	\$64	+22%

Note. Per Gerstein et al., “[w]e infer a casino effect if and only if the chi-square (one degree of freedom) is statistically significant at the standard $\alpha = 0.05$ level” (69). In this table, only response variables meeting this criteria are reported. Table 3 lists 30 of the variables tested and reported by Gerstein et al. Three bankruptcy variables are excluded (see note 20).

^a Baseline level is the average of values in years without proximate casinos.

^b Casino effects (i.e., the coefficients on the CASINO dummy) are all significant at the $\alpha = 0.05$ level.

IV. Methodology

The dataset assembled by Gerstein et al. presents an opportunity to test whether Indian casinos have a differential socioeconomic impact on surrounding communities relative to non-Indian casinos. The data they assembled do not cover Indian communities¹⁴; however, the dataset affords a systematic examination of the off-reservation economic impacts in the expected “Surrounding Community” effects shown in Table 1. Sixteen of the 40 communities that witness a casino introduction in the 1980-1997 period are in proximity to a tribal casino—defined by Gerstein et al. to be within 50 miles. Thus, since Indian casinos—by virtue of their location on the economically depressed reservations¹⁵—are often in areas systematically less prosperous than their non-Indian counterparts,¹⁶ it may be possible to shed light on the argument of whether casinos represent a prudent economic development policy.

Clearly, as the “Reservation” effects column in Table 1 suggests, Indian gaming is a tool tribes can use to improve their own fortunes. The evidence suggests that tribes have understood this possibility and many have embraced it, particularly those most in need of economic development. Among the 75 largest tribes in the country, 17 of the poorest 20 opened casinos (Cornell et al.). Moreover, tribes that eventually compacted for casino gaming by 1996 reported 24% higher unemployment at the time of IGRA’s passage (1988) than those that did not eventually develop casinos. By 1995, these gaming tribes reported 12% lower unemployment rates than their non-compacting counterparts. Thus, the tribes that

adopted gaming started the period 1988-1995 with higher unemployment and finished the period with lower unemployment than their peers (Cornell et al.). More generally, the reservations with casinos saw employment, income, and government revenues rise substantially since the advent of casino gaming (see also NGISC, 1999).

A more open question concerns the “Surrounding Community” effects of Table 1, i.e., whether Indian gaming’s cannibalization and substitution effects make Pyrrhic victories for non-Indian communities of the destination, multiplier, and intensity effects. Much has been made of the relatively successful use of gaming as an economic development strategy for depressed areas such as Tunica, Mississippi (see, e.g., Meyer-Arendt, 1998), yet not much attention has been paid to the consequences of Indian casinos on the surrounding non-Indian communities that are often themselves below national averages in economic status. Four of the ten poorest counties in the United States have Indian casinos, and eight of the ten poorest counties either contain an Indian casino or abut a county that contains an Indian casino (Taylor et al.). Moreover, quite a few tribal casinos have become the largest employers of their region (Cornell et al.; Taylor et al.). Thus, whether or not Indian casinos export economic benefits or costs is an important policy issue, particularly for the poorer counties that experienced the introduction of a proximate casino.

Even for surrounding non-Indian communities that are not suffering below-average economic conditions, the question has been raised whether Indian gaming

has a net negative impact. Anders, Seigel, and Yacoub, for example, assert that the introduction of Indian gaming is associated with a decline in Arizona sales tax revenue.¹⁷ More importantly, one might expect that in a relatively prosperous region, e.g., a large metropolitan market area, there could be a de minimis destination effect yet perhaps a substantial substitution or cannibalization effect (see Krepps, 1997).

On the social side, the data of Gerstein et al. afford a comprehensive and systematic assessment of the argument that Indian casinos—because they improve the economic fortunes and the community integrity of a heretofore-underdeveloped minority—can actually precipitate a net social benefit. In the field of criminal justice policy, the observation has been made that:

employment opportunities created by Indian gaming establishments reduced the incidence of crime. ...employed persons were less likely to commit criminal acts. (Nelson, Erickson, and Langan, 1996)

Similarly, the analogy could be drawn to suicides and other social pathologies if the gains in social conditions on reservations exceeded the losses due to off-reservation gambling pathology.¹⁸

To capture the Indian effects and to distinguish between large and small markets, we elaborate upon Gerstein et al. by adding two dummy variables to their Model 3. Thus the equation in note 13 becomes “Model 4” or:

$$Y_{ij} = \alpha + \alpha_j + \sum_{t=81}^{97} \gamma_t I_{ijt} + \beta_1 CASINO_{ij} + \beta_2 INDIAN_{ij} + \beta_3 LGMKT_j + e_{ij}$$

where INDIAN_{ij} takes on the value 1 if community *j* has a nearby Indian casino in year *i* and zero otherwise¹⁹; and LGMKT_j takes on the value 1 if community *j* is near the Mashantucket Pequot and Mohegan casinos in eastern Connecticut or the Shakopee Mdewakanton Sioux and the St. Croix Chippewa casinos outside the Twin Cities in Minnesota.

This latter dummy allows the regression to isolate towns proximate to two of the largest concentrations of casino capacity in the United States outside of Las Vegas and Atlantic City. Gerstein et al. selected casinos for their dataset if they contained 500 or more electronic gaming devices (EGDs). These two regions each have more than ten times that amount of capacity among their casinos, and the Connecticut tribes have a combined total approaching nearly 20 times that quantity (Sankey and Russell, 1997). By contrast, other towns proximate to Indian casinos face an average capacity of 1,800 EGDs and are geographically more remote from metropolitan areas. Moreover, of the 16 communities proximal to Indian casinos, nine were communities accessible to the casino capacity in each of these two regions. Thus, to account for the substantially different size and metropolitan flavor of these communities, we distinguish them with LGMKT.

V. Results

Table 3 and Table 4 present the results of our analysis. Table 3 shows the 30 outcome variables for which we were able to duplicate the baseline results reported in Gerstein et al.²⁰ Of the 30, 16 of the response variables are better predicted by our Model 4 than by Model 3 as indicated by the statistically significant chi-square test results in the right-most column of Table 3. In Table 4 we discard the other 14 regressions for which Model 4 offers no improvement on Model 3 on the grounds that we cannot infer a distinguishable Indian casino effect if the predictive power of our model is no greater than that of Model 3 in Gerstein et al.

Table 3
Strength of the Indian Casino Model (Model 4)

<u>Outcome Measure</u>	<u>Baseline</u>	<u>Model 4 v. Model 3^a</u>
SPENDING		
Casino Spending	\$29	8.149*
EMPLOYMENT		
% Unemployed	6.4%	24.130*
% Employed - Local Govt.	8.9%	2.928
% Employed - Construction	6.1%	1.187
% Employed - Services	26.6%	4.765
% Employed - Retail Trade	18.8%	9.105*
DEMOGRAPHIC BEHAVIOR		
Infant deaths (per 1,000)	9.3	0.986
INCOME AND EARNINGS		
Total Income	\$16,153	7.324*
Income Maintenance	\$157	81.805*
Retirement	\$1,867	6.343*
Transfer Payments	\$2,094	17.878*
Unemployment Insurance	\$70	18.331*
Net Earnings	\$10,976	8.421*
Earnings - Construction	\$679	0.801
Earnings - Restaurants, Bars	\$241	40.299*
Earnings - Hotel	\$64	5.388
Earnings - Recreation	\$64	28.277*
Earnings - Retail Trade	\$1,104	9.096*
Earnings – Gen. Merchandise	\$124	6.462*
Earnings - Local Government	\$824	44.203*
Earnings - Services	\$2,354	4.424
Earnings - Social Services	\$69	0.716
Earnings - Transportation	\$769	0.907
CRIME		
FBI Crime Index	4,400	0.356
FBI Modified Crime Index	4,430	0.350
Larcenies (per 100,000)	3,863	4.121
Burglaries (per 100,000)	1,326	4.943
MV Thefts (per 100,000)	367	18.669*
Assaults (per 100,000)	322	0.254
Robberies (per 100,000)	132	16.873*

Note. Only 30 of the 33 outcome variables reported in Gerstein et al. are reported here (see also discussion in note 20).

^a The column “Model 4 v. Model 3” reports differences of log-likelihood measures between Model 3 and Model 4. If the difference is significant by the chi-square test, it can be concluded that adding INDIAN and LGMKT helps in predicting the outcome variable.

* The two-degrees of freedom chi-square test is significant at the $\alpha = 0.05$ level.

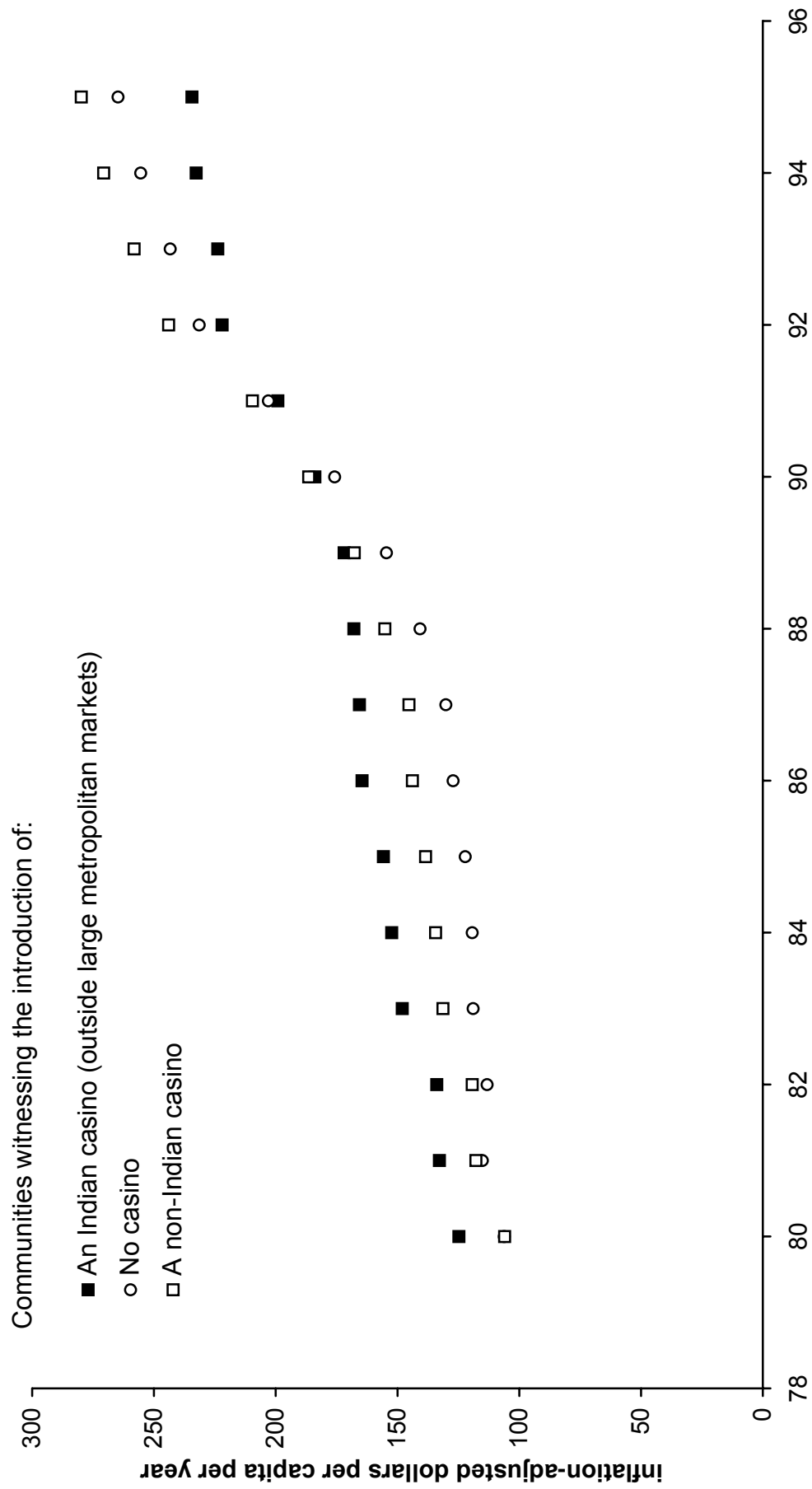
The results of Table 4 indicate a pattern of distinguishable Indian casino effects consistent with the notion that destination effects more than offset substitution and cannibalization effects for off-reservation communities outside of large market areas. While estimated casino spending in communities witnessing the introduction of an Indian casino is statistically indistinguishable from casino spending in communities witnessing non-Indian casino introductions (i.e., the coefficient in Table 4 for INDIAN is not statistically significant), the income effects are quite different.²¹ Gerstein et al. reported that no statistical power was obtained by their Model 3 for Total Income and Net Earnings (i.e., their addition of CASINO did not improve upon their Model 2 of only year and community-specific effects). However, our Model 4 indicates that a discernible 3% increase in total income (\$485 per capita) and a 5% increase in net earnings (\$549 per capita) are visited upon non-Indian communities when an Indian casino is introduced nearby. Indeed, the per capita income gap of 19% between communities that ultimately witnessed Indian casinos and those that witnessed non-Indian casinos narrowed to 13% by 1996 (see note 16).

These increases in total income and total net earnings come despite declines in income associated with income maintenance programs and from transfer payments. Casinos generally could be expected to have a 6% decrease in income from income maintenance programs, whereas Indian casinos precipitate a more profound 32% decline. This substantial decline is sufficient to move off-reservation communities witnessing an Indian casino introduction from above their

counterparts to below them. The effect is particularly striking visually (see Figure 1) and represents the off-reservation analogue to the reservation unemployment finding we referred to above (at the beginning of Section IV). Not only do Indian casinos help the poorer of the tribes move ahead vis-à-vis their counterparts with respect to employment (Cornell et al.), but also this evidence indicates Indian casinos have accomplished the same for proximate non-Indian communities with respect to income maintenance programs.

Similarly, generic casinos generally have no discernible effect on transfer payments, yet communities witnessing the introduction of an Indian casino are visited by 6% reductions in transfer payments. Retirement income also declines (-4%).²²

Figure 1
Average Income from Income Maintenance Programs
in Non-Indian Communities



Note: the average casino introduction year is 1991 for communities witnessing both kinds of introductions (Indian or non-Indian).

Table 4

Indian Casino Effects

Outcome Measure	Baseline	Model 3		Model 4	
		Casino	Casino	Indian Casino	Large Market
SPENDING					
Casino Spending	\$29	+121%*	+119%*	-3%	+16%*
EMPLOYMENT					
% Unemployed	6.4%	-14%*	-19%*	-4%	+26%*
% Employed - Retail Trade	18.8%	-3%*	-3%	+3%	-8%*
INCOME AND EARNINGS					
Total Income	\$16,153	0%	-1%	+3%*	-2%
Income Maintenance	\$157	-15%*	-6%*	-32%*	+26%*
Retirement	\$1,867	-1%	0%	-4%*	+4%*
Transfer Payments	\$2,094	-3%*	-2%*	-6%*	+7%*
Unemployment Insurance	\$70	-20%*	-27%*	-5%	+38%*
Net Earnings	\$10,976	+1%	-1%	+5%*	-2%
Earnings - Restaurants, Bars	\$241	-20%	+1%	-10%	-63%*
Earnings - Recreation	\$64	+22%*	+55%*	-38%*	-57%*
Earnings - Retail Trade	\$1,104	0%	+2%	-2%	-5%*
Earnings – Gen. Merchandise	124	-17%	-13%	+23%	-57%*
Earnings - Local Government	824	-1%	-4%*	+10%*	-7%*
CRIME					
MV Thefts (per 100,000)	367	+1%	+21%*	-49%*	+25%*
Robberies (per 100,000)	132	+3%	+27%*	-39%*	-7%

Note. Within Model 4 the effects are additive. For example, transfer payments decline 2% from their baseline value for the introduction of any kind of casino. If the casino is an Indian casino, they decline an additional 6% for a total decline of 8%. And if the Indian casino is in one of our two identified large markets, transfer payments rise by 7% for a net decrease of 1%. Baseline values and Model 3 CASINO coefficients reported here are our own rather than those of Gerstein et al. (see note 20).

*Significant at the $\alpha = 0.05$ level.

While net earnings are positively affected by the introduction of an Indian casino, the picture is not consistently positive through the categories of income we examined. On the one hand, earnings in the recreation sector rise by 55% for casinos generally; however, Indian casinos appear to precipitate only a net increase of 17% ($55\% - 38\% = 17\%$). On the other hand, local government earnings decline by 4% for casinos generally; however, they rise by 6% in communities where proximate Indian casinos are introduced.

The negative coefficient on recreation earnings near Indian casinos may be explained by the aforementioned difficulty in obtaining reliable data about Indian Country. That is, the increase in the Indian casino's earnings may not be imputed to statistics on recreation earnings since they are not reported except to the National Indian Gaming Commission, which keeps the information confidential. This effect would be countervailed to the extent that the casinos approach the limits of the 50-mile circles of proximity established by Gerstein et al., i.e., the further the casino is from the community in question, the less likely its recreation revenues would be totaled in (e.g.) county data to begin with.

The latter effect, i.e., on local government earnings, is more of a puzzle. Gerstein et al. found that local government employment declined by 2% and earnings in the sector were statistically unchanged. Table 4 indicates opposite and statistically significant effects on local government earnings depending on whether the introduced casino is Indian or not.

On the social side, we find discernible effects in the crime categories of motor vehicle theft and robbery. Gerstein et al. found no statistically significant results for any crime variables, yet our Model 4 indicates communities witnessing the introduction of a proximate Indian casino experience a substantial net decline in auto theft and robbery. We found no statistically discernible effects for larcenies, burglaries, assaults, and the crime indexes.

The statistical insignificance of the results of Gerstein et al. may be driven by the fact that aggregation of Indian and non-Indian casinos would mask an underlying difference of effects on crime; we find a statistically significant and positive effect for non-Indian casinos. Indeed, this hypothesis may be lent further credence by the apparent rise in local government expenditures in Indian casino contexts as proxied by the aforementioned local government earnings regression if rising government expenditures (e.g., on police activities) have a depressive effect on crime.

The data on auto theft and robberies are consistent with the hypothesis that casino introductions in depressed regions would reduce the existing propensity to commit crime more than introducing new levels of crime per the observation of Nelson et al. above. Given that these results abstract away from the issue of adjusting populations for visitation before calculating crime rates per unit of population (see, e.g., Cornell et al.; Taylor et al.), they are particularly strong.²³ Nonetheless, the silence of our results on the other dimensions of crime and on infant mortality underscores the difficulty of picking up statistically discernible

social effects. As Gerstein et al. point out, the net effects could be there but too small to register in the “wash of the statistics” or self-cancelled by virtue of offsetting costly and beneficial consequences (70).

We are hesitant to read too much into our results for the LGMKT variable until more analysis on the markets in question can be done. The statistical significance of the results and frequent difference of sign for LGMKT indicate that it is important to include the variable. We also believe that the Shakopee, Pequot, and Mohegan casinos are outliers in the basic sense that they are in a class unto themselves—the Pequot’s casino is the largest in the world. However, it is entirely possible that the LGMKT variable picks up an irrelevant regional effect coincidentally common to the Twin Cities and eastern Connecticut.

This caveat aside, it is interesting to note that where the coefficients on INDIAN and LGMKT are significant, they are, with one exception, opposite in sign and of similar magnitude. Thus, if the variable is not picking up a regional effect, it suggests that we have identified two poles of a continuum of casino effects that differ across the dimension of urbanization. Casinos introduced into rural and generally poorer locations are likely to perpetrate net positive effects as destination effects swamp substitution and cannibalization effects, whereas the opposite may happen in the context of large casino introductions in metropolitan markets.²⁴ An interesting frontier of investigation would be to first determine if such a continuum was indicated, and second to assess where on the continuum the one effect begins to dominate the other two.

VI. Conclusions

The overall picture presented in Table 4 indicates Indian casinos in more rural and poorer markets have a net positive impact on the surrounding communities. Gross incomes rise and certain crime rates fall when Indian casinos are introduced near non-Indian communities. As a result, the income gap between communities that witnessed a non-Indian casino introduction and those that saw a proximate Indian casino introduction closed. In addition, the average per capita income derived from income maintenance programs in communities proximate to Indian casinos (outside of large market areas) dropped from above comparable community averages to below (see Figure 1). Moreover, no detectable increase in social pathology is visible in, e.g., infant mortality and crime increases. Thus, this evidence would tend to allay the policy concern that, while Indian gaming may be a boon to tribes, it could come at the expense of the surrounding communities. Indeed, it suggests exactly the opposite, i.e., that Indian gaming is not only a development tool that poorer-than-average tribes have used to pull ahead in their cohort (Cornell et al.), it is a tool of development by which tribes have improved the economic lot of their non-Indian neighbors as well.

This result probably stems from the location of the Indian casinos in rural, lower income areas rather than from any particular Indian character of the casinos. In such areas, Indian casinos appear to attract more new spending than they divert from existing businesses in the leisure and hospitality sectors. As such, Indian

casinos may be a refreshingly new instance where economic rents generated in America's poorer areas tend to redound to the communities there.

It has already been made clear that the tribes benefit from gaming. This evidence indicates off-reservation communities benefit substantially, too, and consequently they are natural allies with tribes. Moreover, as quite a few states have explicitly committed themselves to developing their poorer and rural areas, this research indicates that there is reason to believe tribes and states need not be adversaries over compacting for casinos as they have been. Particularly where tribes are located in rural and poor regions, states need not be concerned about cannibalization and substitution effects swamping the benefits of gaming.

VII. References

- Anders, G. C. (1998). Indian gaming: Financial and regulatory issues. The Annals of the American Academy of Political and Social Science, Gambling: Socioeconomic Impacts and Public Policy, 556, 98-108.
- California v. Cabazon and Morongo Bands of Mission Indians, 107 S. Ct. 1083 (1987).
- Center for Applied Research. (1995). Indian reservation gaming in New Mexico: An analysis of its impact on the state economy and revenue system. Denver, CO: Center for Applied Research.
- Center for Applied Research. (1996, January). The benefits and costs of Indian gaming in New Mexico. Denver, CO: Center for Applied Research.
- Clapp, J. M., et al. (1993). The economic impacts of the Foxwoods High Stakes Bingo & Casino on New London County and surrounding areas. Storrs, CT: Arthur W. Wright & Associates.
- Coopers & Lybrand, LLP. (1995). Analysis of the economic impact of the Oneida Nation's presence in Oneida and Madison Counties. Coopers & Lybrand, LLP.
- Cornell, S. E., Kalt, J. P., Krepps, M. K., and Taylor, J. B. (1998). American Indian gaming policy and its socio-economic effects: a report to the National Gambling Impact Study Commission. Cambridge, MA: The Economics Resource Group, Inc.

- Costa, D. (1997). Less of a luxury: The rise of recreation since 1988 (NBER Working Paper 6054). Cambridge, MA: National Bureau of Economic Research.
- Deller, S. C., Lake, A., & Sroka, J. (1996, August). The St. Croix Casino: A comprehensive study of its socioeconomic impacts. Madison: University of Wisconsin Extension.
- Eyrich, G. I. (n.d.). Economic impact analysis: Cabazon Band of Mission Indians. Riverside, CA: Constituent Strategies, Inc.
- Gazel, R. (1998, March). The economic impacts of casino gambling at the state and local levels. The Annals of the American Academy of Political and Social Sciences, 556, 66-84.
- Gerstein, D., Volberg, R., Harwood, H., & Christansen, E. (1999, April). Gambling impact and behavior study: Report to the National Gambling Impact Study Commission. Chicago: University of Chicago, National Opinion Research Center.
- Getches, D. H., Wilkinson, C.F., & Williams, R. A., Jr. (1998). Cases and materials on federal Indian law. St. Paul, MN: West Publishing Company.
- Goldberg-Ambrose, C. (1997, Spring). Pursuing tribal economic development at The Bingo Palace. Arizona State Law Journal, 29 (1), 97-120.
- Goldstein, H. (1995). Multilevel statistical models. London: Edward Arnold.
- Goldstein, H. (1998). A user's guide to MLwiN. London: University of London, Institute of Education.

- Grinols, E. L. (1995). The impact of casino gambling on income and jobs. In R. Tannenwald (Ed.) Casino development: How would casinos affect New England's economy? 3-17. Boston: Federal Reserve Bank of Boston.
- Harvard Project on American Indian Economic Development. Ojibwe Language Program Department of Education, Mille Lacs Band of Ojibwe (Honoring Contributions in the Governance of American Nations: 1999 Finalists). Retrieved February 29, 2000, from the World Wide Web:
<http://www.ksg.harvard.edu/hpaied/winner/lang.htm>
- Henderson, E. (1997, Spring). Indian gaming: Social consequences. Arizona State Law Journal, 29 (1), 205-250.
- Hoенack, S. A., & Renz, G. (1995, May). Effects of the Indian-owned casinos on self-generating economic development in non-urban areas of Minnesota. Plymouth, MN: Stephen A. Hoенack and Associates.
- Indian Gaming Regulatory Act, 25 U.S.C. § 2701 (1998).
- Indian Self-Determination and Education Assistance Act, 25 U.S.C. §450 (1975).
- Indian Health Service. (1997) Trends in Indian Health. Washington, D. C., Department of Health and Human Services.
- Klas, J. M., & Robinson, M. S. (1997, January) Economic benefits of Indian gaming in the state of Minnesota. Minneapolis: Marquette Advisors.
- Klas, J.M., & Robinson, M. S. (1996, June). Economic benefits of Indian gaming in the state of Oregon. Minneapolis: Marquette Advisors.

- Krepps, M. B. (1997). Competition for the gaming dollar and the urban casino puzzle. Paper presented at the 10th International Conference on Gambling and Risk-Taking. Montreal.
- Meyer, H. (1993). Indian gaming: Is it out of control in Minnesota? Hospitality Management, 13 (1), 34-38.
- Meyer-Arendt, K. (1998). From the river to the sea: Casino gambling in Mississippi. In K. Meyer-Arendt & R. Hartmann (Eds.), Casino gambling in America: Origins, trends, and impacts. New York: Cognizant Communications Corporation.
- Minnesota Indian Gaming Association & KPMG Peat Marwick. (1992, April). Economic benefits of tribal gaming in Minnesota. Minnesota Indian Gaming Association.
- Murray, J. M. (1993). The impact of American Indian gaming on the government of the state of Wisconsin. Madison: University of Wisconsin Extension.
- Murray, J. M. (1997). Direct and indirect impact of Wisconsin Indian gaming facilities on Wisconsin's output, earnings, and employment. Madison: University of Wisconsin Extension.
- National Gambling Impact Study Commission. (1997). Research agenda: As unanimously adopted by the Commission on October 31, 1997. Retrieved February 29, 2000, from the World Wide Web:
<http://www.ngisc.gov/research/agenda.html>

- National Gambling Impact Study Commission. (1999). National Gambling Impact Study Commission final report. Retrieved February 29, 2000, from the World Wide Web: <http://www.ngisc.gov/reports/fullrpt.html>
- Nelson, D. J., Erickson, H. L., & Langan, R. J. (1996). Indian gaming and its impact on law enforcement in Wisconsin. Green Bay, WI: API Consulting Services.
- Pavlakovich, V. (1994). Economic impact of Indian tribes on the Arizona economy. American Indian Relationships in a Modern Arizona Economy, Phoenix, AZ: Arizona Town Hall, 185-192.
- Sankey, M. L., & Timothy, O. R. (1997). Where to play in the USA: The gaming guide. Tempe, AZ: Facts on Demand Press.
- Seminole Tribe of Florida v. Florida, 517 U.S. 44 (1996).
- Tiller, V. E., & Chase, R. A. (n.d.). Economic contributions of Indian tribes to the economy of Washington state. Albuquerque, NM: Tiller Research, Inc.
- Taylor, J. B., Grant, K. W., Jorgensen, M. R., & Krepps, M. B. (1999). Indian gaming in Arizona: social and economic impacts on the state of Arizona. Cambridge, MA: The Economics Resource Group, Inc.

Notes

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² Hereinafter "IGRA," 25 U.S.C. Sec. 2701, et seq. See Getches, Wilkinson, and Williams (1998) for a detailed treatment of tribal regulatory powers and Indian gaming legislation.

³ See, for example, Center for Applied Research (1996); Center for Applied Research (1995); Clapp (1993); Coopers & Lybrand (1995); Cornell, Kalt, Krepps, Taylor (1998); Deller, Lake, and Sroka (1996); Eyrich (n.d.); Hoenack and Renz (1995); Klas and Robinson (1997); Klas and Robinson (1996); Minnesota Indian Gaming Association and KPMG Peat Marwick (1992); Murray (1997); Murray (1993); Pavlakovich (1994); Tiller (n.d.); and Taylor, Grant, Krepps, and Jorgensen (1999).

⁴ There are a number of other economic impacts that do not fit into this taxonomy, e.g., the diversification of the tribal and regional economies and the development of Indian and non-Indian managerial human capital. We abstract away from them here because they have not played a key role in the policy debates around Indian casino introductions.

⁵ Generally speaking, reservation economies did not feature well-developed tribal or private leisure and hospitality firms prior to the advent of gaming. Thus, it would not be reasonable to expect that there would be a negative substitution effect on the reservations. (Note: casinos may also cause substitution away from other, non-leisure activities. We cover those in our classification as intensity effects below.)

⁶ The converse could be true, i.e., tribal casinos may bring benefits into a region by cannibalizing out-of-region gambling opportunities like trips to Las Vegas.

However, that positive effect could easily be classified under the destination effect above. While the distinction is relatively unimportant to this classification, it is relevant in a net benefits analysis that seeks to avoid double counting.

⁷ As noted in Costa (1997), there is already a secular trend toward leisure spending in the U.S. economy from which a casino-induced change would have to be separated.

⁸ There is a secular rise in tribal spending and policy making discretion over recent decades, particularly as federal self-determination policy has allowed greater tribal participation in the federal programs on the reservation (see, e.g., Self-

Determination and Education Assistance Act, 1975). Nonetheless, casino gaming is distinct from that trend in both the degree and the scope of the fiscal discretion it has given tribes.

⁹ Indians commit suicide at nearly 1.7 times the national all-races rate (Indian Health Service, 1997).

¹⁰ An additional five began the period with a casino nearby (Gerstein et al., 65).

¹¹ Gerstein et al. calculate per capita rates for the response variables, transform the measures by taking the natural logarithm to account for skewness, and weight the observations by 16-year mean population to improve the efficiency of the regression. They observe that the weighting may understate “good” effects such as employment, because in larger communities the effects would be less salient. They also assert that negative consequences (e.g., pathological gambling consequences) would be understated because they would not vary with the size of the community. A detailed discussion of the methodology and data sources is available in Gerstein (pp. 67-7; App. B, pp. 47-58).

¹² Gerstein et al. test community-level effects alone—i.e., to the exclusion of year effects—in their “Model 0” (examining community effects) and “Model 1” (examining community effects and casino effects). Due to the consistency of the year effects measured in both Models 2 and 3, they report the results of those to the exclusion of Models 0 and 1 (Gerstein et al., 69). See also note 13.

¹³ “The most general model is Model 3, which can be written in the following manner:

$$Y_{ij} = \alpha + \alpha_j + \sum_{t=81}^{97} \gamma_t I_{ijt} + \beta CASINO_{ij} + e_{ij},$$

where Y_{ij} denotes the outcome measure for community j in year i ; I_{ijt} denotes a 0-1 dummy variable that takes on the value 1 if $i = t$ and takes on the value 0 otherwise; and $CASINO_{ij}$ is a 0-1 dummy variable that takes on the value 1 if community j has a proximate casino in year i and takes on the value 0 otherwise.

“The parameters α , β , and γ_t are fixed constants. α_j and e_{ij} are random variables assumed to be normally distributed with zero mean and constant variance. The variance of α_j is the level-2 (community-level) variance, and the variance of e_{ij} is the level-1 variance. The community-specific intercept of the j^{th} community equals $(\alpha + \alpha_j)$.

“Models 0, 1, and 2 result from setting specific parameters equal to zero in Model 3. Model 0 assumes that β and the γ_t 's equal zero. Model 1 assumes that the γ_t 's equal zero. Model 2 assumes that β equals zero.” Gerstein et al., note 14.

¹⁴ Gerstein et al. attempted to compile the socioeconomic statistics for five Indian communities, yet data specific to them were unavailable.

¹⁵ Only two Indian casinos in the country have been constructed on tribal trust lands acquired and taken into trust after passage of the Indian Gaming Regulatory Act (NGISC, 1999).

¹⁶ For example, the communities in this sample that ultimately witnessed a non-Indian casino introduction had per capita incomes 19% higher, on average, in 1980 than communities that ultimately witnessed an Indian casino introduction.

¹⁷ As we have pointed out elsewhere, the Anders, Seigel, and Yacoub paper suffers not only from a post hoc ergo propter hoc problem, but a “pre hoc” error as well. Their measured effect coincides with the signing of legal agreements allowing Indian gaming to proceed, not the actual capacity expansion necessary to effectuate their impact. That expansion substantially post-dates their measured effect (Taylor et al.).

¹⁸ Indian reservations generally suffer from above-average health problems, accidental death rates, crime rates, housing shortages, drop-out rates, and a host of other social pathologies and shortages (see, e.g., IHS, 1997).

¹⁹ Per the methodology of Gerstein et al., a 0.5 is given for the CASINO and INDIAN variable if the casino opens within a given year rather than at its start.

²⁰ Note that for the three bankruptcy variables reported in Gerstein et al., we were unable to transform the data to yield a similar baseline value let alone a similar coefficient value. Of the remaining 30, we were able to duplicate the results of Gerstein et al. for 28 outcome variables to within one unit of the least significant digit. For the proportion of the civilian labor force in the construction industry we came reasonably close to the baseline value; however, our chi-squared test results and coefficient estimates were not similar or significant. For the estimate of casino

spending per capita, we were able to duplicate their results with respect to sign and significance, but not with respect to magnitude.

²¹ Our coefficient for Model 3 in the regression of casino spending is different in magnitude, but not in either sign or significance from that reported in Gerstein et al. (see our discussion at note 20).

²² A decline in retirement income could result from migration, from an increase in the average retirement age, or from declining income per retiree. Our analysis can not offer information that would be dispositive of these competing hypotheses.

²³ One would expect where casinos were creating destination attractions, higher numbers of visitors per day would bring greater total crimes; thus adjusting for visitation would be necessary. Orlando, Florida, for example, has a higher than average crime rate per resident, yet the visitor-adjusted crime rate is not unreasonably elevated. The data used here are not visitor-adjusted and would tend to overstate increases in crime and understate decreases.

²⁴ For example, coefficient on LGMKT is large and negative for the regression of earnings in the restaurant and bars sector (-62%), yet the coefficients on CASINO and INDIAN are not significant.