CONTEMPORARY ECONOMIC POLICY

TRIBAL CASINO IMPACTS ON AMERICAN INDIANS WELL-BEING: EVIDENCE FROM RESERVATION-LEVEL CENSUS DATA

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After the passage of the Indian Gaming Regulatory Act in 1988, tribal gaming revenues increased dramatically. Using a differences-in-differences methodology with 1990 and 2000 census data, this study finds that American Indians (AI) on gaming reservations experience a 7.4% increase in per capita income and reductions in both family and child poverty rates relative to AI on non-gaming reservations. Large and medium casinos are associated with changes in well-being while smaller casinos are not. These results are sensitive to the inclusion of the Navajo reservation, a large non-gaming reservation with increased income during the 1990s. (*JEL* I32, L83)

I. INTRODUCTION

This study adds to the literature that examines whether tribal casinos improve the well-being of American Indians (AI). During the 1990s, gaming changed the economic landscape for American Indian tribes dramatically, but it has been unclear how much the average gaming tribe gained and how these gains were distributed among tribal members. In 1987, tribal bingo generated approximately $225 million in gross revenue.[1] By 1999, tribes generated $9.8 billion in gaming revenue. By 2009, tribal gaming generated $26.5 billion in revenue.[2]

However, as revenues grew, the popular press brought attention to the inequities between tribes near metropolitan areas running large, profitable casinos and rural tribes running smaller establishments.[3] In 1995, eight tribal casinos earned about 40% of all gaming revenues.[4] In 2003, the Foxwoods casino and the Mohegan Sun casino, operated by two Connecticut tribes, earned $2 billion in revenue, whereas gaming facilities operated by Montana and North Dakota tribes earned $15 million and $95 million, respectively.[5]

To address these inequities, this study examines how tribal casino benefits are distributed within and across reservations by applying a differences-in-differences (D-in-D) model to 1990 and 2000 reservation-level census data.

First, to explore how tribal casino benefits are distributed within reservations, we examine whether casinos increase reservation per capita income (PCI) and reduce reservation poverty rates. Changes in the poverty rate determine whether the bottom of the income distribution benefits from gaming. The focus on poverty is also important as a large proportion of AI families traditionally have been in poverty.

Second, to explore the cross-reservation benefits of casinos, this article examines whether gaming operation size is correlated with changes

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1. See Cordeiro (1989).
2. Revenue estimates are in nominal dollars from the National Indian Gaming Commission.
3. See Barlett and Steele (2002) and Rezendes (2000).
4. United States Government Accountability Office (GAO 1997).
5. See Light and Rand (2005, 91–92).

ABBREVIATIONS

AI: American Indians
BIA: Bureau of Indian Affairs
D-in-D: Differences-in-Differences
GAO: Government Accountability Office
IGRA: Indian Gaming Regulatory Act
PCI: Per Capita Income

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in income and poverty. The relationship between casino size and changes in well-being is important given the unequal distribution of gaming revenues.

Results are sensitive to the inclusion of the Navajo reservation, which had no gaming during the 1990s. If models include the Navajo, casinos have no significant effects on either poverty rates or income. In regression models, reservations are weighted by their American Indian population and the American Indian population on the Navajo reservation is larger than all other non-gaming reservations combined. Therefore, positive economic trends on this single reservation dominate results.

However, when we exclude the Navajo, on gaming reservations, casinos increase income and reduce poverty compared to non-gaming reservations. Large and medium-sized casinos are associated with increased income and reduced poverty. In contrast, smaller casinos are not associated with any significant changes in these measures of well-being.

II. BACKGROUND

During the 1970s and 1980s, tribes opened bingo parlors and other forms of gaming to stimulate their economies. Arguments with the states over the legality of these operations led to the 1987 Supreme Court ruling in the *California v. Cabazon and Morongo Bands of Mission Indians* case. The *Cabazon* ruling declared that if a state permitted a form of gaming, then it could not regulate similar tribal operations.[6] In 1988, battles over *Cabazon's* interpretation led Congress to pass the Indian Gaming Regulatory Act (IGRA).[7]

IGRA stipulates that, unlike privately owned casinos, tribally owned casinos must reinvest net revenues into the tribe to promote economic development. Net revenues can be used to fund tribal government operations and programs, to increase "General Welfare" of the tribe, for economic development, as donations to charity, to fund local government agencies, and as direct transfers to tribal members in the form of dividends.

As tribes must use net gaming revenues for development, whether casinos improve socioeconomic outcomes for AI is an important policy question. Past studies examine how tribal casinos affect employment, educational attainment, crime, income, and poverty.

Studies show that tribal casinos improve employment outcomes, but the effects vary by the group examined. Evans and Topoleski (2002) find that casinos increase tribal employment levels and rates and decrease the percentage of the tribal members who were working poor. Gitter and Reagan (2007) examine AI living on or near reservations using Public Use Microdata from the 1990 and 2000 censuses, where reservations are not identified. They find gaming increases household income in all areas and increases employment, but only for households outside Metropolitan Statistical Areas. Using internal census microdata that identify reservations, Evans and Kim (2005) find casinos increase the likelihood of employment for younger workers and effects are generally stronger for the less educated.

Estimated impacts on educational attainment are mixed. Evans and Kim (2005) find that casinos increase high school dropout rates and reduce college enrollment. Akee et al. (2010), using data from the Eastern Cherokee Reservation, find per capita payments *improve* educational outcomes for children.

Studies looking at the relationship between casinos and crime also have mixed results. Both Evans and Topoleski (2002) and Grinols and Mustard (2006) find casinos have lagged positive effects on crime. Grinols and Mustard examine all casinos, not just tribal casinos. Reece (2010) finds that there is a *negative* relationship between casino activity and crime using Indiana non-tribal casino data.

Several studies examine tribal casino impacts on income and poverty. Kim (2006) finds that casinos increase the income of 18- to 64-year-old AI, but do not affect child poverty. He does not control for the Navajo. Cookson (2006) finds that slots per capita significantly increase reservation PCI in 2000 and PCI growth between 1990 and 2000. Cookson does not account for the potential unobserved correlation between having slots and reservation income.

Another set of studies compare mean outcomes for gaming and non-gaming reservations using the same dataset as in this article, reservation-level census data from 1990 and 2000. Taylor and Kalt (2005) find PCI increases more and poverty rates decline more on gaming reservations relative to non-Navajo, non-gaming reservations. Conner and Taggert (2009) and

6. *California v. Cabazon and Morongo Bands of Mission Indians* (1987).

7. Evans and Topoleski (2002).

Gonzales, Lyson, and Mauer (2007) compare changes in social and economic characteristics for reservations in Arizona and New Mexico.

III. TESTABLE IMPLICATIONS

Casinos affect PCI and poverty rates through changes in wage and non-wage income. Changes in income may come from either the demand side or supply side of the labor market. On the demand side, job creation, either at the gaming operation or any of its auxiliary industries, increases market wages through an upward shift in the market labor demand curve. On the supply side, if tribes distribute per capita payments, casinos increase non-wage income but reduce hours worked and, in turn, reduce wage income (wages $\times$ hours worked).

Therefore, the effects on wage income and total income are unclear. The effect on wage income depends on the increase in wages coming from the shift in the market labor demand curve and the reduction in hours worked resulting from any per capita payments. The decline in hours worked depends on the elasticity of labor supply and the size of any per capita payments. Finally, if casinos reduce wage income then total income is reduced *only* if the fall in wage income exceeds the per capita payments.

Evidence suggests that per capita payments are uncommon or do not affect labor supply. The U.S. Department of Interior (2003) finds about one-fourth of gaming tribes have the revenue allocation plans needed to distribute per capita payments and the Government Accountability Office (GAO 2002) finds that 12 out of 87 gaming tribes distributed payments exceeding $5,000. Akee et al. find that per capita payments averaging $4,000 did not cause Eastern Cherokee adults to leave the labor force.

Casinos will be associated with reduced poverty rates if tribal casinos increase family income at the bottom of the distribution and the magnitude of that increase brings families' income above their poverty thresholds. If tribal casinos increase family income through per capita payments, they increase income across the entire distribution. If tribal casinos increase family income through higher wages, then the composition of the labor demand shift determines where on the income distribution increased wages occur. As casinos and their auxiliary services, like hotels and restaurants, create mostly low-skill jobs, casinos likely increase the earnings of lower-wage workers. For example, Evans and Kim find that casinos increase wages and employment for less-educated workers and affect the entertainment subsector of the service industry.

Poverty rates may also change if tribal casinos change family structure as family composition determines poverty thresholds. Kim finds that the number of young women having children falls on gaming reservations relative to non-gaming reservations. This decline in family size potentially reduces poverty rates on gaming reservations as thresholds decline, even if income is unchanged.

IV. EMPIRICAL METHOD

Before IGRA, many tribes operated high stakes bingo, or Class II games.[8] Most tribes began operating slots or slot-like gaming, called Class III gaming, after IGRA and the 1990 and 2000 census data provide the before and after comparison needed for D-in-D. Evans and Topoleski show that tribal gaming impacts grow over time, but have little effect during the first year a casino opens.[9] Our article defines the treatment group, "gaming," as reservations that began Class III operations *between 1989 and 1998*, and the control group, "non-gaming," as reservations that did not open Class III operations between 1989 and 1998. Sixteen reservations opened Class III gaming operations before 1989 and are excluded from our sample.[10]

Tribes, with the exception of those in a few states, have the option to open a casino.[11] Using a first-differenced model addresses this potential endogeneity. It removes the time-invariant portions of the error terms of the reservation outcomes potentially correlated with the decision to open a casino. For example, tribes with better entrepreneurial abilities may be more likely to open gaming operations, but also have higher

8. IGRA (25 U.S.C. 2701-2721) divides gaming into three classes. We use Class III casino opening dates from William Evans. Tribes must enter compacts with the state to open Class III operations which typically define the types of games allowed, casino size and location, and wager limitations.

9. The Lummi and Hualapai closed casinos (Evans and Topoleski 2002). We include the Lummi as gaming as their operation lasted 6 years. The Hualapai operation was open less than a year and we code it as non-gaming.

10. We also place those into the control, non-gaming group. Results are available upon request.

11. Maine, Oklahoma, Rhode Island, South Carolina, and Utah banned Class III gaming (Evans and Topoleski 2002).

PCI and lower poverty rates relative to tribes with weaker entrepreneurial abilities.

The estimating Equation (1) is:

(1)

$$y_{i2000} - y_{i1990} = a_1 + d(\mathrm{D2000}_t * c_i) + (\boldsymbol{X}'_{i2000} - \boldsymbol{X}'_{i1990}) * B + a_2(\mathrm{D2000}_t * \mathrm{reg1}_i) + a_3(\mathrm{D2000}t * \mathrm{reg2}_i) + a_4(\mathrm{D2000}_t * \mathrm{reg3}_i) + v_{i2000} - v_{i1990}.$$

where y_{it} = economic outcome for AI on reservation i in census year t in (1990, 2000)

c_i = dummy for whether reservation i opens casino between 1989 and 1998

$\mathrm{D2000}_t$ = dummy for whether or not an observation is from 2000

$\boldsymbol{X}_{it}$ = vector of state, county, and reservation controls for reservation i in year t

v_{it} = reservation time-varying unobserved characteristics

$\mathrm{reg1_i}$–$\mathrm{reg4_i}$ = dummies for being in BIA (Bureau of Indian Affairs) Regions 1 to 4, Region 4 is the excluded group.

This article examines casino effects on reservation PCI, family poverty rates, and child poverty rates. The coefficient on $\mathrm{D2000}_t * c_i$, the D-in-D estimator, identifies a casino impact as the difference in the change in an outcome for reservations with casinos relative to those without casinos, between 1990 and 2000.

However, the first-differenced results are only unbiased if a tribe's decision to open a casino is orthogonal to other time-varying characteristics associated with reservation income or poverty.

Our article reduces this potential correlation by including a set of time-varying controls. BIA region dummies interacted with $\mathrm{D2000}_t$ control for differences in growth across the nation between 1990 and 2000 potentially correlated with a reservation's decision to open a casino. As the four region dummies are mutually exclusive, we exclude Region 4. We also include a vector of time-varying state, county, and reservation characteristics, $\boldsymbol{X}_{it}$. State PCI, PCI for the White population in the surrounding counties, and the average population density of the surrounding counties identify contemporaneous state and county economic shocks.[12] The relative numbers of American Indian adults 25 and older with a high school degree and associate's degree or more control for changes in workforce human capital over time (Appendix Table A1 details data).

12. AI in the surrounding counties may be affiliated with the reservation.

V. DATA

Our analysis primarily uses Taylor and Kalt's (2005) dataset: *American Indians on Reservations: A Databook of Socioeconomic Changes Between 1990 and 2000 Censuses*. It contains 1990 and 2000 U.S. Census Summary File 3 data normalized to 2000 Census boundaries for American Indian/Alaska Native lands in the lower 48 states and whether or not the tribe affiliated with an area operated a gaming facility on it before 2000.[13]

The sample consists of 107 federally recognized reservations with an American Indian population of at least 250 in 1990, of which 64% opened casinos between 1989 and 1998. There are 194 reservations with an American Indian population of less than 250. These reservations made up 1.9% of the American Indian reservation population in 1990 and 5.6% in 2000. The Mohegan and Mashantucket Pequot reservations, which own the Mohegan Sun and Foxwoods, are in this excluded group.

Starting in census 2000, respondents could report multiple races. Our 2000 sample excludes AI reporting more than one race. The change in the race question led the American Indian/Alaska Native population to increase from 1.9 million to 4.1 million from 1990 to 2000. The 4.1 million AI and Alaska Natives in census 2000 is the sum of 2.5 million people reporting being American Indian/Alaska Native alone and 1.6 million people reporting American Indian/Alaska Native in combination with at least one other race (Ogunwole 2002). However, most AI reporting more than one race lived outside reservations—only 2.5% of AI living on larger federally recognized reservations (our sample) were mixed race.[14]

VI. RESULTS

A. Analysis of Means

Table 1 shows mean income, poverty rates, and the American Indian population across years

13. Results using 2000 population as weights are available upon request.

14. This analysis used census 2000 Summary File 4 data (U.S. Census Bureau 2003). It has more detailed race information than the Summary File 3 data.

TABLE 1
Income, Poverty, and Population for AI on Reservations by Gaming Status

	Gaming					Non-Gaming, Non-Navajo					Navajo				
				Percent Change					Percent Change					Percent Change	
	1980	1990	2000	1980 to 1990	1990 to 2000	1980	1990	2000	1980 to 1990	1990 to 2000	1980	1990	2000	1980 to 1990	1990 to 2000
Per capita income (PCI)	$6,202	5,898	7,875	−4.9	33.5	7,690	7,122	8,626	−7.4	21.1	5,154	5,067	6,807	−1.7	34.3
Standard error	213	191	301	1.8	3.1	530	261	360	4.4	2.9					
				Difference					Difference					Difference	
				1990–1980	2000–1990				1990–1980	2000–1990				1990–1980	2000–1990
Family poverty rate	41.8	47.9	35.3	6.2	−12.7	33.8	38.8	31.6	5.0	−7.3	51.2	54.9	41.1	3.7	−13.8
	1.3	1.4	1.4	0.9	0.9	2.2	1.8	1.6	1.5	1.1					
Child poverty rate	NA	57.9	45.6	NA	−12.3	NA	47.1	40.1	NA	−7.1	NA	59.1	47.1	NA	−12.0
		1.4	1.6		1.0		2.0	1.9		1.3					
Population	138,252	167,402	205,052			59,904	73,683	80,647			107,687	142,939	174,847		
Reservations	67	68	68			37	38	38			1	1	1		

Notes: Means and standard errors use the number of people in each cell as weights. The *t*-statistics testing whether changes in means over time differ across gaming and non-Navajo, non-gaming reservations are as follows: (a) PCI 1980 to 1990: 0.52; 1990 to 2000: 2.91 and (b) family poverty rate 1980 to 1990: 0.64; 1990 to 2000: −3.75. We assume correlation within groups across years but not across groups.

Sources: Taylor and Kalt (2005), U.S. Census Bureau (1986), William N. Evans (for Class III opening dates).

by reservation gaming status. There are several key features of the data.

First, the American Indian population on the Navajo reservation is about double that of all other non-gaming reservations combined. Regressions are weighted by the 1990 American Indian population and, if included, the Navajo reservation dominates all other non-gaming reservations. From 1990 to 2000, PCI increased at the about same rate and family and child poverty rates declined by about the same magnitude on the Navajo reservation as on gaming reservations. In contrast, between 1990 and 2000, average PCI increased by 12.4 percentage points more and the average family and child poverty rates declined by 5 percentage points more on gaming reservations compared to non-Navajo, non-gaming ones. Discussion excludes the Navajo reservation for the remainder of this section.

Second, Table 1 includes 1980 income and family poverty rates to compare to 1990. This comparison allows us to test whether gaming and non-gaming tribes were on similar trend paths prior to IGRA. From 1980 to 1990, average PCI declined and family poverty increased across all reservations. However, the *relative* differences in the income declines and the family poverty increases across gaming and non-Navajo non-gaming tribes were not statistically different suggesting our empirical strategy is valid.

Finally, even on gaming reservations, American Indian income was still low and poverty still high relative to the rest of the nation in 2000. PCI was $7,875, the family poverty rate was 35.3%, and the child poverty rate was 45.6%. In the United States overall, PCI was $21,500, the family poverty rate was 9.0%, and the child poverty rate was 17%.

B. Estimated Casino Effects

Consistent with Table 1, regression results in Table 2 show, compared to non-Navajo, non-gaming reservations, casinos increase PCI by 7.4%, reduce family poverty rates by 4.9 percentage points, and reduce child poverty rates by 4.6 percentage points.

Some control variables have significant effects and others do not. County White PCI is not significant in any regressions. State PCI only significantly affects child poverty rates. A $1,000 increase in state PCI reduces the average child poverty rate by 2 percentage points.

TABLE 2
Reservation AI Per Capita Income and Poverty Estimating Equations

	Log(PCI), Navajo In	Log(PCI), Navajo Out	Family Poverty Rates, Navajo In	Family Poverty Rates, Navajo Out	Child Poverty Rates, Navajo In	Child Poverty Rates, Navajo Out
$D2000_t*c_i$	0.035 (0.034)	0.074** (0.032)	−0.019 (0.016)	−0.049*** (0.016)	−0.013 (0.021)	−0.046** (0.020)
County White PCI/1,000	−0.011 (0.008)	0.005 (0.010)	0.005 (0.004)	−0.006 (0.004)	0.003 (0.005)	−0.009 (0.006)
County population density	0.002*** (0.000)	0.001*** (0.000)	−0.001*** (0.000)	−0.000*** (0.000)	−0.001*** (0.000)	−0.001*** (0.000)
State PCI/1000	−0.014 (0.014)	−0.002 (0.013)	0.000 (0.007)	−0.009 (0.006)	−0.01 (0.008)	−0.020** (0.008)
Percent AI with high school degree only	0.003 (0.003)	0.002 (0.003)	−0.002 (0.002)	0.000 (0.002)	−0.001 (0.002)	0.001 (0.002)
Percent AI with some college	0.014*** (0.005)	0.013*** (0.005)	−0.008*** (0.002)	−0.007*** (0.002)	−0.012*** (0.003)	−0.011*** (0.003)
Adjusted R^2	0.152	0.179	0.126	0.197	0.211	0.299
Reservations	107	106	107	106	107	106

Notes: Robust standard errors in parentheses are beside estimates. All regressions include a constant term and three region variables interacted with year 2000 (with Region 4 as the excluded group).

*Significant at <10%; **significant at <5%; ***significant at <1%.

Sources: Taylor and Kalt (2005), William N. Evans (for Class III opening dates), Department of Interior (2005), GAO (2006), Regional Economic Accounts Data (2008), U.S. Census Bureau (1993a, 1993b, 2002).

TABLE 3
D-in-D Estimator by Casino Size

	Log (PCI)	Family Poverty Rates	Child Poverty Rates	Log(PCI)	Family Poverty Rates	Child Poverty Rates
	Slots Per Capita			**Square-Feet Per Capita**		
Dsmall	0.023 (0.048)	−0.02 (0.022)	−0.013 (0.030)	0.003 (0.037)	−0.024 (0.020)	−0.014 (0.028)
Dmedium	0.062 (0.038)	−0.046*** (0.017)	−0.038* (0.022)	0.095*** (0.035)	−0.053*** (0.019)	−0.048** (0.023)
Dlarge	0.156*** (0.042)	−0.082*** (0.020)	−0.098*** (0.026)	0.151*** (0.045)	−0.080*** (0.021)	−0.097*** (0.027)
T-Stat, Dmedium = Dlarge	2.157	−1.877	−2.233	1.316	−1.401	−1.852
Adjusted R^2	0.22	0.22	0.34	0.23	0.22	0.34
	Slots			**Square-Feet**		
Dsmall	−0.026 (0.048)	0.000 (0.026)	0.000 (0.032)	0.007 (0.039)	−0.024 (0.021)	−0.017 (0.028)
Dmedium	0.077** (0.036)	−0.055*** (0.016)	−0.049** (0.021)	0.072** (0.035)	−0.047** (0.018)	−0.048* (0.025)
Dlarge	0.153*** (0.044)	−0.074*** (0.020)	−0.076** (0.030)	0.161*** (0.042)	−0.084*** (0.020)	−0.076** (0.029)
T-Stat, Dmedium = Dlarge	1.716	−1.025	−0.888	2.266	−1.443	−0.994
Adjusted R^2	0.25	0.25	0.32	0.24	0.23	0.31

Notes: Includes all controls in Table 2.
Sources: Taylor and Kalt (2005), William N. Evans (for Class III opening dates), Department of Interior (2005), GAO (2006), Regional Economic Accounts Data (2008). U.S. Census Bureau (1993a, 1993b, 2002), Casino City and 500nations.com.

County population density is associated with an increase in PCI and a reduction in poverty. The change in the percentage of AI with at least an associate's degree is significant in all models, but the percentage of American Indian adults with a high school degree is not.

C. The Relationship Between Gaming Facility Size and Changes in Income and Poverty

Larger casinos may have more gaming devices or more services. In turn, they may demand more workers, increasing market labor demand and wages more than smaller casinos. Additionally, relative to smaller casinos, larger casinos may generate larger net revenues to be invested into tribal enterprises or to be distributed as per capita payments (holding American Indian reservation population constant).

Equation (2) estimates whether small, medium, and large casinos differentially affect income and poverty. We split the D-in-D estimator, d, into three using a population-weighted distribution of casino size.[15] For robustness, Equation (2) is estimated using four different casino size measures: total slots, per capita slots, total square-feet, and per capita square-feet.[16] Equation (2) is:

(2)

$$\begin{aligned} y_{i2000} - y_{i1990} = {} & a_1 + d\text{small}(\text{D2000}_t * c\text{small}_i) \\ & + d\text{medium}(\text{D2000}_t * c\text{medium}_i) \\ & + d\text{large}(\text{D2000}_t * c\text{large}_i) \\ & + (\boldsymbol{X}'_{i2000} - \boldsymbol{X}'_{i1990}) * B \\ & + a_2(\text{D2000}_t * \text{reg1}_i) + a_3(\text{D2000}_t * \text{reg2}_i) \\ & + a_4(\text{D2000}_t * \text{reg3}_i) + v_{i2000} - v_{i1990.} \end{aligned}$$

where $c\text{small}_i$ = dummy for whether reservation i has a casino less than the 25th percentile of the size distribution

$c\text{medium}_i$ = dummy for whether reservation i has a casino greater than equal to the 25th percentile of the size distribution and less than the 75th percentile of the size distribution

$c\text{large}_i$ = dummy for whether reservation i has a casino greater than or equal to the 75th percentile of the size distribution.

Table 3 shows no statistically significant relationship between having a small casino and changes in PCI or family and child poverty rates. In contrast, with the exception of slots per capita equations, both large and medium-sized casinos are associated with changes in well-being. However, results do not consistently show that large casinos are associated with greater changes in income and poverty than medium-sized ones.

VII. CONCLUSIONS

This article provides some evidence that casinos increased income and reduced poverty for AI on reservations during the 1990s. This is consistent with positive employment effects found by Evans and Topoleski and Evans and Kim and with the analysis of means by Taylor and Kalt. If the Navajo reservation is omitted from regressions, having a tribal casino increases PCI by 7.4%, reduces the family poverty rate by 4.9 percentage points, and reduces the child poverty rate by 4.6 percentage points. However, casino size matters. Smaller casinos do not have a significant relationship with income or poverty. Larger casinos and medium-sized casino are positively correlated with all three outcomes.

As a robustness check, this study reran regressions estimating casino effects including AI who reported more than one race in census 2000. Casino effects increased in magnitude, but generally were within the 90% confidence intervals of those in Table 2. Additionally, as in Table 3, smaller casinos were not associated with changes in income and poverty whereas large and medium-sized casinos were.[17]

Casinos may improve well-being through in-kind benefits not measured in this article. According to the Harvard Project on American Indian Development (2007) and the National Gambling Impact Study Commission (1999), tribes use gaming revenues to reduce emergency response times, provide indigenous language training, and improve government services and housing.

15. The 2000 American Indian population is used.

16. Per capita slots and casino square-feet use the reservation American Indian population from 2000.

17. Results replicating analysis are available upon request.

APPENDIX

TABLE A1
Unweighted Summary Statistics

Variable	Observations	Mean	SD	Min	Max
Reservation characteristics					
American Indian (AI) population[a]	214	3,947	15,381	64	174,847
AI per capita income (PCI)[a]	214	$8,322	$3,171	$3,807	$32,395
AI family poverty rate[a]	214	34.45	13.19	4.49	76.24
AI child poverty rate[a]	214	41.92	15.42	8.55	83.33
AI percent 25 years and over with high school degree only[a]	214	33.76	6.36	17.72	51.75
AI percent 25 years and over with associate's degree or more	214	12.23	5.68	0.88	35.36
Total slots[b]	68	757	802	41	4,000
Total casino square-feet[b]	68	48,989	53,072	1,000	341,000
Other characteristics					
In east/mid-west region[c]	214	0.21	0.41	0.00	1.00
In interior-west region[c]	214	0.53	0.50	0.00	1.00
In northwest region[c]	214	0.17	0.37	0.00	1.00
In California region[c]	214	0.09	0.29	0.00	1.00
State PCI[d]	214	$24,386	$3,789	$16,788	$32,816
County White PCI[e]	214	$17,890	$3,695	$11,209	$32,910
County population density[e]	214	73.25	140.53	1.33	753.14

[a]Taylor and Kalt (2005).
[b]William N. Evans (for Class III opening dates), Taylor and Kalt (2005), Casino City and 500nations.com.
[c]The regions are calculated using BIA (Bureau of Indian Affairs) regions collapsed into four groups. Department of Interior (2005) and GAO (2006).
[d]Regional Economic Accounts Data (2008).
[e]If a reservation is in multiple counties, we take the weighted average of county characteristics using the proportion of the 1990 American Indian reservation population within each county. U.S. Census Bureau (1993a, 1993b, 2002).

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