JRAP (1998) 28, 1, 18-32

Have Native American casinos diminished other gambling in Minnesota? An economic answer based on accessibility

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Abstract. Over the last decade Native American casinos have been more successful than most envisioned. In some states questions have been raised about social costs and lost sales tax revenues as a result of expenditures being transferred from taxable businesses to reservation casinos. This paper addresses the more specific concern of whether casinos have diminished other forms of gambling in Minnesota that are sources of tax revenue. A model is developed and tested based on accessibility to Native American casinos for the 87 counties of Minnesota. While Native American casinos are found to have adversely affected the lottery and charitable gambling in the state between 1988 and 1993, the diminution is less than two percent and, thus, inconsequential.

1. Introduction

The advent of Native American casinos in America is a recent phenomenon whose consequences are not yet fully understood. While their creation by the federal government was opposed by some, many states were unconcerned and even sympathetic (Carter 1992). Now, however, the dramatic success of these casinos across the country has led to many questions about their existence and proliferation. Some states, such as Arizona (Anders 1996), have resisted the creation of Native American casinos. Others, such as Minnesota (Carter 1992), were quick to reach agreements with reservations within their state, but have since come to question Native American casinos.

The legal impetus for Native American casinos was the 1988 American Indian Gaming Regulatory Act which allowed tribes to offer the types of gam-

* An earlier version of this paper was presented at the Annual Meetings of the Western Regional Science Association. The able computational assistance of Mike Pletan is gratefully acknowledged. Nonetheless, the author accepts full responsibility for the statements made in this paper.

bling that are legal in the state in which they are located. The specifics for each type of gambling are detailed in compacts between the states and each tribe or reservation. In Minnesota the law allowed video machines and blackjack but not roulette and craps. By 1992 each of the 11 reservations in Minnesota were operating gambling facilities, and 22 of the 32 compacts in the United States were with Minnesota tribes. Minnesota was leading the nation in the creation of Native American casinos. These casinos were accessible throughout the state; Minnesotans proved to be eager customers.

The growth of Native American casinos is only one part of the expansion of casino gambling in America. For example, between 1988 and 1994 casino revenue jumped from $8 billion to $15 billion annually while households in which one member visited a casino doubled between 1990 and 1993, from 46 million to 92 million (Goodman 1995). This growth is part of a history of ups and downs in gambling activity corresponding to changing public sentiments toward gambling (Lears 1995).

While the casinos are not required to disclose their financial situation, there are indications that individual casinos have been hugely successful. For example, a power struggle in one tribe (the Shakopee Mdewakanton Sioux) revealed that its casino, which is the closest to Minneapolis-St. Paul, generated $178 million in net revenue in 1993 and profits of $96.8 million. Given that this tribe distributes all its profits to its enrolled members, who number less than 200, it means that each receives about $500,000 a year (Marcotty 1994).

These and other indications of success have led to some reactions within the state. For example, lobbyists instigated a bill in the 1994 legislative session to allow video slot machines in bars. This bill was defeated when polls indicated that Minnesotans wanted casino gambling to remain an Native American monopoly. A similar bill has been considered in Wisconsin and the governor, Tommy Thompson, has indicated a tougher stance (e.g., revenue sharing) in negotiating future compacts with tribes in Wisconsin (Mayers 1996, January 3).

Various studies show casinos' favorable economic impact either as an industry (Cartee and Gordon 1997) or as a single entity (casino) (Anders 1996). At the same time, studies in Minnesota (*Duluth News-Tribune* 1994) and Wisconsin (Thompson, Gazel, and Rickman 1995) suggest substantial, but as yet unmeasured, social costs and negative economic consequences for some businesses (e.g., bars and restaurants) near Native American casinos.

One could broaden the context of the economic debate by viewing these casinos as a mechanism by which state citizens transfer money to tribal members; thus, casinos may provide an alternative to welfare. For example, by receiving casino profits many Minnesota tribes have become less dependent on AFDC and other social programs (Carter 1992). Consequently, this reduces government expenditures and could lower other taxes (though whether they are is a legislative matter). If casino profits are viewed as an alternative to taxing (to

pay for welfare), it is a mechanism supported by groups (e.g., elderly households) that often oppose other forms of taxation.

The casinos also involve a change in economic activity, with redistribution that is somewhat disadvantageous to non-Native American businesses. On the other hand, the spending at Native American casinos may involve export substitution if local residents stop gambling out of state (e.g., in Las Vegas). Such changes are a market decision on the part of consumers to purchase a service at the casino and forgo some other purchase. Therefore, these adjustments reflect the cornerstone of capitalism, consumer sovereignty.

Another consideration is whether the state loses in that gambling purchases at Native American casinos are not subject to sales tax collection whereas most other purchases are. Mason and Stranahan (1996) provide a general theoretical framework for analyzing the effects of casino gambling on state tax revenues. Anders, Siegel, and Yacomb (1998) empirically study the same issue and conclude that tax revenues are lost in four of 12 sectors of the Maricopa County, Arizona, economy. They do not estimate the magnitude of tax revenue losses in either dollar or percentage terms.

A narrower issue, which will be addressed in this paper, is whether the Native American casinos in Minnesota have adversely affected other forms of gambling in the state. Specifically, a model is proposed and estimated that allows for determination of the economic loss (in dollars) in each county of lottery and charitable gambling[1] sales as a result of accessibility to Native American casinos. From this analysis the conclusion will be drawn that Native American casinos have had only a small adverse effect on other gambling. Consequently, Native American casinos have not significantly impacted the state, which derives some tax revenue from both the lottery and charitable gambling. Also, the State of Minnesota does not have a revenue sharing agreement with the casinos as is true in other states.

2. Methodology

Having outlined the issue to be addressed (i.e., whether Native American casinos have diminished other forms of gambling in Minnesota), it is necessary to consider alternative methods that might be employed to resolve the issue. Each of these has potential value, but the implementation of a methodology requires the availability of certain data. Inhibiting many of the approaches is the

[1] The lottery began in Minnesota in 1990 and includes a multistate lottery (or lotto), as well as a daily numbers game and instant (scratch-off) games. Charitable gambling began as bingo in church basements but expanded after state regulation, from $295 million in 1985 to $1.3 billion in 1990 (Franklin 1994, May 1). During this time charities were allowed to sell pulltabs (a sort of paper slot machine) in bars, which has become the largest source of charitable gambling revenue.

lack of financial information pertaining to the various Native American casinos. About all that is known is their location in the state and something of their size (e.g., employment and number of gaming devices). On the other hand, the state collects detailed information on revenues for other forms of gambling (i.e., the lottery and charitable gambling) for each county on a monthly basis.

One approach, which may seem the most direct and obvious, would be to survey individual citizens about how much they gamble at Native American casinos. Some such surveys have been conducted (e.g., Thompson, Gazel, and Rickman 1995). The ability and willingness to answer such a question may be a problem. Even more difficult would be to have someone estimate if they gamble less on the lottery or charitable gambling since Native American casinos have opened and, if so, how many dollars less. No one has tried to solicit these responses in a survey, as yet. Likewise, it is also questionable if sellers of lottery tickets or charitable gambling pulltabs could be expected to estimate if, and how much, their sales have diminished since the opening of Native American casinos.

Therefore, more indirect methods based on aggregations of data will be better suited to resolve the issue at hand. The aggregation will be geographic in nature and may or may not involve a time series data approach. If a single geographic entity (e.g., state or county) were used as the unit of observation it would be necessary to create a model using time series information to ascertain if the expansion of Native American casinos was followed by a diminution in sales of lottery tickets[2] and charitable gambling pulltabs. Anders, Siegel, and Yacomb (1998) followed this approach in doing an event study for Maricopa County in Arizona. On the other hand, if smaller geographic aggregations are used it is not necessary to focus on the time dimension as a means of ascertaining the influence of Native American casinos on other gambling. Instead, the proximity to such casinos can be used to detect their influence on other types of gambling revenues.

The approach in this paper is based on the notion of geographical accessibility. It suggests that the extent of an activity (lottery and charitable gambling) in one location (county) might be influenced (negatively) by the availability of competing alternatives (Native American casinos) in the same or accessible locations (counties). While the extent of the lottery and charitable gambling can be measured in dollars, the availability and accessibility of Native American casinos cannot. Hence, only their presence will be measured or accounted for in the approach. There will be some consideration given to time but the approach

[2] Any time series data model of the lottery would need to take into account the changing jackpot over time. This has been shown to be a more important determinant of lottery play than demographics (Clotfelter and Cook 1990). On the other hand, charitable gambling is not influenced by jackpot size and so is more easily analyzed using time series data.

will not use time series data or involve event study methodology. When more detailed time series data become available, it will be possible to alter the proposed model and estimate it with pooled time-series, cross-section data.

One precedent for this approach is a study by Mikesell (1991) that sought to determine the lottery expenditures of Indiana households at a time when the state did not have a lottery. He found expenditures to be greater for households in counties of Indiana that bordered, or were adjacent to, states that had a lottery. While his results were based on individual household data, this paper will be based on a model using geographically aggregated (i.e., counties) data.

The model attempts to explain, in two equations, the extent of a gambling economic activity i (lottery or charitable gambling sales) in each of j locations on the basis of the accessibility to Native American casinos in the same j locations. It also includes socioeconomic (e.g., income and age) variables that may influence the demand[3] for activity i in location j. These will be specified based, in part, on those factors that have been found to determine the propensity to gamble. The general model is as follows:

$$GAMBLING_{ij} = f(CASINO_j, ACCESSCAS_{not\,j}, SOCECON_j)$$

where:

$GAMBLING_{ij}$ = Gambling of type i in location j;

$CASINO_j$ = Presence of casino in location j;

$ACCESSCAS_{not\,j}$ = A measure of access to casinos in locations other than location j;

$SOCECON_j$ = Socioeconomic characteristics (a vector) of location j;

i = Lottery or charitable gambling; and

j = Geographic areas (counties).

The most comprehensive measures of accessibility would consider the availability of Native American casinos in all j locations and take into account distance [e.g., using potential variables (see, for example, Steinnes and Snow 1982) with different distance weighting schemes]. While availability could be measured in different ways (e.g., dollars, employment, or number of gaming devices), only the presence in a location (county) will be used. Also, only the presence in the same and adjacent, rather than all other, counties will be specified in the estimation.

The rationale for limiting, or truncating, the range of accessibility is that casinos in distant locations (counties) do not provide an alternative to gambling activity i in location j. Also, it is assumed that the presence of more than one

[3] It might also be possible to consider supply by measuring the number of locations (in each county) engaged in lottery sales and charitable gambling. Such information is not available, however. In any case, there is no barrier to entry, so it is likely that these activities are ubiquitous in each county.

casino in location j does not further diminish the extent of activity i than would the presence of a single casino. Hence, the variable $CASINO_j$ will be a binary, or dummy, variable. Likewise, it is assumed that the presence of a casino in one or more adjacent counties will have the same effect as having a casino in only one adjacent county. This means a binary adjacency variable will be more effective than a variable counting the number of adjacent counties with casinos. These assumptions are tested empirically against alternatives, and the binary variables prove to be better specifications. Also, a single access measure will be tested based of the binary variables just outlined.

The general accessibility model proposed is specified based, in part, on the availability of data. The observations, or locations j, are the 87 counties of Minnesota. The model consists of two equations, one for each gambling activity i. For any given year the extent of these activities are measured in dollars gambled per capita [based on the dollars and population of the year in question as provided in Franklin (1994, May 1)]. By using per capita measures, the equations are not measuring scale or population size. The total 1993 dollar sales for the lottery and charitable gambling, by county, are found in Table 1. While the changes in total charitable gambling between 1988 and 1993 are shown in Table 1, corresponding changes for the lottery are not because the lottery did not exist in 1988.

The dependent variables measure the change in per capita gambling expenditures between 1988 and 1993, a time span during which all the Native American casinos were opened. The timing of the influence could be further discerned, perhaps, if changes over smaller time periods (e.g., years or months) were specified for the dependent variable. Such a model will be tested in the future, and it will more carefully consider the exact time that each casino was opened during the 1988-1993 period. The introduction of time series data, rather than the cross-sectional data used in this study, creates problems. For example, a downturn in the national economy might adversely affect lottery and charitable gambling sales in all counties. If this coincided with the opening of Native American casinos, it would be possible, statistically, to attribute the fall in lottery and charitable gambling sales to the opening of Native American casinos rather than to the national recession. The cross-section approach taken in this paper avoids this statistical problem.

Using a change specification for the dependent variable means that county differences in socioeconomic characteristics are less likely to be significant because they are intended to explain the level, not the change, of gambling in each county.

The socioeconomic characteristic vector contains information for each county obtained from the *Census of Population* (1990): median household income (MEDINC), percentage of population over 65, and the unemployment rate. Some of these variables are suggested by previous studies (Clotfelter and

Table 1. Gambling in Minnesota, by county

County	(1) TOTAL $ LOTT93	(2) TOTAL $ CHAR93	(3) TOTAL $ CHANGE IN CHAR (88-93)
Aitkin	1052352	7955280	1716336
Anoka	22190568	76264136	21425376
Becker	1860474	11811191	-591969
Beltrami	2009991	7440493	-2292095
Benton	2062840	9742952	285624
Bigstone	528728	1063604	909904
Blue Earth	3868151	14165060	-2342683
Brown	1789458	5829295	1355650
Carlton	2281279	9984299	385151
Carver	2596614	9520918	3156668
Cass	1762648	9638784	602424
Chippewa	973544	5867576	2499640
Chisago	2836416	9669600	451248
Clay	5508648	10150194	-2193258
Clearwater	558981	3462345	859329
Cook	322342	444203	672201
Cottonwood	696080	1657936	240464
Crow Wing	4394112	25815408	-686580
Dakota	20040567	44147336	13941264
Dodge	1222308	3007521	1736964
Douglas	2411814	16679292	7903776
Faribault	1509660	3354800	788378
Fillmore	1207038	4932207	2830296
Freeborn	3165984	12894789	7453254
Goodhue	3021543	8650719	4553010
Grant	404040	1796424	366744
Hennepin	78540450	190000000	35605004
Houston	1200448	3957727	1500560
Hubbard	1057770	7159110	168630
Isanti	1538544	6397104	3832864
Itasca	4006003	17262982	3551714
Jackson	545670	1532520	255420
Kanabec	781140	4478536	-2043983
Kandiyohi	3124608	8503680	3045504
Kittson	494073	2640735	1277775
Koochiching	1201332	5548257	1217139
Lacquiparle	413929	1594067	730981
Lake	766122	3199077	1418361
Lake of the Woods	304483	3778926	1826898
LeSueur	1696536	8129235	2238485
Lincoln	238560	1111008	722496
Lyon	1734320	3518192	1164472
Mahnomen	375032	0	-967988
Marshall	630460	4174080	1695720

Table 1 (cont.). Gambling in Minnesota, by county

County	(1) TOTAL $ LOTT93	(2) TOTAL $ CHAR93	(3) TOTAL $ CHANGE IN CHAR (88-93)
Martin	2030268	5588940	-1596840
McLeod	2383085	9010020	3395080
Meeker	1451070	4647630	1177680
Mille Lacs	2127216	8698794	-1937286
Morrison	2558075	17033770	4423965
Mower	4456907	10786464	4868890
Murray	441462	1775445	1324386
Nicollet	1951396	5050672	1377456
Nobles	1288960	3242540	624340
Norman	402339	2098474	-402339
Olmsted	7775670	19994580	8664318
Ottertail	4448919	19329786	1789795
Pennington	901136	5936896	-357804
Pine	1457585	10224850	-2175500
Pipestone	480240	720360	93960
Polk	4086500	14776784	-490380
Pope	654103	3656543	1758572
Ramsey	43142704	1 1E+08	39710898
Redlake	94185	1556295	-376740
Redwood	1070864	1468120	241808
Renville	1159158	3266718	2054871
Rice	3837392	12875460	4241328
Rock	302250	887250	9750
Roseau	1085945	4328485	351785
Saint Louis	15343020	70538040	-1195560
Scott	3469760	17596640	2292520
Sherburne	3371175	14653374	-5573676
Sibley	587776	3440640	1433600
Stearns	9534720	44006400	20414080
Steele	2797830	8455664	3512831
Stevens	508416	1938336	889728
Swift	828048	3131720	1624248
Todd	1474326	7441836	3252878
Traverse	267363	390087	-13149
Wabasha	1559220	10914540	6236880
Wadena	1143528	5678208	1537848
Waseca	1187340	5163130	2266740
Washington	10783044	27348300	5313384
Watonwan	978012	2736105	244503
Wilkin	849186	119184	-610818
Winona	3608475	9574487	4763187
Wright	5820688	22147008	4897896
Yellow Medicine	695340	2352567	822819
Totals	343.32 million	1,125.75 million	244.15 million

Cook 1990 and Mikesell 1991) that have investigated the determinants of lottery gambling. It is assumed that they also may be important in explaining charitable gambling. Past research has indicated that lottery sales are income inelastic over most income levels (Clotfelter and Cook 1990), so this variable may be insignificant given the limited variation in median incomes across the 87 Minnesota counties. Each of the socioeconomic variables has little variation across the counties. The coefficients of variation are .24 for median income, .28 for percentage over 65, and .40 for the unemployment rate. In contrast, the coefficient of variation for the dependent variable (change in charitable gambling per capita) is 1.45.

3. Estimation results

The model developed and specified to investigate the impact of Native American casinos on other forms of gambling in Minnesota is estimated using ordinary least squares. The estimation results in Table 2 are for a multiple linear regression model using the 87 counties in Minnesota as observations. While the measures of significance for the overall model (e.g., R-Square and F-value) and individual independent variables (i.e., t-values) are not high, this is not unexpected given the nature of the model. The dependent variables have been scaled (i.e., per capita) and measured in changes. Moreover, the fact that the access measures for Native American casinos are not significant is the main result of the paper. No discernable statistical impact is found on either the lottery or charitable gambling resulting from Native American casinos.

In Table 2 median income, MEDINC, has a negative effect on the lottery, while it is positive for charitable gambling. Likewise, both ELDERLY and UNEMPRATE show opposite signs for the two forms of gambling, which suggests each form of gambling may have its own unique determinants. The insignificance of these variables prohibits drawing any firm conclusions.

Previous studies (Clotfelter and Cook 1990) have shown those over 65 play the lottery less than those between 18 an 65, and this trend is confirmed in Table 2. On the other hand, ELDERLY is positive for CHAREXP, but this observation may reflect that elderly incomes rose more than the income of the rest of the population during this time period. ELDERLY was also interacted with Native American casino access measures, but this proved ineffective statistically because of collinearity. It was anticipated the interaction would show that the elderly have a greater propensity to gamble at Native American casinos than other age groups, as others have suggested (e.g., Anders, *et al.* 1998 and Thompson, *et al.* 1995). The county unemployment rate, UNEMP, is used as a measure of economic conditions and is hypothesized to be negative. It is for CHAREXP but not for LOTTEXP. Finally, it should be mentioned that meas-

Table 2. Estimation results

Independent variables	Dependent variables, change in expenditures 1988-1993 (t-values in parentheses) (1) LOTTEXP	(2) CHAREXP	(3) LOTTEXP	(4) CHAREXP
constant	88.37	-111.26	88.68	-135.25
	(2.32)	(-.57)	(2.34)	(-.68)
MEDINC	-.00027	.0038	-.00026	.0043
(1990 median household income)	(-.34)	(.92)	(-.34)	(1.05)
ELDERLY (% over 65 in 1990)	-83.09	714.07	-84.46	788.57
	(-.90)	(1.50)	(-.92)	(1.63)
UNEMP (% unemployed in 1990)	75.05	-490.62	88.40	-586.61
	(.71)	(-.90)	(.82)	(-1.04)
CASINO (=1 if casino(s) in county)	-.46	-51.28		
	(-.08)	(-1.80)		
ACCESSCAS			-1.54	-6.69
(=2 if DCASINO eq 1)			(-.51)	(-.42)
(=1 if DADJACENT eq 1 and DCASINO ne 1)				
Sample size (n)	87	87	87	87
F-value	.694	2.96	.759	2.120
R-squared	.033	.126	.036	.094

ures of tourism activity in each county were tried but proved unsuccessful. There are other omitted variables that might explain the variation in lottery sales and charitable gambling.

While different Native American casino access measures were considered, the estimation results for only two will be presented (Table 2) and used to estimate the impact (Table 3) of Native American casinos on the lottery and charitable gambling. Other specifications of access are less significant or give comparable impact estimates.

Columns 1 and 2 of Table 2 use the simplest type of Native American casino access measure, a binary variable (CASINO) that equals 1 if county j has an Native American casino and zero if it does not. It has the anticipated negative sign for both other types of gambling, though the effect for CHAREXP is considerably larger. This distinction holds true for the other access measure reported and eventually leads to the conclusion that Native American casinos have been more detrimental to charitable gambling than to the lottery.

In columns 3 and 4 of Table 2 CASINO is replaced with a variable, ACCESSCAS, that takes into account casinos both in the same county (j) and in counties adjacent to j. This variable assumes a linear relation in terms of access. ACCESSCAS has a value of 2 if there is a casino in county j, a value of 1 if

Table 3. Impact of Native American casinos, by county

	Gain if no DCASINO		Gain if no ACCESSCAS		
	(1)	(2)	(3)	(4)	(5)
County	Lottery	Charitable Gambling	ACCESSCAS	Lottery	Charitable Gambling
Aitkin	0	0	1	19305.65	83824.85
Anoka	0	0	0	0	0
Becker	0	0	1	43439.25	188612.6
Beltrami	0	0	1	54340.28	235944.7
Benton	0	0	1	48905.18	212345.6
Big Stone	0	0	0	0	0
Blue Earth	0	0	0	0	0
Brown	0	0	1	41781.13	181413.1
Carlton	74985.94	1339466	2	91310.41	396468.5
Carver	0	0	1	78458.47	340665.6
Cass	56471.67	1008748	2	68765.58	298579.2
Chippewa	33297.84	594795.9	2	40546.79	176053.6
Chisago	0	0	1	49669.51	215664.3
Clay	0	0	0	0	0
Clearwater	0	0	1	12856.56	55823.01
Cook	9949.36	177724.4	2	12115.34	52604.64
Cottonwood	0	0	1	19502.9	84681.3
Crow Wing	0	0	1	70534.65	306260.5
Dakota	0	0	1	447572.7	1943354
Dodge	0	0	1	24783.9	107611.4
Douglas	0	0	0	0	0
Fairbault	0	0	0	0	0
Fillmore	0	0	0	0	0
Freeborn	0	0	0	0	0
Goodhue	104760.6	1871329	2	127567.1	553894.4
Grant	0	0	0	0	0
Hennepin	0	0	1	1613744	7006855
Houston	0	0	0	0	0
Hubbard	0	0	1	23623.53	102573
Isanti	0	0	1	41594.67	180603.5
Itasca	0	0	1	63641.76	276331.6
Jackson	0	0	0	0	0
Kanabec	0	0	1	20062.28	87110.13
Kandiyohi	0	0	1	60949.63	264642.4
Kittson	0	0	1	8751.34	37998.19
Koochiching	0	0	1	24358.59	105764.6
Lac Qui Parle	0	0	1	13571.59	58927.64
Lake	0	0	1	15953.97	69271.92
Lake of the Woods	0	0	1	6427.51	27908.16
LeSueur	0	0	1	36310.58	157660
Lincoln	0	0	0	0	0
Lyon	0	0	1	38179.82	165776.2
Mahnomen	12827.11	229129.3	2	15619.58	67819.98
Marshall	0	0	1	16750.67	72731.17

Table 3 (cont.). Impact of Native American casinos, by county

	Gain if no DCASINO		Gain if no ACCESSCAS		
	(1)	(2)	(3)	(4)	(5)
County	Lottery	Charitable Gambling	ACCESSCAS	Lottery	Charitable Gambling
Martin	0	0	0	0	0
McLeod	0	0	0	0	0
Meeker	0	0	0	0	0
Mille Lacs	48071.28	858692.5	2	58536.43	254164.3
Morrison	0	0	1	46376.4	201365.6
Mower	0	0	0	0	0
Murray	0	0	0	0	0
Nicollet	0	0	0	0	0
Nobles	0	0	0	0	0
Norman	0	0	1	12156.95	52785.3
Olmsted	0	0	1	171175.8	743243
Otter Tail	0	0	0	0	0
Pennington	0	0	0	0	0
Pine	55061.91	983565.3	2	67048.91	291125.4
Pipestone	0	0	0	0	0
Polk	0	0	1	50378.37	218742.2
Pope	0	0	0	0	0
Ramsey	0	0	0	0	0
Red Lake	0	0	1	6911.38	30009.14
Redwood	43715.43	780884.4	2	53232.3	231133.9
Renville	0	0	1	27064.58	117514
Rice	0	0	1	77808.17	337842
Rock	0	0	0	0	0
Roseau	38711.65	691502.2	2	47139.19	204677.7
Saint Louis	504327.1	9008744	2	614119.3	2666497
Scott	156820.8	2801274	2	190960.7	829148.7
Sherburne	0	0	1	69266.41	300753.8
Sibley	0	0	1	22091.78	95922.18
Stearns	0	0	0	0	0
Steele	0	0	0	0	0
Stevens	0	0	0	0	0
Swift	0	0	1	16359.26	71031.66
Todd	0	0	1	36062.48	156582.8
Traverse	0	0	0	0	0
Wabasha	0	0	1	30804.59	133753.1
Wadena	0	0	1	20254.9	87946.5
Waseca	0	0	0	0	0
Washington	0	0	0	0	0
Watonwan	0	0	0	0	0
Wilkin	0	0	0	0	0
Winona	0	0	0	0	0
Wright	0	0	0	0	0
Yellow Medicine	0	0	1	17858.65	77542
$ Totals	1.139 mil	20.346 mil		4.887 mil	21.218 mil

there is a casino in a county adjacent to county j (but not a casino in county j), and a value of 0 otherwise. This variable is negative in both models but larger for the CHAREXP model (column 4), which is consistent with the results using CASINO.

In Table 2 the explanatory power (i.e., R^2) is greater for charitable gambling, though both models are insignificant (based of F-values). Also, the Native American casino access measures (CASINO and ACCESSCAS) are larger and more significant for the CHARPC model (columns 2 and 4). This supports the earlier point that Native American casinos have had more impact on charitable gambling than on the lottery. The impact for both is minor.

The focus now turns to using the results in Table 2 to estimate the impact on the lottery and charitable gambling sales of Native American casinos. Columns 1 and 2 of Table 3 show the impact on other gambling in each county when CASINO is used to measure access. These values are found by multiplying the per capita impact (i.e., the coefficient of CASINO in Table 2) by the population of each county with a casino. As seen in Table 3, the impacts are not evenly distributed across counties and are larger for charitable gambling than for the lottery when all counties are added together. (See the bottom of Table 3.)

Columns 4 and 5 of Table 3 use the results in Table 2 and the ACCESSCAS values for each county (column 3 in Table 3) to estimate the impact of Native American casinos. ACCESSCAS values are multiplied by the coefficient of ACCESSCAS in Table 2 to obtain a per capita impact. The per capita impact is multiplied by the population of each county. The gains are more widely distributed across counties than in columns 1 and 2 but the statewide totals are similar, especially for charitable gambling. This suggests that the impacts are minor and not sensitive to the alternative specifications of access, CASINO or ACCESSCAS.

To put the statewide impact estimates in perspective, they can be compared to the total amount of gambling in 1993 (Table 1). The impacts are smaller than the 1993 values found in Table 1 for each county, which lends some plausibility to the estimation procedures being used. The statewide impacts are a small percentage of total gambling. For the lottery, the impacts estimated using CASINO (Table 4) are $1.139 million (or .33 percent of $343.32 million gambled on the lottery in Minnesota in 1993). A slightly larger impact is found using ACCESSCAS, $4.887 million, or 1.42 percent.

While charitable gambling shows larger dollar impacts, $20.346 million using CASINO and $21.218 million using ACCESSCAS, these are small respective percentages (1.81 and 1.88) of the total charitable gambling in 1993, $1,125.75 million in Table 1. Taken together, the impacts in Table 3 suggest that Native American casinos have had little effect on other forms of gambling in the state of Minnesota. Moreover, the loss in state tax revenues is only a frac-

tion of the reduction in gambling, about one-fourth for the lottery (Clotfelter and Cook 1990) and even less for charitable gambling.

4. Discussion

Having made the case that the success of Native American casinos in Minnesota has led to questions of social and economic impact, this paper analyzes one of the possible adverse consequences. The potential negative impact of Native American casinos on other forms of gambling, which are sources of tax revenue for the state, is estimated and found to be inconsequential.

The methodology employed relies on cross-section, rather than time-series, data and assumes that other gambling is more adversely affected in counties that contain, or are near, Native American casinos. The fact that little connection is found between the different forms of gambling based on accessibility is, however, consistent with those who have studied such connections using time series data. For example, Clotfelter and Cook (1990) conclude that sales of instant and numbers games were not hurt by the introduction of lotto in 13 states analyzed over a two-year period (before and after the introduction of lotto in these states). In the future greater information may become available regarding casino operations (e.g., revenue) that will allow for a more definitive specification of accessibility.

While it will be interesting to consider the impact of Native American casinos on other gambling in Minnesota using time series data, the results of this paper suggest that little impact will be discovered. It also remains to be determined if, and to what extent, other sectors (e.g., the entertainment sector, including bars and restaurants) of the Minnesota economy have been diminished by the Native American casinos success. While these displacement issues have been raised by some, further study may reveal that the casinos have also replaced exports (e.g., trips to Las Vegas by Minnesota residents). For these issues to be completely analyzed it will be necessary to have more information available regarding the operation of Native American casinos (e.g., sales and/or expenditures), which has been a problem (Anders 1996).

As other states reach compacts with tribes, more information will become available on the consequences, both economic and social, of Native American casinos. At the same time there is much to be learned about the determinants of Native American casino gambling. How much do people gamble at Native American casinos, and what are the characteristics of the players? These issues may only be understood fully when more economic information regarding the casinos is released. Casinos are important economic engines for many reservations in Minnesota, and they are likely to be replicated throughout the country. Given this growing importance, it is incumbent on social scientists to study all aspects of Native American casinos in the future.

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