The Impact of Casino Gaming on Sales Tax Revenues in States Legalizing Casinos in the 1990s.

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I. INTRODUCTION

Over a 58-year period from 1931 to 1989, only two states (Nevada in 1931 and New Jersey in 1976) legalized casino gaming. Legalization of casinos for revenue generation and economic development purposes, however, surged in the 1990s as casino operations commenced in 13 states. Gaming at full-blown casinos comprising table games, slot machines, and, in many cases, various other amenities commenced in nine states (Colorado, Illinois, Indiana, Iowa, Louisiana, Michigan, Mississippi, Missouri, and South Dakota). During FY 2003, casino operations in these nine states generated approximately $12.4 billion in adjusted gross wagering receipts (AGR). AGR is the amount of dollars wagered by gamblers that is ultimately retained by the casino after pay out of winnings to gamblers. Mississippi casinos led this group by generating about $2.7 billion in AGR, with South Dakota the lowest at about $69.0 million. In addition, gaming at racetrack slot parlors called "racinos" commenced in six states (Delaware, Iowa, Louisiana, New Mexico, Rhode Island, and West Virginia). Racinos in these six states generated about $2.2 billion in AGR during FY 2003. Racino AGR ranged from a high of about $717.1 million at West Virginia venues while the fledgling racinos in Louisiana represented the low at about $232.7 million. Table 1 presents information on casino gaming in these 13 states.

[PLACE TABLE 1 HERE]

Research estimating the effect of consumer purchases of lottery tickets on state taxes, the cross effects of lottery purchases on pari-mutuel gaming, and the cross effects of casino gaming on lottery purchases is minimal. Research on displacement of sales tax by consumer spending on casino gaming activities is even more limited. As casino gaming becomes a larger revenue source for states, more analysis is warranted to determine the net revenue effects of the casino operations. Displacement of sales tax revenue by wagering has important implications for setting tax rates on gaming activities that are compatible with sales tax rates due to the potential for displacement. The implications also extend to the distributional formula enacted by policymakers for purposes of dividing tax revenue, including gaming tax revenue, among

various governmental uses. Given the pervasiveness of casino gaming in the U.S. (currently operating in over one-fifth of the states), and the potential for many more states to legalize casino gaming, empirical analysis of the effects of casino gaming on sales tax revenue is a vital addition to the public finance literature.

In this study, time-series cross-sectional data from 42 states that impose sales taxes are employed to estimate the displacement effects of casino wagering on state sales tax revenue. The sample spans 19 years, from 1985 to 2003, and includes 12 states where large scale casino gaming commenced during the 1990s. Delaware is the only state among the new casino states that doesn't impose a sales tax. The study improves on prior single-state case studies by providing a global comparative analysis of sales tax displacement in all the states that recently adopted casino gaming. Also, the study directly measures the impact of consumers' gaming expenditures (measured by AGR) on sales tax revenue. This is in contrast to two of three existing studies that derive only implied estimates of this displacement effect by regressing sales tax revenue on a dummy variable corresponding to the start-up time of casinos. Finally, this study derives two types of displacement estimates: (1) the estimated average displacement effect for the 12 new casino states that have sales taxes; and (2) separate displacement effects arising in each of the focal states.

The remainder of this paper is divided into the following five sections: (1) a review of pertinent empirical research regarding displacement of tax revenue by gaming activity; (2) an explanation of the econometric model; (3) a description of the sample data and estimation methodology; (4) a discussion of the regression results; and (5) a concluding section discussing the policy implications of the regression estimates.

II. LITERATURE REVIEW

Literature estimating the displacement of state sales tax revenue by consumer spending on casino gaming is scarce. The current body of literature comprises only single-state case studies using county-level data to estimate the displacement effects of tribal casinos in Arizona and

New Mexico, and commercial casinos in Missouri. Each study employs an interrupted time-series spanning the commencement of casino gambling operations in and around the counties being analyzed. Anders, Seigel, and Yacoub (1998) employ a monthly times-series to estimate the determinants of county-level sales tax collections in Maricoupa County, Arizona. The period of analysis spans the commencement of tribal casino operations in and around the county. During this period, 15 tribal casinos commenced operating under compacts in Arizona, with three located in or adjacent to Maricoupa County. Since wagering receipt totals generated at the tribal casinos was not available, the sales tax model includes a dummy variable equal to one if tribal casinos operated during the month. Thus, the estimated model does not yield the dollar-for-dollar displacement effects of casino wagering. Nevertheless, the model estimates suggest that tribal casino operations lowered sales tax revenues by an average of 2.7%.

Popp and Stehwien (2002) extend this methodology to estimate the relationship between county-level taxable sales in New Mexico and two dummy variables indicating the presence of tribal casinos. Popp and Stehwien employ quarterly time-series cross-sectional data comprising all counties in New Mexico and spanning the time that 12 tribal casinos commenced operating in the state. Again, since wagering receipt totals generated at tribal casinos was not available, the impact of casinos on taxable sales was measured implicitly via dummy variables, with one measuring the presence of a single casino in a county and a second dummy variable measuring the presence of two casinos. The model estimates suggest that the presence of one casino has very little impact on the sales tax base, but two casinos have a recognizable effect. The model estimates suggest that counties containing two tribal casinos have a sales tax base that is 6.2% lower than counties without tribal casinos.

Siegel and Anders (1999) also use county-level sales tax data, but this time distributed by SIC industry group, to estimate the displacement of sales tax revenue due to wagering at riverboat casinos in Missouri. Siegel and Anders use quarterly time-series cross-sectional tax and AGR data comprising 11 Missouri counties either containing riverboat casinos or situated

within driving distance of riverboat casinos. The quarterly series spans the startup of 10 riverboat casinos in Missouri, including the maturation period of at least five of these casinos. This analysis is superior to those conducted by Anders, Seigel, and Yacoub (1998) and Popp and Stehwien (2002) because it yields direct estimates of the sales tax elasticity due to changes in casino wagering. In addition, this study also focuses on economic sectors (trade and services) that may be most affected by casino operations. The model estimates fail to reveal displacement effects involving sales tax collections in the general merchandise, apparel and accessory stores, miscellaneous retail, and personal services industry groups. However, the model estimates do reveal displacement in the amusement and recreation industry group. The estimates suggest that a 10% increase in casino AGR results in an average decline in sales tax revenue from this industry group ranging from about 3% to about 5.9%, depending upon the location of the riverboat casinos in Missouri.

Pertinent literature also includes multi-state studies by Borg, Mason, and Shapiro (1993), Kearney (2002), and Fink, Marco, and Rork (2003) estimating the displacement of state sales tax revenue or non-gaming consumption spending by consumer spending on state lottery games. The dollar-for-dollar displacement estimates vary from a low range of $0.02 to $0.14 reduction in state sales tax revenue per $1.00 increase in state lottery revenue (Borg, Mason, and Shapiro) to $1.35 sales tax reduction per $1.00 increase in state lottery revenue (Fink, Marco, and Rork). Given what appear to be substantial differences in the market structures of state lottery games versus commercial casinos, these displacement estimates may not provide a reliable gauge of casino displacement. However, these studies are instructive as to the methodology that might be employed to generate multi-state estimates of the displacement effects of casino wagering.

The most recent multi-state study of lottery impacts on state sales tax revenue was completed by Fink, Marco, and Rork (2003). This study provides an excellent methodological blueprint. They estimate the impact of per capita net lottery revenue on state sales tax revenue

controlling for the effects of various other demographic and financial factors. The lottery revenue model is estimated with a time-series cross-sectional sample spanning 1967 to 1999 and comprising states with sales taxes. Nominal dollar amounts are transformed to real terms (base year = 1996). Fink, Marco, and Rork employ Heckman's two-stage estimation methodology to control for statistical bias resulting from the endogeneity of lottery adoption.[1] As well, they estimate the substantial lottery revenue equation by 2SLS in order to control for simultaneity between lottery revenue and sales tax revenue. The coefficient estimate on net lottery revenue suggests that sales tax revenue declines by $1.35 per $1.00 in additional lottery revenue. Fink, Marco, and Rork suggest that this result is not attributable, entirely, to pure substitution between taxable purchases and lottery purchases. But, is also the result of states being less likely to raise sales tax rates when experiencing high lottery revenues.

III. ECONOMETRIC MODEL

The following sales tax model is employed to estimate the impact of casino gaming expenditures on state sales tax revenue.

$$\text{SALES TAX REVENUE} = \beta_0 + \beta_1(\text{SALES TAX RATE}) + \beta_2(\text{FOOD EXEMPTION}) + \beta_3(\text{INCOME}) + \beta_4(\text{AGR}) + \beta_5(\text{STATE}) + \beta_6(\text{YEAR}) + \varepsilon$$

The model suggests that annual per capita state sales tax revenue (SALES TAX REVENUE) is dependent on the state sales tax rate (SALES TAX RATE); the presence of a food exemption (FOOD EXEMPTION) specified by a dummy variable equal to one when a food exemption is present; per capita personal income (INCOME); and per capita casino adjusted gross wagering receipts (AGR). AGR is the amount of dollars wagered by gamblers that is ultimately retained by the casino after pay out of winnings to gamblers. Thus, AGR represents amounts spent by consumers on casino gaming in lieu of alternative uses such as savings or expenditures on taxable and nontaxable goods and services. The model measures the per

capita dollar amount of sales tax revenue displaced for each additional $1.00 of per capita casino gaming expenditures.

SALES TAX REVENUE is expected to be directly related to SALES TAX RATE and INCOME ($\beta_1 > 0$, $\beta_3 > 0$) and inversely related to AGR ($\beta_4 < 0$). FOOD EXEMPTION is expected to reduce SALES TAX REVENUE ($\beta_2 < 0$). The model also includes state fixed effects (STATE) and year fixed effects (YEAR) specified by dummy variables. STATE accounts for variation in unobservable state level political, economic, and demographic variables, and YEAR accounts for unspecified economic fluctuations.

IV. ESTIMATION METHODOLOGY

The sales tax model is estimated using time-series cross-sectional data spanning 1985 to 2003 and comprising 42 states with preexisting sales taxes.[2] The sample consists of 798 observations. Nominal dollar amounts are transformed to real terms (base year = 1985). Definitions and summary statistics for the dependent and explanatory variables in the estimated sales tax model are presented in Table 2. Annual state sales tax revenue totals were obtained from the U. S. Census Bureau, *State Government Finances* database and annual state income totals were obtained from the U. S. Bureau of Economic Analysis, *Annual State Personal Income Estimates* database. State sales tax rate and food exemption histories were obtained via state revenue department annual reports and contacts with state revenue personnel. Finally, annual AGR totals were obtained from state gaming agency reports; state lottery agency reports; and contacts with gaming and lottery agency personnel.

[PLACE TABLE 2 HERE]

The estimation methodology utilized follows the procedures employed by Fink, Marco, and Rork (2003) to estimate the displacement of state sales tax revenue by state lottery purchases, and by Fink and Rork (2003) to estimate the displacement of state lottery revenue by casino wagering. These procedures control for statistical bias due to the endogenous nature of states'

choosing to legalize casino gambling as well as the simultaneous relationship between sales tax revenue and AGR.

A. Endogeneity Issues

While SALES TAX REVENUE is observed for all states in the sample, AGR is observed only for those states that have chosen to legalize casino gaming during the period of analysis. OLS estimation of the sales tax model with this sample will yield a biased coefficient estimate on AGR. This is because the presence of casino gaming in a state where AGR > 0 as opposed to AGR = 0 is endogenous. That is, AGR is essentially a selection variable that is correlated with unobservable factors not specified in the sales tax model but accounted for by the error term. These unobservable factors are, thus, correlated with SALES TAX REVENUE and AGR. Most likely β_4 will be negatively biased where legalization of casino gaming (AGR > 0) is associated with a preexisting decline in sales tax revenue. Thus, the displacement effects of casino gaming will be overestimated.[3]

Negative endogeneity bias could arise if states experiencing declining tax revenues, including sales tax revenue, systematically have chosen to legalize casino gaming to provide for a new and growing source of revenue from gaming taxes. As a result, the onset of casino gaming and ramping up of casino AGR (AGR > 0) is inversely related to sales tax revenue. The self-selected sample will result in the estimation of a larger displacement effect than we would expect if casino gaming arose in a random sample of states. Negative bias also could arise if economic distress is severe and sufficiently widespread in states that legalized casinos in seriously distressed communities to spur economic development. In this scenario, general economic decline is directly related to otherwise declining sales tax revenue, with both being inversely related to casino AGR levels.

To control for the endogeneity of state legalization of casino gaming, I employ Heckman's two-stage estimation procedure. The first stage consists of a probit regression to estimate the determinants of state legalization of casino gaming.[4, 5] The dependent variable in this model is

a dummy variable equal to one in years a state has legalized casino gaming and zero otherwise. The explanatory variables comprise fiscal, economic, demographic, and gaming determinants of the probability that a state would legalize casino gaming. The predicted probit scores for casino gaming legalization are utilized to calculate the inverse Mills' ratio (IMR). The IMR is included in the sales tax equation as a separate explanatory variable to correct for the expected negative endogeneity bias.[6]

B. Simultaneity Issues

In addition to the endogeneity problem, SALES TAX REVENUE and AGR also may be simultaneously determined. Presumably, sales taxation and casino gaming are substitute policies where the legalization and expansion of casino gaming influences sales tax revenue, and sales tax rate hikes or broadening of the sales tax base reduces the disposable income that consumers have to spend on casino gaming. To correct the simultaneity bias, 2SLS is employed. An instrumental variable for AGR is estimated using four instruments: (1) per capita electronic gaming devices (EGDs) present in a state during the year; (2) the square of per capita EGDs; (3) a dummy variable indicating whether a state imposed a loss limit on gamblers; and (4) a dummy variable indicating whether a state imposed a wagering limit on gamblers.[6] The instrumental variable derived from this process (AGR-IV) is used as the focal explanatory variable in the estimating model. Summary statistics are reported in Table 2 for AGR-IV.

V. REGRESSION RESULTS

The coefficient estimates derived for two variations of the sales tax model are presented in Table 3. Both of the estimating models include state and year fixed effects variables as well as the IMR.[7] Model 1 estimates the determinants of sales tax revenue in 42 states. Specifically, it estimates the average impact of AGR on sales tax revenue in the 12 new casino states that impose sales taxes. Model 2 includes AGR and interactions of AGR and the state fixed effects variables. The combination of the main AGR effect and the interaction effects provides

estimates of the distinct displacement effects occurring in each of the 12 new casino gaming states.

[PLACE TABLE 3 HERE]

The coefficients on the control variables have the expected signs, are statistically significant, and are stable. Both models are statistically significant and explain approximately 95% of the variation in annual per capita state sales tax revenue. The coefficient on the IMR correction factor is negative but is not statistically significant. In Model 1, eight of 19 year fixed effects variables are statistically significant and 37 of 41 state fixed effects variables are statistically significant. In Model 2 six of 19 year fixed effects variables are statistically significant and 33 of 41 state fixed effects variables are statistically significant.

Model 1 suggests that a displacement effect does not exist. The coefficient on AGR is positive but small indicating that per capita sales tax revenue increases by an average of $0.03 per additional $1.00 per capita of AGR generated in the 12 casino states. However, the coefficient is not statistically significant. In Model 2, the coefficient on AGR is positive and statistically significant. The coefficients on all 10 of the interaction variables are negative, with nine of the coefficients being statistically significant. South Dakota, which exhibits the lowest AGR totals for the 12 casino states, is the reference group both for the state fixed effects variables and the interaction variables. The combination of the coefficient on AGR and the coefficient on the interaction variable provides an estimate of the net effect of AGR on sales tax revenue for each of the casino gaming states. This model specification suggests that the precise effects of casino gaming on sales tax revenue are state-specific. Compared to Model 1, the results of the main and interaction terms in Model 2 also suggest that the casino gaming effects across the 12 focal states are quite varied. That is, the relationship between AGR and sales tax revenue is sufficiently varied - exhibiting net positive impacts in several of the focal states and both small and large net negative impacts in the other focal states - that the average

effect measured by the Model 1 specification is zero. Thus, the Model 2 specification appears to be an improvement over Model 1.

The net effects of AGR on sales tax revenue are summarized in Table 4. Column 2 presents the net change in per capita sales tax revenue for a $1.00 change in per capita AGR.

[PLACE TABLE 4 HERE]

The Model 2 coefficient estimates suggest that four states (Louisiana, Michigan, Mississippi, and South Dakota) have experienced a net gain in per capita sales tax revenue due to casino gaming. Combining the main effect and the pertinent interaction effects suggests that per capita sales tax revenue in these states increased by $0.01 to $0.47 per additional $1.00 of per capita AGR. Potentially, the casino gaming industry in these states generates more sales tax revenue via employment, investment, and other operational expenditures than is displaced by consumer's wagering at the casinos. The Model 2 estimates, however, suggest that the eight remaining new casino states have experienced a net reduction in per capita sales tax revenue due to casino gaming. Together, the main and interaction effects suggest that per capita sales tax revenue in these states has declined by $0.01 to $1.24 per additional $1.00 of per capita AGR. Excluding the extremes, the displacement range narrows somewhat to $0.10 to $0.67 reduction in per capita sales tax.

Column 4 of Table 4 reports the current casino wagering tax revenue derived per $1.00 of AGR in each of the new casino states. These revenue yields are based on the average wagering tax rate imposed in each state and reported in Column 3. Column 5 reports the net gain or loss of revenue from the combination of sales tax and wagering tax. The extent that wagering taxes offset reductions in sales taxes is a function of the displacement effect and each state wagering tax rate. Accounting for wagering tax revenues derived from the casino industry, the estimates suggest that eight of the new casino states potentially are experiencing a net gain from casino gaming. At least in so far as wagering taxes either: (1) add to the gain in sales tax revenue associated with casino gaming; or (2) offset the reduction in sales tax revenue

associated with casino gaming. This net gain is estimated to range from $0.01 per capita in Indiana to $0.60 per capita in Michigan and Rhode Island.

VI. CONCLUSIONS

The statistical analysis provides evidence that casino wagering can displace taxable consumer expenditures and, as a result, sales tax revenue. These results have implications for:

(1) Setting gaming tax rates to offset displacement of sales tax revenue.

(2) Distributing gaming tax revenue to government purposes financed with sales tax.

(3) Placing geographic limits on casino locations to minimize sales tax displacement.

Since legalization of casino gaming has generally been motivated to augment state revenue systems, the displacement effect has important implications for setting gaming taxes. At a minimum, therefore, state wagering tax rates should be at least equal to state sales tax rates. However, the estimated displacement rates are high enough that even this would be insufficient to offset reductions in sales tax revenues due to casino wagering by consumers. The analysis presented in Table 4 suggests that four of the new casino gaming states where displacement has been found have succeeded in offsetting the sales tax impact with tax rates on wagering ranging from 20% to 61% on average. In contrast, four other casino gaming states impose wagering taxes ranging from 14% to 44% on average that are insufficient to offset the estimated displacement effects.

In addition, the displacement effects also have implications for the distributional formula utilized to divide tax revenue between various government funds and purposes. This means that beyond the issue of setting wagering tax rates appropriate to offset sales tax displacement, distribution of wagering taxes to funds that receive sales tax revenue is also imperative. The distributional decisions have no bearing on the displacement effects of casino gaming or the level of offset achieved through casino taxes. Without understanding the displacement effects,

however, policy makers may inadvertently reduce funding for programs and services paid by sales tax revenue. This could occur even in the presence of offsetting wagering taxes, if policy makers distribute the wagering tax revenue to alternative uses.

For instance, in Indiana 49% of sales tax revenue is distributed to the State General Fund and 50% is distributed to property tax relief. In contrast, no wagering tax is distributed to the State General Fund but about 59% is utilized for property tax relief. Thus, wagering tax revenue more than offsets any sales tax reductions to property tax relief, but does not replace the sales tax dollars lost to the General Fund. The estimates suggest, however, that four states are experiencing a net loss in revenue, where wagering taxes fall short of offsetting the reductions in sales tax revenue associated with casino gaming. In these four states, the net loss ranges from $0.13 per capita in New Mexico to $0.81 per capita in Illinois. Again, to the extent that wagering tax is not distributed under a formula similar to sales tax revenue in these states, the net tax loss could potentially be magnified in terms of resource losses to governmental programs that are funded with sales tax but not with wagering tax.

The varied displacement effects estimated by this study suggest that additional modeling and research is warranted to investigate the determinants of this variation. Links between the cross-state variation of displacement levels and variation in specific state demographic and economic features are, at this point, difficult to expose. On the surface, the differences in state displacement effects appear not to have any regional basis or to be associated with variation in state population, number and dispersion of casino venues, type of casino venues (land-based, riverboat, or racino), or the absolute magnitude of casino wagering at a state's venues.

Relative differences in resident gambling at states' casinos could potentially factor into the variation in state displacement effects. This could potentially have implications for where casinos should be allowed within a state – interior areas where state residents would presumably represent a larger proportion of a casino's market or border areas where non-residents might contribute a larger portion of casino receipts and tax revenue. It stands to

reason that displacement of sales tax would be directly related to the share of state residents patronizing casino venues. Given the spatial market structure of casinos (with the preponderance of customers residing within 50 to 100 miles of the casino) states that have more casinos operating at interior locations may systematically experience higher rates of displacement.

In Illinois, for example, three of nine casinos are located in interior areas (Aurora, Elgin, and Peoria) and two others (located in Joliet) are at least 35 miles from the Indiana border. These five locations generated $1.27 billion in AGR during FY 2003. In contrast, none of Indiana's casinos are located in highly populated interior areas. And, in fact, nine of 10 casinos are located in border areas opposite large metropolitan areas in other states (Chicago, IL, Cincinnati, OH, and Louisville, KY).

An additional, albeit smaller, example of this phenomenon may be South Dakota where casino gaming is located in Deadwood only about 10 miles from the Wyoming border. Of equal importance in the South Dakota example is that the Deadwood venue is just off of interstate 90 near a large volume of cross country traffic and near tourist areas such as Sturgis. A significant tourism industry regardless of whether it is driven by gambling also may serve to hold down displacement levels. Significant levels of wagering by tourists in Gulf Coast areas of Louisiana and Mississippi has almost certainly resulted in employment and investment by the casino industry that would never occur or be sustained by the resident population. Thus, sales tax associated with casino employment and investment may achieve levels that offset sales tax declines due to resident wagering at the casinos. Louisiana, Mississippi, and South Dakota may benefit both from border area casinos drawing large numbers of patrons from surrounding states and tourist locations drawing additional nonresident patrons. These issues warrant further investigation, potentially, at a lower level of analysis using county-level data to get at some of the geographic market effects of casinos on sales tax displacement.

NOTES

1. Fink and Rork (2003) also employ Heckman's two-stage methodology to estimate the displacement effects of casino gambling on lottery revenue in states adopting casino gambling during the 1990s. The Heckman methodology is used to control for statistical bias due to the endogeneity of casino gaming legalization.
2. Alaska and Hawaii are excluded from the sample a priori. Four states without sales taxes (Delaware, Montana, New Hampshire, and Oregon) are excluded from the sample. Nevada and New Jersey are also excluded from the sample due to their potential for skewing the statistical analysis results. Casinos and racinos in the 13 states legalizing such gaming operations during the 1990s generated approximately $14.6 billion in AGR during FY 2003. The leading state was Mississippi where casinos generated about $2.7 billion in AGR. In comparison, casino gaming in Nevada generated about $9.6 billion in AGR and in New Jersey about $4.7 billion during FY 2003. The skewing effect is apparent when statewide annual casino AGR is regressed on statewide annual total electronic gaming devices supplied for purposes of the 2SLS procedure.
3. One can develop a scenario under which β_4 is positively biased, where AGR > 0 is associated with a preexisting increase in sales tax revenue. In this case, the displacement effects would be underestimated. However, negative endogeneity bias appears to be the much more plausible condition. Positive endogeneity bias could arise if state policy makers legalized casino gaming based on their observations of year-to-year growth in personal income and employment. That is, policy makers may have legalized casino gaming by correctly assuming that taxes on casino gaming operations would yield a high growth revenue stream. Under these circumstances, otherwise growing sales taxes (due to underlying growth in income and employment) are directly related to the onset of casino gaming and the growth in casino AGR.
4. The probit regression for casino legalization is estimated with time-series cross-sectional data spanning 1985 to 2003 for sales tax and non-sales tax states. Again, Alaska and Hawaii, Nevada, and New Jersey are excluded.
5. Following Lee (1983), logistic regression is utilized to estimate the casino legalization equation. The logit scores are transformed to quasi-probit scores, from which the inverse Mills' ratio is derived.
6. Variable definitions, data sources, summary statistics, and regression results for the casino legalization equation and the instrumental variable equation are available from the author upon request.
7. Heteroskedastic errors in the estimated sales tax model will result from using Heckman's two stage methodology. The standard errors are corrected using GLS with the appropriate estimated variance.

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TABLE 1: Gaming Data from States Recently Adopting Casino Gaming.

State	Venues	AGR (in millions)		Mean Annual Growth
		FY Casino Gaming Commenced*	FY 2003	
Colorado	Land-based Casinos	$96.3	$707.2	19.87%
Delaware	Racinos	$76.7	$524.5	31.62%
Illinois	Riverboat Casinos	$80.6	$1,797.7	32.61%
Indiana	Riverboat Casinos	$73.2	$2,160.7	62.20%
Iowa	Riverboat Casinos Racinos	$18.5	$980.0	39.24%
Louisiana	Riverboat Casinos Land-based Casino Racinos	$188.2	$2,004.8	30.06%
Michigan	Land-based Casinos	$539.6	$1,120.6	27.58%
Mississippi	Riverboat Casinos	$428.3	$2,701.8	20.22%
Missouri	Riverboat Casinos	$7.4	$1,307.5	77.81%
New Mexico	Racinos	$11.5	$150.8	90.13%
Rhode Island	Racinos	$16.4	$314.7	34.36%
South Dakota	Land-based Casino	$14.3	$66.9	12.57%
West Virginia	Racinos	$28.1	$717.1	49.90%

*Fiscal year casino gaming commenced: Colorado 1992; Delaware 1996; Illinois 1992; Indiana 1996; Iowa 1991; Louisiana 1994; Michigan 2000; Mississippi 1993; Missouri 1994; New Mexico 1999; Rhode Island 1993; South Dakota 1990; West Virginia 1995.

Source: Monthly and annual financial reports of state gaming agencies. U. S. Census Bureau, *State Government Finances* , 1985-2003.

TABLE 2: Sample Summary Statistics.

Sales Tax Model Variables (n=798)			
Variable	**Definition**	**Mean**	**Std. Deviation**
Sales Tax	Annual real per capita state sales tax revenue (base year = 1985).	366.53	117.49
Sales Tax Rate	State sales tax rate.	0.050	0.010
Food Exemption	Dummy variable = 1 if state has exemption for food purchases, 0 otherwise.	0.625	0.484
Income	Annual real per capita non-farm personal income (base year = 1985).	16,015.21	3,110.97
AGR-IV	Annual real per capita adjusted gross wagering revenue (base year = 1985) - instrumental variable.	20.34	72.14

TABLE 3: Sales Tax Model Regression Results.

Variable	Model 1		Model 2	
	β	S. E.	β	S. E.
Constant	-101.15	32.22	-125.30	33.05
Sales Tax Rate	4,799.28 *	299.94	4,855.45 *	296.03
Food Exemption	-19.39 *	6.89	-20.61 *	7.12
Income	0.02 *	0.00	0.02 *	0.00
AGR-IV	0.03	0.02	0.47 *	0.12
IMR	-4.32	4.34	-4.40	4.16
Interaction of AGR-IV with state fixed effects variables.				
Colorado			-0.78 *	0.16
Illinois			-1.72 *	0.22
Indiana			-0.78 *	0.15
Iowa			-0.58 *	0.14
Louisiana			-0.46 *	0.13
Michigan			-0.11	0.25
Mississippi			-0.38 *	0.12
Missouri			-0.62 *	0.17
New Mexico			-0.85 *	0.21
Rhode Island			-0.48 *	0.24
West Virginia			-1.14 *	0.18
Adj. R^2	0.946 *		0.954 *	

*p<.01, **p<.05, ***p<.10.

TABLE 4: Net Displacement Effects.

Casino State	Change in Sales Tax Revenue Per Dollar of AGR	Current Average Wagering Tax Rate**	Wagering Tax Per Dollar of AGR	Net Revenue Gain/Loss
South Dakota	$0.47	8.0%	$0.08	$0.55
Michigan	$0.36	24.0%	$0.24	$0.60
Mississippi	$0.09	12.0%	$0.12	$0.21
Louisiana	$0.01	20.5%	$0.21	$0.22
Rhode Island*	-$0.01	60.6%	$0.61	$0.60
Iowa	-$0.10	20.5%	$0.21	$0.10
Missouri	-$0.14	20.0%	$0.20	$0.06
Indiana	-$0.31	32.0%	$0.32	$0.01
Colorado	-$0.31	14.0%	$0.14	-$0.17
New Mexico	-$0.38	25.0%	$0.25	-$0.13
West Virginia*	-$0.67	43.5%	$0.44	-$0.23
Illinois	-$1.24	43.0%	$0.43	-$0.81

*Racinos operate as lottery retailers operating video lottery terminals (VLTs).
Wagering Tax Rate = (AGR - Retailer Commissions) / AGR, where AGR = VLT Sales - Prizes.

**Based on FY 2004 financial totals reported by state gaming regulators (state lotteries in West Virginia and Rhode Island).