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Growth and Change
Volume --, No. --, pp. 1–24

Gaming, States and Tax Revenues—The Tortoise or the Hare: A CGE Comparative Assessment of Casino Resorts and Games-only Casinos

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ABSTRACT**.** Theoretically speaking, heavy tax rates on gambling should dampen growth of the casino revenues. Indeed, a cursory glance at data across U.S. states suggests more jobs and income are generated directly by the gaming industry when lower tax rates are applied. Using a detailed computable general equilibrium model, we evaluate the effects of a proposed machine-based casino on New Jersey's economy as well as on the state's existing set of casino resorts in Atlantic City. We find few winners other than the state's tax coffers.

Introduction

> Online gaming is falling well below its targeted tax generation goal (run rate of ~$19 million in tax revenues versus a $160 million estimate in the recent state budget), New York is on the verge of issuing casino licenses and now Showboat is closing while Revel faces bankruptcy. As a result, we believe the push toward a Meadowlands casino project is almost certain as New Jersey currently faces a $2.75 billion budget gap as well as ~$800 million FY2014 (ends June 30) shortfall and sizable unfunded pension liabilities.
> (John Brennen, *NorthJersey.com*, June 27, 2014)
> http://blog.northjersey.com/meadowlandsmatters/8879/wall-street-casino-analyst-on-showboat-meadowlands-revel-etc/

In this paper we examine a likely future condition, the setting of which is roughly outlined in the preceding quote. That is, we investigate the macroeconomic implications of a new gaming facility that is to be dominated by machine games alongside the Meadowlands horse track in New Jersey, a state that has a strong base of casino resorts. The new gaming venue is likely to be predicated on a Pennsylvania model of high casino taxation, while the existing set of casinos in the state are taxed at nominal levels.

Outside of the likely taxation level and the new casino's likely location with a racetrack in the Meadowlands near Secaucus, New Jersey, few further details have been discussed publicly due to its highly preliminary and politically tenuous nature. (Given that the horse track and the casino are destined to be at least on the same property—if not in the same structure, we often use the term "racino" to refer to the proposed casino throughout the remainder of the paper.) Hence, we had to make some assumptions about the pending racino facility and how customers of existing casino resorts would likely respond to its presence. First of all, we modeled the future Meadowlands racino's gaming operations on similar casinos nearby in Pennsylvania—the Sands Casino in Bethlehem and the Parx Casino in Bensalem. [1] Net revenues at these two casinos, which are on the order of $500 million, are reaped almost exclusively via slot-machine gaming, although revenue shares from table games are gaining ground. That is, racino proponents insist that they expect revenues associated with food and beverage, entertainment, and lodging activities to be negligible, if they exist at all, at the proposed facility.

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Keywords: Gambling, regional economies, computable general equilibrium models.
JEL classification: L83, R13, C68.

The proposed racino's proponents assert that practically all of its customers will emanate from Pennsylvania and New York. For this political reason, we examine the possibility. It seems to us (as well as to its opponents in Atlantic City) that this assertion is quite unrealistic, particularly given the racino's proposed location near the geographic center of wealth in northern New Jersey. We therefore also probe the possibility that the casino resorts in Atlantic City will (somehow) concomitantly lose $250 million in casino revenues from customers who presently also originate from outside of the state. We, separately, examine the further loss of the nongaming expenditures typically made by such visitors to Atlantic City as well as the decline in investments made by casino resorts that is historically associated with such revenues. In each case we examine the state's comparative fiscal well-being, employment levels, and gross domestic product. An important aspect of all of the analysis is that it is performed in a general equilibrium context. That is, we not just consider the direct effects on the economy (including state tax revenues generated) of the assumed changes in activity, but also their indirect effects. This is what lead to the analogy with the race between the tortoise and the hare. That is, a question that has been asked by policymakers is "what is better for a state's economy, a casino gaming industry centered on slot machines that directly generate high levels of tax revenues (the hare) but fewer local jobs, or one that is a diversified casino resort (the tortoise), which create more indirect jobs and wealth per unit of direct gaming revenue but for which gaming revenues are taxed at a lower rate?" This is the current paper's core research question—a question which has not yet been addressed by the literature. Before delving into an answer to this question, however, we provide more backdrop to the political economy of the situation.

Legal casino gaming during the past four decades has been viewed through a political lens that has enabled society to see the industry as a means of achieving a "higher purpose." This is a major turnaround from the 1970s and earlier when it was viewed as "an immoral threat to public safety and to the work ethic, and as a magnet for organized crime" (Furlong, 1998, p. 374). Now some U.S. states earmark tax revenues generated by gambling for specialized public services for senior or non-ambulatory citizens or the reallocation of wealth to underprivileged groups. Such purposes can be fulfilled when a state captures some of the large economic benefits that can arise from legalizing a previously prohibited economic activity like casino gaming. More generally, the legalization of gaming has been made possible through the promise of economic development benefits from the existence of casinos, such as job creation, investment stimulation, tourism development, and urban revitalization. Indeed, one or both of these factors explain why Monaco, Macao, Nevada, the Caribbean, and Atlantic City opted to pursue casino gaming. The economic development aspect was undoubtedly key to the more recent expansion of legalized gaming in the U.S. into such municipalities as East St. Louis, Illinois; Gary, Indiana; Tunica, Mississippi; New Orleans and Shreveport, Louisiana; Chester, Pennsylvania; and Detroit, Michigan.

Because it must be sanctioned by state governments, the commercial casino industry is one of the most transparent, regulated, monitored, and taxed industries in the United States. Moreover, most commercial casino companies and gaming equipment manufacturers are publicly held companies whose equities are traded on stock exchanges. It is state governments that play the main role in regulating the industry. In turn, the regulating states receive a substantial portion of net casino receipts in the form of tax revenues. Statutory casino-gaming revenue tax rates vary by state, ranging from as low as 6.75 percent of gaming revenues in

Nevada to 55 percent in Pennsylvania in 2012 (The AGA Survey of Casino Entertainment, 2013).

Table 1: Casino Revenue, Wages and Taxes for Major Gaming States, 2012

	Date of First Casino	Gross Casino Gaming Revenue ($ Billion) **(1)**	Casino Employee Wages ($ Billion) **(2)**	Ratio **(2)/(1)** **(3)**	Gaming Tax Revenue ($ Million) **(4)**	Ratio **(4)/(1)** **(5)**	Casino Employees **(6)**
Nevada	1931	10.86	7.693	0.708	868.6	0.080	170,206
New Jersey	1978	3.06	0.912	0.298	305.5	0.100	34,726
South Dakota	1989	0.11	0.038	0.356	16.62	0.155	1,512
Colorado	1991	0.77	0.217	0.283	104.3	0.136	9,278
Illinois	1991	1.64	0.324	0.198	466.1	0.284	7,687
Iowa	1991	1.47	0.341	0.233	334.4	0.228	9,558
Mississippi	1992	2.25	0.848	0.377	272.7	0.121	23,377
Rhode Island	1992	0.53	0.108	0.204	329.0	0.623	3,000
Louisiana	1993	2.40	0.631	0.262	579.5	0.241	15,061
Missouri	1994	1.77	0.336	0.190	471.4	0.266	9,631
West Virginia	1994	0.95	0.135	0.142	402.5	0.424	4,528
Delaware	1995	0.53	0.105	0.200	217.4	0.413	2,775
Indiana	1995	2.61	0.462	0.177	806.6	0.309	12,543
Michigan	1999	1.42	0.367	0.259	319.8	0.226	7,972
New Mexico	1999	0.24	0.030	0.123	62.8	0.260	918
New York	2004	1.80	0.190	0.105	822.7	0.457	5,233
Maine	2005	0.10	0.012	0.120	43.1	0.434	879
Oklahoma	2005	0.11	0.023	0.204	20.38	0.180	870
Florida	2006	0.43	0.105	0.245	161.8	0.378	3,319
Pennsylvania	2007	3.16	0.340	0.108	1,487.0	0.471	10,162
Kansas	2009	0.34	0.050	0.148	92.2	0.270	1,344
Maryland	2010	0.38	0.017	0.046	218.2	0.578	499
Ohio	2012	0.43	0.091	0.212	138.18	0.321	4197

Source: American Gaming Association. *State of the States 2013: The AGA Survey of Casino Entertainment*. http://www.americangaming.org/sites/default/files/aga_sos2013_rev042014.pdf
†Data in red for Oklahoma and Rhode Island are estimates made by the authors.

Table 1 presents the gross casino gaming revenues for 2012. This is, the handle (amount bet) less winnings or similarly, the net earnings of casino facilities before taxes, salaries and other expenses. The data correspond to all types of casinos, including slots-only facilities through to full-blown casino hotel resorts. As can be seen from Table 1, gaming tax revenues from casinos as a share of total state gaming revenues generally correlate fairly well with the year of legalization. The share ranges from about 8.0 percent in Nevada, the first state to legalize gambling, to 57.8 percent in Maryland. It is also fairly clear from Table 1 that gaming-related employment tends to fall as effective gaming privilege taxes rise across states. Essentially, by garnering tax revenues from casinos, governments severely reduce the ability of casinos to invest internally. That is, some of the state tax revenues can be viewed as moneys that likely would be

used by casinos to expand and employ more workers (Christiannsen, 2005). But, as mentioned earlier, governments typically apply the revenues they collect from casinos to the benefit of their broader society.

In essence then, tax rates do not simply establish government claims on gambling revenue. They also largely determine the kind of gambling that will be taxed. High tax rates are necessarily associated with what ordinarily would be high-profit activities, and lower rates are associated with more-diversified gaming and related activities. Casino resort properties relate to communities differently than do racinos and games-only casinos.[2] The latter in turn have different effects upon communities than do video poker machines in neighborhood businesses. Each in turn can be taxed at higher rates and still turn a reasonable profit. Thus, when lawmakers set high gambling privilege tax rates, they effectively decide against diversified casino resort properties and in favor of machines-only facilities that offer gaming and little else. Thus while high gambling privilege tax rates can maximize government revenues, they also militate against the establishment of capital-intensive/labor-intensive facilities.

With that in mind let us now review the literature to find an answer to our focal research question "what is better for a state's economy, a heavily taxed casino-gaming industry centered on machines or a diversified casino resorts taxed at a lower rate?" The most refined answer to date is that provided by Pollock (2010). He suggests that the highest rate at which a government can tax gaming facilities, which is typically selected for political reasons, is not likely to be the optimal choice for either casinos or the long-run economic development of the region in which they operate. Indeed, he suggests high tax rates on gaming are likely counter-productive. Outside of this core piece, the set of academic literature that facilitates a response to the question above is rather thin. Indeed, published economic studies for the U.S. mostly focus on evaluating the effects of casinos and other gaming industries on state tax revenues using standard econometrics approaches (Anderson, 2005; Calcagno, Walker, and Jackson, 2010; Furlong, 1998; Walker and Jackson, 1998, 2007, 2011).[3] We summarize related findings a few below.

Walker and Jackson (1998, 2007) found that while lotteries and horse racing yielded positive benefits to state tax coffers, greyhound racing and casino gambling did not. In fact, in their 1985-2000 study period—one during which many states started legalizing the industry—casino revenues apparently yielded net negative effects on total state tax revenues from all sectors in an economy by offsetting expenditures on other goods and services in general equilibrium. But they acknowledge that exceptions to their findings surely exist since Nevada has clearly benefitted heavily from the location of casinos in Las Vegas.

The issue at hand in this paper is intrastate competition among casinos. In this vein, Walker and Jackson (2008) note that tribal casino floor size has positive spillovers effects on commercial casino revenues within the same state. More recently, Walker and Nesbit (2014) find that casinos within Missouri largely compete for clientele, although they appear to complement each other when it comes to table games. All complementarity seems to disappear when it comes to casino revenues in adjacent states, for which Walker and Jackson (2008) instead detect clear substitution effects. Gallagher's (2014) research suggests that cannibalization among casinos is likely limited a geographic extent of 25 miles or less, at least among riverboat casinos in Illinois. Moreover he finds that new casinos, and not the expansion of pre-existing ones, have the largest cannibalization effect. He caveats his work, however, by noting that market size is a critical factor as is the new casino's size.

The market for Atlantic City's casino resorts originally extended at least to New York City and Philadelphia. Evidence strongly suggests that its revenue base has been eroded by the entry of several new casinos in southeastern Pennsylvania, the revenues of which are largely generated via machine games. The literature in the prior paragraph suggests that further erosion of casinos revenues in Atlantic City should be expected if a new venue opens up in the Meadowlands. Unfortunately the same literature does not provide a solid indication of the extent of the cannibalization effects over the 120 miles that lie between the Meadowlands and Atlantic City.

Findings in Walker and Jackson (2008) undoubtedly led Calcagno, Walker, and Jackson (2011) to further investigate the extent to which casino gaming may be a viable counter-tactic in interstate competition for gamblers' cash. These authors note, since the advent of casinos in Mississippi, that states have been more interested in keeping resident gamblers in-state as a means to re-secure lost consumer dollars and concordant taxes. Such tax revenue retention appears to have motivated the legalization of casinos in Massachusetts, the expansion of them in New York, and also for other states, such as New Hampshire, to consider casinos. Pennsylvania has been particularly successful in employing the strategy of regaining taxes on money formerly spent at Atlantic City casinos. Indeed, Pennsylvania's casino industry has grown tremendously since its start in 2007, largely at the expense of New Jersey's, which is part of the backdrop for the policy storyline developed in this paper.

In the above context of tax revenue competition among neighboring states, Furlong's (1998) findings that casino gambling is most likely to be adopted by states with lagging job growth, modest tax increases, and low tax rates make some sense. That is, he denies casino adoption is an explicit counter-tactic to interstate tax revenue competition. Instead, Furlong finds that state legislatures only opt to enable casino gaming when economic times are bad. He suggests that regionalism of casino adoptions is an artifact of economic reality that neighboring states have similar economic structures and cycles. In light of Furlong's work, recall that Pennsylvania's legislators waited until the nadir of the Great Recession to legalize casino gaming. As an early adopter of legal casinos, New Jersey was bound to lose substantial gaming revenues ***whenever*** its neighbor states also legalized them.

Of course, there has been a myriad of studies that investigate the economic contribution of casino gambling to local economies, although few have been published. Most have, in fact used general equilibrium perspective, but typically the more-limited acuity of the input-output model. In a meta-analysis of those released to date, Rose (2001) discovers that economic benefits tend to invigorate host economies of gaming casino. But neither Rose nor others, including input-output analysts, have compared the wider regional economic benefits of machine-based facilities to their more diversified counterparts. Although such input-output analysis-based studies are important to the scant body of gaming economic literature, none of them captures the general equilibrium substitution and price effects affiliated with these industries. This is important since Anders, Siegel, and Yacoub (1998) find that casinos can dampen the economic performance of other forms of entertainment, at least within the same county. Such substitution (and also price) effects, which can be obtained via a computable general equilibrium (CGE) model, are a key contribution of the present piece. On the other hand, we can evaluate how taxes on gaming industries may affect directly and indirectly the welfare of households capturing the high detailed circular flow of income in the state economy.

In summary, then, the answer to the question of whether the tortoise or the hare will win the race for a region remains unclear, although Pollock (2010) at least has planted a seed of

doubt about the long-run benefits to an economy of taxing gaming facilities at a high rate. Still, it is clear that both casino types can help the fiscal condition of a functional economic region that is a late adopter of gaming activities. The gains in activity by late adopters undoubtedly come at the expense of early adopters. Further, regions are more likely to adopt gaming-favorable policies when they are in fiscal distress.

We confess that New Jersey is a unique setting for any casino-related investigation. But then what region is not, given differences in economic structure, casino regulations, and taxation rates? In the case of New Jersey presented here, as noted earlier, the casino taxation rates are substantially lower than that of all other areas of the United States except Las Vegas and the rest of Nevada. Indeed, New Jersey's tax rates on gaming casinos are likely lower than most of its equivalents worldwide. Thus, outcomes obtained by any modeling "exercise" presented here can be viewed as being biased in favor of the new machine-dominated gaming venue that we insert into the regional economy; the taxation differences are exaggerated by New Jersey's low rates on the existing set of casinos. Thus while we safely assert that the approach we employ is transferrable, we also contend that any net benefits we find for a new casino are undoubtedly an upper bound for most other regions worldwide.

The rest of the paper is organized as follows. Section 2 depicts the main characteristics of the CGE model and Section 3 presents the main features of the database, the SAMNJ-10. In Section 4, the simulated shocks are explained and discussed. Finally, Section 5 concludes.

The Regional Computable General Equilibrium Model

CGE models obtain solutions to a set of nonlinear macroeconomic equations based on the optimization behavior of pertinent economic agents. In the case of the present model, the SAMNJ-10 data define the equations. In the last ten years or so, the use of regional and multiregional CGE models to evaluate the economic impact of very different topics has bloomed (McGregor et al., 2010). In the case of the U.S., a majority of studies have tended to use general purpose CGE models and databases elaborated by third-party institutions (c.f., Seung and Waters, 2010; Giesecke, 2011; Monge and Bryant, 2012). However, CGE models are best exploited when they are designed and used by the constructors of the database and model since they are best positioned to know the data's limitations and the model's inherent assumptions.

The static CGE model used in the course of the research presented here contains 57 productive industries that minimize their costs subject to total production, which is a constant elasticity of substitution (CES) combination of domestic production, international imports, and inflows. This production is demanded by households and nonresident consumers. The representative household maximizes its utility through a combination of consumption and savings, and its income stems from capital and labor while the Government revenues primarily derive from taxes and transfers paid by other agents in the economy. The corporate sector is an intermediate agent that receives income from capital and that pays taxes and current transfers. Finally, the external sector is bifurcated: the rest of the US (RUS) and the rest of the world (ROW).

Firms. The total supply (Y_i) has a nested constant-returns-to-scale production technology. As usual, at the first level of the nesting, total supply is a CES of aggregate regional production (Y_{ri}) and inflows from the RUS (Y_{rui}) and the ROW (Y_{rowi}).

$$Y_i = \phi_i\left(\delta_{ri}Y_{ri}^{\rho_i} + \delta_{rui}Y_{rui}^{\rho_i} + \delta_{rowi}Y_{rowi}^{\rho_i}\right)^{1/\rho_i} \qquad \delta_{ri} + \delta_{rui} + \delta_{rowi} = 1 \qquad (1)$$

where δ_{ri}, δ_{rui}, and δ_{rowi} are the regional and foreign distributive parameters and ρ_j is a parameter that determines the degree of substitution between regional production, inflows and international imports (Armington, 1969).

In the second level, regional production (Y_{ri}) is a Leontief combination of intermediate inputs and value added.

$$Y_{ri} = \min\left(\frac{X_{1i}}{a_{1i}}, \frac{X_{2i}}{a_{2i}}, ..., \frac{V_i}{v_i}\right) \quad i = 1,...,57 \tag{2}$$

where X_{ji} and V_i are the quantities of input j and value added used to produce the regional commodity i. a_{ji} and v_{ji} are the corresponding technical coefficients and unitary requirements of intermediate inputs and value added. Finally, valued added is a Cobb-Douglas function of labor (L_i) and capital (K_i).

$$V_i = \gamma_i L_i^{\beta_{li}} K_i^{(1-\beta_{li})} \; i = 1,...,57 \tag{3}$$

where γ_i, β_{li} and $(1-\beta_{li})$ are, respectively, the scale parameter and factor distribution parameters.

Firms minimize their costs subject to the value-added constraint in the prior level in the nesting , which derives labor and capital demand. The price of value added is a function of labor and capital prices.

In the upper nest of the CES production function, firms minimize the cost of total supply including in total supply prices the tax rate on sales, which is positive in the retail and wholesale sectors and zero elsewhere.[4] The price of regional domestic production is calculated as an aggregation of unitary prices of intermediate consumption and value added plus taxes on production (τ_i^{otp}) net of subsidies (s_i^{otp}) and taxes on gaming (τ_i^{gam}). The tax rate on gaming is positive for Casinos and zero elsewhere.

$$p_{ri} = \left(\sum_j^{57} p_j a_{ji} + p_{vi} v_i\right)\left(1 + \tau_i^{otp} - s_i^{otp} + \tau_i^{gam}\right) \tag{4}$$

In this paper, import prices are fixed and equal to one (the typical assumption for an open economy), and exports are valued at total production prices. That is, we opted to assume that changes in New Jersey prices do not affect external or foreign prices. Finally, the consumer price index, P_c, is a weighted average of consumer prices.

$$P_c = \sum_{i=1}^{57} p_i \pi_i \tag{5}$$

The Corporate Sector. As mentioned before, the corporate sector is an intermediate agent in the model that receives revenues from capital services and pay taxes and transfers. The gross income of corporate sector (GI_{cs}) can be defined as:

$$GI_{cs} = r \cdot K_{cs} \tag{6}$$

Net disposable income of corporate sector (NDI_{cs}) is obtained from GI_{cs} less income tax:

$$NDI_{cs} = (1 - \tau^{cs}) GI_{cs} \tag{7}$$

Finally, the corporate sector savings are obtained as net disposable income less the proportion of dividends (θ_h) over capital revenues paid to households and the current transfers paid to households (TRP_h) and Non-Profit Institutions Serving Households, NPISH (TRP_n)

$$S_{cs} = NDI_{cs} - \theta_h r K_{cs} - p_c\left(TRP_h^{cor} + TRP_{SLG}^{cor}\right) \tag{8}$$

The Representative Household. The representative household maximizes utility via a Cobb-Douglas combination of consumption and savings

$$U(C,S) = \prod_{i=1}^{n} C_i^{\alpha_i} S_h^{1-\sum_{i=1}^{n}\alpha_i} \tag{9}$$

where C_i is the consumption of commodity/service i and S_h is savings and α's are the share parameters of consumption. Households' gross aggregate income comes from the sale of labor services in New Jersey $(\overline{L}^{nj})$ and in other states $(\overline{L}^{ru})$; the sale of capital services in, $(\overline{K}_h)$; unemployment benefits; the share in the revenues of social security contributions of employers; transfers from the corporate sector; other current transfers from State and Federal Government; and dividends.

$$\begin{aligned} GI_h &= w(1-u)\overline{L}^{nj} + \overline{w}^{ru}\overline{L}^{ru} + r\overline{K}_h + PSCE_h \cdot SCE \\ &+ p_c\left(TRP_h^{cor} + TRP_h^{FG} + TRP_h^{SLG}\right) + \mu \cdot w \cdot u \cdot \overline{L} + \theta_h r K_{cs} \end{aligned} \tag{10}$$

where u is the unemployment rate;[5] $PSCE_h$ is the share of households in social contributions of employers revenues, which is SCE; TRP_h^{cor} current transfers paid by corporations; TRP_h^{FG} current transfers paid by the federal government and TRP_h^{SLG} current transfers paid by the state and local government. Finally, μ is the fraction of the average wage rate that unemployed are paid.

Net disposable income, NDI_h, equals GI_h minus personal income tax, and Consumption and savings demands are the solution to the maximization problem of households. Consumption and savings are

$$C_i = \alpha_i \frac{NDI_h}{P_i} \qquad S_h = \left(1 - \sum_{i=1}^{n}\alpha_i\right)\frac{NDI_h}{P_s} \tag{11}$$

Where p_s is a price index of private investment.

State and Local Government. State and Local governments[6] collect a share of direct taxes on income, on sales, on gaming, and on production. They also receive transfers from corporations and the federal government. In the model State and Local public revenues are defined as

$$\begin{aligned} GI_{SLG} &= r \cdot K_{SLG} + PDTX_{SLG}\left(GI_h \cdot \tau^{it} + GI_{cs} \cdot \tau^{cs}\right) + \tau_i^{sl} P_i Y_i + \\ &\tau_i^{GM} P_i Y_i + PTP_{SLG} \cdot \left(\tau_i^{p} P_{ri} Y_{ri}\right) + p_c\left(TRP_{SLG}^{FG} + TRP_{SLG}^{cor}\right) \end{aligned} \tag{12}$$

Where TRP_{SLG}^{cor} is current transfers paid by corporation. TRP_{SLG}^{cor} is the current transfers paid by the Federal Government; $PDTX_{SLG}$ and PTP_{SLG} are the share coefficients of state and local government on direct tax and other taxes on production revenues, respectively.

These revenues are used to pay unemployment benefits and other transfers and subsidies. State and Local Government consumption and investment are constant in the model, but because prices and revenues are endogenous, the public deficit also is endogenous.

Federal Government. The Federal Government collects taxes on labor (social security contributions of employees and employers) and taxes on imports in addition to taxes on production and income tax. These revenues are used to pay current transfers to households and the State and Local Government. In this case, also federal public investment and consumption are exogenous, and federal public surplus is endogenous.

External Sectors. In the two external sectors of the model, the rest of the US and the rest of the world, revenues stem from endogenous inflows and imports respectively while outflows and exports are exogenously determined. The external current balances are endogenous and match the difference between imports/exports and inflows plus adjustment of residence/outflows.

Investment and Calibration. The closure rule in a CGE model determines the endogenous variables in the market clearance conditions. There are several closure rules and they may have significant effects on the results. In this paper we use the Keynesian closure rule whereby private investment $(\bar{I})$ is exogenous and domestic and external savings are the adjusting variables (investment driven). This is a short-run model that does not include the effects of capital accumulation. FGS and $SLGS$ are, respectively, federal government and state and local government savings and CAS_{rus} and CAS_{row} are the current account surplus with the rest of the US and the rest of the world.

$$p_I \bar{I} = p_I S_h + S_{cs} + FGS + SLGS + CAS_{rus} + CAS_{row} \tag{13}$$

Additionally, the nominal wages are the *numeraire* in our model, and the unemployment rate is adjusts to clear the labor market, so that labor demand equals effective labor supply.

$$\sum_{i=1}^{57} L_i = (1-u)\overline{L} \tag{14}$$

The capital market clears,

$$\sum_{i=1}^{30} K_i = \overline{K} \tag{15}$$

As does the market for services and commodities

$$Y_i = \sum_{j=1}^{57} X_{ij} + C_i + NR_i + \overline{C}_{fi} + \overline{C}_{sli} + \bar{I}_i + \bar{I}_{fj} + \bar{I}_{slj} + \overline{V}_i + \overline{X}_i^{rus} + \overline{X}_i^{row} \tag{16}$$

where NR_i is nonresident consumption, $\overline{C}_{fi}$ is federal government consumption, $\overline{C}_{sli}$ state and local government consumption and $\overline{V}_i$ is stock variations. $\overline{X}_i$ are exports. This (Keynesian) closure rule is clearly the most appropriate for evaluating the effects of external shocks from nonresident consumption (Álvarez-Martínez and Polo, 2012). Under other closure rules, an increase of external demand would reduce external savings and induce a fictitious negative impact in private investment.

In this study, we evaluate the effects of raising final demand of "nonresidents"—that is, residents from other states in the U.S. In conventional neoclassical closure, rises in this variable reduce external savings from the rest of the U.S. (RUS). If private investment in Equation 13 is not fixed, the reduction in total savings should produce a similar decline in total private investment such that the rise in nonresidents' income and the drop in private investment would keep final demand almost constant. These countervailing effects then should result in negligible impacts on employment, GDP and other macroeconomic variables. We therefore opted to employ Keynesian closure, believing it would lead to more realistic results. Under this closure rule, private investment is exogenous, and no wage equation exists. Consequently, changes in

nonresidents' consumption raises both employment and resident households' incomes. These, in turn, modify total households' savings in Equation 13 to match total private investment. In this way, we better capture the impact of the simulations on employment and GDP. The unemployment rate remains endogenously determined.

The effects of shocks in CGE models in which investment/capital stock is exogenously determined are usually associated with short-run analyses, while the effects derived from models with endogenously determined investment levels are associated with long-run analyses (Thaipasert et al., 2011; Partridge and Rickman, 1998, 2007). In this paper, we are interested in evaluating the effects of rising nonresidents' consumption of racino activity on jobs and GDP as well as in the effects of any changes in the investment behavior of Atlantic City's casino resorts. The latter can be simulated in a CGE model only if private investment is assumed to be exogenous, which reinforces the need for a model Keynesian closure.

The parameters and exogenous variables are numerically defined during calibration of the model. This model has been calibrated with the SAM of New Jersey described in the following section of the paper. Prices are equal to one in the base year; thus figures in the SAM are effectively equal to quantities. The elasticities of substitution between imports, inflows, and regional commodities have been derived from GTAP (Hertel et al., 2008). The equilibrium is a set of prices and quantities whereby total supply equals total demand in all commodity markets; labor supply equals effective labor demand and capital services supply equals demand; Private investment is equal to domestic and external savings and public deficit is equal to public revenues less expenditures. Foreign savings also satisfy the restrictions of the external sectors.

The SAMNJ-10

A Social Accounting Matrix (SAM) is a balanced matrix that captures the circular flow of income within an economy for a specific period of time. SAMs complete the information provided by input-output tables with data included in national accounts. They are designed to depict the full interaction among production, generation of income, and use of income.

The SAM for New Jersey in 2010 (SAMNJ-10) has been elaborated using the latest benchmark input-output tables for the U.S.[7] and data from the U.S. Bureau of Economic Analysis (BEA) State and Local Income series, the U.S. Bureau of Labor Statistics's *Quarterly Census of Employment and Wages* (QCEW), the *Internal Revenue Service Data Book, 2010*, and The U.S. Census Bureau's *State and Local Government Finances*: 2010 for New Jersey. We started off with a SAMNJ-10 that was a 439-by-439 balanced matrix based on producers' prices. It contained one representative household, one nonresident consumer from the RUS, a corporate sector, two sectors of government (federal and a combined state and local, which included Non-Profit Institutions Serving Households (NPISH)), and two external sectors, RUS and ROW. There had two accounts for transfers (unemployment benefits and dividends), six accounts for tax revenues (direct taxes, Social Security Contributions of employers, Social Security Contributions of employees, taxes on production, taxes on sales, and taxes on imports), one account for subsidies on production, three investment accounts (federal government, state and local government, and private investment), changes in the industry stocks, savings, two productive factors (labor and capital), and 416 productive sectors or activities. The 416 sectors were later aggregated to 57 for the purposes of this paper (see Appendix, Table A1). In this paper, the directly affected industries are I43: Amusements and gaming, which includes the new racino facility and I46: Casino resorts. It should be noted that the purchasing patterns of the casino resorts in SAMNJ-10 reflect those reported by casinos for 2008 to New Jersey's Casino Control Commission.[8] This includes whether those purchases were made within the state or not,

as well as the industry from which the purchase was made. The general structure of the SAM is detailed in Figure 1. An initial version of the 2010 input-output matrix for New Jersey was estimated following Lahr (2001), but the usual general lack of regional data posed added problems to the construction of a SAM.[9]

Simulations and Results

The simulations implemented in this paper are motivated by the prospect of creating a new gaming industry in northern New Jersey[10] that relies on slot machines. State legislators are proposing that this lone casino will taxed at a premium rate. We somewhat arbitrarily decided the new facility would add $500 million in net revenues to the Entertainment industry. The $500 million figure is the reported gross gaming revenue stream for the largest casinos in Pennsylvania (Pennsylvania Gaming Control Board, 2013). We further decided that customers of the new casino would strictly be from Pennsylvania and New York (its revenues would derive from nonresident consumption). This conjecture was based on testimony by advocates for the racino before a subcommittee of the state's General Assembly (Friedman, 2012). Since it is unlikely that all of the racino's customers would strictly be from outside of New Jersey, this assumption clearly enables an upper-bound estimate of the value of the proposed casino addition to the state's economy. This is because it implies that all of the spending at the racino will be new to the state.

To enable a decomposition of the likely positive or negative macroeconomic effects on New Jersey of a new gaming establishment, we simulated three different sets of conditions. In the first, henceforth *SimA*, we simulated the impact of an increase in nonresident consumption of $500 million in the entertainment sector. This represents 33.1 percent rise in nonresident consumption of New Jersey-provided Entertainment (sector I43 in Table A1). This new addition to the Entertainment industry is taxed at 47.5 percent—the effective tax rate for Pennsylvania's casino industry in 2010. This rate of taxation implies an increase in the gaming tax rate of the ***entire*** Entertainment sector (I43) of 8.68 percentage points (pp).

Figure 1. Main Accounts of the SAMNJ-10

	Institutions (5)	**Transfers (2)**	**Taxes and Subsidies (7)**	**Gross Capital Formation (4)**	**Savings (1)**	**Primary Factors (2)**	**Productivity Sectors (416)**	**External Sector (2)**
Institutions	Transfers among institutions	Redistribution unemployment benefits and dividends	Redistribution of tax revenues among the institutional sectors			Labor and capital income		
Transfers	Unemployment benefits and dividends payments							
Taxes and subsidies	Income taxes and subsidies payments						Contributions, taxes on production, sale taxes and tariffs	

Gross Capital Formation					Redistribution of savings			
Savings	Public and private savings							External savings
Primary factors							Labor and capital income	Adjustments for residence
Productive sectors	Public and private consumption		Subsidies on production	Investment and Stocks variation			Intermediate matrix	Exports
External sector							Imports	

The second simulation, henceforth *SimB*, includes *SimA* and adds to it a reduction of 12.6 percent in nonresidents' consumption of New Jersey's Casino Resorts industry. The point of this simulation is to simulate a somewhat more realistic scenario in which some of the new casino's revenues are at the expense of the existing set of casino resorts in Atlantic City. The 12.5 percent decline in nonresident consumption at Resort Casinos in the SAMNJ-10 is effectively $250 million in net revenues or 50 percent of the net revenues generated by the new slots-only racino. Such a decline also comports with the share of gaming revenues generated in Atlantic City's casino resorts in 2010 from the income of Pennsylvanians (only) (CDC Gaming Reports, 2013). In short, a $250 million fall in revenues in Atlantic City due to the installation of a $500 million slot-only casino in northern New Jersey appears to be a worthwhile simulation for the State of New Jersey to consider. It may not be a worst-case condition, but it certainly represents a somewhat extreme scenario regarding revenue substitution across the two types of casinos.

SimC is defined as the shocks in *SimB* plus a reduction of nonresident consumption in tourism-related sectors (tourism spending in hotels, restaurants, etc.) associated with casino visitors in Atlantic City. In recent years, casinos have reported an increase in the shares of their revenues that arise from nongaming activities. It is clear that in some cases, the diversification of amenities and the attraction of a broader range of visitors have boosted casino gaming and related activities somewhat nationwide. This is certainly the case in Las Vegas, which is an international tourism destination, and to a lesser extent also of Atlantic City, which attracts some nongaming visitors from nearby states. New Jersey, however, is attempting to rebrand Atlantic City as a family destination in the face of deep losses in its casino gaming activities (Mikle, 2014), which it attributes to both poorly performing national economy and intrusions in its former market area by recently founded Pennsylvania casinos. In any case, in simulation *SimC*, we use the relationship between total tourism spending in Atlantic City and casino resort gaming as reported in Lahr *et al*. (2010). Their findings suggest that the $250 million in gaming revenues at the casino resorts are affiliated with $166.3 million in other forms of tourism spending. That is, the visitors to Atlantic City not only spend at the city's casino resorts but also enjoy its concert venues, magic shows, and other performing arts events as well as its high-quality bars

and restaurants, high-end shopping venues, and the like. The proposed racino in the Meadowlands will lack these venues. We assume that patterns of visitor spending in Atlantic City did not change from 2008 as reported in Lahr et al. (2010). We distributed the $166.3 million among the industrial categories as displayed in Table 2. Furthermore, 60 percent all of the spending in Atlantic City is assumed to be by non-New Jerseyans (Casino Reinvestment Development Authority, 2012).

Table 2. Variation in nonresident consumption, *SimC*

Commodities/Services		Shares of average tourism spending		Change in nonresidents demand in *SimC*
Lahr et al. (2010)	**SAMNJ-10**	**%**	**Millions**	**%**
Food and beverage	(I47) Food and drinking places	9	$37.2	-1.33
Shopping	(I29) Wholesale trade and (I30) Retail trade	8	$33.3	-6.47
Entertainment	(I42) Performing arts, etc.	11	$45.8	-2.72
Lodging	(I38) Real state and leasing	10	$41.7	-1.4
Travel	(I31) Air transportation and (I35) Other transportation	2	$8.3	-1.8
Gaming	(I46) Casinos	60	$250.0	-12.6

Source: Lahr *et al*. (2010) and own elaboration.

Finally, *SimD* evaluates the effects of *SimC* and adds to it a reduction in the mandatory community investment for Casino Resorts in Atlantic City and a likely fall of private investment. This is designed to simulate conjectures of CDC Gaming Reports (2013) that suggest investors prefer casinos with low tax rates because the return of investment is likely higher. According to ACA (2011), Casino Resorts in New Jersey pay taxes plus a community investment obligation of 1.25 percent of gross gaming revenues. In the current simulation, the reduction by this 1.25 percent represents a cut in state investment in Construction (I7) in the SAMNJ-10 of 0.07 percent. Additionally, we estimate the drop in private investment in construction using data on the 2000-2010 reports on casino budgets. In general, the growth rate of investment in Casino Resorts in New Jersey varies around 10 percent: We assume that the rate of investment it is somewhat smaller for machine-based facilities, 2.5 percent. (A tax rate of almost 50 percent leaves little room for reinvestment funds.) Applying the latter growth rate to the $500 million revenues generated with new facility and subtracting the 10 percent of the $250 million that would be lost due to the reduction in nonresident consumption of Casino resorts means that $12.5 million less would be allocated to private investment annually. This sum of $12.5 million represents a reduction in private investment via construction of 0.16 percent.[11]

Simulation SimA. The results of this first simulation on public revenues and expenditures are presented in Table 3. Table 4 displays the impact on the main macroeconomic variables and Table A2 in the Appendix presents the variation of regional production by industry. The increase of nonresident consumption on entertainment has significant positive effects on public deficit due to the increase of taxes on gaming. The nominal wage is the *numeraire* and, hence, cannot react to changes in labor demand. Thus, the price of capital services rises to adjust the capital market balance. As a consequence, domestic and consumer prices rise. Current transfers and

public consumption, valued with the consumer price index, increase but the positive effects on employment reduce expenditures on unemployment transfers. These effects combined with the increase of tax revenues on gaming cut public deficit down in 1.92 percent.

As can be observed in Table 4, the increase of nonresident consumption barely changes real GDP due to the general equilibrium effects but reduces unemployment by 0.09 pp and raises the state's job count by 4,960. This number is estimated by multiplying the figure of employees in New Jersey in 2010, 4,964,752 according to U.S. Bureau of Economic Analysis, by the percentage rise of employment, which results from the model. Households' disposable income goes up as result of the improved employment situation, as do private consumption and savings. The increase in the demand for labor and in households' gross income leads to higher income tax revenues, which edge upward by 0.09 percent. In the simulation, the increase in nonresident consumption reduces external savings but a rise in imports and prices make the current balance of payments more favorable with the rest of the US (it rises 0.49 percent). The current balance with the ROW increases in 0.08 percent. From this, it can be concluded that the positive effects of raising final demand outweigh the negative effects of the enhanced tax burden on the Entertainment industry.

Table 3. Variation in New Jersey's State and Local Government Accounts by Simulation
(change in accounts in percentages; benchmark levels in 2010 millions of dollars)

	BENCHMARK	*SimA*	*SimB*	*SimC*	*SimD*
TOTAL REVENUES	**74,230.508**	**0.454**	**0.374**	**0.324**	**0.322**
Taxes on production	29,289.718	0.124	0.076	0.016	0.015
Taxes on gaming[12]	339.323	73.733	67.772	67.742	67.741
Taxes on sales	11,439.799	0.073	0.029	-0.027	-0.028
Income taxes	12,370.417	0.090	0.036	0.003	0.002
capital revenues	16,385.840	0.128	0.054	0.001	-0.001
Intergovernmental transfers	3,954.785	0.055	0.037	0.024	0.024
Corporate transfers	450.626	0.055	0.037	0.024	0.024
CURRENT EXPENDITURE	**82,233.011**	**0.149**	**0.047**	**0.002**	**0.000**
Subsidies to production	1,785.000	0.090	0.049	0.000	-0.001
Unemployment benefits	7,625.010	-0.941	-0.264	-0.002	0.012
Transfers paid to households	1,137.410	0.055	0.037	0.024	0.024
Consumption	71,685.591	0.031	0.014	0.002	0.001
INVESTMENT	**8,450.795**	**0.015**	**0.006**	**0.000**	**0.000**
PUBLIC SURPLUS	**-16,453.298**	**-1.924**	**-1.432**	**-1.196**	**-1.187**
SimA: Increase of taxes on gaming (Amusements & gambling, I43) in 8.68 pp and nonresident consumption (Amusements & gambling) in 33.1 percent.					
SimB: *SimA* + reduction in nonresident consumption in Casinos (I46) in 12.6 percent.					
SimC: *SimB* +variation in nonresident consumption Table 2					
SimD: *SimC* +variation in state and local public investment and private investment					

As can be observed in Table A2, the biggest change in regional production is in the directly affected sector Amusements and gambling, followed by far for Oil and gas extraction products, Performing arts, Federal Government enterprises and Beverage and tobacco. In some sectors the level of regional production is quite small despite their high rates of change.

Table 4. Variation of Macroeconomic Variables by Simulation for New Jersey (percentage)

	BENCHMARK	*SimA*	*SimB*	*SimC*	*SimD*
Nominal GDP	480,510.650	0.162	0.089	0.049	0.048
Real GDP	480,510.650	**0.059**	**0.016**	**-0.002**	**-0.003**
Employment	-	0.100	0.028	0.000	-0.001
Household disposable income	364,570.375	0.074	0.029	0.004	0.003
Consumption	321,401.413	0.074	0.029	0.004	0.003
Savings	43,168.962	0.074	0.029	0.004	0.003
BP RUS	-113,877.890	0.494	0.307	0.208	0.216
BP ROW	76,498.855	0.081	0.043	0.018	0.017
Unemployment rate (in percentage) and Jobs created (in levels)					
	BENCHMARK	*SimA*	*SimB*	*SimC*	*SimD*
Unemployment rate	**9.600**	**9.510**	**9.575**	**9.600**	**9.601**
Jobs created	-	**4960.245**	**1391.850**	**12.944**	**-62.900**
SimA: Increase of taxes on gaming (Amusements & gambling, I43) in 8.68 pp and nonresident consumption (Amusements & gambling) in 33.1 percent.					
SimB: *SimA*: + reduction in nonresident consumption in Casinos (I46) in 12.6 percent.					
SimC: *SimB* +variation in nonresident consumption Table 2					
SimD: *SimC* +variation in state and local public investment and private investment					

Simulation SimB. The positive results from *SimA* are more than halved when some potential deleterious shocks are simultaneously effected on the Casino resort industry (I46). In this simulation *SimB*, it is assumed that the new slot machine establishment partially substitutes for the Casino Resort industry, reducing nonresident consumption at Casino Resorts by $250 million or 12.6 percent of their 2010 revenue base. The increased tax rate on the Entertainment sector still raises gaming tax revenues significantly, but the loss of nonresident demand at the Casino Resorts lowers those tax revenues somewhat from those obtained via *SimA*. The price of capital services also increases to equilibrate the capital market by capturing any relative price effects. Nominal wages are fixed in all simulations. Consumer prices and the CPI also rise concordantly. Interestingly, unemployment benefits fall only by 0.26 percent, almost 70 percent less than in the prior simulation. The reduced level of nonresidents' consumption in Casino resorts significantly affects employment, although the racino still yields a net employment benefit to the state's economy. On the other hand, income tax revenues are much lower than in *SimA,* as are tax revenues from production, gaming, and sales. The slight increase in prices also rases current public spending by 0.05 percent and public investment levels by 0.01 percent, both of which lead to a decline in public deficit of 1.43 percent. The effects on real GDP are almost negligible, the unemployment rate goes down by less than 0.03 pp and the number of jobs created drops from the 4,960 in *SimA* to 1,392. The negative effects on those more investment-oriented sectors can be observed in Table A2 in the Appendix.

Simulation SimC. This simulation represents a more complete scenario. In addition to the decline in nonresident consumption at Casino Resorts, we include a decline in associated final demand of food and beverage, shopping, entertainment, lodging and travel from visitors who stay overnight. Although this is deemed to be a worst scenario of the three for the state, results show the impacts of a new racino are, in net, positive for the State government. Taxes on gaming revenues rise significantly and compensate the dampened benefits from sales taxes via lost tourism dollars. Indeed, total revenues go up by 0.32 percent ($237.5 million). Still, the lost nonresidents demand for Casinos Resorts and for related tourism basically offset any employment gains from the new racino. The number of jobs created is only just 13 more than the number of jobs lost, and unemployment benefits change imperceptibly if at all. Similar observations can be made for real GDP as well as households' savings and consumption. Still, the State's public deficit falls by 1.2 percent. A glance at Table A2 reveals that only Amusements, gambling, Casino resorts, and Federal government enterprises yield significant changes in domestic production.

Simulation SimD. The final simulation, *SimD,* is the most realistic scenario. Although the effects of a decline in nonresident consumption in Casino resorts on local and private investment are small, they cannot be dismissed. The last column of Table 4 shows results very similar to those in simulation *SimC.* The only difference is the number of jobs created, which falls by 63 for the whole economy; consequently, expenditures on unemployment rise. Nevertheless, as in the previous simulation, the public deficit still falls by almost 1.2 percent. Indeed, this suggests that only real beneficiary of a machine-based gaming facility in New Jersey, beyond the owner, would be the state's tax coffers as real GDP and employment change negligibly and, in some cases, for the worst.

Conclusions

In this paper we evaluate the effects of a proposed new gaming establishment in New Jersey. We examine the prospects of this proposed facility using a regional CGE model calibrated to New Jersey in 2010 and using Keynesian closure—assuming the proposed facility caters strictly to consumers from outside of the state. Proponents of the proposed casino have assured that when it launches it will be taxed at a very high rate, which is the direction of most states that are deciding to host gaming venues. We further assume that, unlike existing gaming taxes, which are designated to fund specialized social services, the tax revenues from the new gaming facility would be channeled into the general fund to reduce the state's deficit and/or debt load. Again, this is part of regime for new pools of casino gaming tax revenues across the United States.

We find that, in isolation, the new casino could provide substantial and positive benefits to the state across an array of macroeconomic measures. This represents the perspective of those supporting development of the new facility and who are pushing for the facility to regain gambling dollars lost to Pennsylvania's nascent casino industry. They also are quick to note gambling facilities are likely to arise soon in New York City, which will raise similar issues for New Jersey's economy even if the casino does not take hold in the Meadowlands as proposed. These *SimA* findings also have direct implications to other areas of the nation and of the world that are small, open economies when no substitution with existing Entertainment or Casino resorts is evident. In such cases, if a reasonably sized machine-based casino generates most revenues from nonresidents to the economy (or can regain such spending from neighboring regions), subsequent job, income, and GDP effects can be substantial.

But the picture painted by the scenario developed for *SimA* is overly rosy for cases such as New Jersey's. While about 60 percent of visitors to Atlantic City are from out-of state, it is unlikely that clients lost by Atlantic City's casino resorts to Pennsylvania (as well as those likely to be lost to New York's future set of racinos) were strictly gamblers who resided outside of the New Jersey.[13] That is, many New Jerseyans who visited Atlantic City regularly are undoubtedly now making frequent runs across the border to Pennsylvania, Thus, many of the proposed facility's visitors are likely to view this new venue as a substitute not just for out-of-state casinos but also for the state's existing Casino resort industry, which presently is legally limited geographically to Atlantic City. To some degree, it may also substitute for other types of entertainment for New Jerseyans. In this vein, the naïve set of results from *SimA* are *optimistic* outcomes for New Jersey's economy from a Pennsylvania-style casino.

With further, more-realistic, simulation, we find that the new gaming establishment (at least the configuration we have assumed) would clearly increase nonresident consumption and state tax revenues. But it would also likely harm the state's existing set of Casino resorts in Atlantic City as well as the sundry set of industries that support tourism there, such as Food and drinking places, Entertainment venues, Hotels, and other retail establishments. This counterpoint developed in *SimD* may be somewhat pessimistic from the perspective of the proposed facility's proponents. It assumes that the new facility does, in fact, partially substitute for the existing set of casino resorts in Atlantic City. We effect this by reducing revenues the Casino resort industry's obtains from nonresidents by $250 million when the $500 million proposed casino is operating at full steam. We find that most macroeconomic benefits from the proposed casino become negligible if 50 percent of its revenues are gained at the expense of the state's Casino Resorts (and concomitant tourism dollars are lost). The results show that beyond the owner of the new establishment, the only clear beneficiary of the investment would be the State government. The State government's deficit would fall by about 1.2 percent annually, assuming that no new spending programs are implemented as a result of these new-found public revenues. Of course, this assumes the proposed casino actually does have net revenues of $500 million of which only half substitutes for net revenues of the casino resorts in Atlantic City (or other entertainment venues). It also assumes the revenues for the proposed facility are generated from the incomes of visitors to New Jersey and not at all from income earned by the state's residents. Differences from either of these core and rather strong assumptions could substantially moderate the proposed casino's singular beneficial effect of improving the state's tax coffers.

If the tourism spending and Casino resort investment aspects strictly viewed as pre-existing, direct implication to other areas are tough to derive from the *SimD* simulations. This is because few other regions in the world have a bank of Casino resort hotels like the set that exists in Atlantic City. The substitution of a new casino to other forms entertainment within a region can, however, draw fairly direct policy implications from the results of *SimB*, findings. In essence, the benefits of a proposed casino are highly moderated when 50 percent of the gaming revenues are effectively derived from internal sources. In fact, the impacts reported in *SimA* are reduced by ***more*** than 50 percent in *SimB*. The technological nature of the Casino resort industry in New Jersey as well as the openness of the state's economy moderate the degree to which one can infer implications for other regions.

From another perspective, however, *SimD* which substitutes a machines-dominated casino for all activity surrounding Casino resorts does reveal the winner of the race between the tortoise and the hare. The hare (high-taxes rates on slot machine facilities) and not the tortoise (investment-intensive casino resorts) should win the race if we judge the winner in light of state

tax coffers alone. The direct tax revenues from gaming at the proposed facility simply trump any general equilibrium tax revenue benefits (largely personal income taxes and sales taxes on working households) that a more investment-intensive Casino resort industry. While tax coffers would continue to reveal the hare was first to cross the end line, however, all other measures (cameras) would disclose the tortoise as the winner. While this is not immediately evident from, *SimD* findings, recall the evaluation did not compare similarly sized establishments—the Casino resorts lost half of the revenues gained by the racino. That is, the difference in economic development potential is largely due to large size of the tourism industry that necessarily accompanies the casino resorts as well as state policy that dictates New Jersey's Casino resorts must hire people who live in New Jersey as well as purchase what goods and services it can reasonably purchase within the state. The racino will likely be under no such requirement. Moreover, our scenarios assume the tortoise—the state's Casino resort industry—sleeps knowing full well that the hare is set in his marks and ready to sprint at an impossible-to-beat speed.

REFERENCES

Álvarez-Martínez, M.T. and C. Polo 2012. A general equilibrium assessment of external and domestic shocks in Spain, *Economic Modelling,* 29, 2486–2493.

American Gaming Association. (2012). *State of the States 2011: The AGA Survey of Casino Entertainment.* at http://www.americangaming.org/files/aga/uploads/docs/sos/aga-sos-2011.pdf

Anders, G.C., D. Siegel, and M. Yacoub. 1998. Does Indian casino gambling reduce state revenues? Evidence from Arizona, *Contemporary Economic Policy,* 16, 347–355.

Anderson, J. 2005. Casino taxation in the United States, *National Tax Journal,* 58, 303–324.

Armington, P.S. 1969. A theory of demand for products distinguished by place of production, *International Monetary Fund Staff Papers*, 16, 159–178.

Casino Reinvestment Development Authority. 2012. Minutes public meeting 12-09, Atlantic City, NJ, available online in August 2014 at http://www.njcrda.com/uploads/1/2/5/2/12523432/meeting_minutes_-_8-21-12.pdf.

Christiansen, E. 2005. Impacts of gaming taxation in the United States, *AGA 10th Anniversary White Paper Series*. Washington: American Gaming Association. http://www.americangaming.org/files/aga/uploads/docs/whitepapers/the_impacts_of_gaming_taxation.pdf.

Calcagno, P.T., D.M. Walker, and J.D. Jackson. 2010. Determinants of the probability and timing of commercial casino legalization in the United States, *Public Choice,* 142, 69–90.

CDC Gaming Reports. 2013. http://cdcgamingreports.com/commentaries/a-pennsylvania-whirlwind-that-hit-ac-may-now-be-coming-back/#.UmqkuPkqgRY

Friedman, M. 2012. North Jersey lawmakers want casino at Meadowlands to be a solution for struggling Atlantic City, *Newark Starledger*, July 19. http://www.nj.com/news/index.ssf/2012/07/north_jersey_lawmakers_want_ca.html.

_____. 2014, Bill Would Tax Potential North Jersey Casinos at Far Higher Rate than Atlantic City, *Star-Ledger*, July 9,

http://www.nj.com/politics/index.ssf/2014/07/bill_would_tax_potential_north_jersey_casinos_at_higher_rate_than_atlantic_city.html.

Furlong, E.J. 1998. A logistic regression model explaining recent state casino gaming adoptions, *Policy Studies Journal,* 26, 371–383

Gallagher. R.M. 2014. An examination of cannibalization effects within the riverboat gaming industry: The case of Illinois-area casinos, *Growth and Change*, 45, 41–59.

Giesecke, J.A. 2011. Development of a large-scale single US region CGE model using IMPLAN data: A Los Angeles County example with a productivity shock application, *Spatial Economic Analysis,* 6, 331–350.

Gu, X. and G. Li. 2009. Why do various gaming markets adopt different tax rates, *Journal of Gambling Business and Economics*, 3, 65-88.

Hertel, T., R. McDougall, B. Narayanan, and A. Aguiar. 2008. GTAP 7 data base documentation-Chapter 14: Behavioral parameters, Center for Global Trade Analysis.

Internal Revenue Service. 2011. *Internal revenue service data book, fiscal year 2010*, Publication 55B, Washington, DC.

Lahr, M.L. 2001. "Reconciling domestication techniques, the notion of re-exports and some comments on regional accounting, *Economic System Research* 13, 165–179.

Lahr, M.L, G. Hincken, J. Chao, and N. Azhar. 2010. The contribution of the casino hotel industry to New Jersey's economy, *R/ECON Working Paper*, Edward J. Bloustein School of Planning and Public Policy, Rutgers University, New Jersey.

McGregor, P.G., M.D. Partridge, and D.S. Rickman, 2010. Innovations in regional computable general equilibrium (CGE) modeling, *Regional Studies,* 44, 1307–1310.

Mikle, J. 2014. Shore towns feel ripple effect as A.C. looks to rebrand, *Courier-Post*, July 28, last accessed in August 2014 at http://www.courierpostonline.com/story/news/local/south-jersey/2014/07/27/shore-hit-casino-closings/13257105/.

Monge, J.J. and H.L. Bryant. 2012. A static computable general equilibrium model for forestry and agricultural regional markets (FARM), *AFPC Research Report 12-3*, College Station, Texas.

Partridge, M.D. and D.S. Rickman. 1998. Regional computable general equilibrium modeling: A survey and critical appraisal, *International Regional Science Review* 21, 205–248.

_____. 2010. Computable general equilibrium (CGE) modeling for regional economic development analysis, *Regional Studies* 44, 1311–1328.

Pennsylvania Gaming Control Board. 2013. *Annual report 2011-2012*, Harrisburg PA, www.gamingcontrolboard.pa.gov.

Pollock, M. 2011. "Casino tax policy: Identifying the issues that will determine the optimal rate, presented to National Tax Association, 103rd Annual Conference on Taxation, November 18-20, 2010, Chicago.

Quarterly Census of Employment and Wages (QCEW). 2012. U.S. Bureau of Labor Statistics, Washington, DC.

Rose, A.Z. 2001. The regional economic impacts of casino cambling, in M.L. Lahr and R.E. Miller (eds) *Regional Science Perspectives in Economic Analysis*. North Holland: Amsterdam, pp. 345–378.

Seung, C.K. and E.C. Waters. 2010. Evaluating supply-side and demand-side shocks for fisheries: a computable general equilibrium (CGE) model for Alaska, *Economic Systems Research*, 22, 87–109.

State and Local Government Finances: 2009 and 2010, New Jersey.

Schubert, S.F., A, Matias, and C.M.G. Costa. 2012. A general equilibrium analysis of casino taxation in Portugal, *Tourism Economics,* 18, 475–494.

Thaiprasert, N., D. Faulk, and M.J. Hicks. 2011. An examination of the economic impact of property tax levy caps on economic activity in New Jersey, Center for Business and Economic Research, Ball State University.

Walker, D.M. and J.D. Jackson. 1998. New goods and economic growth: Evidence from legalized gambling, *Review of Regional Studies,* 28, 187–198.

_____. 2007. Do casinos cause economic growth, *American Journal of Economics and Sociology,* 66, 593–607.

_____. 2008. Do U.S. gambling industries cannibalize each other?, *Public Finance Review*, 36, 308–333.

_____. 2011. The effect of legalized gambling on state government revenue, *Contemporary Economic Policy,* 29, 101–114.

Walker, D.M. and T.M. Nesbit. 2014. Casino revenue sensitivity to competing casinos: A spatial analysis of Missouri, *Growth and Change*, 45, 21–40.

APPENDIX

Table A1. SAMNJ-10: Industries	
I1	Agriculture, Forestry and Hunting
I2	Fishing
I3	Oil and gas extraction
I4	Mining
I5	Mining support activities
I6	Electricity, Gas distribution and water
I7	Construction
I8	Food manufacturing
I9	Beverage and tobacco
I10	Textile mills
I11	Textile product mills
I12	Apparel manufacturing
I13	Leather
I14	Wood product manufacturing
I15	Paper
I16	Printing and related support activities

I17	Petroleum and coal products manufacturing
I18	Chemical manufacturing
I19	Plastics and rubber products manufacturing
I20	Nonmetallic mineral product manufacturing
I21	Ferrous and non ferrous metallic production
I22	Other fabricated metal product manufacturing
I23	Machinery manufacturing
I24	Computer and electronic machinery
I25	Electrical equipment manufacturing
I26	Motor vehicle manufacturing and parts
I27	Furniture and related product manufacturing
I28	Medical equipment and supplies manufacturing
I29	Wholesale trade
I30	Retail trade
I31	Air transportation
I32	Rail transportation
I33	Water transportation
I34	Transit and ground passenger transportation
I35	Other transportation
I36	Publishing and communications
I37	Finance and insurance
I38	Real estate and leasing
I39	Other services
I40	Educational services
I41	health care and social services
I42	Performing arts, spectator sports, museums, zoos, and parks
I43	Amusements, gambling
I44	Other recreations
I45	Accommodation
I46	Casinos
I47	Food and drinking places
I48	Automotive repair and goods repair
I49	Personal and laundry services
I50	Religious, civic and similar organizations
I51	Private households
I52	Postal service
I53	Federal Government enterprises
I54	State and Local government enterprises
I55	General Federal defense government services
I56	General Federal nondefense government services
I57	General state and local government services

Table A2. Variation in domestic production (percentage), *continue*

	BENCHMARK	*SimA*	*SimB*	*SimC*	*SimD*
I1	Agriculture, Forestry and Hunting	-0.059	-0.006	0.031	0.032
I2	Fishing	-0.036	-0.011	0.006	0.007
I3	Oil and gas extraction	-0.585	-0.249	-0.005	0.003
I4	Mining	0.007	-0.013	-0.010	-0.013
I5	Mining support activities	-0.004	0.001	0.008	0.008
I6	Electricity, Gas distribution and water	0.066	0.086	0.099	0.099
I7	Construction	-0.001	-0.063	-0.057	-0.078
I8	Food manufacturing	0.081	0.085	0.083	0.084
I9	Beverage and tobacco	0.176	0.156	0.145	0.145
I10	Textile mills	0.035	0.062	0.082	0.082
I11	Textile product mills	0.022	0.021	0.024	0.024
I12	Apparel manufacturing	-0.064	-0.029	0.001	0.002
I13	Leather	-0.085	-0.038	-0.001	0.000
I14	Wood product manufacturing	-0.030	-0.015	-0.003	-0.007
I15	Paper	0.034	0.040	0.043	0.043
I16	Printing and related support activities	0.151	0.153	0.156	0.156
I17	Petroleum and coal products manufacturing	-0.048	-0.017	0.006	0.007
I18	Chemical manufacturing	-0.028	-0.009	0.007	0.008
I19	Plastics and rubber products manufacturing	-0.022	0.001	0.017	0.017
I20	Nonmetallic mineral product manufacturing	-0.017	-0.138	-0.125	-0.127
I21	Ferrous and nonferrous metallic production	-0.069	-0.029	0.001	0.002
I22	Other fabricated metal product manufacturing	-0.029	-0.008	0.010	0.009
I23	Machinery manufacturing	-0.064	-0.031	-0.002	-0.001
I24	Computer and electronic machinery	-0.057	-0.021	0.006	0.007
I25	Electrical equipment manufacturing	-0.070	-0.023	0.015	0.015
I26	Motor vehicle manufacturing and parts	-0.028	-0.013	0.001	0.001
I27	Furniture and related product manufacturing	-0.032	-0.018	-0.002	-0.003
I28	Medical equipment and supplies manufacturing	-0.076	-0.029	0.006	0.007
SimA: Increase of taxes on gaming (Amusements & gambling, I43) in 8.68 pp and nonresident consumption (Amusements & gambling) in 33.1 percent.					
SimB: *SimA*: + reduction in nonresident consumption in Casinos (I46) in 12.6 percent.					
SimC: *SimB*+variation in nonresident consumption Table 2					
SimD:: *SimC*+variation in state and local public investment and private investment					

Table A2. Variation in domestic production (percentage), *continued*

	BENCHMARK	*SimA*	*SimB*	*SimC*	*SimD*
I29	Wholesale trade	0.030	0.014	-0.011	-0.011
I30	Retail trade	0.026	0.005	-0.048	-0.048
I31	Air transportation	0.064	0.057	-0.072	-0.072
I32	Rail transportation	0.022	0.030	0.036	0.036
I33	Water transportation	0.023	0.019	0.017	0.017
I34	Transit and ground passenger transportation	0.069	0.003	-0.002	-0.002
I35	Other transportation	0.077	0.039	0.028	0.028
I36	publishing and communications	0.119	0.123	0.125	0.125
I37	Finance and insurance	0.090	0.068	0.062	0.061
I38	real state and leasing	0.028	0.028	-0.015	-0.015
I39	other services	0.128	0.121	0.117	0.117
I40	Educational services	0.025	0.010	0.004	0.004
I41	health care and social services	0.029	0.009	0.002	0.002
I42	Performing arts, spectator sports, museums, zoos	0.300	0.302	0.198	0.198
I43	Amusements, gambling	15.762	15.756	15.754	15.754
I44	other recreations	0.046	-0.003	-0.009	-0.010
I45	Accommodation	0.055	0.054	0.054	0.054
I46	Casinos	0.076	-6.499	-6.503	-6.503
I47	Food and drinking places	0.081	0.075	-0.122	-0.122
I48	Automotive repair and goods repair	0.095	0.052	0.044	0.044
I49	Personal and laundry services	0.105	0.073	0.065	0.064
I50	Religious, civic and similar organizations	0.043	0.022	0.015	0.014
I51	Private households	0.040	0.014	0.004	0.003
I52	Postal service	0.070	0.056	0.035	0.035
I53	Federal Government enterprises	0.199	0.189	0.172	0.172
I54	State and Local government enterprises	0.054	0.025	0.011	0.010
I55	General Federal defense government services	0.003	0.003	0.003	0.003
I56	General Federal nondefense government services	-0.025	-0.011	-0.001	0.000
I57	General state and local government services	0.003	0.003	0.002	0.002
SimA: Increase of taxes on gaming (Amusements & gambling, I43) in 8.68 pp and nonresident consumption (Amusements & gambling) in 33.1 percent.					
SimB: *SimA*: + reduction in nonresident consumption in Casinos (I46) in 12.6 percent.					
SimC: *SimB*+variation in nonresident consumption Table 2					
SimD:: *SimC*+variation in state and local public investment and private investment					

NOTES

[1] The Sands Casino Resort in Bethlehem, Pennsylvania, nets $116.9 million from table games and $286.1 million from slot machines. The Parx Casino in Bensalem Township in Bucks County, Pennsylvania, nets $95.8 million and $387.9 million, respectively, via table games and slot machines.

[2] Racinos are horse tracks that also maintain slot-machines. They are included in the broader category of "casinos."
[3] Shubert et al. (2012) evaluated the effects of eliminating taxes on casinos using a stochastic dynamic general equilibrium model. Using a very aggregate model that includes just manufacturing, tourism services, and casino gaming industries, they conclude that dropping the casino tax would improve welfare in Portugal. Their work is countered by that of Gu and Li (2009) who, through the use of formal analytics, find that high gaming taxes can only be sustained if the tax is borne by nonresidents. Of course, it is conceivable both sets of authors are correct. That is, it may be that Portuguese residents comprise the lion's share of the client base for Portuguese casinos, so that Gu and Li's point is impractical insofar as Shubert et al.'s simulations are concerned.
[4] Taxes on sales are limited to the retail trade and not distributed across concordant consumptive commodities. This could cause problems in a study that focuses on a fiscal analysis. In this paper, however, this sales tax issue should not have much of an effect since gaming industries are the focus of the study and the distribution of sales across good sold should not be significant across the scenarios examined.
[5] Nonresidents do not receive unemployment benefits in our model, which is focused on New Jersey economic activity. Unemployment benefits are only paid to New Jersey state residents. That is, the model does not consider rises and falls of unemployment in other states due to job losses in New Jersey. This likely approximates reality since New Jersey contains suburbs of both New York City and Philadelphia. Thus, there are more New Jersey residents working in New York and Pennsylvania than there are New York and Pennsylvania residents working in New Jersey.
[6] In this definition of government, NPISH are included.
[7] When this paper was written the latest benchmark U.S. table was that for the year 2002.
[8] When Atlantic City was selected to be the home of casinos in New Jersey, the state's General Assembly put a lot of thought and effort toward assuring that as much of the state as possible would benefit economically as a result. Thus, two original key elements of the New Jersey's Casino Control Act <http://www.state.nj.us/casinos/actreg/act/> were that all casino floor personnel had to be state residents, and the other was every effort had to be made to assure that casino suppliers were located within the state.
[9] SAMNJ-10 details are available upon request from the authors As mentioned in the text, however, much of the approach is discussed in Lahr (2001).
[10] New Jersey's Meadowlands, the oft-cited location for this proposed casino, are 20 minutes due east of New York City by car.
[11] In this paper we do not account for the initial construction of the new (largely) slots-only facility since it would be a one-time permanent investment, and the rest of the analysis examines the net change in the impact of operations.
[12] The figure of taxes on gaming in the benchmark (2010) includes the taxes paid by casinos (I46) detailed in Table 1 for New Jersey, $305.5 million, plus other taxes paid by the Amusements and gambling industries (I43), $33.823 million.
[13] In our model, households' consumption is an endogenous variable derived from their optimization behavior. Thus, we are not simulating a negative shock in private consumption