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## BRIEF REPORT

## Smoke-free law did not affect revenue from gaming in Delaware

L L Mandel, B C Alamar, S A Glantz

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**Objective:** To determine the effect of the Delaware smoke-free law on gaming revenue.

**Methods:** Linear regression of gaming revenue and average revenue per machine on a public policy variable, time, while controlling for economic activity and seasonal effects.

**Results:** The linear regression showed that the smoke-free law was associated with no effect on total revenue or average revenue per machine.

**Conclusion:** Smoke-free laws are associated with no change in gaming revenue.

Smoke-free policies reduce cigarette consumption,<sup>1</sup> which translates into lost tobacco industry revenue. Because of its lack of public credibility, the tobacco industry has used its allies in the hospitality industry, including the gaming industry,<sup>2</sup> to act as surrogates in the fight against smoke-free workplaces.<sup>3</sup> Despite the claims of the tobacco industry and its allies in the hospitality industry,<sup>3</sup> it has been shown that smoke-free ordinances have no effect or a positive effect on restaurant and bar revenues,<sup>4</sup> bingo revenue,<sup>5</sup> and restaurant values.<sup>6</sup>

In response, opponents of smoke-free workplaces have claimed that smoke-free laws still negatively affect gaming revenue. In 2003, the gaming industry in Delaware was continuing to blame the November 2002 Delaware Clean Indoor Air Law for reduced revenue and layoffs.<sup>7–8</sup> In May 2003, a gaming executive from Park Place Entertainment, which operates gaming facilities in Delaware (Dover Downs) and New Jersey, testified against a proposed smoke-free law at a New Jersey State Senate Health Committee hearing. The executive claimed that the Delaware Clean Indoor Act had a negative effect on gaming revenue and that her concerns for New Jersey were “supported by the results that happened in Delaware”.<sup>9</sup> The executive claimed that Dover Downs, a racino that includes video slot machines and horse racing, had experienced a 25% drop in revenue and already reduced its staff by 100 workers since the Clean Indoor Air Act. She stated that Dover Downs would continue to reduce staff by as much as double what they already had if revenue continued to decrease, a trend she claimed would continue as long as the casinos were forced to be smoke-free. The executive admitted that factors such as other economic variables and weather may have played a role in the decrease in revenue, but concluded on behalf of the Casino Association of New Jersey, that “we would expect significant pressure on a business as a result of the enactment of this [proposed New Jersey smoke-free] bill”.<sup>9</sup>

The executive failed to mention that Park Place Entertainment’s first quarter Securities and Exchange Commission (SEC) filing stated that the 7% decrease in revenue for its three casinos in Atlantic City and the management fees from Dover Downs was mainly caused by

inclement weather.<sup>10</sup> The online summary of the filing did not mention the smoking restrictions as a reason revenue was down from the first quarter of the previous year.<sup>10</sup>

In 1994, Delaware passed legislation that allowed each of the state’s three racetracks to have slot machine-like video lottery terminals. Delaware Park and Dover Downs have operated machines since December, 1995 and Harrington Raceway has operated machines since August, 1996.<sup>11</sup> As of May 2004, Delaware Park operated 2475 machines and Dover Downs operated 2500 machines, and the Harrington Raceway operated 1435 machines.

On 27 November 2002 the state of Delaware implemented the Delaware Clean Indoor Air Act, a comprehensive state wide smoke-free law that made virtually all of Delaware’s public places and workplaces smoke-free, including the three racinos.<sup>12</sup>

## METHODS

Regression analysis was used to test for the effects of the smoke-free law on the gaming industry in Delaware. Data on gaming revenue by establishment and number of machines per establishment from January 1996 (Delaware Park and Dover Downs) and from August 1996 (Harrington) to May 2004 (for all three facilities) were obtained from the Delaware Video Lottery.<sup>13</sup> The revenue data were then inflated to May 2004 dollars using the Chained Consumer Price Index (CPI) published by the US Bureau of Labor Statistics.<sup>14</sup> The revenue and machine data were used to calculate the average revenue per machine on a total basis.

Estimates of annual personal income are published quarterly for the MidEast region by the US Bureau of Economic Analysis.<sup>15</sup> The data were interpolated to create monthly estimates. These monthly estimates of income were used as a control for economic activity. To further control for any economic or other changes not accounted for by the income, a time variable with 1996 set to 0 and increasing by one for each month was included in the regression equation. The time variable was tested for both linear and quadratic effects with the quadratic specification providing a better fit. The better fit for the quadratic time specification is likely due to the maturing, and thus slowing growth, of gaming in Delaware. Seasonal dummy variables were also tested in the models with winter defined as December, January, and February; spring defined as March, April, and May; and summer defined as June, July, and August. Only winter was found to be significant, thus only the results with winter are reported.

We tested for effects of the law on two variables: total revenues and average revenue per machine. We did this by using a dummy policy variable,  $P_{law}$ , that was set to zero pre smoke-free law and was set to one for every month the law was in effect.

$$\text{Total revenues} = \beta_{law} P_{law} + \gamma_{Time} \text{Time} + \epsilon_{time2} \text{Time}^2 + \alpha_{Machines} \text{Machines} + \chi_{Income} \text{Income} + \eta_{Winter} \text{Winter}$$

**Table 1** Estimated effects of the smoke-free law

Variable	Total revenues (\$million)			Average revenue per machine (\$/machine)		
	Estimate	SE	p Value	Estimate	SE	p Value
P <sub>law</sub> (unit/month)	4.582	2.968	0.126	735	725.95	0.314
Time (unit/month)	0.562	0.117	<0.001	78.48	35.95	0.032
Time <sup>2</sup> (unit/month <sup>2</sup> )	-0.005	0.001	<0.001	-0.849	0.259	0.001
Machines (unit/machine)	0.004	0.002	0.017	-2.424	0.445	<0.001
Income (unit/\$million)	8.761	1.734	<0.001	12415	562.9	<0.001
Winter	-4.653	1.149	<0.001	-1405	315	<0.001
n	101			101		
R <sup>2</sup>	0.803			0.622		

The same specification as above was also used for average revenues per machine. The parameters were estimated using ordinary least squares.

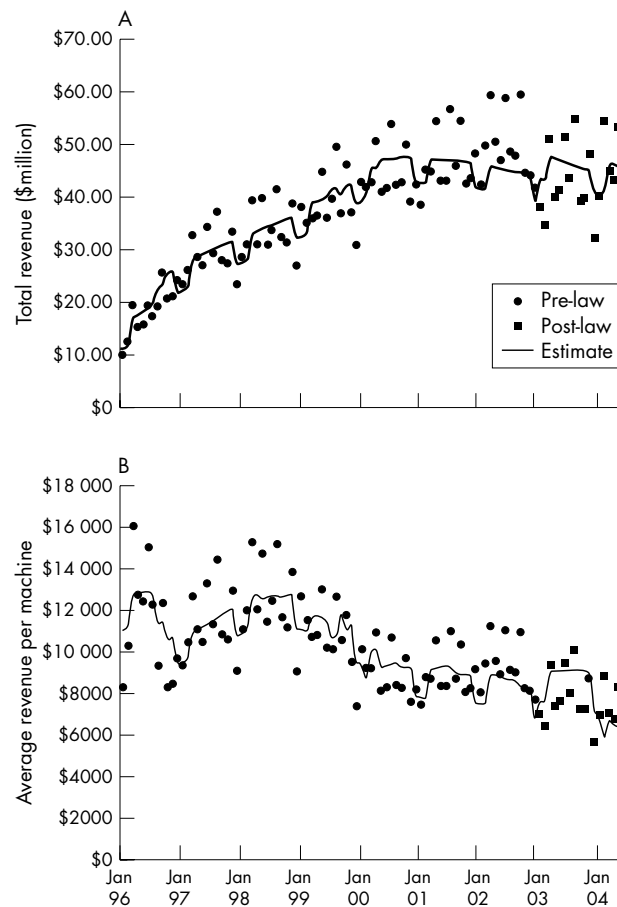
**RESULTS**

The estimates from the equation are reported in table 1 and fig 1. Both estimations show a good fit to the data with an R<sup>2</sup> of 0.803 for total revenues and an R<sup>2</sup> of 0.622 for average revenues per machine. Controlling for underlying economic conditions, the results show no significant effect of the smoke-free law for either total revenues (p = 0.126) or

**What this paper adds**

Many studies have previously examined the effects of smoke-free laws and ordinances on the hospitality industry and charitable bingo. These studies have found either a positive or no effect on restaurant values, revenues, and employment; bar revenues and employment; and on bingo revenues. No previous study, however, has examined the effects of a state wide smoke-free law on gaming revenue.

This study is the first to show no impact of smoke-free laws on gaming revenues. The paper tests for effects on both total revenues and average revenues per machine and finds no significant changes associated with the smoke-free law.



**Figure 1** (A) Total revenues increase from the creation of the racinos and then flatten out with the economic downturn. No significant relation between total revenues and the smoke-free law exist. (B) Average revenues per machine vary overtime and decrease with the downturn in the economy. No significant relation between average revenues and the smoke-free law exist.

average revenues per machine (p = 0.314). These results indicate that the smoke-free law had no effect on the total revenues (power to detect a 10% drop in revenues 0.98) or the average revenue per machine (power to detect a 10% drop in average revenues 0.97).

**DISCUSSION**

The smoke-free law had no detectable effect on total gaming revenue or the average revenue per machine. These results reject the argument that smoke-free laws hurt revenues from gaming. No effects were found on total revenue or average revenues per machine. Smoke-free laws do not harm racinos just as they do not harm restaurants, bars, or bingo parlours.<sup>4 5 6</sup>

Outside Delaware, casinos and other gaming facilities including bars, taverns, restaurants, and grocery stores with video gaming machines remain one of the last places that continue to be exempt from smoke-free ordinances. This type of gaming venue is the fastest growing sector within the gaming industry. Frank Fahrenkopf, one of the casino industry's top Washington DC based lobbyists and president of the American Gaming Association, predicted at his keynote speech at the 2003 American Gaming Summit in Las Vegas that the continued growth of racinos, not resort style casinos, will fuel the expansion of the gaming industry.<sup>16</sup> It is important that state legislatures and public health advocates in states considering allowing racinos know that despite the claims from opponents, smoke-free laws do not affect gaming revenue.

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## REFERENCES

- 1 **Fichtenberg CM**, Glantz SA. Effect of smoke-free workplaces on smoking behaviour: systemic review. *BMJ* 2002;**325**:1-7.
- 2 **Mandel LL**, Glantz SA. Hedging their bets: tobacco and gambling industries work against smoke-free policies. *Tobacco Control* 1004;**13**:268-76.
- 3 **Dearlove JV**, Bialous SA, Glantz SA. Tobacco industry manipulation of the hospitality industry to maintain smoking in public places. *Tobacco Control* 2002;**11**:94-104.
- 4 **Scollo M**, Lal A, Hyland A, *et al*. Review of the quality of studies on the economic effects of smoke-free policies on the hospitality industry. *Tobacco Control* 2003;**12**:13-20.
- 5 **Glantz SA**, Wilson-Loots R. No association of smoke-free ordinances with profits from bingo and charitable games in Massachusetts. *Tobacco Control* 2003;**12**:411-13.
- 6 **Alamar BC**, Glantz SA. Smokefree ordinances increase restaurant values. *Contemporary Economic Policy* 2004;**28**:520-5.
- 7 **Chase R**. Smoking ban may be factor in keeping Delaware casinos competitive. *Associated Press State and Local Wire*, 2003. [http://web.lexis-nexis.com/universe/document?\\_m=aab7a5d5c403ff85dde0930aaf682af3&\\_docnum=1&wchp=dGLbVlz-zSkVb&\\_md5=16a066912d56c07fa9147e008eb918f3](http://web.lexis-nexis.com/universe/document?_m=aab7a5d5c403ff85dde0930aaf682af3&_docnum=1&wchp=dGLbVlz-zSkVb&_md5=16a066912d56c07fa9147e008eb918f3) (Accessed 30 Aug 2003).
- 8 **Chase R**. Dover Downs blames layoffs on Delaware smoking ban. *The Associated Press State and Local Wire*, 2003. [http://web.lexis-nexis.com/universe/document?\\_m=aab7a5d5c403ff85dde0930aaf682af3&\\_docnum=21&wchp=dGLbVlz-zSkVb&\\_md5=557039c54d22b08d1ed0e371ff683871](http://web.lexis-nexis.com/universe/document?_m=aab7a5d5c403ff85dde0930aaf682af3&_docnum=21&wchp=dGLbVlz-zSkVb&_md5=557039c54d22b08d1ed0e371ff683871) (Accessed 30 Aug 2003).
- 9 **New Jersey Senate Health Committee Hearing**. New Jersey Legislature, May 19, 2003. [http://www.njleg.state.nj.us/media/archive\\_audio2.asp?KEY=SHH&SESSION=2002](http://www.njleg.state.nj.us/media/archive_audio2.asp?KEY=SHH&SESSION=2002) (Accessed 12 Aug 2003).
- 10 **Park Place Entertainment**. Park Place Reports Financial Results for First Quarter. 2003. <http://investor.parkplace.com/ReleaseDetail.cfm?Releaseld=108048&Category=Earnings%20Releases> (Accessed 22 Aug 2003).
- 11 **The Delaware Lottery**. The Delaware Lottery 2002 Annual Report. The Delaware Lottery, 2002. <http://delottery.com/pdf/2002annualreport.pdf> (Accessed 15 Aug 2003).
- 12 **American Lung Association**. Tobacco Policy Trend Alert Clean Indoor Air: The Delaware Campaign Model; 2002 November.
- 13 **The Delaware Lottery**. Monthly Proceeds and Distribution. 2004. <http://lottery.state.de.us/videlottery.html> (Accessed 5 June 2004).
- 14 **Chained Consumer Price Index**. Bureau of Labor Statistics, 2004. <http://www.bls.gov/data/home.htm> (Accessed 5 June 2004).
- 15 **Regional Accounts Data Personal Income**. Bureau of Economic Analysis, 2003. <http://www.bea.gov/bea/regional/> (Accessed 5 June 2004).
- 16 **Simpson J**. Lobbyist Sees Expansion for Racinos: Fiscally strapped states not expected to look to Las Vegas-style resort model. *Las Vegas Review Journal*, 2003. <http://reviewjournal.printhis.clickability.com/pt/cpt?action=cpt&expire=&urlID=5052771&fb=Y&partnerID=566> (Accessed 22 Aug 2003).

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Stanton A Glantz, Benjamin Alamar (23 May 2005)

## Erratum

23 May 2005

Stanton A Glantz, Professor UC San Francisco, Erratum to Mandel, L; BC Alamar; and SA Glantz, "Smokefree Law did not affect revenue from gaming in Delaware" *Tobacco Control* 14 (2005), 10-12.

Benjamin Alamar

The results in the original publication reflect a data entry error. The revised table in this erratum present the results with this error corrected. Using the corrected data, White's test for heteroskedasticity rejected homoskedasticity ( $p = 0.016$ ) in the case of total revenues. We corrected for the heteroskedasticity in total revenues by using a weighted least squares analysis using the inverse of the number of video lottery machines as the weight. White's test of the residuals from the weighted regression did not reject homoskedasticity ( $p=0.293$ ). Average revenues were homoskedastic ( $p=0.13$ ) so we continued to use an unweighted regression, as in the original paper. The analysis based on the corrected data confirms the results of the published paper, that the smokefree law had no effect on revenue from gaming in Delaware.

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**Table 1. Estimated effects of the smokefree law**

Unit Variable	Total Revenues			Average Revenue per Machine		
	(Weighted Least Squares) (\$million)			(Ordinary Least Squares) (\$/machine)		
	Estimate	Standard Error	p value	Estimate	Standard Error	p value
P <sub>law</sub> (unit/month)	-2.404	3.302	0.468	-1158.11	745.10	0.123
Time (unit/month)	0.612	0.102	<0.001	96.47	36.70	0.010
Time <sup>2</sup> (unit/month <sup>2</sup> )	-0.005	0.001	<0.001	-0.31	0.278	0.259
Machines(unit/machine)	0.003	0.001	0.024	-2.424	-2.762	<0.001
Income (unit/\$million)	7.568	1.087	<0.001	10717.00	467.00	<0.001

Winter	-4.147	0.872	<0.001	-1353.01	314.79	<0.001
n	101			101		
R <sup>2</sup>	0.669			0.639		

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