The Impact of Deregulation on Casino Win in Atlantic City

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Abstract. This paper examines the impact of deregulation on the demand for casino gaming in Atlantic City. Specifically, the paper analyzes the impact of expanded operating hours and floor space devoted to slot machines. Using monthly win data between June 1978 and July 1996, the analysis reveals that expanded floor space had a significant, positive impact on win, resulting in an average monthly increase of over $2 million. This shows the importance of developing a regulatory structure rigid enough to ensure the honesty and integrity of the gaming industry, but flexible enough to allow management to respond to changing market conditions.

Key words: Casino win (gross gaming revenue), Atlantic City, deregulation.

I. Introduction

Casino regulation in Atlantic City has frequently been criticized for being excessive and too intrusive into operational matters (see, e.g., Lowenhar et al. (1991) and Satre (1981)). While few would argue that regulatory oversight is necessary to keep out organized crime, maintain the integrity of casino operation, ensure proper financial reporting, and guarantee the legitimacy of the games, the regulation of issues directly related to casino operations is more debatable. Many issues left to management discretion in other jurisdictions, such as house rules and odds, are explicitly regulated in Atlantic City. For example, New Jersey statutes state that the Casino Control Commission shall be responsible for "defining and limiting the areas of operation, the rules of authorized games, odds, and devices permitted, and the method of operation of such games and devices" and "prescribing for games operations and procedures, forms and methods of management controls, including employee and supervisory tables of organization and responsibility, and minimum security standards, including security personnel structure, alarm and other electrical or visual security measures" (New Jersey Statutes, L. 1977, c. 110, s. 70 amended L. 1995, c.18, s. 70). Has such regulatory oversight restricted management's ability to respond to changing market conditions, thereby retarding demand growth and stifling the industry's revenue growth potential? The debate over this question came

to the forefront during the late 1980's when growth in casino revenue came to a near standstill.

This paper sheds light on this debate by estimating the impact of deregulation in the areas of floor plan and hours of operation, two areas arguably best left to casino management discretion. The next section of this paper discusses the extent and reasoning behind Atlantic City's strict regulatory policies and its more recent relaxation of these policies. Section III describes the data, explains why gross revenue (casino win) is used to examine the impact of deregulation on demand for casino gaming, and provides a descriptive analysis of monthly revenue in Atlantic City. Section IV discusses the empirical methodology used to assess the impact of deregulation. Empirical results and the impact that deregulation had on casino revenue are presented in Section V. Section VI concludes the paper with thoughts on further regulatory changes and the competitive environment in Atlantic City.

II. Regulation and Deregulation in Atlantic City

In Atlantic City, the primary purpose of casino gaming is "the rehabilitation and redevelopment of existing tourist and convention facilities in Atlantic City, and the fostering and encouragement of new construction and the replacement of lost convention, tourist, entertainment, and cultural centers in Atlantic City" (New Jersey Statutes, L. 1977, c110, s. 1; amended L. 1995, c.18, s. 1). Redevelopment is sponsored by the Investment Alternative Tax, a tax levied at 2.5% of gross revenue unless a casino invests in Casino Redevelopment Authority (CRDA) bonds or projects in which case the rate is lowered to 1.25%.[1] In addition, the state earmarks expenditures, primarily providing assistance to senior citizens and disabled persons.[2]

Given its uncommon social objectives, the regulatory structure in New Jersey has been strict. Some of these restrictions may be justifiable since New Jersey is a state, although by no means the only state, suspected of having a relatively large presence of organized crime (Sternlieb and Hughes, 1983, pp. 53, 135–139). To be sure, strict licensing requirements and rigorous background investigations are one means of assuring that this reputation does not cross over to the gaming industry. Strict regulatory policy, however, goes beyond licensing and enforcement issues and extends into operational matters generally left to managerial decision making.[3] The Casino Control Commission has the authority to create and mandate standardized casino operations for all properties. Examples include residency requirements for

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[1] For fiscal year 1995, the Investment Alternative Tax raised $46.6 million. Since its inception a total of $446.5 million has been raised with nearly $347 million going to Atlantic City and the remainder going to the state, Madhusudhan (1996).

[2] In fiscal year 1995 the Casino Revenue Tax (8% of gross revenue) amounted to $298.3 million dollars. This was distributed as follows: medical assistance, 65%; property tax reimbursements, 5%; housing, 10%; transportation, 6%; and lifeline, 13%; Madhusudhan (1996).

[3] For an excellent summary of the New Jersey licensing process and regulatory structure see Casiello (1993).

employees, a prohibition against the advertising of odds, and the requirement that the casino be located in a single room. In short, nearly every aspect of casino operations, from minimum payout percentages on slot machines to the type of chairs used, falls under regulatory oversight.[4]

Whereas many of these may be a mere nuisance with little consequence for casino revenue, other regulations are arguably more detrimental. Two examples of this include the hours a casino is legally allowed to operate and the amount of floor space devoted to slot machines and the aisles between them. The general argument for limited hours is that it reduces the social costs of gambling by reducing the incidence of problem gambling. The limitation on slot machine space (density of slot machines as it is referred to in the statutes) is designed to promote optimum security, avoid distraction of table game players, promote the comfort of players, create a gracious playing environment, and encourage competition by assuring that a variety of games is offered.

Prior to July 1991, casinos were restricted to operating 18 hours a day on weekdays, closing between 4 a.m. and 10 a.m., and 20 hours a day on weekends, closing between 6 a.m. and 10 a.m. Similarly, the amount of casino floor space that could be allocated to slot machines and their aisles was 30% (Casiello, 1993).

Beginning in July 1991, casinos were allowed to operate 24 hours a day on weekends, holidays, or anytime a special event was hosted in Atlantic City. Perhaps more importantly, the amount of floor space that could be devoted to slot machines and their aisles increased from 30% to 45% of the first 50,000 square feet of gaming space. Hotels with fewer than 1,200 rooms could increase slot density in any additional space in excess of 50,000 from 25% to 32%, while hotels with greater than 1,200 rooms were allowed to expand slots in additional space from 25% to 45%. This increase was allowed to take place gradually over three years for existing hotels, with 10% of existing machines being added by the end of the first year, 20% by the end of the second, and 30% by the end of the third. Given that slot revenue was 63% of gross revenues in 1990 and growing, the potential impact for such deregulation is obvious. This paper empirically tests whether the deregulation taking place in July of 1991 had a noticeable impact on casino revenue.

III. Data and Descriptive Statistics

The data for this study consist of monthly slot, table, and total win from May 1978 to July 1996. All data are adjusted for inflation using the monthly consumer price index (CPI) and expressed in May 1978 dollars. Casino win, actually gamblers' losses, equals gross gaming revenue. It is important to note that this includes cash "complimentaries", cash and redeemable coupons given to gamblers by casinos.

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[4] The chairs at slot machines have to be affixed to the floor. The reasoning is that in the event of a fire the aisles will not become blocked with movable chairs, thereby preventing casino patrons from safely exiting. More colorful stories of regulatory oversight exist. For example, some have claimed that showgirl costumes are regulated by the Casino Control Commission. Much of this, however, is myth (Pollock, IGWB, 1993).

In this respect, win is an inflated figure of revenue because casinos are winning back their own money. Between 1991 and 1994 complimentaries were stable and averaged 8.5% of total win. For the first nine months of 1996, however, complimentaries increased to 11.7% of total win.[5] Nevertheless, win is used in the analysis for several reasons. First, it is gross *casino* revenue and does not include any non-gaming revenue such as hotel or food and beverage. In this respect, it provides accurate insight into whether deregulation resulted in increased demand and play at Atlantic City casinos. Second, complimentaries are a constant percentage of win between 1991 and 1994 and, therefore, are unlikely to distort the impact of deregulation. Third, data adjusting for complimentaries, such as net income, has large fluctuations due to such factors as debt restructuring, debt refinancing, debt extinguishment, and changes in accounting rules.[6] Furthermore, net income for partnerships (four casino properties) does not fully reflect provisions for income tax considerations. While the use of earnings before interest, taxes, depreciation and amortization (EBITDA) would control for extraordinary items and different tax structures, it too includes non-gaming revenue. Finally, accounting changes that occurred in 1993 introduce a potentially tenuous comparison of periods before and after 1993 when using accounting data on profit.[7]

Average annual growth rates in casino win, calculated as the average change in monthly revenue from the same month one year earlier, are provided in Table I.[8] Immediately obvious is the decline in table win over the most recent eight years of data. From 1984 to 1989, table win grew at 3.6%. After this period, however, real table win actually declines at a rate of 3.6%. In contrast, slot win continued to rise, albeit at a slower rate. Slot win grew nearly 8% prior to 1989, but fell to 4.2% from 1989 to 1996. From opening in 1978 until 1989, Atlantic City enjoyed continuous growth in win. That is, monthly win was higher than the same month one year earlier. Beginning in 1989, however, this pattern reverses and monthly revenues are generally lower than their peak in 1988. Real win in July 1989, for example, was $149.55 million, down from $155.43 million in 1988. In 1990, real win fell further to $141.84 million. The result has been a significant decline in the annual real growth rate in total win, from 5.71% between 1984 and 1989, to 1.03% since 1989.

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[5] Complimentaries were also slightly higher in 1995, equaling 9.8% of total win. For this reason, the potential for deregulation to increase competition and reduce profit is discussed below in section VI. In addition, net income results for the period of deregulation are reported in Table VI.

[6] See Table VI, which gives both reported net income and net income adjusted for extraordinary gains and losses, for an illustration of these fluctuations between 1990 and 1996.

[7] See Fisher and McGowan (1983) and Benston (1985) for a discussion and summary of the many problems with using accounting data for economic analysis.

[8] 1984 was chosen as the starting point to avoid inflation of growth figures resulting from the rapid increase in win in the late 1970's and early 1980's. Between 1978 and 1984 average annual growth in total, slot, and table win was 48%, 52%, and 44% respectively.

Table I. Average annual growth rates in real total, slot and table win Atlantic City: 1984:01–1996:07[a]

	Total Win	Slot Win	Table Win
Annual Growth Rate (1984:01–1996:07)	0.0289	0.0564	−0.0078
Annual Growth Rate (1984:01–1988:12) Annual Growth Rate (1989:01–1996:07)	0.0571 0.0103	0.0783 0.0420	0.0358 −0.0366
Difference (1984:01–1988:12 vs. 1989:01–1996:07)	0.0468[b]	0.0363[b]	0.0724[b]
t-statistic	4.54	3.33	5.60

[a] Annual growth in win is calculated as the average change in monthly revenue from the previous year. Thus, June 1984 is compared with June 1983, etc. 1984 is chosen to avoid bias introduced by the rapid growth between 1978 and 1984. Over this time, growth in total, slot, and table win was 48%, 52%, and 44% respectively.
[b] Significant at the 5% level.

IV. Empirical Methodology

To examine the impact of the deregulatory measures occurring in July 1991, an intervention analysis employing the Box-Jenkins (1976) autoregressive moving average (ARIMA) process is chosen. Doing so requires identifying the ARIMA parameters, including any seasonal autoregressive (AR) or moving average (MA) parameters.[9] All tests and results reported below are carried out on the log values of real monthly win.

Since estimated results on the levels of a non-stationary time series yield spurious results, the series is initially tested for stationarity using the augmented Dickey-Fuller test. The results indicate that we fail to reject the null hypothesis of a unit root (t statistic of -2.53 with a 5% critical value of -2.86). Consequently, the series was differenced to achieve stationarity (t statistic of -18.95). Examining the autocorrelation function and partial autocorrelation function suggested an AR 2 model with possible seasonal (lag 12) AR and MA parameters. Diagnostic checks revealed that an ARIMA (2 1 0)(1 0 1) model (AR 2 with seasonal AR and MA parameters) provided the best fit, with the modified Q-statistic (Ljung and Box (1978)) confirming that the residuals from this model are white noise.

Algebraically, the model estimated is

$$\Delta Y_t = \alpha + \frac{(1 - \theta_{12}(B_{12}))}{(1 - \phi(B) - \phi_2(B_2))(1 - \phi_{12}(B_{12}))} a_t \qquad (1)$$

where ΔY_t is the change in log monthly win, θ_{12} is the seasonal MA parameter, B_i is the backshift operator (i.e., $B_i = \Delta Y_{t-i}$), $\phi_j, j = 1, 2$ is the AR parameter,

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[9] Win in Atlantic City is predictably seasonal. An examination of the data reveals peaks in the warmer summer months and troughs in the colder winter months.

ϕ_{12} is the seasonal AR parameter, and a_t is a sequence of uncorrelated random variables with $E(a_t) = 0$, $V(a_t) = \sigma^2$, and $\text{Cov}(a_t, a_{t-k}) = 0$ for $k \neq 0$.

To examine the effect of deregulation, a transfer function model specifies the impact of an intervention.[10] The transfer function within in the context of Equation (1) takes the following form:

$$\Delta Y_t = \alpha + \upsilon(B)I_t + \frac{(1 - \theta_{12})B_{12}))}{(1 - \phi(B) - \phi_2(B_2))(1 - \phi_{12}(B_{12}))}a_t \qquad (2)$$

where

$$\upsilon(B) = \frac{\omega(B)}{\delta(B)} = \frac{\omega_0 + \omega_1 B + \omega_2 B^2 + \cdots + \omega_n B^n}{1 - \delta_1 B - \delta_2 B^2 - \cdots \delta_n B^n}, \qquad (3)$$

and I_t is a dummy variable equal to one in the month of the intervention.

The transfer function, $\upsilon(B)$, allows for the impacts of deregulation to occur over several periods and in various forms. The simplest form is $\upsilon(B) = \omega_0$, in which case the deregulation has a one time impact in the month of the intervention. Multi-period impacts are represented by including further numerator terms. The denominator in Equation (3) allows for multi-period impacts that are an exponentially declining function of the first period impact. Such flexibility in specification is fortunate as some deregulation, most notably extended operating hours, may have an immediate impact whereas other deregulation, such as expanded slot areas, may occur gradually if it takes time to occur or is done by casinos at different times. In addition, the transfer function can be specified to allow for a delay of b periods in the effects of regulation by substituting I_{t-b} for I_t in Equation (3).

Recall that deregulation in New Jersey has occurred in stages. While expanded operating hours went into effect in July 1991, increased floor space devoted to slot machines occurred over a three year period. To capture this, Equation (3) is specified in the following multivariate form:

$$\begin{aligned} \Delta Y_t = {} & \alpha + \upsilon_1(B)\,OPEN24 + \upsilon_2(B)\,YEAR91 + \upsilon_3(B)\,YEAR92 \\ & + \upsilon_4(B)\,YEAR93 + \frac{(1 - \theta_{12}(B_{12}))}{(1 - \theta(B) - \phi_2(B_2))(1 - \phi_{12}(B_{12}))}a_t \quad (4) \end{aligned}$$

where OPEN24 takes on a value of one in July 1991, the month that 24-hour gambling was allowed, and YEAR91, YEAR92, and YEAR93 are equal to one in August of 1991, 1992, and 1993 respectively.

V. Empirical Results and the Impact of Deregulation

The results from estimating Equation (4) for total and slot win are provided in Table II. The exact specification of the transfer functions given in Equation (4)

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[10] See Mills (1990), especially Chapters 12 and 13, for an excellent overview of intervention analysis and transfer function models.

Table II. Estimated results from intervention model[a]

Variable	Total win	Slot win
OPEN24		
ω_0	0.0472	0.0253
	(1.22)	(0.61)
YEAR92[b]		
ω_5	0.1237[d]	0.0816
	(2.47)	(1.53)
ω_6	−0.0309	0.0652
	(0.33)	(1.07)
ω_7	−0.0874	−0.0946[c]
	(1.21)	(1.65)
ω_8	−0.0314	−0.0455
	(0.377)	(0.774)
ω_9	0.0957[c]	0.1007[c]
	(1.86)	(1.94)
δ_1	0.5108	
	(1.43)	
YEAR93[b]		
ω_5	0.1719[d]	0.1477[d]
	(3.46)	(2.71)
ω_6	−0.2408[d]	−0.1916[d]
	(2.87)	(2.34)
ω_7	0.0310	−0.0313
	(0.34)	(0.35)
ω_8	0.1007[c]	0.1270[d]
	(1.87)	(2.40)
δ_1	0.5910[d]	0.3686
	(2.34)	(1.06)
YEAR94[b]		
ω_5	−0.0242	−0.1216[d]
	(0.59)	(2.30)
ω_6	0.0522	0.2172[d]
	(1.25)	(2.40)
ω_7		−0.0714
		(1.26)
δ_1	0.9754[d]	0.9566[d]
	(35.96)	(18.50)
ϕ	−0.6738[d]	−0.5760[d]
	(9.91)	(8.20)
ϕ_2	−0.5177[d]	−0.4440[d]
	(7.54)	(6.25)
ϕ_{12}	0.9594[d]	0.9386[d]
	(68.29)	(68.35)
θ_{12}	−0.5668[d]	−0.4820[d]
	(8.18)	(6.54)
α	−0.0721[c]	−0.0425[c]
	(1.91)	(1.73)

Table II. Continued.

Variable	Total Win	Slot Win
Q-Statistic $\sim \chi^2$ (39)	51.477	47.877
Adjusted R^2	0.764	0.808
BIC	−5.82	−5.70
Durbin-Watson	1.951	2.042

[a] Absolute values of the t statistic are shown in parentheses.
[b] The BIC criterion favored a five period delay in the initial response to the deregulation allowing slot machine expansion.
[c] Significant at the 10% level.
[d] Significant at the 5% level.

Table III. Asymptotic impact of deregulation

	Total Win		Slot Win	
Variable	Asymptotic impact	F Statistic[a]	Asymptotic impact	F Statistic[a]
OPEN24	0.0472		0.0253	
YEAR92	0.1425	4.794[c]	0.1073[b]	2.096[b]
YEAR93	0.1535[b]	5.601[c]	0.0820	3.243[c]
YEAR94	1.1377[c]	551.838[c]	0.5553[b]	133.528[c]

[a] F statistic for the joint significance of the coefficients in the transfer functions given in Equations (3) and (4) and reported in Table II.
[b] Signficant at the 10% level.
[c] Significant at the 5% level.

was accomplished using the Bayesian Information Criterion (BIC). This involves a grid search over all possible combinations of leads, lags, and delays in the transfer functions in Equation (4). This procedure is atheoretic in that the specification chosen is based on the minimum BIC value subject to the constraint that the residuals are not statistically different from white noise.[11] Table III provides the asymptotic impact of the deregulation along with results from an F-test for the joint significance of the coefficients in each transfer function.[12]

The results in Tables II and III reveal that deregulation had a positive impact on gaming win. However, most of the gain is through slot expansion as opposed to 24-hour gaming. While the coefficient on OPEN24 is positive, it is not statistically significant from zero. This in not wholly surprising since the deregulation allowed casinos to remain open in the traditionally slower early morning hours between

[11] See Mills (1990, p. 138) for the definition of the BIC and why it is preferable to the Akaike Information Criterion (AIC). For similar applications of multivariate intervention analysis models see McPheters, et al. (1984) and Fomby and Hayes (1990).
[12] See Mills (1990, p. 251) for formulas used in calculating the asymptotic impact with various lags.

6 a.m. and 10 a.m. In contrast, the results for slot expansion are significant. All coefficients, except those on YEAR91 for slot win, are jointly significant at the 5% level. Moreover, the asymptotic impact is positive and generally increasing. That is, the asymptotic impact is greater in later years when casinos were increasing slot density. For example, the asymptotic impact of slot expansion on total win in the first year is 0.1425. That is, the growth rate of total win increased 14.25%. If total win was growing at approximately 1%, expanded slot machines in the first year would have increased the growth rate of win to 1.14%. By the final year, however, the asymptotic impact is 1.13, a doubling of the growth rate from 1% to 2.13%. In summary, the expansion of operating hours appears to have had no significant impact on total or slot win. On the other hand, the increase in allowable floor space devoted to slot machines had a positive impact that grew over time with increased slot density.

As noted, a question frequently raised is whether New Jersey is over-regulated. The above results confirm that stringent regulations restricting casino operations did have a negative impact on win, or more precisely, that deregulation occurring in July 1991 had a positive impact on win. These events also provide a natural experiment to quantify the impact of changes in regulatory policy. Doing so simply involves comparing what casino win would have been if the deregulation had not occurred with the actual win stream following deregulation. While win absent the deregulation is clearly an unknown, an approximation can be made by forecasting the revenue stream forward from July 1991 without the intervention and comparing this to actual revenue. This should provide a rough approximation to the impact of the deregulatory policy.

The results from this procedure, in both constant 1978 and current dollars, are provided in Tables IV and V for total and slot win respectively. The results clearly show that the deregulation that began in July 1991 had a positive impact on casino win. For example, the average difference between actual and predicted monthly win over the first year is $2.26 million (current) dollars. The difference over the entire first year was $27.27 million. Comparative figures for slot win show that deregulation over the first year resulted in an average monthly increase of $1.67 million and a total increase of $19.18 million, estimates very much in line with those suggested by Satre (1981).[13] Satre claims that in 1981 Harrah's wished to expand its slot space by 50 machines. The estimated gain to Harrah's was an

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[13] These results, of course, are only as reliable as the forecast upon which they are based. As a check, revenues for the *previous* year were forecasted and compared with actual win. That is, the revenues between July 1990 and June 1991, a period when no deregulation was occurring, were forecasted and compared with actual revenue over the same period. The average monthly difference between actual and forecasted revenue was $-358,220. Thus, the forecasting method (Box-Jenkins) appears reliable. Moreover, the forecasted revenue between July 1990 and June 1991 was *higher* than actual revenue. If the forecasted revenue beginning in July 1991 were similarly high, this would suggest that gains from deregulation were even larger than those suggested in Tables IV and V. That is, had deregulation not occurred, actual revenue would have been lower than what was forecasted. In this respect, the figures in Tables IV and V provide conservative estimates of the gains from deregulation.

Table IV. Average monthly[a] and cumulative[b] change in total win after deregulation (in thousands)

	Total win (Real 1978 dollars)	Total win (Current dollars)
Average Monthly Change (1991:07–1992:06)	1,130.94	2,259.16
Cumulative Change	13,813	27,267
Average Monthly Change (1991:07–1993:06)	992.07	2,027.85
Cumulative Change	25,894	52,273
Average Monthly Change (1991:07–1994:06)	1,144.26	2,386.62
Cumulative Change	46,110	96,036
Average Monthly Change (1991:07–1995:06)	1,441.55	3,129.17
Cumulative Change	76,109	166,190
Average Monthly Change (1991:07–1996:07)	1,574.94	3,522.10
Cumulative Change	105,450	238,350

[a] Average monthly change in win from same month one year earlier.
[b] Total change in win over the given time period.

annual increase in revenue of $3.05 million dollars, or an average monthly gain of $254,166. Assuming that 12 properties exist (the number operating in 1991) and that each achieves similar gains from expansion implies annual gains to Atlantic City of $36.6 million, very close to the estimated results in Table IV and perhaps confirming their conservative nature.

The figures for the first year impact have the advantage that short-term forecasts are likely to be more accurate. They, therefore, provide an accurate figure of deregulation's impact. As mentioned earlier, however, the expansion of casino floor space, arguably the most significant piece of legislation affecting casinos since their legalization in May 1978, occurred in a piecemeal fashion over time. The full impact of deregulation therefore requires comparing forecasts of win in later years with actual revenue. The remaining rows of Tables IV and V show the difference between actual and forecasted revenues for the remaining years. The second row, for example, shows the average monthly and cumulative impact when comparing actual and forecasted revenue between July 1991 and June 1993. Examining the table it is immediately obvious that the difference between actual and forecasted revenue is generally increasing over time. This is consistent with the results in Table III which shows a larger asymptotic impact associated with increased slot expansion. The average monthly increase in win, in current dollars,

Table V. Average monthly[a] and cumulative[b] change in slot win after deregulation (in thousands)

	Total win (Real 1978 dollars)	Total win (Current dollars)
Average Monthly Change (1991:07–1992:06)	825.51	1,679.52
Cumulative Change	9,506	19,183
Average Monthly Change (1991:07–1993:06)	645.13	1,340.80
Cumulative Change	16,193	33,282
Average Monthly Change (1991:07–1994:06)	648.50	1,369.73
Cumulative Change	26,319	55,493
Average Monthly Change (1991:07–1995:06)	846.14	1,865.52
Cumulative Change	45,211	100,510
Average Monthly Change (1991:07–1996:07)	909.25	2,067.88
Cumulative Change	61,728	142,000

[a] Average monthly change in win from same month one year earlier.
[b] Total change in win over the given time period.

is well over $2 million. The final row of Tables IV and V shows that from July 1991 to July 1996 the increase in total win was $238 million.

VI. Conclusion

The results of this paper provide evidence that the deregulation in Atlantic City beginning in July 1991 had a significant positive impact on casino win. Average monthly win increased $2.26 million in the first year. Similarly, average monthly slot win increased $1.67 million. Such increases in win are interesting since they evolved, in part, from regulatory changes involving firm operations that are left to management discretion in other jurisdictions (for example, Nevada and Mississippi).

Will increases in win result in higher profits? The answer to this is not clear. While net income adjusted for extraordinary gains and losses was positive and generally increasing between 1992 and 1995 (see column two of Table VI), 1996 was characterized by an escalating marketing war in which casinos gave away more cash and coupons as a way to gain market share. It is possible that the expansion in slot machines fueled this marketing war. Moreover, Atlantic City is expanding again with four new "megaresorts" in the works (Rzadzki, 1996). While this planned expansion is consistent with an increase in demand and represents the

Table VI. Net income (loss) for Atlantic City casinos, 1990–1996 (in thousands)

Year	Reported net income	Adjusted net income
1990	(266,245)	(182,199)[a]
1991	205,529	(54,071)[b]
1992	164,717	31,111[c]
1993	(1,203)	53,597[d]
1994	31,423	48,125[e]
1995	147,091	149,387[f]
1996 (first nine months)	(113,182)	62,318[g]

[a] Adjusted for $39.5 million in extraordinary income related to restructuring of long-term debt at Claridge, and extraordinary loss of $183.8 million due to restructuring and refinancing expenses and write-off of affiliated bad debts at Resorts.
[b] Adjusted for $259.6 million in extraordinary income related to restructuring of long-term debt in connection with reorganization plan at Trump Taj Mahal.
[c] Adjusted for extraordinary income at TropWorld due to a tax benefit from an accounting change, an extraordinary gain of $128.3 million at Trump's Castle due to restructuring of long-term debt, and an extraordinary loss of $32.8 million in connection with reorganization plan at Trump Plaza.
[d] Adjusted for extraordinary losses resulting from accounting changes at Bally's ($11.4 million), The Grand ($32 million), and Ceasars ($2.4 million); extraordinary losses due to refinancing at Harrah's ($4.5 million), Showboat ($6.7 million), and Sands ($4.5 million); extraordinary gains resulting from accounting changes at Sands ($2 million) and Showboat ($600,000); and extraordinary gain from refinancing at Trump Plaza ($4.1 million).
[e] Adjusted for extraordinary gain of $4 million due to debt refinancing at Resorts and an extraordinary loss of $20.7 million due to early extinguishment of debt at Bally's.
[f] Adjusted for an extraordinary loss of $2.3 million from early redemption of notes at Trump Plaza.
[g] Adjusted for extraordinary loss of $175.5 million due to debt refinancing at Trump Taj Mahal ($116.4 million) and Trump Plaza ($59.1 million).
Source: *Casino Chronicle*, April 6, 1992; April 12, 1993; April 11, 1994; May 6, 1996; and December 9, 1996.

first growth in the number of hotel/casinos since 1987 when the industry expanded from eleven hotel/casinos to twelve, the downside for existing properties is the likely increase in competition unless these new properties can significantly expand the customer base.

Finally, the questions of whether the benefits of deregulation exceed the cost and if deregulation is in the spirit of casino gaming in Atlantic City are addressed. The costs of deregulation would primarily stem from an increase in compulsive gambling and the various spillover effects it has on the community. This paper has not tried to quantify these costs primarily because the social costs of gambling are very difficult to measure. Add to this the task of quantifying the incremental

costs associated with this deregulation and the task becomes even more daunting. Nevertheless, perhaps a comment is in order. It seems doubtful that an additional 4 hours of operation on weekends/holidays (later to include 6 hours on weekdays as 24-hour gambling was expanded) would seriously contribute to the problem of compulsive gambling. While compulsive gamblers may gamble several days a week for numerous hours, it is uncertain how many do so 24 hours a day.[14]

Will the expansion of slot machines increase compulsive gambling? Perhaps, perhaps not. While video poker and other devices have been criticized as highly addictive, there is a difference between introducing these games for the first time and expanding their number in an existing jurisdiction (Griffiths, 1993). Increasing the number of machines has expanded play, but this does not necessarily translate into addiction. A gambling addict may gamble whether the percentage of the casino floor devoted to slots is 30% or 45%.

Is the current deregulation consistent with the intention and spirit of casino gaming in Atlantic City when it was legalized in 1976 and began operating in 1978? In a perverse way it is. Legislation in Atlantic City has attempted to do two fundamental things. One is to redevelop Atlantic City. The second is to protect citizens from the ills of casino gambling. The result has been a compromise in nearly every aspect of casino legislation (Cabot, 1996). For example, credit is allowed, but the check has to be deposited in a specified time period (Eadington, 1987). Casinos may advertise hours of operation, but not odds. Slot machine space is limited, but minimum payouts of 83% are required. Moreover, the average hold percentage by property is public information and is released monthly by the Casino Control Commission.

While the round of deregulation considered here represents an attempt to give casinos more freedom in their operation, it maintains the compromise feature of earlier legislation. Slot space was expanded, but it is still restricted. This clearly is a compromise, probably made to make the deregulation politically palatable, and is inconsistent. If expanding the area of casino floor space devoted to slot machines has negative consequences (i.e., leads to a rapid increase in social costs, prevents adequate security measures, creates an ungracious playing environment, or is not in the interest of Atlantic City), it should not be allowed. On the other hand, if expansion has little or no negative impact, it should be at the casino's discretion. Stating that 45% of floor space devoted to slots is acceptable but that any more is not sends a very mixed signal as to the regulators' intention. No reasoning is provided for why 45% is acceptable but more is not, or why 45% is acceptable today when only 30% was acceptable a few years ago.

Regardless of the logic of piecemeal deregulation, the fact remains that it has increased the gross revenue of casino operators and, therefore, increased tax revenue to state and local governments. In addition, it benefits casino patrons who have expressed their demand in other jurisdictions for more slots and expanded hours.

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[14] See, however, Strachan and Custer (1993) who find that 21% of 52 participants in Gambler Anonymous reported gambling for over 24 hours on occasion.

Further deregulation in areas of casino management and operations will most likely continue as competition from within Atlantic City and other jurisdictions increases. This is not to say that wide-spread, haphazard deregulation should take place. Rather, it is a call for careful examination of the current regulatory structure to determine whether further deregulation can benefit all (or nearly all) parties involved without compromising the integrity of the gaming industry in Atlantic City.

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