RESEARCH NOTE: CONTRARY EVIDENCE ON THE ECONOMIC IMPACT OF THE SUPER BOWL ON THE VICTORIOUS CITY

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Abstract: Previous research has indicated a surprising statistically significant impact on the local economy in the city that wins the Super Bowl. An analysis of personal income growth in victorious Super Bowl cities from 1972-2000 cannot further confirm these results, finding no statistically significant effect on the local economies of these cities.

JEL Classification Codes: L83 - Sports; Gambling; Recreation; Tourism; R53 - Public Facility Location Analysis; Public Investment and Capital Stock

Introduction

Professional sports are big business in the United States. If the popular media is to be believed, the championship games of the major professional leagues such as Major League Soccer's MLS Cup, the National Basketball Association (NBA) and National Hockey League (NHL) Finals, Major League Baseball's (MLB) World Series, and the National Football League's (NFL) Super Bowl generate huge profits for the metropolitan areas lucky enough to host these events.

Numerous scholars have attempted to estimate the impact of large sporting events and league championships on host cities. Baade and Matheson (2001) use employment and taxable sales data to find the effect of MLB's All-Star Game metropolitan areas. Porter (1999) uses taxable sales data determine the implications of hosting the Super Bowl for host cities. Baade and Matheson (2003a, 2003b) use metropolitan area personal income data to estimate the impacts of MLB's post-season and the Super Bowl on local economies. In all cases, the economic consequences of hosting these mega-events are statistically insignificant and certainly much smaller than the figures quoted by league and team boosters. The prevailing opinion among economists is that while these sporting events may be large in a gross sense, because of crowding out, leakages, and substitution effects, the net influence on the host city is small. For further discussion see Siegfried and Zimbalist (2000) among others.

The one exception to this is rule is Coates and Humphreys (2002). Their examination of post-season play in the NFL, NBA, and MLB, similar to all of the previous studies, finds that the cities hosting post-season play experience no significant increase in real per capita personal income. In a very surprising discovery, however, they found that over the time period of their sample, 1969-1997, the city winning the Super Bowl experienced a statistically significant increase of roughly

$140 in per capita income.

This result is particularly surprising considering that the Super Bowl, unlike the championships in the other major professional sports, hockey, basketball, and baseball, is held at a pre-determined neutral site rather than at one of the participants home fields. Therefore, while one might predict that the economies in the cities of the other sports' champions will be influenced by the economic activity surrounding the actual game(s), in the case of the Super Bowl, the winner's home town receives no direct revenue from the team's big victory since the win will likely take place thousands of miles away. In fact, no Super Bowl champion has ever won the big game in their own home stadium. Furthermore, because of the single-game elimination playoff system, it is quite possible that the winning team may never have played even a single post-season game at home.

Coates and Humphreys offer several reasons for their finding. They offer that the result could simply be an anomaly or the result of model mis-specification or an omitted variable problem. Indeed, with 28 independent variables in their matrix of sports environment variables, one might expect at least one case of spurious correlation just based on the law of averages. They argue, however, that their finding is reasonably robust to the inclusion of a variety of additional explanatory variables and alternative functional forms. Instead they propose that the increase is possibly the result of labor productivity increases in the winning city. "If winning the Super Bowl has a stimulating effect on the productivity of the fans of the winning team, then the value of marginal product of these workers would increase as would the wage bill and income of these workers. This could possibly lead to an increase in real per capita income in a city for a short period of time." (Coates and Humphreys, 2002, pg. 298)

It is curious that only football, and not professional basketball or baseball leads to this

increase in productivity, but this is explained by the authors by the fact the it is truly football and not any of the other sports that truly captures the heart and soul of a city and, indeed, the world. Some might even argue that winning championships might reduce productivity since the resulting parades and celebrations often result in business closures and because of the unfortunate circumstance that fan rioting after sporting championships has become increasing commonplace in the United States. (Baade and Matheson, 2003c) The questions remains, however, how to explain this curious result. In the next section, an alternative model to answer this riddle is proposed. The paper ends with results and conclusions.

Data and Methodology

The economic activity generated by or related to any sporting event is likely to be small relative to the overall economy, and isolating the event's impact, therefore, is not a trivial task. The approach used here is an *ex post* examination of personal income growth in individual metropolitan statistical areas (MSA) and is identical to that used by Baade and Matheson (2003a, 2003b). Explanatory variables identified from past models are used to help establish what personal income growth would have been in the absence of winning the Super Bowl, and then these predictions are compared to actual income growth rates to assess the contribution of the win to the local economy. The success of this approach, of course, depends on the ability to identify those variables that explain the majority of observed variation in growth in personal income in those cities that have won the Super Bowl. Equation (1) represents the model used to predict changes in income for winning cities.

$$\Delta Y_t^i = \beta_0 + \beta_1 \sum_{i=1}^{n} \frac{\Delta Y_t^i}{n_t} + \beta_2 \Delta Y_{t-1}^i + \beta_3 \frac{Y_{t-1}^i}{\sum_{i=1}^{n} Y_{t-1}^i / n} + \beta_4 W_t^i + \beta_5 T_t^i + \beta_6 TR_t^i + \beta_7 OT_t^i + \varepsilon_t^i \quad (1)$$

For each time period *t*, Y_t^i is the real income and ΔY_t^i is the change in real personal income in the ith MSA, *n* is the number of cities in the sample, W_t^i is the nominal wages in the ith MSA as a percentage of the average for all cities in the sample, T_t^i is the state and local taxes in the ith MSA as a percentage of the average for all cities in the sample, TR_t^i is an annual trend variable, and ε_t^i is the stochastic error. OT_t^i is a dummy variable used in certain cities' regression equations to specify city-specific events such the significant economic influence of Hurricane Andrew on the economy of Miami and the effect of the oil boom and bust on oil patch cities such as Denver and Dallas.

The cohort of cities used in the sample includes the seventy-three largest MSAs in the United States by population over the time period 1969-2000. Personal income data from 1969-2000 were obtained from the Regional Economic Information System at the University of Virginia, which derives its data from the Department of Commerce statistics. Data regarding state and local taxes as a percentage of state GDP were available for all cities from 1970 to 2000 and were obtained from the Tax Foundation in Washington, D.C. Manufacturing wage data from the Bureau of Labor Statistics Current Employment Statistics Survey were available for all cities over varying time periods. A complete description of the data is available from the author upon request.

For the purposes of this analysis, the functional form is linear in all the variables included in equation (1). The equation was estimated for 14 different metropolitan areas representing all of the cities that have won at least one Super Bowl since 1969. Not every variable specified in equation (1) emerged as statistically significant for every city. The decision of whether to include an independent variable known to be a good predictor in general but failing to be

statistically significant in a particular city's case is largely an arbitrary one. The inclusion of theoretically valuable variables that are idiosyncratically insignificant will improve some measures of fit such as R-squared but may reduce other measures such as adjusted R-squared or the standard error of the estimate. Since the purpose of equation (1) is to produce predictive rather than explanatory results, variables were included in the regression equation as long as they improved predictive success. Table 1 presents the regression results for all cities with the combination of variables that minimizes the standard error of the estimate (SEE). For about half of the cities, autocorrelation was identified as a significant problem, and, therefore, the Cochrane-Orcutt method was used for cities where its use again reduced the SEE.

Results

The model identified in Table 1 for each city is used to estimate income growth for each city for each year that data are available, 1969-2000. City-specific wage data are not available for all cities prior to 1972, and therefore only the Super Bowl winners since 1972 are examined. This leaves 12 cities and 29 championships in the data set.

Once income growth is estimated by the model, the predicted income growth is then compared to the actual income growth that each MSA experienced during the year(s) in which it won the Super Bowl. If it is assumed that any difference between actual and predicted income can be accounted for by winning the Super Bowl, this method allows for an estimate of the impact of the game on victorious cities. Table 2 shows the winning city, predicted growth, estimated growth, the difference between predicted and actual growth (the residual), and the standardized residual. In an effort to compare these results in a meaningful way to the results of

Coates and Humprheys, the real per capita income (in 2000 dollars) and the change in the per capita income above or below predictions are shown. It is important to note that this model was not designed to directly calculate changes in per capita personal income. Instead changes in per capita income are inferred from the change in total personal income, and so it must be assumed that winning the Super Bowl has no effect on population growth in an MSA for these figures to have validity. If a win in the Super Bowl spurs migration into the city, then the figures in Table 2 actually overstate the increase in real per capita income. Only if the Super Bowl win induces residents to flee the city over the course of the year, a highly unlikely scenario, do the calculations understate the true per capita income gains.

The statistics recorded in Table 2 suggest two things worth noting. First, the dollar differences recorded in the final column vary substantially with some cities exhibiting per capita income gains nearly $1,000 in excess of model predictions, and other cities showing a large negative impact. Second, actual and predicted growth on average are almost exactly the same with actual income growth exceeding predicted growth by 0.169 percent. Again assuming no effect from the Super Bowl on population growth, real per capita income rose by just under $50 on average, a figure roughly one-third that estimated by Coates and Humphreys.

The magnitude of the variation of the estimates at first blush appears high. The explanation for this range of estimates is simply that the models do not explain all the variation in estimated income, and, therefore, not all the variation can be attributable to winning the Super Bowl. In short, there are omitted variables. While the model fit statistics for the individual city regressions display moderately high R-squared numbers, the standard error of the estimate for the typical city is roughly one percent meaning that one would expect the models to predict

actual economic growth for the cities within one percentage point about two-thirds of the time. Given the size of these large, diverse economies, the effect of even a large event with hundreds of millions of dollars of potential impact is likely to be obscured by natural, unexplained variations in the economy. Indeed, none of the standardized residuals are statistically significant at the 5% level.

While it is unlikely that the models for any individual city will capture the effects of even a potentially large occasion like winning the Super Bowl, one would expect that across a large number of cities and years, any event that produces a big impact would emerge on average as statistically significant. Using the seemingly unrelated regressions approach, one can compare the standardized residuals for the 29 observations with residuals being normally distributed with a standard deviation of 1. A test on the null hypothesis that the average standard residual is different than zero provides a p-value of 39.5 percent, well outside any range of statistical significance.

As detailed in Baade and Matheson (2003a, 2003b), the seemingly unrelated regressions approach can be taken one step further by incorporating assumed economic impacts into the model predictions. Using these techniques, it is found that per capita income gains of $123.35, $145.34, and $188.60 can be rejected at the 10%, 5%, and 1% significance level respectively.

Conclusions

An analysis of personal income growth in the year following a win in the Super Bowl in the winning team's home city shows a slight increase in personal income growth but one that is not statistically different than zero. This contradicts recent findings by Coates and Humphreys

(2002) that seemed to show a significant gain in per capita incomes in winning cities. Their plausible explanations for the gain included both the possibility that the finding was spurious and a purported productivity increase due to jubilant fans in the city.

The finding in this paper supports their first conclusion that the finding was purely an anomaly. Obviously, additional research will be required to determine which set of results truly reflects the real impact of winning sports championships on local economies. Based on this study, however, the impact appears to be small or non-existent. While Caesar may thought that the way to keep citizens happy and productive was to provide “bread and circus,” winning the Super Bowl does not seem to be this magic ticket to riches.

REFERENCES

Baade, Robert A. and Victor A. Matheson. (2001). Home Run or Wild Pitch? Assessing the Economic Impact of Major League Baseball's All-Star Game. *Journal of Sports Economics*, 2(4), 307-327.

Baade, Robert A. and Victor A. Matheson. (2003a). Super Bowl or Super (Hyper) Bole? Assessing the Economic Impact of America's Premier Sporting Event. Working paper.

Baade, Robert A. and Victor A. Matheson. (2003b). Assessing the Impact of Major League Baseball's Post-Season. Working paper.

Baade, Robert A. and Victor A. Matheson. (2003c) The Paradox of Championships. Working paper.

Coates, Dennis and Brad Humphreys. (2002). The Economic Impact of Post-Season Play in Professional Sports. Journal of Sports Economics, 3(3), 291-299.

Porter, Philip. (1999). Mega-Sports Events as Municipal Investments: A Critique of Impact Analysis. In Fizel, J., Gustafson, E. & Hadley, L. Sports Economics: Current Research. Westport, CT: Praeger Press.

Seigfried, John and Andrew Zimbalist. (2000). "The Economics of Sports Facilities and Their Communities," *Journal of Economic Perspectives*, Summer 2000, 95-114.

TABLE 1

Regression results for Equation 1 all variables included that minimize SEE. (t-stats in parentheses)

MSA	Cons.	Avg. Y_t	Y_{t-1}	Inc.	Wages	Taxes	Time	Other	Fit
Chicago	.343 (4.94)	.961 (12.00)	-	-.073 (-1.13)	.068 (1.32)	-.348 (-4.90)	-	-	Adj. R^2 = .8954 SEE = 0.7958%
Dallas	-2.449 (-2.68)	.980 (8.47)	-	-	-	-.280 (-3.34)	.0014 (2.81)	-.0151 (-1.79)	Adj. R^2 = .7730 SEE = 1.1578%
								**	
Denver	1.947 (1.44)	.918 (-1.32)	.152 (1.25)	-.122 (-1.29)	-	-.225 (-1.95)	-.0008 (-1.32)	-.0377 (-4.69)	Adj. R^2 = .7549 SEE = 1.3175%
Green Bay	.447 (2.79)	.847 (9.68)	.053 (0.60)	-.482 (-2.78)	-	-	-	**	Adj. R^2 = .7769 SEE = 0.9159%
Los Angeles	10.81 (2.55)	1.032 (8.67)	-.071 (-0.78)	-.530 (-2.46)	-	-	-.0052 (-2.54)	**	Adj. R^2 = .7831 SEE = 1.2470%
Miami	10.44 (2.65)	.809 (5.12)	.213 (2.40)	-.576 (-2.55)	.331 (2.16)	-	-.0051 (-2.67)	-.0871 (-6.02)	Adj. R^2 = .8646 SEE = 1.3471%
								.0845 (3.35)	
New York City	-7.601 (-4.88)	1.018 (8.07)	-.249 (-2.39)	-.421 (-3.69)	.265 (1.87)	-	-	**	Adj. R^2 = .7374 SEE = 1.265%
Oakland	-.210 (-1.36)	.882 (7.68)	-	.361 (2.80)	-.202 (-4.06)	.049 (1.34)	-	-	Adj. R^2 = .7678 SEE = 1.1782%
Pittsburgh	2.078 (3.08)	.613 (7.10)	.235 (2.34)	.248 (2.16)	-.169 (-2.57)	-.150 (-1.84)	-.0010 (-2.89)	-	Adj. R^2 = .7461 SEE = 0.8575%
Saint Louis	.613 (3.32)	.973 (17.16)	-	-.509 (-2.87)	-	-.138 (-2.88)	-	**	Adj. R^2 = .9134 SEE = 0.5552%
San Francisco	-0.486 (-5.27)	.853 (5.40)	-	.338 (5.29)	-	-	-	-	Adj. R^2 = .6691 SEE = 1.714%
Wash., D.C.	-1.401 (-0.33)	.653 (6.11)	-	-	-.111 (-1.90)	.049 (1.41)	.0007 (1.04)	**	Adj. R^2 = .7244 SEE = 0.9581%

OLS regression used in all cases except those noted by **. The Cochrane-Orcutt method was used in these cases where the elimination of serial correlation improved model fit as measured by the SEE.

TABLE 2

Year	SB Winner	Real per Capita Income	Predicted Growth	Actual Growth	Difference	Standard Residual	Per Capita +/-	SEE
1972	Dallas	$ 20,420	7.614%	7.669%	0.055%	0.047	$ 11.20	1.158%
1973	Miami	$ 22,989	6.852%	8.358%	1.506%	1.118	$ 346.23	1.347%
1974	Miami	$ 22,309	0.683%	-0.267%	-0.950%	-0.705	$ (211.98)	1.347%
1975	Pittsburgh	$ 20,281	-0.372%	0.425%	0.797%	0.929	$ 161.65	0.858%
1976	Pittsburgh	$ 21,127	3.304%	3.897%	0.594%	0.692	$ 125.44	0.858%
1977	Oakland	$ 25,547	5.124%	3.915%	-1.209%	-1.026	$ (308.85)	1.178%
1978	Dallas	$ 24,316	7.309%	9.219%	1.910%	1.650	$ 464.49	1.158%
1979	Pittsburgh	$ 22,779	0.042%	-0.137%	-0.179%	-0.209	$ (40.75)	0.858%
1980	Pittsburgh	$ 22,254	-2.051%	-2.791%	-0.741%	-0.864	$ (164.83)	0.858%
1981	Oakland	$ 26,751	1.766%	1.753%	-0.013%	-0.011	$ (3.50)	1.178%
1982	San Francisco	$ 33,652	1.380%	0.702%	-0.678%	-0.396	$ (228.09)	1.713%
1983	Washington	$ 28,386	4.670%	5.261%	0.591%	0.617	$ 167.78	0.958%
1984	Los Angeles	$ 26,263	6.005%	6.366%	0.361%	0.290	$ 94.84	1.247%
1985	San Francisco	$ 36,935	4.750%	2.450%	-2.300%	-1.342	$ (849.57)	1.713%
1986	Chicago	$ 27,972	4.315%	3.951%	-0.364%	-0.458	$ (101.85)	0.796%
1987	New York	$ 30,979	3.181%	3.820%	0.639%	0.505	$ 197.99	1.265%
1988	Washington	$ 34,775	5.876%	6.290%	0.414%	0.433	$ 144.12	0.958%
1989	San Francisco	$ 40,650	2.854%	2.320%	-0.534%	-0.312	$ (217.20)	1.713%
1990	San Francisco	$ 41,426	1.104%	2.102%	0.998%	0.583	$ 413.56	1.713%
1991	New York	$ 33,253	-1.395%	-1.636%	-0.241%	-0.191	$ (80.19)	1.265%
1992	Washington	$ 34,957	2.593%	2.251%	-0.342%	-0.357	$ (119.44)	0.958%
1993	Dallas	$ 28,708	2.567%	2.920%	0.353%	0.305	$ 101.43	1.158%
1994	Dallas	$ 29,247	3.972%	4.414%	0.442%	0.382	$ 129.37	1.158%
1995	San Francisco	$ 41,839	2.526%	4.772%	2.246%	1.311	$ 939.71	1.713%
1996	Dallas	$ 30,468	4.390%	5.770%	1.380%	1.192	$ 420.46	1.158%
1997	Green Bay	$ 27,882	3.901%	4.953%	1.052%	1.148	$ 293.21	0.916%
1998	Denver	$ 34,355	8.067%	7.266%	-0.801%	-0.608	$ (275.19)	1.318%
1999	Denver	$ 35,408	5.938%	5.877%	-0.061%	-0.046	$ (21.46)	1.318%
2000	St. Louis	$ 31,313	2.004%	1.990%	-0.014%	-0.025	$ (4.38)	0.555%
	Average		3.413%	3.582%	0.169%	0.160	$ 47.73	
					T-stat =	0.864		
					P-value =	39.5%		