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The Labor Market Effects of the Salt Lake City Winter Olympics

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Abstract

The local, state, and federal governments, along with the Salt Lake City Organizing Committee, spent roughly $1.9 billion in direct costs related to planning and hosting the 2002 Winter Olympic Games. In this paper, we investigate whether these expenditures increased employment. At the state level, we find strong evidence it increased leisure related industries in the short run and potentially in the long run. However, the results indicate it had no long term impact on trade or total employment.

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Introduction and Background

The competition among cities to host major sporting events can be as fierce as the competition that takes place on the field of play. For example, no fewer than ten countries submitted applications to host the 2002 Winter Olympics four of which, Salt Lake City, Utah; Quebec City, Quebec; Sion, Switzerland; and Ostersund, Sweden, were named finalists. In a selection process that was marred by scandal and allegations of bribery, Salt Lake City ultimately won the right to host the 2002 Games. But the question remains, what motivates local communities to bid for the rights to host mega-events such as the Olympics or the World Cup? While civic leaders and local residents may wish to bask in the prestige and reflected glory that comes with a major sporting event, it is undeniable that the lure of a significant financial windfall is also a prime motivator in the bidding process. This paper examines labor markets in and around Salt Lake City during the 2002 Winter Olympics to determine the extent to which the local economy won “Olympic Gold.”

From February 8 through February 24, 2002, Utah was the center of the sports world as 3,500 athletes from 80 countries participated in 70 sporting events spread across 10 venues. The International Olympic Committee (2002) estimated a worldwide television audience numbered at over 2 billion. Of course, staging such a spectacle did not come cheaply. The Games were estimated to have cost $1.9 billion (in 2002 dollars) in total direct costs for projects and activities related to planning and hosting the event. Of this figure, the Salt Lake City Organizing Committee (SLOC), the State of Utah, the local government, and the Federal government spent $1.3 billion, $150 million, $75 million, and $342 million, respectively, making them the largest and most expensive Winter Games ever conducted in the United States (Baade, Baumann, and Matheson, 2010). Did the region get a good economic return on this investment?

Case studies of past mega-events have placed considerable doubt on the ability of major sporting competitions to generate large economic returns. For example, in examining the 1994 Winter Olympic Games in Lillehammer, Norway, Spilling (1996) notes, "With the exception of significant growth in the tourism industry, the long-term economic benefits for the region have turned out to be fairly modest and out of proportion to the huge costs of hosting the Games." Teigland (1999) even questions the potential gains to the tourism sector observing, "After hosting the 1994 Winter Olympics, the Norwegian national and local authorities expected a 'big boom' in tourism; the actual effects have been less than, and different from, the predictions, and 40% of the full-service hotels in Lillehammer have gone bankrupt." Winter Olympic Games from Nagano to Vancouver provide equally discouraging numbers. The Conference Board of Canada estimated that the 2010 Vancouver Games injected $1.56 billion into the local economy, an impressive figure until one compares that amount to the $10 billion impact predicted by finance minister Colin Hansen prior to the Game or to the $6 to $7 billion in costs to stage the event. (MacLeod, 2010).

Ex post econometric analyses of mega-events also find negligible economic benefits. For example, Baade and Matheson's (2002) *ex post* analysis of the 1996 Summer Olympics in Atlanta found that employment in the region increased by between 3,467 jobs and 42,448 jobs, a fraction of the 77,000 jobs that Olympics organizers predicted the event would generate. Jasmand and Maennig (2008) also find minimal effects on employment from the 1972 Summer Olympic Games in Munich. Other international mega-events exhibit a similar pattern. For example, Baade and Matheson (2004) and Hagn and Maennig (2007; 2008) both find little or no impact on host economies from soccer's Worlds Cup.

Baade, Baumann, and Matheson (2010) do identify a positive effect from the 2002 Winter Olympics in Salt Lake City on taxable sales receipts in the hotel and restaurant sectors of the economy, but the gains in those sectors were balanced out by reductions in taxable sales at department stores and ski resorts leading to an overall reduction in taxable sales in the region during the three-month period around the Olympics. Indeed, a primary reason cited by economists as to why the economic impact predictions of boosters diverge from the observed data is that these events simply alter consumption patterns without actually increasing overall economic activity. Sports fans crowd out other visitors, and local residents shift their spending towards spectator sports and away from other sectors of the local economy. As noted by Baade, Baumann and Matheson (2010) while the "Winter Olympics may generate a great deal of economic activity, if a similar level of economic activity is deterred by the Games, the economy as a whole may not benefit from the event. Any gains in one part of the economy, such as the hospitality sector, may simply come at the expense of other businesses."

The Salt Lake Chamber of Commerce and the State of Utah published their own estimates of the economic legacy of the 2002 Games. According their analysis, the 2002 Winter Olympics resulted in 35,000 job years of employment (International Olympic Committee, 2010). The following empirical section examines employment data for Utah labor markets in order to assess the accuracy of these claims.

Data and Model

We examine Utah employment data in three industries to determine the effect from hosting the Olympics. State-level data are preferable to, say, Salt Lake City data for two reasons. First, the 2002 Winter Olympics were held in locations throughout northern Utah. Second, the vast majority of the Utah population is in the same northern region. For example, four of the five metropolitan areas in Utah are in the Wasatch Front region in northern Utah. We examine employment in the entire state and also in two industries: trade and leisure. The decision to examine industry-level effects is motivated by both by Baade, Baumann, and Matheson (2010) who found disparate effects at the industry-level in taxable sales from hosting the 2002 Winter Olympics as well as Coates and Humphreys (2003) who examine the effect of professional sports on employment in the services and retail sectors in U.S. cities. Our sample frame for overall and leisure employment is January 1990 to November 2009, and the sample frame for trade employment begins at January 1997.

We use two methods to find employment effects of the 2002 Winter Olympics. The first is an ARIMA technique that maps Utah employment data in each industry. The second uses a control group of all the states that are adjacent to Utah: Arizona, Colorado, Idaho, Nevada, New Mexico, and Wyoming. This method purges out any regional trends that may have impacted employment around the same time of the 2002 Winter Olympics. In either case, the model is

$$y^*_{st} = \beta_0 + \sum_{p=1}^{P} \Phi_p \, y^*_{s,t-p} + \sum_{q=0}^{Q} \Theta_q \, \varepsilon_{s,t-q} + \lambda year_t + \alpha oly_t + \varepsilon_t$$

where y^*_{st} is employment in time period t, P is the number of lagged values or the autoregressive (AR) dimension of the model, ε_t is an error term, and Q is the number of lagged values of the error term or the moving average (MA) dimension of the model. oly_t equals one during the month of the Winter Olympics (February 2002) and zero otherwise. There are also dummy variables for each year ($year_t$) to account for macroeconomic trends. This model is used for each employment type.

Dickey-Fuller and Phillips-Perron tests suggest the possibility of a unit root in the levels of each employment type for Utah and its surrounding states. However, these same tests reject the existence of a unit root using the 12-month growth rate of each variable. The 12-month growth rate also helps correct seasonality issues in the data. For these reasons, all estimations use the 12-month growth rate. Table 1 presents summary statistics for each employment control in Utah and its control group.

Table 2 presents results for the ARIMA model that uses only Utah data. Because we use the 12-month growth rate, there are two controls for the Winter Olympics: one during the event in February 2002 ("Olympics In") and a second one year later ("Olympics Out"). It should be noted that this methodology is useful for capturing any sudden spikes in employment due to a macroeconomic shock like the Winter Olympic but is less suitable for identifying employment gains that occur gradually over longer periods of time. For example, if the Olympics cause a sudden increase in hiring of 10,000 employees during the month of the event, such an intervention will be easily identified in an ARIMA model. However, the same 10,000 person increase in employment that manifests itself as a rise in employment of 100 per month for 100 months is not likely to show up as a statistically significant event. While this is clearly a limitation of this methodology, most *ex ante* economic impact analyses of mega-event show that a majority of the employment impact from an event should occur in the time frame during which the event takes place. Therefore, while any ARIMA estimates of employment will underestimate the total employment increases from the event, a significant portion of the total employment gains will be captured by the model.

We use the Akaike Information Criterion to find the optimal AR and MA dimensions and the Newey-West method to calculate standard errors. The results suggest that overall employment improved in Utah during the Olympics, but these gains were temporary. Total employment increased by an estimated 0.7 percentage points during the month of the 2002 Winter Olympics, or approximately 7,000 jobs, but decreased by roughly the same level the following February. Since the bump in employment had completed dissipated within one-year, a 7,000 person increase in employment for one month implies a maximum of 7,000 job-years of employment (and a minimum of just 580 job-years).

Using statistical significance as a gauge, the Olympics had no discernable effect on trade employment. Leisure employment had a large increase during the Olympics, roughly 5.3 percentage points (roughly 4,800 jobs), and only 4.0 percentage points of that gain (3,700) jobs was lost one year later.

The next test introduces a control group of states adjacent to Utah to determine whether the marginal effects in the ARIMA model were specific to Utah or experienced throughout the region. It is possible another event or macroeconomic trend is driving the ARIMA results, and using a control group may improve the isolation of an Olympic effect on employment. Since introducing a control group now means the data is a time-series cross-section, we use the technique developed by Arellano and Bond (1991), also known as differenced Generalized Method of Moments (GMM), technique to produce consistent estimates. Below is a brief description of this technique, and greater detail can also be found in Bond (2002) and Roodman

(2006).

By differencing the data, the constant is removed. In case the dependent variable remains endogenous after differencing, the Arellano and Bond technique uses higher-order lags of the un-differenced dependent variable as instruments. Holtz-Eakin, Newey, and Rosen (1988) notes that each instrument produces a moment condition to estimate the parameters. This provides an abundance of instruments since there are 226 observations of overall and leisure employment and 146 of trade employment. We use a technique by Hansen (1982), which tests for over-identification, to determine the number of higher-order lags of Y_{it} to use as instruments. Finally, several works note the Arellano and Bond technique produces a downward bias on the standard errors, so we use a finite-sample correction described in Windmeijer (2005). Similar to the Utah data, unit root tests for time-series cross-sections (Levin, Lin, and Chu, 2002; Im, Pesaran, and Shin, 2003) do not reject the existence of a unit root for the combined Utah and control group employment data. However, these same tests reject the null hypothesis of a unit root using the 12-month growth rate for each employment string.

Table 3 presents the results of the Arellano and Bond estimation. We find no statistically significant effects on total or trade employment from hosting the Olympics. However, leisure employment increased by roughly five percentage points or roughly 4,700 jobs a very similar result to that found in the ARIMA model. It is difficult in the Arellano and Bond estimation results to determine whether these gains in leisure employment were temporary or permanent because of the large standard error of “Olympics Out”. Comparing the results of the two models to each other in Tables 2 and 3, the temporary bump in overall employment found in the ARIMA model appears to be a regional effect that may not have been tied to the Olympics. Trade employment appears unaffected in either specification. Finally leisure employment increased substantially from hosting the Olympics; however, it is unclear whether these gains were temporary or not. The ARIMA model suggests four of the five percentage point increase was gone one year after hosting the Olympics, while the Arellano Bond results also suggest a negative effect but with a large standard error.

Conclusions

We have investigated whether the $1.9 billion dollars in funds spent on the 2002 Winter Olympic Games increased employment in Utah. Event promoters suggested that Games would increase employment in the state by 35,000 job-years. Although the results vary depending upon the approach used to estimate its impact, we found the Games' impact was a fraction of that claimed by Olympics boosters. While the Winter Olympics did increase employment in leisure related industries, the Games had a modest short-run impact on employment and no significant impact on total employment in the long run.

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Table 1: Summary Statistics
(standard deviations in parenthesis)

	Sample Mean in Utah	Sample Mean in control group
Overall Employment (000s)	1,015 (164)	1,097 (747)
12-month Growth Rate of Overall Employment	2.81% (2.45)	2.51% (2.68)
Trade Employment (000s)	135 (8.27)	140 (92.8)
12-month Growth Rate of Trade Employment	1.49% (1.95)	1.44% (3.26)
Leisure Employment (000s)	92.2 (15.4)	146 (101)
12-month Growth Rate of Leisure Employment	3.03% (2.86)	2.38% (2.97)

Note: The Control Group is all states adjacent to Utah: Arizona, Colorado, Idaho, Nevada, New Mexico, and Wyoming.

Table 2: ARIMA Results
(standard errors in parentheses)

	Total	Trade	Leisure
Olympics In	0.669** (0.107)	-0.107 (0.283)	5.256** (0.248)
Olympics Out	-0.693** (0.107)	0.247 (0.214)	-4.034** (0.300)
Constant	2.789** (0.659)	1.470* (0.688)	2.637* (1.113)
AR(1)	0.151** (0.028)	0.967** (0.029)	0.994** (0.025)
AR(2)	0.967** (0.030)	-	-
AR(12)	-0.162** (0.017)	-0.042 (0.032)	-0.040* (0.022)
MA(1)	0.884** (0.064)	0.123 (0.097)	-
MA(2)	-0.116* (0.064)	-	-

Note: (1) Year dummies are included in each model but omitted for brevity. Full results are available upon request.
(2) ** and * represent statistical significance at the one percent and ten percent levels, respectively.
(3) All standard errors are calculated using the Newey-West method.

Table 3: Arellano-Bond Results
(standard errors in parentheses)

	Total	Trade	Leisure
Olympics In	0.359 (0.688)	-0.362 (0.764)	5.062^{**} (0.775)
Olympics Out	-7.879 (23.237)	-4.042 (10.171)	-12.603 (74.3)
instruments (lags of dep. var.)	4,5,6,7	2,3,4	3,4
Hansen test for over-identification	$\chi^2 = 6.48$ $p = 0.166$	$\chi^2 = 5.22$ $p = 0.157$	$\chi^2 = 4.97$ $p = 0.174$

Note: (1) Year dummies are included in each model but omitted for brevity. Full results are available upon request.
(2) ** and * represent statistical significance at the one percent and ten percent levels, respectively.