The Labor Market Effects of the 1996 Atlanta Summer Olympics

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Abstract

This paper examines the labor market effects of the 1996 Atlanta Summer Olympic Games. At a state level, the paper finds strong evidence that the Olympic Games increased employment in the leisure and hospitality industry in the short run. It also shows that the Olympics increased employment in the construction industry during the pre-Olympic construction period, but the effect died out quickly. However, the Olympics did not contribute much to the employment in the retail industry as well as the overall employment across the state.

1 Introduction

Held every four years, the Summer Olympics is considered the world's foremost sports event with more than 200 participating countries. It has gained substantial media coverage over the years and is generally associated with positive economic effects on hosting cities. The competition among cities to host the Olympic Games became consistently more fierce as a result.

The 1996 Atlanta Summer Olympic Games were not an exception in terms of the competition. Atlanta was selected on September 18, 1990 to host the 1996 Summer Olympics. It competed against Athens, Belgrade, Manchester, Melbourne, and Toronto at the 96th IOC (the International Olympic Committee) Session. The Mayor of Atlanta, Andrew Young, wanted to host the Olympics in the hope to showcase a changed American South with a growing economy to help offset international stereotypes that the region was still plagued with poverty. With a record-breaking 8.6 million tickets sold, the 1996 Olympic Games seemed to have stimulated the economy of Georgia a great deal (Feddersen and Maennig [2013]).

This paper examines the labor market effects of the Atlanta Olympic Games in Georgia. It focuses on the state-level employment in various industries from pre-Olympic time to post-Olympic time, and also looks into the employment data of adjacent states as a comparison. The results of the paper indicate that the leisure and hospitality industry experienced a 4.4 percentage points increase in the monthly growth rate of employment during the time of the Olympics, which was equivalent to around 12,060 to 15,780 jobs created in a month. The Olympics also had positive effects on the construction industry where 3,600 to 28,800 jobs were created during the pre-Olympic construction period from 1993 to 1996. However, these additional jobs created by the Olympics were mostly temporary as these two industries both experienced a big employment drop as soon as the Olympics ended. There were not enough evidence to conclude that the Olympics influenced the employment in the retail and trade industry.

2 Background and Literature Review

The 1996 Summer Olympic Games were held in Atlanta, Georgia, USA, from July 19 to August 4, 1996. It was indeed a mega-event in sports considering the number of people involved and the level of media coverage: 197 National Olympic Committees and 10,318 athletes took part in 271 sports events, and over 15,000 media representatives and 47,000 volunteers were registered. The Olympic Games also contributed to a boost in local tourism and global attention: during the 17 days of the Olympic Games, over 2 million visitors came to Atlanta and it was estimated that 3.5 billion people around the world watched the games on television (Feddersen and Maennig [2013]).

The development of service-related industries and new job openings seemed to generate a huge amount of income for Georgia. However, the funding needed for the Olympics was also high. Corporate sponsorships and donations by the IOC as well as more than $1 billion of public money were collected to make the necessary preparations for the Olympics such as constructing new venues, expanding existing sports stadiums, and building 7,500 new hotel rooms. Most income from ticket sales was also dedicated to cover the cost of the Olympics, so the government was not able to gain profit from ticket sales (Feddersen and Maennig [2013]).

Much of the previous literature has looked at the economic implications of the Olympics and emphasized the long-term benefits that the Olympics can bring, such as newly constructed event facilities and infrastructure, urban revival, additional employment, and business opportunities (Kasimati [2003]). It is also widely accepted that Olympics may have a stronger impact on service-related industries, which include food services, hospitality, and retail trade industries (Feddersen and Maennig [2013]). For the 1996 Olympics, past researchers have generally attested that it had positive employment effects, although the degree of the effects is up to debate. Hotchkiss et al. [2003] estimated a 17% increase in employment, which translates into approximately 293,000 more jobs post-Olympics. However, they did not conclude how long these jobs would last. Baade and Matheson [2002], on the other hand, were less positive and estimated that the Olympics generated cumulative job growth of 42,500 full-time and part-time jobs between 1994 and 1996. They also noted that the economic impact of the Olympics was transitory as their model indicated between 17,706 and 32,768 jobs were "given back" in 1997 (Baade and Matheson [2002]). This means that around 40% to 77% of the jobs created by the Olympics only lasted for at most three years.

Among the previous papers on Olympics' economic effects, the Feddersen and Maennig [2013] paper and the Baumann et al. [2012] paper stood out in that they both used monthly employment data as supposed to using quarterly data. And instead of examining the employment of the hosting city as a whole, they looked into sectoral employment. Feddersen and Maennig [2013] studied the 1996 Olympics Games and used monthly employment data from 16 sectors for each county in Georgia. They used a partially nonparametric approach to isolate employment effects and found significant positive employment effects exclusively during the Olympic Games, but hardly any evidence for a persistent shift in the aftermath of or the preparation for the Games. These findings were disappointing to boosters of the Olympics who predicted that due to spending on infrastructure, employment should increase during the preparation period. The positive employment effects only started showing in 1995 and peaked in July 1996. However, their approach compared Fulton County, where Atlanta is located and the largest percentage of Olympic sports events were held, with a control group consisting of 8 venue counties in Georgia. So the temporary employment effect they found was only valid when comparing Fulton County to other venue counties. Since the venue counties in the control group were also positively influenced by the Olympics, comparing their employment to that of Fulton County's would likely to underestimate the Olympics' employment effects on Fulton County.

Baumann et al. [2012] focused on the 2002 Winter Olympics in Salt Lake City, Utah. Although a different event, this paper used an ARIMA technique that maps Utah employment data in each industry and compared it to a control group of all the states that are adjacent to Utah. Similar to Feddersen and Maennig [2013]'s conclusion, their results showed that the Olympics had no significant impact on total employment in the long run, although it did increase employment in leisure related industries. Their paper is applicable to this research as it has a well-established model that isolates the employment effects of the Olympics to some degree and is not overly convoluted.

Drawing from the existing literature, this paper focuses on employment data for the state of Georgia, and will be differentiated from former research in terms of the frequency and the geographical range of the employment data. The data consist of monthly employment data collected at a state level, differentiated by industries. Most former literature only used quarterly employment data, whereas this paper will use monthly employment data as the Feddersen and Maennig [2013] paper did. This will better capture short-term effects on the labor market since the Olympics only lasts for 17 days. But unlike the Feddersen and Maennig [2013] paper which focused on a more local area (the Fulton County), this paper uses a state level dataset and incorporates a control group that includes other states for better comparison of the results.

3 Data and Model

3.1 Data

The paper uses state-level monthly employment data in different industries (seasonally adjusted in thousands) from the Bureau of Labor Statistics (BLS) to examine the employment effects of the Olympics. State-level data are preferred because the Olympics were held not only in Atlanta, but also in several other cities in Georgia. Among the 27 venues used for the event, 22 were located in 9 different counties of Georgia (Figure 1) with the main venue, Olympic City, located in the city of Atlanta (Feddersen and Maennig [2013]). If the Olympics turned out to affect the employment, it is likely to have affected the state as a whole.

The control group incorporated in the model includes the five states adjacent to Georgia: Florida, Alabama, Tennessee, North Carolina, and South Carolina. This control group is included because it is possible that some macroeconomic trends are driving the employment. The model results of this control group will expose if there was a regional trend at around the same time of the Olympics and may improve the isolation of the Olympic effect on employment. These states are comparable to Georgia as the average population of them is similar to that of Georgia's (10 million). And since they are geographically close, they have a similar industry structure and are likely to experience similar economic shocks such as extreme weather.

The monthly employment data include the employment level for the following three industries: construction, leisure and hospitality, and retail trade. The time frame spans from 1990 to 2014. The three industries chosen are service-related industries and are more likely to be impacted by the Olympics and experience a rise in employment due to the Olympics. Table 1 summarizes the employment data used in the paper.

Figure 1: 1996 Summer Olympic Games Venue and Near-Venue Counties in Georgia (Hotchkiss et al. [2003])

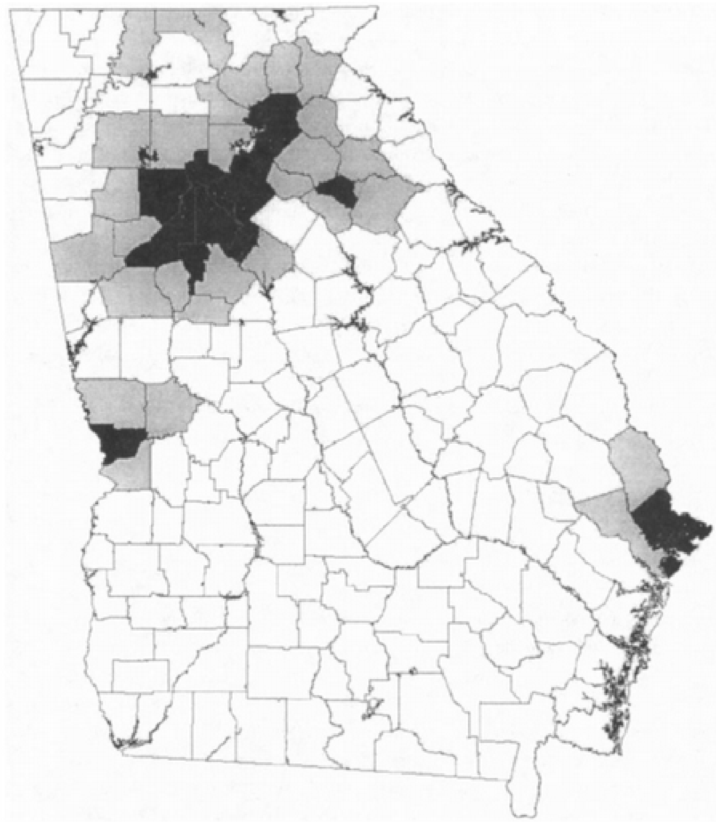

Table 1: Summary of Employment Data

Employment data from the following states and industries	
States	Georgia Florida Alabama Tennessee North Carolina South Carolina
Industries	Leisure and hospitality Retail trade Construction

3.2 Model

For the purpose of this paper, which is to analyze monthly employment data across years, the autoregressive integrated moving average (ARIMA) model is chosen. It is a time series method that is used to better understand data or predict future points in series. An ARIMA model is often written as an ARIMA (p, d, q) model with the three parameters each referring to the autoregressive, integrated, and moving average part of the model. Using differencing of the data, which corresponds to the integrated part of the model, ARIMA can effectively reduce non-stationarity, and therefore is widely used in time series analysis. Since the employment level varies over time greatly, it is likely to show non-stationarity. Thus, the differencing aspect of ARIMA model becomes useful.

The specific ARIMA model that we will use is based on the Baumann et al. [2012] paper. The model is as follows:

$$y^*_{s,t} = \beta_0 + \sum_{p=1}^{P} \phi_p y^*_{s,t} + \sum_{q=1}^{Q} \theta_q \epsilon_{s,t-q} + \lambda year_t + \alpha oly_t + \gamma cons_t + \epsilon_t$$

where $y^*_{s,t}$ is employment in time period t, and s denotes the industry type. P is the number of lagged values or the 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 MA dimension of the model. oly_t equals one during the months of the Summer Olympics (July and August of 1996) and zero otherwise. $cons_t$ is the dummy variable for the construction period that venues and related infrastructure were being built (from July 1993 to June 1996), which equals one in the construction period and zero otherwise. The variable $year_t$ is a dummy variable for a calendar year to account for macroeconomic trends. This model is used for employment of the entire state, the leisure industry, and the trade industry. It is also applied to the control group. Table 2 summarizes the variables in the model and their meanings.

Because we are working with time series data, we have to make sure our model does not have a unit root. The presence of a unit root indicates the mean, variance, and autocorrelation of the data change over time, which can cause problems in our statistical analysis. A widely accepted way to test for the existence of a unit root in an autoregressive model is the Augmented Dickey-Fuller (ADF) test, which removes all the structural effects (autocorrelation) in the time series and then tests for the unit root. The ADF test on employment levels of all the industries selected returns the possibility of a unit root for each employment variable. However, when using the first-order differenced values, the test rejects unit root for most of the variables (Table 3). The first-order differencing operation transforms employment levels into the 1-month growth rate of employment. Since the p-values for the t-statistics are all zero for the growth rates of the state-level total employment, the leisure and hospitality industry employment, and the retail and trade industry employment, we reject the null hypothesis that unit root exists for these variables. The p-values for the t-statistic of construction employment growth rate is 0.1809, which has also decreased tremendously compared to the previous value, 0.6412. Therefore, using the growth rate of employment will greatly reduce the possibility of the presence of a unit root. As a result, all the analysis in the paper will use the first-order differenced values, i.e., the monthly growth rate of employment, rather than employment levels.

Table 4 below presents a summary of the descriptive statistics of variables used in the model. All data are transformed from employment level (in thousands) to 1-month percentage change.

Table 2: Variables in the Model

$y^*_{s,t}$:	employment in time period t
P:	number of lagged values for the AR dimension of the model
ϵ_t:	error term
Q:	the number of lagged values of the error term for the MA dimension of the model
oly_t:	dummy variable for the Olympic event
$cons_t$:	dummy variable for the pre-Olympic construction period
$year_t$:	dummy variable for a calendar year

Table 3: Dikey-Fuller Test for Unit Root (Georgia)

Employment level	Total	Construction	Leisure	Retail
t-Statistic	0.9159	-1.9205	-1.2724	-0.9958
P-value	0.9517	0.6412	-0.8924	-0.9418
Monthly growth rate	Total	Construction	Leisure	Retail
t-Statistic	-5.8746	-2.8484	-18.1699	-9.5438
P-value	0.0000	0.1809	0.0000	0.0000

Table 4: Summary of 1-month Percentage Change Employment Variables

Variables	Description	Mean	Median	Max	Min	Std. Dev.	Obs.
GA_ALL_1	Georgia total	0.1157	0.1000	2.4000	-0.6000	0.2583	300
AVER_ALL_1	Control group total	0.0589	0.1000	1.7000	-1.1800	0.3135	299
GA_CONS_1	Georgia construction	0.0197	0.1000	3.7000	-5.5000	0.9962	299
AVER_CONS_1	Control group construction	0.0107	0.0800	1.9000	-3.0400	0.7489	299
GA_LEIS_1	Georgia leisure	0.2030	0.2000	4.3000	-3.7000	0.6634	299
AVER_LEIS_1	Control group leisure	0.1656	0.2000	1.580	-1.1000	0.3926	299
GA_RETAIL_1	Georgia retail	0.0581	0.1000	1.4000	-0.8000	0.2402	301
AVER_RETAIL_1	Control group retail	0.0710	0.1000	1.0600	-1.3400	0.3078	299

4 Model Results

Table 5 shows the ARIMA results of the Georgia employment data. *Olympics in* represents a dummy variable that equals one for July 1996, when the Olympics started, whereas *Olympics out* represents a dummy variable that equals one for August 1996, when the Olympics ended. The Olympics occurred across July and August (from July 19 to August 4), and therefore by recording these two month, we hope to capture the labor market effects during the event. And although the Olympics only lasted for four days in August, we were not able to segment the employment data further to account for this issue. The *Construction period* is a dummy variable that equals one from July 1993 to June 1996, and zero otherwise, which corresponds to the $cons_t$ variable described in Table 2, Section 3.2. The optimal number of lags for AR and MA are chosen based on the Akaike Information Criterion (AIC). A smaller AIC value typically represents a better choice of the AR and MA dimensions. The specific dimensions chosen for each regression is shown in Table 5. All the regression results have R-squared values above 0.5.

4.1 Model Results for Georgia

The model results indicate that the Olympics had little influence on the total employment of Georgia. The coefficient of *Olympics in* and *Olympics out* are very small (0.0569% and 0.0317%, respectively) with high p-values. Since the standard deviation is 0.2051, which was 4 times of the coefficient of *Olympics in*, an estimate on job increase using this value is not reliable and thus cannot provide much economic implication. The Olympic effect on total employment growth in the pre-Olympic construction period is also tiny (only a 0.075% increase shown in Table 5). Also, this result is only statistically significant under a 40% level. Therefore, our results did not suggest the claim that Olympics can drive the overall local employment.

However, when we look at industry level employment growth rate, the labor market effects of the Olymics becomes more substantial. There is strong evidence that the Olympics influenced the employment of the leisure and hospitality industry. The coefficient of *Olympics in* is 4.4, and the coefficient of *Olympics out* is -4.1 (Table 5), which means when the Olympic Games started, the monthly growth rate of employment in the leisure and hospitality industry increased by about 4.4 percentage points solely due to the Olympics. This is equivalent to around 12,060 to 15,780 additional jobs created in the leisure and hospitality industry within July 1996. And when the Olympics ended, this positive employment effect disappeared quickly: a 4.1-percentage-point decrease in the monthly employment growth rate amounts to 11,570 to 15,510 job losses. So most of the jobs created in the Olympic month were temporary. Both the coefficients of *Olympics in* and

Olympics out are highly statistically significant because they both have p-values less than 1 percent and low standard errors. It is consistent with the assumption that the large flow of tourists due to the Olympics tend to boost demand for leisure-related services, and therefore leisure-related industries hire more workers to satisfy this increased demand. This phenomenon is also shown in the [Baumann et al., 2012] paper, the result of which indicates a 5.26% increase in the 12-month growth rate of employment in Utah, where the 2002 Salt Lake City Winter Olympic Games were held. We can also see that the positive coefficient of the Construction period variable is significant under a 10% level (Table 5), indicating that pre-Olympic construction also positively influenced the employment of the leisure and hospitality industry in Georgia.

For the construction industry, there is an increase of 0.31 percentage points in the monthly employment growth rate attributed to the pre-Olympic construction period. This suggests that around 100 to 800 more jobs per month were created in the construction industry during this period compared to other times, which is equivalent to 3,600 to 28,800 new jobs in total from July 1993 to June 1996. This result is moderately statistically significant with a p-value of 0.27. One factor that could potentially affect the p-value is that the construction industry includes sub-industries in residential and non-residential building. Residential building is unlikely to be affected by the Olympics and so including it in the regression might underestimate the Olympic effect on construction. However, state-level employment data does not segregate to these two sub-industries, so we could not further differentiate the data to get the desired result. Nonetheless, an interesting phenomenon shows that the coefficients of *Olympics in* and *Olympics out* are both negative and highly significant. Since the coefficient of *Olympics out* has a larger magnitude, it reveals that the drop in employment growth rate became sharper after the Olympics ended. This could indicate that as the construction for the Olympics became more and more completed, the need for construction employees dropped, and therefore the employment growth rate kept decreasing. These negative coefficients reflect a job decrease of 4,315 to 10,466 in the construction industry during July and August of 1996. Thus the labor effects of the Olympics were also mostly transitory in the construction industry.

Finally, the regression shows no significant results in retail and trade industry, whether during the Olympics, or in the pre-Olympic construction period. This result seems to contradict the common perception that retail and trade would flourish under the influence of the Olympics. But Maennig and Zimbalist [2012] noted that this was not a surprising phenomenon since local residents could leave the areas during the period of the Olympics to avoid the crowds and congestion associated with the event, exerting a negative force on the retail and trade industry.

Table 5: ARIMA Results for Georgia

	Total	Construction	Leisure	Retail
Olympics in	0.0569 (0.2051)	-1.2258^{*} (0.8929)	4.4074^{***} (0.5949)	0.0048 (0.1868)
Olympics out	0.0317 (0.1986)	-3.0918^{***} (0.8977)	-4.1371^{***} (0.5995)	0.0253 (0.1851)
Construction period	0.0750 (0.0870)	0.3110 (0.2805)	0.2555^{**} (0.1374)	0.0038 (0.0702)
Constant	0.0363 (0.0746)	-1.1605^{***} (0.3293)	0.0188 (0.1039)	-0.1293 (0.1278)
AR(1)	1.1446^{***} (0.0591)	0.3840 (0.7820)	-0.4742^{***} (0.0721)	0.7546 (0.4943)
AR(2)	-0.4103^{***} (0.0567)	0.2081 (0.6159)	0.4394^{***} (0.0644)	0.0516 (0.4531)
MA(1)	-0.9995^{***} (0.0674)	-0.6470 (0.7437)	-0.0224 (0.0409)	-0.8515^{**} (0.4825)
MA(2)	-	-0.3514 (0.8354)	-0.9628^{***} (0.0408)	-0.1483 (0.5222)

Note:

(1) Year dummies are included in the regression, but are omitted here for brevity.

(2) $***$: p-value less than 1%.

$**$: p-value less than 10%.

$*$: p-value less than 20%.

(3) Standard errors are in parentheses.

(4) More detailed regression results are available upon request.

4.2 Model Results for Control Group

Now if we look at the model results for the control group, we can see that there was no particular regional trend that could drive the changes in employment (Table 6). In fact, the total employment were experiencing a slight decrease during the Olympics. So the results in Section 4.1 are more credible as there was no evidence of other positive regional trend that could have boosted the employment in Georgia during the Olympics. Moreover, no significant trend is found in construction, leisure, and retail industries.

Table 6: ARIMA Results for Control Group

	Total	Construction	Leisure	Retail
Olympics in	-0.1170 (0.2423)	-0.8699^{*} (0.5512)	-0.1698 (0.3322)	0.2055 (0.2732)
Olympics out	-0.5386^{**} (0.2340)	0.0120 (0.5581)	-0.0816 (0.3338)	-0.1854 (0.2750)
Construction period	0.0915 (0.1020)	0.1736 (0.2177)	-0.0855 (0.0924)	-0.0317 (0.0982)
Constant	-0.4125^{***} (0.1517)	-0.7918 (0.1678)	-0.1336 (0.0710)	-0.2201^{**} (0.1108)
AR(1)	0.0716 (0.1654)	-1.0902^{***} (0.0158)	0.5384^{***} (0.1121)	1.4212^{***} (0.0600)
AR(2)	0.4782^{***} (0.1597)	-0.9786^{***} (0.0151)	-	-0.3482^{***} (0.1045)
AR(3)	-	-	-	-0.2506^{***} (0.0612)
MA(1)	-0.0061 (0.1613)	1.0289^{***} (0.0649)	-0.8619^{***} (0.1482)	-1.9660^{***} (0.0074)
MA(2)	-0.6321^{***} 0.1597	0.9599^{***} 0.0673	-0.1379 0.0969	0.9664^{***} 0.0073^{***}
MA(3)	-0.3615^{***} (0.0711)	-0.0210 (0.0632)	-	-

(1) Year dummies are included in the regression, but are omitted here for brevity.

(2) $***$: p-value less than 1%.

$**$: p-value less than 10%.

$*$: p-value less than 20%.

(3) Standard errors are in parentheses.

(4) More detailed regression results are available upon request.

5 Conclusions and Discussion

Cities vigorously compete to host mega-events in sports such as the Summer Olympic Games. They hope to enhance their image and stimulate the economy through these international sporting events. The Olympics are costly as they require substantial expenditures on infrastructure and security (Baade and Matheson [2004]). Boosters of the Olympics therefore need to convince the public that hosting will generate economic profit. Under this motivation, they sometimes tend to exaggerate the magnitude of the economic profit to secure more public funds. This paper investigates the economic benefits that the 1996 Atlanta Summer Olympic Games brought to the labor market. In doing so, we hope to provide some policy implications to cities bidding for the Olympic Games.

Specifically, the paper examines the state level monthly employment data. The results may differ depending on different approaches, but the model in this paper indicates some positive effects that the Olympic Games had on the employment in Georgia, mainly limited to the leisure and hospitality industry and the construction industry. According to the model results, around 12,060 to 15,780 jobs were created in the leisure and hospitality industry in the month of July 1996, when the Olympics started in Atlanta. And during the Pre-Olympic construction period from 1993 to 1996, there were on average an addition of 100 to 800 jobs per month in the construction industry created by the pre-Olympic construction. However, these employment effects were short-lasting as most of these jobs were temporary and terminated after the Olympics ended. This is consistent with the findings of the [Feddersen and Maennig, 2013] paper.

These results suggests that the positive labor market effects of the Olympics are much smaller than what the promoters typically claim. Although hosting the Olympics might improve the image and promote political influences in some sense, the employment effects seem fairly small and too concentrated sectorally and geographically to justify the huge public funding required. Although we only did an analysis on one of the many Summer Olympic Games, our choice of the 1996 Atlanta Summer Olympic Games was attested by many researchers as one of the more successful Olympics Games. So the economic effects of other Summer Olympic Games could be even smaller. We therefore would advise cities to evaluate the Olympics' economic impact more thoroughly before committing themselves to host such a costly event so that they won't ending up spending more than earning.

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