Bidding for the Olympics: Fool's Gold?

by

Robert A. Baade
and
Victor Matheson

Introduction

Salt Lake City's successful bid for the Winter Olympic Games in 2002 and Atlanta's hosting of the 1996 Summer Olympic Games have been tainted by scandal. It has been alleged that these cities simply "outbid the competition" for the Games in violation of both stated and unstated Olympic principles as well as U.S. Federal laws. Those who stand accused of bribery might cynically contend in their defense that the allegations are arbitrary, and that the fundamental myth of the Olympics is their amateur character and commercial innocence. Furthermore, there is at least the suspicion that officials in Salt Lake City and Atlanta knew of the promoters' illegal activities, but, seduced by the promise of Olympic economic gold, failed to protest the means employed to secure the Games. In response to the scandal, the structure governing the Olympic bidding process has been revamped, but it is unlikely that the incentive structure to host the games has been fundamentally altered. In part, cities and countries invest in the Olympics because of the prestige and the opportunity to make a political statement, but it is arguable that the primary motivation for hosting the Games is economic. After the 1984 Los Angeles Olympic Games, the prevailing perception seems to be that a properly run Olympics generates billions of dollars in profit. Is this an accurate perception? It is conceivable that part of the problem with the bidding process and related illicit behavior is attributable to misconceptions about their economic value. Do the Olympics represent an extraordinary investment for cities worthy of extensive taxpayer support?

The purpose of this paper is to assess the economic impact of the Olympics, and the use of public funds to host them. Information gleaned from the Los Angeles (1984) and Atlanta (1996) Summer Olympic Games indicate that the event's actual economic impact was more modest than that projected by those promoting the event in those cities.

Economic theory casts doubt on a substantial windfall for the host city from the Olympic Games. Cities competing with one another for the Games would theoretically bid until their expected return reached zero. In theory the International Olympic Committee (IOC), the monopolist supplying the Games, would appropriate any economic rents from the Games directly through bribes from the suitors and indirectly through mandating that potential hosts assume all costs incurred relating to the event. Two things could prevent this from happening. First, the monopoly power of the IOC could be countered if there existed only a single suitor for the Games. In fact, Los Angeles was the sole city bidding for the 1984 Summer Olympic Games.[1] Second, the weight of public opinion could be sufficiently strong to convince the IOC to share the event's monopoly rents. Recent criticisms directed at the IOC have resulted in reforms designed to thwart the acceptance of under-the-table payments to IOC members. These illegal payments, however, represent a small portion of the financial demands the IOC imposes on the host communities. IOC Rule 4, which requires the host city to assume financial liability for the games, constitutes the most significant financial responsibility. Despite the existence of the IOC monopoly, cities continue to compete for the Games. The sheer size and scope of the

[1] This could explain why the 1984 Olympics may have been profitable for Los Angeles. Indeed, the City refused to sign a contract with the IOC on IOC terms. That is LA Mayor Tom Bradley insisted that his City be exempted from the infamous IOC Rule 4 (Shaikin, 1988).

Olympics may well blind the suitors for the Games to the substantial financial risks.

The Olympic Games epitomize the concept of a "mega-event" to borrow a phrase from the literature devoted to economic impact. The word mega conjures up images of vast numbers of alien spendthrifts descending on the lucky host city. The impression of a substantial inflow of money created by the crowds and the excitement at Olympic venues is hard to dispute, but does a sober appraisal of the change in economic activity after the event support those first impressions? Few after-the-fact audits are performed because studies of this sort provide little benefit to cities that have hosted such events. Potential host cities, however, may well derive utility from economic post-mortems. In particular, cities contemplating Olympian expenditures would undoubtedly find useful a dispassionate appraisal of economic benefits to assist them in formulating a representative bid.

The first portion of this paper reviews the literature as it relates to an assessment of the impact of mega-events. In the next section of the paper, the strengths and shortcomings of the theory and techniques used by those who advocate using public funds to host the Games are examined. In the subsequent section of the paper, we discuss the after-the-event model that we propose to estimate the impact. Actual estimates are presented in the paper's next part. Conclusions and policy implications are articulated in the final portion of the study.

Review of the Literature

Economic impact studies exist primarily to assist decision makers in evaluating the efficacy of projects. Once information is obtained on benefits and costs, projects can be dismissed or pursued presumably on rational economic grounds. Incidence issues are neglected on occasion in cost-benefit analysis despite the fact that the distribution of benefits and costs could have significant economic

implications. Large public projects do not always qualify as *pareto optima*l, and as a consequence, economic impact studies supporting them are often contentious. Sports is one realm in which economic impact estimates are contested often as vigorously as the games themselves. Some perceive that the athletes and owners or promoters capture the vast majority of financial benefits from subsidies for sports infrastructure while the costs are borne by a large number of citizens some of whom have no interest in sport whatsoever. Professional sport arguably offers the most egregious examples, or at least the most publicized, of the well heeled using the public sector to enhance their already substantial financial privilege. Some skeptics have concluded that professional sports has a negligible economic impact on their host communities. Would they draw similar conclusions about the economic impact of mega-events?

To justify on theoretical grounds public subsidies for sports or mega-event infrastructure, such investments must exhibit substantial externalities or be construed as "public goods." Boosters offer staggering claims regarding the amount of economic activity a mega-event can generate. For example, in bidding for the Olympic Games in 2012, the chairman of Dallas 2012 conservatively estimated a $4 billion impact and observed:

> How much is $4 billion? It's very close to the 1998 net income for Metroplex giants J.C. Penney Co. Inc., EDS Corp., Kemberly-Clark Corp., Texas Instruments Inc., Halliburton Co. And Texas Untilities Co. -- combined.
>
> That $4 billion will benefit most every business in the Metroplex -- from hotels to restaurants, from real estate to transportation, from communications to health care. Beyond that, Dallas 2012 says landing the Olympic bid would give the city a specific reason to improve local infrastructure: Streets, freeways, the DART rail, even the Cotton Bowl and Fair Park (Cawley, 1999)
>
> Dallas 2012's optimism runs counter to some mega-event experiences elsewhere in the

world. In assessing some of event experiences Mary-Kate Tews observed:

> Throughout the 1980s, World's Fairs and Olympic organizers turned to the mega-event as a panacea, a solution to the myriad of problems caused by economic hard times. Instead of solving such problems, however, they often found themselves involved in very high-stakes, high-risk enterprises that had devastating after-effects. Such was the case in New Orleans, where researchers posed serious questions about the efficacy of the mega-event as a means of achieving economic development goals after Expo '84 declared bankruptcy (Tews, 1993).

Philip Porter offered a similarly negative assessment of the impact that "Superbowls" have on their host communities. After reviewing short-term data[2] on sales receipts for several American football championship games, Porter concluded:

> Investigator bias, data measurement error, changing production relationships, diminishing returns to both scale and variable inputs, and capacity constraints anywhere along the chain of sales relations lead to lower multipliers. Crowding out and price increases by input suppliers in response to higher levels of demand and the tendency of suppliers to lower prices to stimulate sales when demand is weak lead to overestimates of net new sales due to the event. These characteristics alone would suggest that the estimated impact of the mega-sporting event will be lower than impact analysis predicts. When there are perfect complements to the event, like hotel rooms for visitors, with capacity constraints or whose suppliers raise prices in the face of increased demand, impacts are reduced to zero (Porter, 1999).

The widespread disagreement on the economic impact of mega-events offered in bidding for the events and appraising their contributions after the fact begs for a resolution. Have the Olympic experiences in Los Angeles in 1984 and Atlanta in 1996 been good investments for those cities, and do

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[2] Porter's use of monthly sales receipts is important. If the researcher can compress the time period, then it is less likely that the impact of the event will be obscured by the large, diverse economy within which it took place. The use of annual data surely has the potential to mask an event's impact through the sheer weight of activity that occurs in large economies over the course of a year unless steps are taken to isolate the event.

they suggest that properly run mega-events in economies with some slack can match the optimistic claims of event boosters? Reconciling the rosy claims offered to secure the public funding necessary to host the event and the dreary assessments of some events after the fact is essential to insuring future reasonable appraisals of mega-event economic impact. Such reconciliation requires first an assessment of the underlying theoretical issues.

Theoretical Issues

Technically speaking, expert debates about estimates largely center in good part on methodological issues. To help bring these issues into sharper profile, it is useful to note that impact studies are either prospective, *ex ante*, or after the fact, *ex post*, in nature. Prospective studies are more prevalent because they provide the rationale for funding. In a practical sense, once the event or project is completed, the utility the community derives from a study to determine whether the event or project achieved the hoped-for outcome is arguably of negligible value.

In general, forecasting the impact of an event or project necessitates first the construction of an economic model of the host community or region. In the most sophisticated models, interrelationships among sectors of the economy are identified, and the overall impact of an event or project is calculated through "shocking" those sectors of the economy most directly affected by the estimated increase in expenditures associated with the event or project. Given this method, the debate about prospective models focuses on the adequacy of the assumptions that define the economy, the magnitude of the change in direct spending upon which the final impact estimates depend, and the "multipliers" that are used in estimating the indirect changes in spending. Given that the areas of potential dispute are so

fundamental, critics of *ex ante* impact studies may well regard them as political rather than economic in character. Furthermore, given that the political apparatus in a democracy requires information to function properly, the notion that "some number is better than no number" prevails.

The estimates of economic impact obtained *ex post* also raise questions. Foremost among them is the portability of specific numbers. What was true for Los Angeles in 1984 may not be true for Dallas in 2012. Does the unique economic character of individual communities vitiate the value of after-the-fact-audits? We contend that such audits do serve a very useful purpose in that they can be used to identify excessively optimistic appraisals about the extent to which an event or project is likely to bolster the economy of some potential host community. In other words, after-the-fact audits can serve as filters through which the hyperbole that may be present in some prospective economic impact estimates can be captured and eliminated. Despite this, relatively few resources have been devoted to economic post- mortem work. Our particular interest is in answering the question: can the Olympic Games fulfill the expectations created by prospective analyses used to justify public subsidies for them?

If we abstract for a moment from moral and ethical issues, past Olympic economic performance could provide insight into whether Salt Lake City behaved rationally in "bidding" for the Olympic Games. If audits reveal that the Olympics provide relatively little economic impact relative to the costs incurred by a host community, then maybe the temptation to behave unethically to attract the Games will diminish. It is conceivable that current perceptions suggest the costs incurred in hosting the games, to include the direct and indirect costs of bribery, are dwarfed by the benefits. We are not suggesting that a sober appraisal of the benefits facilitates a moral epiphany, but it does have the capacity for altering the incentive structure, and through rational calculation reduce the extent and, perhaps, even the

likelihood of moral abuses in attracting the Games.

Miscalculations regarding the economic effects of hosting the Olympics are most likely, arguably, to occur in assessing the economic benefits from hosting the games and the opportunity costs involved in doing so. With regard to opportunity cost, even if a sports project does generate positive net benefits, public funds should be invested only if the net benefits exceed those from an alternative use of the funds (Kesenne, 1999). The analysis performed in this study, therefore, has been developed with an eye toward ensuring that the benefits are not exaggerated and the opportunity costs have not been ignored. Consider first the issues relating to benefit hyperbole.

There are standard techniques for estimating economic impact that have evolved over time, but in general represent an application of standard macroeconomic theory. Technically speaking, an expenditure or incomes approach could be used to estimate the economic impact. The expenditure approach requires as a first step estimates of direct expenditures attributable to the event or project. These first-round, or direct expenditure, changes are then used to estimate indirect expenditures through the use of a "multiplier." Briefly, multipliers are thought to exist because one person's spending becomes income for others who in turn spend a portion of that new income creating income for still others, and so on. The indirect spending converges to some amount because only a fraction of any income increment received as a consequence of someone's spending is spent again. In other words, some of the money leaks from this system through savings, taxation, or money spent outside the host economy (imports). Using this technique, if a mistake is made in estimating direct expenditures, those errors are compounded in estimating indirect expenditures. The secret to generating credible economic impact estimates using the expenditure approach is to estimate precisely direct expenditures.

A precise measure of changes in direct expenditures is fraught with difficulties. Most prominent among them relates to accurately assessing the extent to which spending in conjunction with the event or project would have occurred in the absence of the event. For example, if an estimate was sought on the impact of professional sport on a local economy, consideration would have to be given to the fact that spending on sports may well merely substitute for spending that would occur on something else in the absence of professional sport. Therefore, if the fans are primarily indigenous to the community, sport may not provide much impact because its availability in a community may serve primarily to reallocate leisure spending while leaving spending overall fundamentally intact. This distinction between gross and net spending has been cited by economists as a chief reason why professional sports does not seem to contribute as much to metropolitan economies as boosters claim (Baade, 1996). One of the attributes of a mega-event is that gross and net spending changes induced by the event are more likely to converge. This is so because spending at a mega-event is more likely to be categorized as export spending since most of it is thought to be undertaken by people from outside the community. Skilled researchers will often eliminate the spending undertaken by local residents at a mega-event because it is likely to be inconsequential relative to that consumption which is undertaken by those foreign to the host community (Humphreys and Plummer, 1995).

Eliminating the spending by residents of the community would at first blush appear to eliminate a potentially significant source of bias in estimating direct expenditures. Surveys on expenditures by those attending the event, complete with a question on place of residence, would appear to be a straightforward way of estimating direct expenditures in a manner that is statistically acceptable. However, while surveys may well provide insight on spending behavior for those patronizing the event,

such a technique offers no data on changes in spending by residents not attending the event. It is conceivable that some residents may dramatically change their spending during the event's play given their desire to avoid the congestion at least in the venue(s) environs. In general, a fundamental shortcoming of economic impact studies is not with information on spending for those who are included in a direct expenditure survey, but rather with the lack of information on the spending behavior for those who are not.

A second potentially significant source of bias in economic impact studies relates to leakages from the circular flow of spending. For example, if the host economy is at or very near full employment, it may be that the labor essential to conducting the event resides in other communities where there is a labor surplus or unemployment.[3] To the extent that this is true, then the indirect spending that constitutes the "multiplier effect" must be adjusted to reflect this leakage of income and subsequent spending.

Labor is not the only factor of production that may repatriate income. If hotels experience higher than normal occupancy rates during a mega-event, then the question must be raised about the fraction of increased earnings that remain in the community if the hotel is a nationally owned chain.[4] In

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[3] The stadium construction accident at Miller Park in Milwaukee on July 14, 1999 illustrates this point. A crane collapsed killing three ironworkers and seriously injuring the crane operator. Of these four people, only two of them resided in the Milwaukee MSA. The third steelworker was from Kimberly, Wisconsin, and the crane operator was from Houston, Texas.

[4] It is not altogether clear whether occupancy rates increase during mega-events. It may be that the most popular convention cities, those most likely to host the Olympic Games, would experience high occupancy even if they are not successful in hosting them. Evidence, however, suggests that room rates increase substantially during the Olympics and the Super Bowl, but questions regarding the final destination of those additional earnings remain.

short, to assess the impact of mega-events, an informed balance of payments view must be utilized. That is to say, to what extent does the event give rise to dollar inflows and outflows that would not occur in its absence. Since the input-output models used in the most sophisticated *ex ante* analyses are based on fixed relationships between inputs and outputs, such models do not account for the subtleties of full employment and capital ownership noted here. As a consequence, it is not clear if economic impact estimates based on them are biased up or down.

The potential shortcomings for calculating the multiplier values described above applies to the uncustomized versions of the most recent U.S. Department of Commerce's Regional Input-Output System (RIMS II) which is a popular tool used by forecasters. Even when the models used to forecast are customized, the possibility remains that essential pieces of information are ignored and the forecast may miss the mark as a consequence. The models constructed by Regional Economic Models, Inc. (REMI) to their credit specify an endogenous labor sector which gives more accurate readings on the employment and wage implications of an "event," but the accuracy of the REMI projection depends on the quality of the model that predicts the future of the regional economy in the absence of an event (control forecast) and the economy's future if the event occurs (alternative forecast). The event's impact is estimated as the difference between the control and alternative forecasts. An *ex post* analysis differs from the REMI approach in that it looks at the economic landscape of a locality or a region before and after an event, and attributes the difference in important economic indicators to the event. The key to the success of this approach is to isolate the event from other changes that may be occurring simultaneously and that may exert a significant impact on the local economy.

As an alternative to estimating the change in expenditures and associated changes in economic

activity, those who provide goods and services directly in accommodating the event could be asked how their activity has been altered by the event. In summarizing the efficacy of this technique Davidson opined:

> The biggest problem with this producer approach is that these business managers must be able to estimate how much "extra" spending was caused by the sport event. This requires that each proprietor have a model of what would have happened during that time period had the sport event not taken place. This is an extreme requirement which severely limits this technique (Davidson, 1999).

An expenditure approach to projecting the economic impact of mega-events is likely to yield the most accurate estimates. Do the estimates on the economic impact of the Olympic Games hosted by Los Angeles in 1984 and Atlanta in 1996 conform to *ex ante* estimates of the economic impact these mega-events on their host cities? In the next section of the paper, the model that is used to develop after-the fact estimates is detailed.

The Model

As noted above, to provide credible estimates on the economic impact of a mega-event, an *ex post* model must account for the impact of other changes in an economy that occur in concert with the event. Since a mega-event's impact is likely to be small relative to the overall economy, isolating the event's impact is not a trivial task. On the other hand, there is evidence to suggest that estimates of direct and indirect expenditures that are induced by sports and mega-events are exaggerated in prospective studies. This is so in part because estimating net spending changes as a consequence of an event requires information not only on how people attending the event consume, but how residents of

the city not attending the event alter their consumption as well. More generally speaking, there are details with respect to dollar inflows and outflows as a consequence of an event that cannot be easily or fully anticipated. Furthermore, *ex ante* studies in general ignore opportunity costs. The model that we have constructed has been inspired by a recognition of the challenges and deficiencies common to both *ex ante* and *ex post* analyses.

In constructing a model to estimate the impact an event has had on a city, several approaches are possible and suggested by past scholarly work. Previous models used to explain metropolitan economic growth have been summarized by Mills and McDonald (1992). They identified five theories: export base, neoclassical growth, product cycle, cumulative causation, and disequilibrium dynamic adjustment. All these theories seek to explain growth through changes in key economic variables in the short-run (export base and neoclassical) or the identification of long-term developments that affect metropolitan economies in hypothetical ways (product cycle, cumulative causation, and disequilibrium dynamic adjustment). Our task is not to replicate explanations of metropolitan economic growth, but to use past work to help identify how much growth in metropolitan employment is attributable to the Summer Olympic Games. To this end we have selected explanatory variables from past models to help establish what employment would have been in the absence of the Olympics. We then compare that estimate to actual employment levels to estimate the contribution of the Games. The success of this approach depends on our ability to identify those variables that explain the majority of observed variation in growth in employment in those cities that have hosted the Summer Olympic Games.

To isolate the mega-event's impact, both external and internal factors need to be considered. External factors might include, for example, a relocation of people and economic activity from the

"rust/frost belt" to the "sun belt," changes in the disposition of the federal government toward revenue sharing, and changes in the demographic character of urban America. Internal factors might include a change in the attitude of local politicians toward fiscal intervention, a natural disaster, or unusual demographic changes. One technique would be to carefully review the history of cities in general and particular and incorporate each potentially significant change into a model. An alternative is to represent a statistic for a city for a particular year as a deviation from the average value for that statistic for cohort cities for that year. Such a representation over time will in effect "factor out" general urban trends and developments. For example, if we identify a particular city's growth in employment as 10 percent over time, but cities in general are growing by 5 percent, then we would conclude that this city's pattern deviates from the norm by 5 percent. It is the 5 percent deviation that requires explanation and not the whole 10 percent for our purposes in this study.[5]

In modeling those factors that are unique to individual cities, it is helpful to identify some conceptual deficiencies characterizing the demand side of *ex ante* and *ex post* models that exaggerated economic impact estimates. Many prospective economic impact studies, particularly those that are older, fail to make a distinction between gross and net spending changes that occur as a consequence of hosting a mega-event. In *ex post* studies failure to factor out the city's own secular growth path could embellish an estimate of the contribution of the Olympic Games. *Ex ante* studies even in very

[5] It should be remembered that our intent here is not to focus on what accounts for all growth in cities. Rather our task is to determine how much a mega-event contributes to a city's economy. It is true that trend-adjusting does not provide any economic insight about those factors responsible for metropolitan growth, but adjusting for trends enables us to focus attention on a smaller component of growth for a city which a mega-event may help explain.

sophisticated forms are based usually on the premise that important economic relationships remain unchanged. It is, after all, historical experiences that defines the statistics upon which prospective impact estimates are based. However, if the event is significant in a statistical sense, will not the event modify historical experience? We cannot claim a significant impact, and at the same time claim that history will be unaltered. Our model, therefore, in various ways "factors out" the city's historical experience. To continue with our example from above, if history tells us that a city that experiences a growth in employment that is 5 percent above the national average, before and after a mega-event, then it would be misguided to attribute that additional 5 percent to the mega-event. If after the event, the city continued to exhibit employment increases 5 percent above the national norm, the logical conclusion is that the mega-event simply supplanted other economic developments that contributed to the city's above-average rate of growth. It will be particularly interesting to see if rates of employment growth forecast for Los Angeles and Atlanta approximate what an *ex post* model not adjusted for a city's secular growth path would conclude.

The alternative to the technique outlined to this point, would be to carefully review the history of cities in general and particular, and explicitly incorporate each potentially significant change into the model. This technique has practical limitations to which past studies attest. Economists who have sought to explain growth using this technique have followed traditional prescriptions, and have developed demand- or supply-centered models through which to explain growth.[6] Some scholars have

[6] To assess the relationships between costs and growth see: Mills and Lubuele (1995), Terkla and Doeringer (1991), and Goss and Phillips (1994).

combined both demand and supply arguments.[7] Both supply and demand models have strong theoretical underpinnings. Those who utilize a demand approach with some version of employment as the independent variable base their theory on the notion that the demand for labor is ultimately derived from the demand for goods and services. Those who favor a supply approach would argue that cost factors are the most critical in explaining employment in a metropolitan statistical area (MSA) or region.

Given the number and variety of variables found in regional growth models and the inconsistency of findings with regard to coefficient size and significance, criticisms of any single model could logically focus on the problems posed by omitted variables. Any critic, of course, can claim that a particular regression suffers from omitted-variable bias, it is far more challenging to address the problems posed by not including key variables in the analysis. In explaining regional or metropolitan growth patterns, at least some of the omitted variable problem can be addressed through a careful specification of the dependent variable. As noted above, representing relevant variables as deviations from city norms, leaves the scholar a more manageable task, namely that of identifying those factors that explain city growth after accounting for the impact of those forces that generally have affected regional or MSA growth. For example, a variable is not needed to represent the implications of federal revenue sharing, if such a change affected cities in ways proportionate to changes in demographic characteristics, e.g. population, used to calibrate the size of the revenue change for any particular city. Of course instead of representing the MSA dependent variable as a deviation from a national mean and its own secular growth path, a national mean and the MSA's growth path can be represented as

[7] See, for example, Duffy (1994) and Wasylenko (1985).

independent variables. In fact, we chose to represent the mean rate of employment growth for MSAs and the city's growth path for employment for the previous three years as independent variables.

Following the same logic, independent variables should also be normalized, that is represented as a deviation from an average value for MSAs or as a fraction of the MSA average. It is important, for example, to model the fact that relocating a business could occur as a consequence of wages increasing in the MSA under study or a slower rate of wage growth in other MSAs. What matters is not the absolute level of wages in city i, but city i's wage relative to that of its competitors. What we propose, therefore, is an equation for explaining metropolitan employment growth which incorporates those variables that the literature identifies as important, but specified in such a way that those factors common to MSAs are implicitly included.

The purpose of *ex ante* studies is to provide a measure of the net benefits a project or event is likely to yield. To our knowledge there is no prospective model that has the capacity for measuring the net benefits of a project relative to the next best alternative use of those funds. If we assume that the best use of funds has always occurred prior to a mega-event, then the growth path observed for a city can be construed as optimal. If this "optimal growth path," identified by the city's secular growth trend, decreases after the mega-event occurs, then the evidence does not support the hypothesis that a publicly subsidized mega-event put those public monies to the best use. A negative or even insignificant coefficient for the Olympics variable is *prima facie* evidence that the mega-event is less than optimal.

Our particular focus in this study is to assess changes in employment in Los Angeles and Atlanta that were attributable to their hosting of the Summer Olympic Games in 1984 and 1996, respectively. Equation (1) represents the model used to predict changes in employment.

$$(1)\qquad MN_t^i = \$_0 + \$_1 \sum_{i=1}^{n} \frac{MN_t^i}{n_t} + \$_2 MN_{t-1}^i + \$_3 MN_{t-2}^i + \$_4 MN_{t-3}^i + \$_5 Pop_t^i + \$_6 y_t^i + \$_7 W_t^i + \$_8 T_t^i + \$_5 OB_t^i + \$_5 REG_t^i + \$_5 SOG_t^i + \$_5 MSA_t^i + \$_5 TR_t^i + ,$$

Where for each time period t,

MN_t^i = % change in employment in the ith metropolitan statistical area (MSA),
n_t = number of cities in the sample,
Pop_t^i = log of the population of the ith MSA,
y_t^i = real per capita personal income in the ith MSA as a percentage of the average for all cities in the sample,
W_t^i = nominal wages in the ith MSA as a percentage of the average for all cities in the sample,
T_t^i = state and local taxes in the ith MSA as a percentage of the average for all cities in the sample,
OB_t^i = a dummy variable for oil boom and bust cycles for selected cities and years,
REG_t^i = dummy variables for eight geographical regions within the United States,
SOG_t^i = dummy variable for the Summer Olympic Games,
MSA_t^i = dummy variable for ith MSA,
TR_t^i = annual trend,
$,$ = stochastic error.

For the purposes of our analysis the variables are specified as percentage changes unless otherwise indicated, and the functional form is linear in all the variables included in Equation (1).

As mentioned previously, rather than specifying all the variables that may explain metropolitan growth, we attempted to simplify the task by including independent variables that are common to cities in general and the ith MSA in particular. In effect we have devised a structure that attempts to identify the extent to which the deviations from the growth path of cities in general ($\sum MN_t^i/n_t$) and city i's

secular growth path (MN^i_{t-1}, MN^i_{t-2}, and MN^i_{t-3})[8] are attributable to deviations in certain costs of production (wages and taxes), demand related factors (population, real per capita personal income), dummy variables for the oil boom/bust cycle and the region in which the MSA is located, and the presence of the Summer Olympic Games. If the Olympic Games dummy variable emerges as significant, then we intended to use the value of the coefficient to estimate the employment effect of the Games directly. Since the coefficient did not emerge as significant,[9] equation (1) was used to predict the growth path for employment, and this predicted value was compared to the actual growth in employment to formulate a conclusion with regard to the effect the Games had on employment in Los Angeles in 1984 and Atlanta in 1996. Of course, the credibility of this procedure depends on a robust equation for predicting employment growth.

Relative values of population, real per capita personal income, wages, and tax burdens are all expected to help explain a city's growth rate in employment as it deviates from the national norm and its own secular growth path. As mentioned above, past research has not produced consistency with respect to the signs and significance of these independent variables. Some of the inconsistency can be attributable to an inability to separate cause and effect. For example, we would expect higher relative wages over time to reduce the rate at which employment is growing in an MSA relative to other cities.

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[8] Growth rates for employment in the three previous years was used to account for estimation problems created by a single aberrant year that could occur for a variety of reasons to include a natural disaster or a change in political parties with accompanying changes in fiscal strategies. Technically speaking the model was more robust with this specification, and the values for the cross correlation coefficients did not suggest a multicolinearity problem.

[9] We estimated that the Summer Olympic Games would have to induce an increase of approximately 70,000 jobs in Atlanta to surface as statistically significant.

That would be true, *ceterus paribus*, if wages determined employment. If, however, high rates of employment increased an MSA's wage relative to that of other cities, it may be that the opposite sign emerges. We do not have as a consequence *a priori* expectations with regard to the signs of the coefficients. That should not be construed as an absence of theory about key economic relationships. As noted earlier, we included those variables that previous scholarly work found important.

Fifty-seven cities constituted our sample, representing all MSAs that were among the fifty largest by population in the United States in either 1969 to 1997. The cities and years for which we had data are identified in the appendix to this report. A bibliography of data sources appears in the general bibliography which follows the conclusions and policy implications.

Results

The results from the regressions run for equation 1 with Atlanta and Los Angeles included are recorded in Tables 1 and 2, respectively. The t-statistics are represented in the parentheses following the coefficient estimates.

TABLE 1

Regression Results for Pooled MSA Data With Atlanta Included

Statistic/Value[a]	Coefficient Values and (t-statistics)
b_0 (constant)	-.436 (-3.91)*
b_1 ($MN_t^i / E\ MN_t^i / n_t$)	.883 (32.78)*
b_2 (MN_t^i / MN_{t-1}^i)	.379 (17.64)*
b_3 (MN_t^i / MN_{t-2}^i)	-.113 (-4.84)*
b_4 (MN_t^i / MN_{t-3}^i)	.127 (6.77)*
b_5 (MN_t^i / Pop_t^i)	-.0089 (-5.27)*
b_6 (MN_t^i / y_t^i)	.000736 (.21)
b_7 (MN_t^i / W_t^i)	-.0084 (-2.17)**
b_8 (MN_t^i / T_t^i)	.0054 (1.58)
b_9 (MN_t^i / OB_t^i)	.0183 (8.27)*
b_{10} (MN_t^i / REG_t^i)[a]	-.006 (-3.69)*
b_{11} (MN_t^i / SOG_t^i)	N.A.
b_{12} (MN_t^i /Atlanta)	.0075(2.38)*
b_{13} (MN_t^i / TR_t^i)	.00025 (4.417)*
R^2	.707
Adjusted R^2	.703
F-statistic	184.92*
Durbin-Watson	1.83[b]

[a] k-1 of the regions identified for the United States by the Department of Commerce were represented by a dummy variable. Those regions include: New England, Mideast, Great Lakes, Plains, Southeast, Southwest, and Rocky Mountain. The West region served as the residual. Therefore, each of the regional coefficients identifies the extent to which the particular regional growth in employment differs from the West region. Values for other regional coefficients were calculated and used to estimate employment growth. Atlanta is located in the Southeast region, and only the value for that coefficient

for that regional dummy was recorded in this table. Since our sample included eight other MSAs in the Southeast region, the coefficient recorded for the dummy variable for Atlanta identifies how it is that Atlanta's growth in employment varies from that of other MSAs in the Southeast region. Given the presence of other cities in the Southeast region in the sample, the dummy variables for the Southeast region and Atlanta are not identical.

[b] Inconclusive region.

* Result was significant at the 99% level.

** Result was significant at the 95% level.

TABLE 2

Regression Results for Pooled MSA Data With Los Angeles Included

Statistic/Value[a]	Coefficient Values and (t-statistics)
b_0 (constant)	-.422 (-3.78)*
b_1 ($MN_t^i / E\ MN_t^i / n_t$)	.88 (32.79)*
b_2 (MN_t^i / MN_{t-1}^i)	.379 (17.63)*
b_3 (MN_t^i / MN_{t-2}^i)	-.112 (-4.84)*
b_4 (MN_t^i / MN_{t-3}^i)	.127 (6.74)*
b_5 (MN_t^i / Pop_t^i)	-.0065 (-3.62)*
b_6 (MN_t^i / y_t^i)	-.0006 (-.18)
b_7 (MN_t^i / W_t^i)	-.009 (-2.3)**
b_8 (MN_t^i / T_t^i)	.0048 (1.41)
b_9 (MN_t^i / OB_t^i)	.0184 (8.29)*
b_{10} (MN_t^i / REG_t^i)[a]	-.003 (-1.34)*
b_{11} (MN_t^i / SOG_t^i)	N.A.
b_{12} (MN_t^i /Los Angeles)	-.00879 (-2.62)*
b_{13} (MN_t^i / TR_t^i)	.00025 (4.417)*
R^2	.707
Adjusted R^2	.703
F-statistic	185.13*
Durbin-Watson	1.809[b]

[a] See the corresponding note for Table 1. The regional coefficient recorded in this table is for the Rocky Mountain region, and it estimates the extent to which growth in the Rocky Mountain region differs from that in the West region. Once again the West region was used as the numeraire.
[b] Inconclusive region.

The F-statistic indicates that the equation for both Atlanta and Los Angeles was significant at

the 1% level, indicating that the model is robust. The adjusted correlation coefficients indicate that equation (1) "explains" approximately 70% of the variation in employment growth rates. The population and wage variables were significant at the 95% level or better while the real per capita income and tax variables were not statistically significant. The signs of the population and wage variables are reasonable. That is, it is not unreasonable to expect that large cities would exhibit slower rates of employment growth than smaller cities, and cities for which money wages are high could be expected to exhibit slower rates of employment growth.

The estimated coefficients for the Summer Olympic Games variable did not emerge as statistically significant in either Los Angeles or Atlanta, and as a result the impact of the Summer Olympic Games could not be directly estimated using the value of the coefficient for the dummy variable representing the Games. The technique used to estimate employment gains attributable to the Summer Olympic Games involved estimating the employment growth path using equation (1) and comparing the predicted values in employment growth to the actual gains in employment. The difference between the predicted and actual employment figures represented an estimate of the employment gains induced by the Summer Olympic Games in Atlanta and Los Angeles. In the case of Atlanta, this estimate is likely to be generous since not all the employment gains can be attributed to the Olympics in a city that grew faster on average than cities in the region and the country. Using this technique, the estimates on employment gains for Atlanta and Los Angeles are represented in Tables 3 and 4, respectively.

TABLE 3

Employment Gains for Atlanta Attributable to the 1996 Summer Olympic Games

Model[a]	**Employment Gains (Losses)**
Model 1	3,467
Model 2	21,767
Model 3	42,448

[a] The models are distinguished according to the manner in which the growth path for employment was specified. In particular the growth path for employment could be calculated to include 1994 and 1995 observed growth in employment. Since it is likely that employment growth in 1994 and 1995 did reflect elevated expenditure levels as a consequence of investments in infrastructure by the Atlanta Committee for the Olympic Games (ACOG), the 1996 estimate for employment growth was less likely to show a substantial increase in job growth above the high levels that characterized 1994 and 1995. Since it is unclear when the infrastructure investments and other direct expenditures in conjunction with the Olympics occurred and exerted an impact on the Atlanta economy, we have specified three models. Model one assumes that most of the direct, indirect, and induced expenditures occurred in 1996. Model two estimates job growth using a growth path for employment that includes 1994, and, therefore, measures the impact of the Olympics on job growth for 1995 and 1996 beyond that expected based on equation (1) estimated through 1994. Model 3 differs from model 2 in that the contribution of the Olympics to employment growth is measured using an estimate for equation (1) that includes the sample period through 1993. The evidence suggests that the bulk of expenditures for the Olympic Games for Atlanta occurred between 1994 through 1996. This assertion is based on the breakdown of expenditures into direct, indirect and induced categories identified in the study commissioned by the AOCG by Humphreys and Plummer (1995). Humphreys and Plummer define indirect economic expenditures as "that portion of spending by out-of-state visitors that purchases goods and services produced by Georgia's industries to satisfy the additional demand." Since Humphreys and Plummer estimate that more than 50 percent of total spending is indirect, then the majority of job growth is attributable to spending that occurred for the most part in 1996. Nonetheless, there is an argument that can be made for using any of the three models that we have specified here even though the Humphreys and Plummer estimates on economic impact are based on Olympic expenditures from 1991-1997.

TABLE 4

Employment Gains for Los Angeles Attributable to the 1984 Summer Olympic Games

Model[a]	**Employment Gains (Losses)**
Model 1	5,043

[a] The only model specified for Los Angeles theoretically corresponds to model 1 in Table 3. Since the infrastructure for the 1984 games in Los Angeles was largely in place and substantial government expenditures by The State of California or the City of Los Angeles were not undertaken in support of the Olympic Games, the expenditure boost provided by the Games was felt primarily, if not exclusively, in the year in which the games were conducted.

As the evidence recorded in Tables 3 and 4 makes clear, the job implications for the Los Angeles and Atlanta Summer Olympic Games were fundamentally different. We attribute the difference to the fact that The City of Atlanta and the State of Georgia spent enormous sums of money on infrastructure for the 1996 Games while the City of Los Angeles and the State of California were miserly by comparison. The infrastructure expenditures for Atlanta as far as we can determine were substantial in 1994 and 1995 although there was some spending in conjunction with the Olympics beginning in 1991. Los Angeles, by contrast, did not spend a substantial amount prior to their Games, and the expenditure boost was largely confined to 1984. The employment impact, therefore, appears to have been felt only in 1984.

In the case of Atlanta, it is not entirely clear when the infrastructure and other preliminary Olympic expenditures occurred and influenced the economy. As a consequence we calculated job growth estimates for three possibilities or models (see the note following Table 3) which took into account accelerated employment growth attributable to pre-Olympic spending. Specifically if the

employment growth was recalculated to account for an accelerated rate of job growth beginning in 1994 induced by substantial preparatory expenditures beginning in that year, i.e., model 3, we estimated the Summer Olympic Games in 1996 generated cumulative job growth in 1994-96 of 42,448 full- and part-time jobs. On the other hand if preparatory expenditures were not substantial enough to accelerate job growth until 1995, i.e., model 2, we estimate that the Atlanta Olympics created 21,767 full- and part-time jobs. Finally, if expenditures were not substantial until 1996, then the Atlanta Olympics accounted for only 3,467 jobs. Models 1 and 3, therefore, represent upper- and lower-bound estimates on job growth induced by the 1996 Summer Olympic Games hosted by Atlanta, Georgia.

The model 3 estimate conforms in order of magnitude to job growth estimates provided by Humphreys and Plummer (1995) who projected that the Olympics would create approximately 77,000 new jobs in the State of Georgia with 37,000 of those materializing in Atlanta.[10] It must be kept in mind, however, that the 42,448 estimate tacitly assumes that all job growth that falls outside the pattern established before 1994 is attributable to the Olympics. Technically speaking, in estimating the cumulative employment impact of all the spending that occurred in conjunction with Olympics, we have

[10] Humphreys and Plummer estimate that the increase in jobs throughout the State of Georgia as a consequence of the Olympics is proportionate to the fraction of the state's population in any particular locale. Since approxiamtely 48% of the State's population resides in Atlanta, then 48% of the estimated increase of 77,000 jobs in the State will be based in Atlanta. This manner of allocating job gains across the State seems inappropriate in light of the fact that arguably more than 48% of the Olympic expenditures occurred in Atlanta and environs. A more reasonable estimate of Atlanta's job growth should be based on the fraction of expenditures occurring in the metropolitan area. This would surely yield an estimate of more than 37,000 jobs in Atlanta even after taking into account the multiplier effect which, of course, expands with the area of analysis.

factored out all the job growth from other sources in 1994 and 1995. It would appear, as a consequence, that the 42,448 is an estimate that casts the Olympics in the most favorable light by attributing all incremental job growth to the 1996 Summer Games. It is arguable that Atlanta's job growth accelerated more rapidly in 1994 in concert with the business cycle. Employment figures for 1991-93 suggest that Atlanta's recovery from the nation's recession that ended in the spring of 1991 did not seem to gather much momentum until 1993. The Olympics is, therefore, credited with job creation that should be attributed to other developments and events.[11]

Those who championed public subsidies for the Atlanta Olympics contend that the impact of the Games endures. Our evidence, however, indicates that the Olympic legacy is likely to be small. In other words, the evidence suggests that the economic impact of the Olympics is transitory, one-time changes rather than a "steady state" change. This outcome is likely to be true unless great care is taken to insure that the Olympic infrastructure is compatible with the resident economy. If the infrastructure for the Games lacks synergy, or worse, if it displaces or competes with resident or established capital and labor, then the job gains are likely to be short-lived. Job growth estimates for 1997 derived through adjusting the model to reflect the higher rates of job growth induced by the Olympics indicate that between 17,706 and 32,768 jobs were "given back." In other words, at least 40% (and perhaps more) of the jobs were transitory. The City of Atlanta and the State of Georgia spent approximately

[11] There is some evidence to support the fact that Atlanta's accelerating growth in employment was attributable to factors other than the Olympics. This possibility is supported ironically by Humphreys. He was part of a three-person team that performed an analysis on the impact of the 1994 Superbowl hosted by Atlanta, and they estimated that the Superbowl was responsible for 1,974 and 2,736 jobs in the City of Atlanta and the State of Georgia, respectively (Humphreys et al, 1993 and Humphreys, 1994).

$1.58 billion[12] to create 24,742 permanent full- or part-time jobs in the best case scenario (model 3) which averages out to $63,860 per job created.[13] It is conceivable that once opportunity costs are considered and the possibility that Olympic venues could compete for limited leisure dollars, the Olympics could actually generate a cumulative long-term job loss. Indeed models 1 and 2 indicate a loss of jobs long-term of 29,301 and 4,540, respectively. These estimates would be credible if for some reason the growth in jobs in 1994 or 1995 was not the result of spending undertaken in conjunction with the Olympics games. This should sound a warning to potential host cities particularly since Atlanta did appear to recognize the need for utilize Olympic infrastructure in meaningful ways after the Games. Recognizing the need for synergy is no guarantee that the plan which it inspires will be free of misconceptions and successful. For example a significant amount of the Olympic infrastructure expense, 71 percent of the new construction budget and 12 percent of total ACOG expenditures, was devoted to the Olympic stadium which became Turner Field, the home of the Atlanta Braves, a Major League Baseball (MLB) team. Turner Field changed the baseball venue, but did it add anything that generates net new spending and permanent jobs? There is ample evidence to indicate that new

[12] See Humphreys and Plummer (1995), p.41.

[13] It is important to note that these are not figures per person-year or full-time employment. To estimate that would require a breakdown of part-time and full-time jobs. To our knowledge no such breakdown exits. To provide some context, it has been estimated that the Local Public Works Capital Development and Investment Act of 1976 (LPW I) and the Local Public Works Capital Employmnet Act of 1977 (LPW II) created direct and indirect jobs at an average cost of $37,000 for a person-year (Hall, 1980). If the cost of creating those jobs doubled between 1980 and 1996, the average cost per person-year would be $74,000 or roughly the same magnitude as the cost of creating a combination of part-time and full-time jobs through Atlanta's hosting of the Summer Olympic Games.

stadiums add little if anything to a metropolitan economy.[14]

Other evidence on the nature of ACOG expenditures invites skepticism about a substantial Olympic economic legacy. Only 31 percent of the ACOG expenditures were in areas that could reasonably be expected to provide a measurable economic legacy. To be more precise, $485 million was spent on "new construction," "electric and electronic," "transportation," and "communication." By contrast wage and salary disbursements ("Households") and "business services" accounted for $740.5 million or 47 percent of the ACOG expenditures (Humphreys and Plummer, 1995).

Furthermore, recent studies on metropolitan growth have emphasized the importance of sectoral clustering. Mills observed:

> At one level, the issue (metropolitan growth) can be stated simply. Many studies have found that similar sectors tend to cluster together in metropolitan areas...find that localization economies are more important than urbanization economies. That means that growth of employment within a sector tends to depend more on the size of the sector than on the size of the metropolitan area. I interpret the strong findings about localization to be findings about the importance of clustering among related but not identical sectors (Mills, 1992).

The Olympics arguably do not generate the sort of clustering that is characteristic of high growth areas. To a significant degree the Olympics represents an alien industry, one that does not connect or mesh well with established businesses. In addition to the Oympic Stadium (Turner Field), the ACOG created an International Horse Park of 1,400 acres, spent $17 million on the Wolf Creek Shooting Complex, and another $10 million on the Lake Lanier Rowing Center. These facilities may be unique, but explanations are required for how these rather esoteric developments fit with other industries and

[14] See for example Baade (1996) and several articles in Noll and Zimbalist (1997).

contribute to the economies of scale arguments that underlie, at least in part, the sectoral clustering, cumulative causation and disequilibrium dynamic adjustment models that represent contemporary explanations for the rapid growth we observe in some MSAs to include Atlanta. Indeed, to the extent that the Olympics are quite alien and divert the MSA from a higher growth path, the Summer Olympic Games could contribute negatively to job growth. This, in all likelihood explains the negative job growth outcomes of models 1 and 2 for Atlanta for 1997.

We estimate that the Summer Olympic Games contributed 5,043 jobs to the Los Angeles economy in 1984. The empirical evidence indicates that the jobs were clearly transitory. Our model fails to reveal any net job gains in 1985 and beyond as a consequence of the Olympic Games. This outcome is probably attributable to the fact there was no significant investment in infrastructure in conjunction with the Games.

Conclusions and Policy Implications

The purpose of this paper was to assess the economic impact of the Summer Olympic Games on Los Angeles in 1984 and Atlanta in 1996. In so doing, it was our hope that we could provide some useful information to cities bidding for the Games. It is conceivable that an after-the-fact sober appraisal of the economic contribution of the Games could help temper some of the excesses that have been brought to light by the well-publicized "overzealous" behavior of those who succeeded in bringing the Olympics to Salt Lake City and Atlanta.

Los Angeles and Atlanta represent an interesting contrast in terms of their approaches to the

bidding process. This difference reflects to a substantial extent past financial experiences. In the wake of the financially troubled Montreal and Moscow Olympic Games in 1976 and 1980, only Los Angeles bid for the 1984 Games. This fact explains the absence of significant public sector financial support in Los Angeles, and, perhaps, the private financial success the 1984 Games are thought to have enjoyed. The increase in economic activity attributable to the 1984 Games, as represented by job growth, an estimated 5,043 full-time and part-time jobs using our model, appears to have been entirely transitory, however. There is no economic residue that can be identified once the Games left town. Los Angeles was not visibly affected by the experience; certainly it was not transformed by it.

Atlanta represented a return to the extraordinary levels of public spending associated with the Olympic Games in 1976 and 1980, a phenomenon not coincidentally associated with several cities bidding for the right to host the Games. In an environment where bidding is intense among a number of cities, economic theory would suggest that the winning bid would be consonant with a zero economic return on the investment if opportunity costs are included in the bidding calculus. The Summer Olympic Games, however, are not ordinary investments, given their substantial political content, and we could expect negative returns on the economic investment as a consequence. In other words government is willing to pay something for perceived political gains. In light of this, it is not surprising that the best case scenario for the Atlanta Games of 1996 is consistent with what we could reasonably expect to find for public investments in general. More specifically if beginning in 1994 all the economic growth beyond Atlanta's normal experience could be attributable to public expenditures in conjunction with the Olympics, Atlanta spent approximately $63,000 to create a permanent full- or part-time job. To create a permanent full-time job equivalent, past public works programs have spent approximately the same

amount of money. It needs to be remembered, however, that the $63,000 job creation figure for Atlanta applies to part-time as well as full-time employment. The statistics on job growth for Atlanta, therefore, do not permit the development of a statistic that is comparable to the cost of what amounts to full-time job creation through the implementation of the Local Public Works Capital Development and Investment Act of 1976 (LPW I) and the Local Public Works Capital Employment Act of 1977 (LPW II).

The best-case scenario does not necessarily equate with that which is most likely to occur. There are compelling reasons to expect that Atlanta's experience deviated with that we identified as the best case. One reason has to do with the fact that the business cycle for Atlanta and the United States in general are not in perfect harmony. Atlanta's recovery from the national recession that ended in the spring of 1991 was tardy. Employment statistics for Atlanta indicate that 1994, the year in which our model began to account for the impact of substantial ACOG spending, was still relatively early in the recovery phase of Atlanta's business cycle. Of course one could argue that is suggestive of the potency of ACOG spending, but there are theoretical reasons to suspect otherwise.

Contemporary theory that attempts to explain metropolitan economic development emphasizes the economies of scale imparted by sectoral clustering or specialization of particular industries within an urban economy. The Olympics industry is by its very nature exceptional in terms of terms of its infrequency and the particular and immediate demands it makes on a host economy. Rather than fitting in, the host economy has to make changes to accommodate the event. This hurricane of economy activity can have a permanent impact only to the extent that its infrastructure demands translate into permanent uses that build on resident capital and labor rather than substituting for them. Atlanta

worked hard to create the necessary synergy, but the Olympics may well represent an industry that emphasizes infrastructure that is infrequently or incompletely utilized. There are limited uses for shooting ranges and sports stadiums. Diverting scarce capital and other resources from more productive uses to the Olympics very likely translates into slower rates of economic growth than that which could be realized in the absence of hosting the Olympic Games. Our other scenarios for Atlanta indicate job gains during the Olympics, but long-term job losses. The outcomes of the scenarios that we have identified as models 1 and 2 for Atlanta seem more likely.

In considering the policy implications of our research, consider first the collective interests of cities. If cities are intent on hosting the Olympic Games they must do the obvious, that is they must take steps to counteract the monopoly power of the IOC. It is in the collective interest of potential host cities to devise means to change the nature of the bidding process. The Los Angeles experience is instructive because in the absence of cities competing with one another, Los Angeles and the IOC were on roughly equal footing in negotiating the financial terms of the Games. As a consequence Los Angeles experienced short-term job gains without jeopardizing their economic future. Los Angeles got from the Olympics what they were capable of providing. Stated somewhat differently, they got that for which they paid. The revamping of rules regarding gifts to IOC members is an obvious way in which cities have recognized their shared interests and prevented the IOC from exercising their monopoly prerogatives. One obvious suggestion is to do away with the current arrangement where IOC officials visit suitor cities. Replace the raucous, open bidding process that currently exists with a single "sealed bid" complete with details on the city's capability of effectively hosting an event of this size.

Where individual cities are concerned, they must be realistic about what the Olympics offer

economically. Thorough investigations of past experiences will not only provide a filter through which the promises of boosters can be run, but it might well indicate the most effective methods for integrating Olympic infrastructure needs with the present economy and a vision of its future. In the absence of careful and directed planning, cities that succeed in hosting the Olympics may well only find fools' gold for their efforts.

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APPENDIX

TABLE A.1
Cities and years used to estimate model in Table 1 and 2

City Name	1969 Population	1969 Rank	1997 Population	1997 Rank	Wage Data availability	Region
Albany, NY	797,010	50	873,856	57	1969-1997	Mideast
Atlanta, GA	1,742,220	16	3,634,245	9	1972-1997	Southeast
Baltimore, MD	2,072,804	12	2,475,952	18	1972-1997	Mideast
Bergen, NJ	1,354,671	26	1,335,665	43	1969-1997	Mideast
					(State data 1969-1997)	
Boston, MA	5,182,413	4	5,826,816	4	1972-1997	New England
Buffalo, NY	1,344,024	27	1,163,149	47	1969-1997	Mideast
					(Average of cities)	
Charlotte, NC	819,691	49	1,351,675	42	1972-1997	Southeast
Chicago, IL	7,041,834	2	7,883,452	3	1972-1997	Great Lakes
Cincinnati, OH	1,431,316	21	1,607,001	32	1969-1997	Great Lakes
Cleveland, OH	2,402,527	11	2,227,495	22	1969-1997	Great Lakes
Columbus, OH	1,104,257	33	1,456,440	41	1972-1997	Great Lakes
Dallas, TX	1,576,589	18	3,123,013	10	1972-1997	Southwest
Dayton, OH	963,574	42	952,060	55	1969-1997	Great Lakes
Denver, CO	1,089,416	34	1,901,927	26	1977-1997	Rocky Mountains
Detroit, MI	4,476,558	6	4,468,503	7	1976-1997	Great Lakes
Fort Lauderdale, FL	595,651	55	1,472,927	38	1969-1997	Southeast
					(State data 1988-1997)	
Fort Worth, TX	766,903	51	1,554,768	33	1976-1997	Southwest
					(State data 1976-1983)	
Greensboro, NC	829,797	48	1,153,447	48	1972-1997	Southeast
Hartford, CT	1,021,033	39	1,106,695	50	1969-1997	New England
Houston, TX	1,872,148	15	3,846,996	8	1972-1997	Southwest
Indianapolis, IN	1,229,904	30	1,504,451	36	1989-1997	Great Lakes
Kansas City, MO	1,365,715	25	1,716,818	28	1972-1997	Plains
Las Vegas, NV	297,628	57	1,262,427	45	1972-1997	Far West
Los Angeles, CA	6,989,910	3	9,116,506	1	1969-1997	Far West
					(State data 1982-1987)	
Louisville, KY	893,311	43	994,537	54	1972-1997	Southeast
Memphis, TN	848,113	45	1,082,526	53	1972-1997	Southeast
Miami, FL	1,249,884	29	2,128,987	24	1969-1997	Southeast
					(State data 1988-1997)	
Middlesex, NJ	836,616	47	1,105,804	51	1969-1997	Mideast
					(State data 1969-1997)	
Milwaukee, WI	1,395,326	23	1,459,760	40	1969-1997	Great Lakes
Minneapolis, MN	1,991,610	13	2,794,939	13	1972-1997	Plains
Nashville, TN	689,753	53	1,136,607	49	1972-1997	Southeast
Nassau, NY	2,516,514	9	2,660,623	16	1969-1997	Mideast
New Haven, CT	1,527,930	19	1,626,327	30	1969-1997	New England
					(Average of cities)	
New Orleans, LA	1,134,406	31	1,308,127	44	1972-1997	Southeast
New York, NY	9,024,022	1	8,650,425	2	1969-1997	Mideast

Newark, NJ	1,988,239	14	1,943,455	25	1969-1997 (State data 1969-1997)	Mideast
Norfolk, VA	1,076,672	36	1,544,781	34	1972-1997 (State data 1973-1996)	Southeast
Oakland, CA	1,606,461	17	2,273,911	21	1969-1997 (State data 1969-1987)	Far West
Orange County, CA	1,376,796	24	2,663,561	15	1969-1997 (State data 1982-1987)	Far West
Orlando, FL	510,189	56	1,462,958	39	1972-1997 (State data 1988-1997)	Southeast
Philadelphia, PA	4,829,078	5	4,939,783	5	1972-1997	Mideast
Phoenix, AZ	1,013,400	40	2,842,030	12	1972-1997 (State data 1972-1987)	Southwest
Pittsburgh, PA	2,683,385	8	2,359,824	19	1972-1997	Mideast
Portland, OR	1,064,099	37	1,789,790	27	1972-1997	Far West
Providence, RI	839,909	46	904,301	56	1969-1997	New England
Riverside, CA	1,122,165	32	3,047,741	11	1969-1997 (State data 1982-1987)	Far West
Rochester, NY	1,005,722	41	1,084,215	52	1969-1997	Mideast
Sacramento, CA	737,534	52	1,503,900	37	1969-1997 (State data 1982-1987)	Far West
St. Louis, MO	2,412,381	10	2,559,065	17	1972-1997	Plains
Salt Lake City, UT	677,500	54	1,250,854	46	1972-1997	Rocky Mountains
San Antonio, TX	892,602	44	1,506,573	35	1972-1997	Southwest
San Diego, CA	1,340,989	28	2,723,711	14	1969-1997 (State data 1982-1987)	Far West
San Francisco, CA	1,482,030	20	1,669,697	29	1969-1997 (State data 1982-1987)	Far West
San Jose, CA	1,033,442	38	1,620,453	31	1972-1997 (State data 1982-1987)	Far West
Seattle, WA	1,430,592	22	2,279,236	20	1972-1997 (State data 1982-1997)	Far West
Tampa, FL	1,082,821	35	2,224,973	23	1972-1997 (State data 1988-1997)	Southeast
Washington, DC	3,150,087	7	4,609,414	6	1972-1997	Southeast

Complete data on population and employment was available for all cities from 1969 to 1997. This implies that data on employment growth and employment growth lagged from 1 to 3 years was available from 1973 to 1997. Tax data was available for all cities from 1970 to 1997, and was obtained from the Tax Foundation in Washington, D.C. Wage data from the Bureau of Labor Statistics was available for cities as described above. When city data was not available, state wage data was used in its place. When possible, the state wage data was adjusted to reflect differences between

existing state wage data and existing city wage data. For MSAs that included several primary cities, the wages of the cities were averaged together to create an MSA wage as noted in Table A.1.

The "Oil Bust" dummy variable was included for cities highly dependent on oil revenues including Dallas, Denver, Fort Worth, Houston, and New Orleans. The variable was set at a value of 1 for boom years, 1974-1976 and 1979-1981, and at -1 for the bust years, 1985-1988. While this formulation does imply that each boom and bust is of an equal magnitude, the variable does have significant explanatory value nonetheless.

Each city was placed in one of eight geographical regions as defined by the Department of Commerce. The region to which each city was assigned is shown in Table A.1. Employment, income, and population data were obtained from the Regional Economic Information System at the University of Virginia which derives its data from the Department of Commerce statistics.