OLYMPIC IMPACTS

Should We Expect an Employment Boom?

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Olympic Impacts: Should We Expect an Employment Boom?

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Olympic Impacts

Should We Expect an Employment Boom?

ON THE VANCOUVER 2010 OLYMPIC BID WEBSITE, the Olympic bid committee claims that hosting the Olympic Winter Games will generate an employment boom. In particular, the committee states, "It is estimated that the activity surrounding a successful Bid will generate up to 244,000 new jobs across industries ranging from architecture to construction to tourism." This report contains a critical evaluation of that claim. The results of the report indicate that the employment numbers presented by the Committee are a huge overstatement of likely impacts.

Even using the numbers from the Economic Impact reports underlying the Committee's claims, the appropriate prediction is much smaller than "244,000 jobs". First, while the Economic Impact report contains the number 244,000, this refers to the combined impact of the Olympics and the Vancouver Convention and Exhibition Centre, which will go ahead without the Olympics and thus should not be counted in any Olympic impacts. Second, this number is based on the most wildly optimistic tourist predictions. Third, the Economic Impact study numbers refer to Person Years (essentially one year of work) not "jobs". If we interpret jobs as employment lasting for a 7 year period spanning the Olympics, then the Person Year numbers should be divided by 7 to obtain an estimated impact in terms of jobs. Taking these corrections together, and using the Impact studies own mid-range tourism impacts, we arrive at a number that is one twentieth or less the size of what the Committee advertises.

Even more importantly, the numbers in the Economic Impact studies represent gross not net effects on employment. Essentially, anyone employed at an Olympic related task is counted as newly employed, even if he or she would have been employed anyway. To try to estimate *net* impacts, I perform a regression analysis of what has actually happened to employment in North American states and provinces that hosted the Winter Olympics in the past. Based on these estimates, I calculate that the Olympics would have a net positive impact of about 10,000 Person Years or about 1,400 7-year jobs. Relative to the approximately 2 million people employed in the BC workforce, this is a trivial addition. Moreover, the estimates suggest that positive impacts will be experienced before and during the Olympic year but will be offset by negative impacts in post-Olympic years because some construction projects that would otherwise have occurred after the Games will have been moved forward in time to meet Olympic needs. The estimates do not suggest a long term employment boom from the Olympics. Ultimately, the results of the analysis indicate claims that the Olympics will generate an employment boom are grossly exaggerated.

Olympic Impacts

Should We Expect an Employment Boom?

Introduction

On the Vancouver 2010 Olympic Bid website, the Olympic bid committee claims that hosting the Olympic Winter Games will generate an employment boom. In particular, the committee states, "It is estimated that the activity surrounding a successful Bid will generate up to 244,000 new jobs across industries ranging from architecture to construction to tourism."[1] The updated Olympic economic impact study behind these numbers states, "A successful bid for the 2010 Winter Olympic and Paralympic Games would be a major long-term stimulus for the British Columbia economy."[2] These are strong claims. Given that there are approximately two million people employed in British Columbia in a typical month, the claim of a quarter of a million "new jobs" appears to represent a 12 per cent increase in the BC workforce. If true, these claims would suggest that voting for the Olympic Games would be a "no-brainer". Vancouver could both have a fun party and get a "major long-term stimulus" at the same time. Better than eating our cake and having it too, this would be the equivalent of eating our cake and waking up to find that a larger one has replaced it. Are these claims realistic? Can the Olympics really deliver jobs on the scale that the Bid committee promises? The short answer is no. The numbers in the Committee's advertisements are vast overstatements of the Olympic employment impact. While some positive impact is likely, there is little direct evidence that the Olympics can "kick-start" the economy, generating post-Game job growth. The goal of this report is to take a closer look at the employment numbers being touted by the Bid Committee.

Where Do the Numbers Come From?

The employment impact numbers set out by the Bid Committee ultimately come from a study entitled, "The Economic Impact of the Winter Olympic and Paralympic Games" prepared by the BC Ministry of Competition, Science and Enterprise.[3] These numbers were reviewed and revised in a study by Intervistas Consulting.[4] In these studies, the authors start with projected spending on capital costs (e.g., spending on Olympic facilities and transportation infrastructure) and operating costs associated with the Olympics, plus spending by tourists induced to come to BC because of the media exposure associated with the Olympics. They then use these expenditures in association with input-output tables to derive the ultimate impact of the expenditures on purchases of labour and materials. The input-output tables are maintained by the BC government and show, historically, the relationship between "outputs" (the expenditures in this case) and the "inputs" (the hours of work, materials, etc.) used to make them. The studies differentiate between expenditures from BC sources and expenditures from governments, businesses and visitors from outside the province. The latter are assumed to be net new expenditures and therefore net gains to the province. It is worth noticing that projections of tourist expenditures play a very large role in these calculations. For example, the capital and operating cost expenditures necessarily end with the Olympics. Thus, given the way the numbers are calculated, the "major long-term stimulus" in the form of job creation after the Olympics must arise from increased post-Game tourist visits.

Can the Olympics really deliver jobs on the scale that the Bid committee promises? The short answer is no. The numbers in the Committee's advertisements are vast overstatements of the Olympic employment impact.

What is a Job?

The Bid Committee advertisement describes an addition of 244,000 "new jobs" for BC. What exactly does a job mean in these numbers? If you ask a typical person what they think a new job means, many may respond that a job corresponds to permanent full-time employment. Others, keeping in mind that the Olympics is a short term event, might envisage temporary, part-time employment. The "jobs" referred to here are something in between. The actual concept used in the reports is Person Years, which corresponds to one year of full time employment—approximately 1,800 hours of work in a year.[5] Thus, if a new full time job lasting 7 years were created because of the Olympics, this would count as 7 Person Years of employment. While the economic impact studies are careful about their use of employment terminology, the Bid Committee prefers to use the confusing term "jobs". This has the potential to make readers of their advertisements believe that the Olympics would create a huge number of permanent jobs.

Which Number Should We Focus On?

The 244,000 Person Year number used in the Olympic Committee's advertising is one of many potential employment impact numbers in the economic impact reports. Again, there is a sharp difference between the carefulness in the reports and the way the numbers are used in the advertising. First and foremost, the impact reports make it clear that the 244,000 Person Year number from the original report corresponds to the most optimistic total employment impact from the Olympics and the Vancouver Convention and Exhibition Centre combined. For the Olympics alone, the most optimistic forecast provided in the reports is for 99,000 Person Years. There seems to be relatively firm agreement that the Convention Centre project will happen with or without the Olympics—though it might not happen as soon. Thus, counting any projected employment gains associated with the Convention Centre as a gain from the Olympics is simply misleading. Indeed, Jack Poole (CEO of the Olympic Bid Committee), in a column in the *Vancouver Sun* in October, 2002, makes the point that the Convention Centre is not part of the costs of the Olympic programme.[6] In other words, he doesn't count the Convention Centre costs but includes it when counting benefits.

As mentioned earlier, predictions relating to tourism and related employment form a large portion of the predicted employment impact of the Olympics. The impact reports, recognizing that guessing the tourism impact is difficult (so difficult, in fact, that Utah decided not to try to estimate pre and post-Olympic tourism responses in forming the economic impact estimates for their Olympics,)[7] provide multiple scenarios for tourism and associated employment impacts. In the most optimistic of these scenarios, the tourist impact of the Olympics begin in 2002 and will continue until 2020, bringing 4.2 million more tourists to British Columbia than would have otherwise come in that period. This added tourism would yield an associated 77,000 Person Years of employment. The lowest scenario, however, envisages just over a million added tourists in the period from 2008 to 2014 with an associated 22,000 Person Years of employment. Note that these are the tourist employment impacts alone. The estimated impact on construction employment in the reports is approximately 5,000 Person Years of employment.

It would seem reasonable, even taking the Bid Committee's numbers at face value, to focus on a middle scenario rather than a wildly optimistic one.[8] In the updated impact report, a medium-high tourists visits scenario would generate 77,000 total Person Years of employment (combining tourist and non-tourist related employment impacts) and the medium scenario would generate 54,000 total Person Years of employment. These numbers are between a third and a fifth of the numbers being reported by the Olympic Committee in their advertisements.

There is a sharp difference between the carefulness in the reports and the way the numbers are used in the advertising. The impact reports make it clear that the 244,000 Person Year number corresponds to the most optimistic total employment from the Olympics and the convention centre combined.

Opportunity Cost

Having established that even using the Committee's own sources a reasonable employment impact is between 50,000 and 80,000 Person Years of employment, the next question is whether those numbers are credible. The impact studies define what they are measuring as the "Economic Impact" of the Olympics. The studies state clearly that in defining Economic Impact their approach, "assumes that all of the 'inputs' required to complete the project, workers, machinery, steel beams and so forth, would be unemployed if not engaged in the Games project." (MSCE(2002)). Typically, economists examining whether a project is worth pursuing use a concept called "opportunity cost". Opportunity cost corresponds to what we give up by doing a project—the value of the best alternative we could proceed with if we were not to do the project. Knowing both the benefits and the opportunity costs of a project, we know its net benefit (or cost) and thus whether it is worth doing. Essentially, the Economic Impact measures advertised by the Committee represent only the benefit of the project. This is effectively equivalent to deciding on whether to allow a mega-hotel in an area by counting the number of people who would be employed in the new hotel, ignoring negative employment consequences resulting from loss of business for existing smaller hotels in the area.[9] Once again, the impact studies are clear on their use of terminology (even if they are somewhat incomplete in giving us the numbers we really need to make a decision), while the Bid Committee tends to use the numbers to imply we are seeing the net benefits (recall that they advertise "244,000 new jobs").

Perhaps, though, it is not unreasonable to assume that the workers and resources used in the Olympics project would be otherwise unemployed in this case. After all, we often hear of references to the Olympics "kick-starting" the BC economy, with the implicit suggestion that it is enough in the doldrums to have unused resources lying about. There are several points worth considering before buying this argument. First, the Olympic-specific spending (i.e., not the spending on the Convention Centre or roads) would not start happening for about 5 years. Is the BC government really stating that the BC economy will still need a kick-start 5 years from now?

Second, most of the spending will occur in the Lower Mainland, which is certainly not in the doldrums. A recent article in the *Vancouver Courier*, quotes several people in the construction industry in Vancouver as saying that costs are escalating because demand already outstrips the workers and resources available. One construction consultant is quoted as saying, "At this point, its hard to say whether ... there will be enough people to build the numerous condos, convention centre and Olympic structures over the next few years. It's a tough call." (Vancouver Courier (2003)). In other words, the Olympic projects will have to bid workers away from other uses, raising construction costs in the area and potentially causing postponement of private projects. In that case, there is no reason we should count every 1,800 hours worked on building a luge run as a "new job". If a contractor regularly hires, say, 20 workers in the booming Vancouver construction sector but takes a job working on an Olympic venue, the Olympic Committee's accounting would count these as 20 new jobs—even if the workers would have been employed anyway.

Third, the employment will not all go to current residents (employed or unemployed) of Vancouver in any case. Utah's estimates for the Salt Lake City Olympics suggested a creation of 35,000 Person Years of employment. They also indicated a temporary in-migration (for the duration of the construction and running of the Games) of 17,000 people (Utah(2000)). If each of these people were employed for one year (some would undoubtedly be employed for more and some for less) this would mean that half the hours of work associated with the Olympics would not have been used to offset any existing unemployment problems in the State.

What Should We Expect for an Employment Impact?

Where does this discussion leave us? It is clear that the 244,000 "new jobs" from the Olympics touted by the Bid Committee is a huge overstatement. Even the 50,000 to 80,000 Person Years of employment predicted by the impact studies in their reasonable scenarios is almost certainly an overstatement of the impact on the BC workforce since, by their own admission, it takes no account of the facts that some of these people would be otherwise employed (that some non-Olympic projects would be put on hold) and that migrants coming to BC to work on the Games will take some of the jobs.

Is there a way to figure out what the impact will be? One possibility is to examine actual employment outcomes before and after previous winter Olympics. By seeing whether employment actually increased in and around an Olympics, we can avoid problems associated with trying to count both the number of people employed by the Olympics and the number of jobs displaced—if jobs working on the Olympics simply displace other jobs then total employment numbers will not increase. Any observed increase, on the other hand, will be the net increase we want to measure. It also means we do not need to engage in debates about the precise timing and size of tourist inflows. Instead, I take the approach that we are not particularly interested in large tourist inflows for their own sake. If there are large inflows and they lead to increases in employment then we will see them in the employment numbers. If there are large tourist inflows but they do not lead to increased employment then we do not view them as particularly useful for British Columbians. Of course, employment is just one measure of the potential benefits of the Olympics. Olympic activity may lead to higher wages without altering employment. However, since the Olympic Committee makes large claims in terms of employment impacts, it is worth examining those separately.

To examine the employment impacts of past winter Olympics, I used employment rate data for each province in Canada and each state in the U.S. for the period from the mid-1970s to 2001. The actual analysis is done in a regression framework but the essence of the approach is to compare the employment rate in years surrounding the Olympics in states or provinces that held the Olympics to the employment rate in other states and provinces at the same time. In fact, I divide North America into 7 regions: Western Canada; Central Canada; Atlantic Canada; the U.S. West; the U.S. Northeast; the U.S. Southeast; and the U.S. Midwest. For each Olympics, the employment rate in the hosting province or state is compared to other provinces or states in the same region. The Olympics included in the analysis are the 1980 Lake Placid, 1988 Calgary, and 2002 Salt Lake City Olympics.

The employment rate is the ratio of the number of people employed in a given period in a given state or province to the number of people of working age (i.e., over age 15) in that state or province. I use the average monthly employment rate for each calendar year. The employment rate is useful because it provides numbers that are proportionate to the size of the province, making comparisons across states and provinces easier. It also avoids the problems with migration described earlier since a person moving to BC to take up a job will appear in both the numerator and denominator of the ratio.

To understand what we try to do in regression analyses of this type, it might help thinking of trying to identify a precise pattern of notes being played on an instrument in a room full of other, background noises. The more the background noise, the less well we can identify the notes—the more distorted the pattern. We can still

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make an educated guess based on what we can hear and our guess may be close to the true pattern being played, but we aren't sure our guess is completely accurate. In the exercise carried out here, the background noise is the data variation stemming from other influences in the economy on the employment rate and from natural measurement error. The pattern of notes we are trying to identify is the impact of the Olympics on employment. In our case, with only three Olympics to study, our ability to confidently identify the pattern through the noise is reduced.[10] Thus, the results presented here should be seen not as the final answer but as part of the larger argument developed throughout this report

To provide a meaningful comparison with the Bid Committee's claims, I converted the estimated impacts of the Olympics on employment rates into their implied effects on Person Years of employment in BC.[11] I actually estimated the average impact on the employment rate for the two years directly preceding the Olympics, the impact in the Olympic year, and the average impact in the five years directly following the Olympics.[12]Based on these estimates, the net effect of the Olympics over the period from 2 years before an Olympics to 5 years after was 10,200 Person Years of employment. This is a number below the low end of the impact studies range and is on the order of one-twentieth of the claim made in the advertisements from the Bid Committee.[13] It also corresponds to approximately 1,500 jobs that last 7 years (the length of time the Impact Reports use to capture Olympic effects, i.e., the time from 2008-2015). As discussed earlier, the estimates have a sizeable standard error attached to them. However, using variations on the estimation approach consistently yielded small estimated impacts and the impacts were always not statistically significantly different from zero. That is, while the best estimate from this exercise is a net positive impact of 1,500 7-year jobs, I cannot reject the hypothesis that the Olympics actually has no net impact on employment. (Please see the appendix for a more detailed explanation of this paper's regression analysis.)

The pattern of the effects is also of interest. The estimates suggest boosts to employment in the years leading up to the Olympics and a smaller net positive effect on employment in the Olympic year, but offsetting declines in employment in the years after the Olympics. The post-Olympic declines might arise because of Olympic impacts on the timing of major construction projects. Thus, if transportation projects are implemented earlier in order to have the infrastructure in place for the Olympics then this would show up as higher employment levels (than would have occurred without the Olympics) before the Games. However, these same jobs will not occur after the Olympics (when they would have occurred in the absence of the Games) and that could result in a decline in employment (again, relative to what would have happened without the Olympics) in the post-Olympic period. This is a plausible pattern according to the analysis by the State of Utah into the likely effects of their own Winter Games. The 2003 Economic Report to the Governor states,

> *Construction and job growth rates would have been lower in the years preceding 2002 were it not for the Games. A significant amount of activity … was shifted to the period before the Games. Job growth in construction increased in the two quarters prior to the 2002 Olympic Winter Games and then fell abruptly in the quarter of the Olympics and the quarter after the Olympics. This is similar to the experience of Atlanta during the 1996 Summer Olympics. Construction job growth accelerated going into the Summer Olympics and then decelerated abruptly for four quarters after the Olympics.*[14]

In other words, the Olympics, in part, shifts employment to the pre-Games years, so that the net impact on employment is smaller than the apparent impact when looking only at pre-Olympic construction employment. Certainly, there is no evidence in any of this analysis that the Olympics will have long-term positive impacts on employment.

A closer look at the numbers quickly and substantially reduces estimated impacts of the Olympics on employment. The 244,000 number fails to take account of the fact that these are Person Years not permanent jobs being measured, that the majority of this figure comes from the Convention Centre not the Olympics, and that the number refers to the total number employed, not to net new job creation.

The net outcome of these analyses is that the Olympics appear likely to have a positive effect on employment in the pre-Olympic years that is partially offset in the post-Olympic years, leaving a net effect which is much smaller than the claims of the Olympic Committee. There is no clear evidence in the data that the Olympics leads to longer run employment growth, i.e., that the Olympics could be counted upon to kick-start a failing economy. Indeed, the Utah analyses seem to imply that the Olympics can best be seen as helping to slow down a general downward trend in the economy.

Conclusions

This report started with the Olympic Committee's claim that the Olympics would create "244,000 new jobs". Such a large impact would mean that hosting the Olympics could be seen as much as a substantial economic policy as a fun event. In fact, a closer look at the numbers quickly and substantially reduces estimated impacts of the Olympics on employment. The 244,000 number fails to take account of the fact that these are Person Years not permanent jobs being measured, that the majority of this employment figure comes from the Convention Centre not the Olympics, and that the number refers to the total number employed not to net new job creation. An analysis of the impact of past North American Winter Olympics on employment suggests that a more plausible net impact on employment would be on the order of 10,000 Person Years (or about 1,400 7-year long jobs). Further, the positive impact occurs before the Olympics and is partly offset by reduced activity after the Olympics. There appears to be little support in the data for claims that the Olympics generates long term employment effects. The best summary of the implications of this analysis probably comes from Fraser Bullock, a main organizer of the Salt Lake City Games:

> *"You put on the Games because you want to host the world, and not because you expect all this transformational economic activity post-Games."*[15]

Notes

[1] Bid Committee (2002).

[2] Intervistas (2002).

[3] MCSE (2000).

[4] Intervistas (2002).

[5] Intervistas (2002).

[6] Intervistas (2002).

[7] Intervistas (2002).

[8] The tourism numbers used in the reports are less estimates than guesses based on previously observed tourist patterns. Thus, the authors observe that tourism to Calgary showed little growth before the 1988 Olympics but grew strongly afterwards. From this they conclude that the Olympics can have large post-Games tourism effects. They also observe that tourism to Norway grew strongly before the 1994 Olympics but grew almost not at all afterwards. From this they conclude that the Olympics can have large pre-Games tourism effects. Putting these two patterns together, they argue that a high expectation scenario would envisage high Olympics induced tourism both before and after a Vancouver Games. This may be a way to form a high end prediction but that doesn't make it a prediction on which we want to base our decision making.

[9] This is a relevant example because Utah's analysis of Olympic Games impacts indicates that just such displacement may have occurred in the Atlanta hotel industry at the time of their Olympics (Utah (2000)).

[10] One response to this is to get data on more winter Olympics. I did try this in the form of bringing in the Lillehammer Olympics, and I will discuss those results below, but otherwise it was difficult to get data that was comparable enough to the North American data. In particular, I could only get data in some instances at the country level. However, for a larger country like France it was unclear whether one would expect to see much impact of the Olympics on the national employment rate even if the local impact was relatively large. It seemed preferable, in that case, to not use those countries in the analysis in order to err on the side of the Olympic Committee's claims. Then, if I find results that contradict their claims, the findings will appear much stronger.

[11] That is, I calculated the implied impact of the Olympics on the employment rate in each year (assuming the employment rate would have been the same as it was in 2001 without the Olympics) and used that in conjunction with the number of people in the BC population who were over age 15 in 2001 to get an estimate of the impact on employment. I then converted the number of people employed into Person Years using the average number of hours worked by all workers in BC in 2001.

[12] Choosing this span of years corresponds to examining the impact from 2008 to 2015 for a 2010 Olympics. This is the time span chosen for examining tourism impacts in all but the highest scenario in the revised impact study.

[13] Again, variability in the data mean that we should view this as a best guess rather than the final word. In estimates in which I included the Norway Olympics and used Sweden, Finland, Denmark and the Netherlands as comparison states, the results actually imply a negative net effect of the Olympics. In other estimates using different combinations of states and provinces as comparisons I could get net effect numbers as low as 3,000 and as high as 35,000 using the North American data. Given inherent differences between Northern Europe and North America, it seemed best to focus on the North American results and to use the results from the plausible set of regional comparison groups given here to obtain a preferred estimate.

[14] Utah (2003).

[15] CBC (2003).

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APPENDIX

Estimating Impacts of the Winter Olympics on Employment Rates

This appendix reports on a set of regressions aimed at estimating the impact of the Winter Olympics on employment rates in a province or state.

Data

The data for the estimation comes from two sources. For the Canadian provinces, the data is from Statistics Canada's CANSIM database and is ultimately based on the Labour Force Survey (LFS). The LFS is a monthly household survey collecting data primarily on labour force status. The employment rate is calculated as the number of individuals employed in the survey week in a given month divided by the number of people over age 15 who reside in the province in that month. For a particular year in a particular province (e.g., BC in 1980), the monthly employment rates are averaged to obtain an annual average employment rate. The data is available on a consistent basis back to 1976. I use observations on the annual average employment rate for each province from 1976 through 2001.

The U.S. data comes from the United States Bureau of Labor Statistics. Annual employment rates are calculated for each U.S. state plus the District of Columbia by dividing total employment in a given year by the population age 16 and above. The employment numbers ultimately come from the Current Population Survey, which is analogous to Canada's Labour Force Survey. Thus, the series for the two countries are very similar. However, as I will discuss in the description of the estimation, I use an estimation approach which allows for substantial differences between Canada and the U.S. in both the level and over time patterns of the employment rate. This is primarily to allow for differences in labour market institutions and macro-economic conditions, but will also capture any measurement differences between the data for the two countries. The U.S. data is available on a consistent basis after 1978 and the data used here consists of employment rates for all U.S. states from 1978 to 2001.

Estimation Approach

Our ultimate goal is to understand how hosting a Winter Olympics can affect employment rates in a state or province. As discussed in the main report, I focus on employment rates for two reasons. First, it improves comparability across units. A small change in the number employed in Ontario would represent a very large impact for PEI, so we need some way to normalize effects. Using the employment rate allows us to see whether any employment impacts are large relative to the size of the potential workforce. Second, I would like to focus on net improvements in employment for people already residing in a province or state. This entails attempting to net out migration effects. To see this, consider an example in which television networks directly employ 500 people in BC during the Olympics, but bring all 500 into the province from elsewhere to fill the jobs. I would argue that we do not want to count this as 500 new jobs for British Columbians. However, if those 500 people spend their wages in BC, this may generate an increase in the number of people residing in BC who are employed. An increase in employment that is matched by an increase in the population (through migration) will lead to an increase in both the numerator and denominator of the employment rate and thus will have little effect on the employment rate. However, if more British Columbians get employment due to the spending of the migrants this will show up as an increase in the employment rate. Finally, because even employment rates show considerable variation across states and provinces, the actual dependent variable used in the analysis is the natural logarithm of the employment rate. Using this dependent variable, we will actually measure the percentage change in the em-

ployment rate when the Olympics occur and this allows an easy comparison of effects even across geographic units that have quite different employment rates.

The effect we are trying to measure can best be described by a thought experiment. We can observe the actual values for the employment rate in Alberta over a period spanning the 1988 Olympics. Suppose we could rerun Alberta's history without their hosting the Olympics and observe the employment rate under this scenario. The difference in the employment rates that would arise in these two situations is the effect of the Olympics on employment. Of course, we cannot run this experiment. We need, instead, to find a benchmark representing what would likely have occurred in Alberta in the absence of the Olympics. The approach taken here is an essentially "reduced form" approach. In particular, I use the employment rates in states or provinces surrounding a hosting state or province as a benchmark for what otherwise would have happened. For example, I use the observed employment rates for the rest of Western Canada (BC, Saskatchewan and Manitoba) as a benchmark for Alberta's hosting of the Olympics.

Given this data, there are three available winter Olympics to study: Lake Placid in 1980, Calgary in 1988, and Salt Lake City in 2002. It is the effects of these Olympics on employment rates that are the focus of this exercise.

The specific estimation approach is a panel data regression estimator. Each province or state has its own regression with the log of the employment rate in a given year as the dependent variable. The regressors in the regression consist entirely of dummy variables. In particular, on the right hand side of each regression is an intercept and a set of dummy variables, each corresponding to a particular year. The coefficient on the intercept in this regression represents the average level of the log employment rate in the base year (the first data year). The coefficients on the dummy variables represent the difference between the average level in each subsequent year and the base year. I estimate the regressions for all states and provinces jointly, imposing cross-equation restrictions. In particular, I impose the restrictions that the year effects are the same for all states or provinces in a region (I define the regions below). Essentially, this amounts to an assumption that underlying macroeconomic forces affect all states or provinces in a region in the same way. I do not, however, force the intercepts in the equations to be the same, thus allowing each state or province to have its own average employment level. The Olympic effects are measured as the coefficients on a set of Olympic dummy variables that take values of one in Olympic related years in host provinces or states and are zero otherwise. This allows average log employment rates to be different in Olympic related years in host locations relative to other locations in the same regions. The other locations in the regions thus provide a benchmark reflected in the estimated year effects for the relevant years. The Olympic effects represent the extent to which the employment rates in the host location differ from those in the other locations in the region in the Olympic related years.

I use two main sets of regressors: a set of regressors corresponding to pre-Olympic, Olympic and post-Olympic years in hosting provinces; and a set of regressors to establish the benchmarks. I generate three Olympic related dummy variables: PREOLY equals 1 in a province or state that hosts the Olympics in each of the two years preceding the Olympics; OLY equals 1 in a province or state that hosts the Olympics in the Olympic year; and POSTOLY equals 1 in a province or state that hosts the Olympics in each of the five years following the Olympics. I chose to examine average impacts for two years before the Olympics and five years after the Olympics, as well as in the Olympic year itself, to match the main period of predicted tourist impacts in the Intervistas Olympic economic impact report. They restrict their main attention to the years 2008 through 2015. The longer post-Olympic effect period is meant to help capture longer term Olympic impacts. I also experimented with a more complete set of Olympic dummy variables: defining one for the year that falls two years before the Olympic year in a hosting state or province, one for the year just before the Olympic year, one for the year just after, etc. Using a more complete set of dummy variables like this gives a closer look at the exact time pattern of Olympic effects. However, using the complete set of dummy variables results in a substantial loss of precision in the estimated effects. This is not surprising since we have only three Olympics with which to identify these effects. The approach used here is a restriction on the more complete set of effects in which pre-Olympic effects are restricted to be the same in each of the two years leading up to the Olympics and post-Olympic effects are restricted to be the same in each of the five post-Olympic years. I cannot reject this restriction in a formal test at any conventional level of significance. Thus, the specification used is not an unreasonable representation of the data and allows for greater precision in estimating overall pre and post-Olympic employment effects.

The other regressors, as described above, consist of year specific dummy variables taking a value of 1 in a given

year and zero otherwise. I impose the restrictions that the coefficients on these dummy variables are the same across the location specific regressions for locations within a given region. The regions are defined as follows: Western Canada (BC, Alberta, Saskatchewan, and Manitoba); Central Canada (Ontario and Quebec); Eastern Canada (Nova Scotia, New Brunswick, PEI, Newfoundland); Western United States (California, Colorado, Wyoming, Idaho, Oregon, Washington, Arizona, New Mexico, Utah, Nevada, Montana); Northeastern United States (New York, Maine, New Hampshire, Vermont, Massachusetts, Pennsylvania, Rhode Island, New Jersey, Connecticut); Southeastern United States (Virginia, North Carolina, South Carolina, Georgia, Alabama, Florida, Kentucky, Louisiana, Tennessee, Mississippi); and Rest of United States (all other states - mostly in the midwest). I also experimented with other regional groupings and report those results below. The specification used here allows for separate trends and cycles for each region. This effectively means that Alberta's employment rate performance is being modelled as having its own level and following the same time pattern as all of the Western Canadian provinces, with movements around 1988 being separately ascribed to the Olympics to the extent they are in common with the movements seen in the other Olympic locations near their Olympic dates. The Olympic effects are identified to the extent that movements in employment rates in Olympic locations differ from the time patterns seen in the comparison regions at the same time.

Results

The results consist of estimated coefficients on the location specific dummy variables (representing differing persistent levels in employment rates across states and provinces); estimated coefficients on time dummies and the time dummies interacted with the regional dummies (representing region specific time patterns); and the estimated coefficients on the Olympic related variables. The first two sets of coefficients (those on the location specific dummies and those on the time dummies) hold little interest in their own right. For that reason, (and because there are 247 coefficients belonging to the first two sets) the main table I will discuss contains the coefficients on the Olympic dummy variables.

Table 1 contains the estimated coefficients and associated standard errors from three specifications differing in the exact definition of the regional dummies interacted with the year dummies and, therefore, in the comparison group being used for each Olympics. In each case, the comparison for the Lake Placid Olympics is the Northeastern United States. In the specification presented in the first column, the comparison for the Salt Lake City Olympics is all western U.S. states (as defined above) and the comparison for the Calgary Olympics is all western Canadian provinces. Several points follow from an examination of column one. First, the R^2 is quite high, suggesting that the flexible modelling strategy results in a good overall fit for the data. Second, the standard errors are all large relative to the corresponding estimated coefficients. Thus, we do not obtain very precise estimates of the Olympic effects and in no case can we reject the null hypothesis that the actual Olympic impact is zero at conventional significance levels. This also means that the precise estimates cannot be given too much emphasis. Rather it is their relative magnitude (or the magnitude of the total effect) where we should focus our attention. Third, the actual coefficients suggest a pattern in which there are employment gains in the two years leading up to the Olympics, a smaller gain in the Olympic year itself, and offsetting employment losses in the post-Olympic years relative to what was happening in the comparison states and provinces.

To obtain a net impact on employment figure, we need to make transformations that reflect the precise nature of our dependent variable. In particular, the coefficients indicate the percentage change in the employment rate in each of these Olympic-related periods. We first need to convert these effects into employment rate terms and then into employment level terms to understand their magnitude. To do this, we make a comparison to the BC employment rate in 2001, which was approximately 60 per cent. The impact on employment in a given year can be obtained by multiplying the Olympic variable coefficient that is relevant times 60 (to find the implied impact on the employment rate in that year), divide by 100 (to convert into proportion rather than percentage terms) and then multiplying by the (over age 15) population of BC. For example, the impact for the Olympic year itself would be to raise the BC employment rate from 60 to 60.34. This, in turn, implies an increase in the number employed in that year of approximately 11,500. If we sum these effects over the 8 years covered by our Olympic variables, we obtain the number reported in the report: 10,210. Since the number generated in each of the 8 years is the difference in employment in that year relative to the what would have happened without the Olympics, summing across the 8 years provides a positive or nega-

tive net Olympic effect expressed in terms of one year jobs. To convert to the Person Year terms used in the Economic Impact studies, we would need to multiply this number by the ratio of the average annual hours worked by a typical individual in BC to 1825 (the number of hours per year used to define a person year). The latter ratio equals .94 and, thus, our estimate corresponds to 9597 Person Years. It is interesting to note that our net impact is approximately equal to the single year impact for the Olympic year itself. That is, the pre-Olympic gains are mainly offset by the post-Olympic losses.

The second column of Table 1 contains estimates from a second specification in which I use all of Canada as a comparison for Alberta rather than just Western Canada. Under this re-definition, the net impact on employment is a loss of about 40,000 Person Years. The third column uses the western provinces as the comparison for Calgary again but restricts the Salt Lake City comparison group to the mountain western states (which is the same as the set of western states minus California, Oregon and Washington). This specification yields results that are only slightly different from the first result in terms of coefficients. The net impact predicted from these coefficients amounts to about a 2020 Person Year increase.

I focus on specification one as the preferred specification. The second specification involves a comparison with all of Canada for the Calgary Olympics. The differences in the essential economic base in eastern versus western Canada suggests this is not the best comparison. The third specification seems like a plausible alternative since it compares Utah to states that are more geographically similar. However, one claim in the Utah government's discussion of recent economic outcomes in the state is that there is a sizeable high tech sector in Utah that has played an important role in the state's economy in the last decade. This suggests that leaving states like Washington and California in the comparison group is appropriate.

The results from the various specifications suggest that there is a fair amount of inherent variation in the data. That, in itself, is a useful lesson. The Olympics are such rare events that to predict with accuracy what they will do is not easy and likely not possible. The same comment can be made about the predictions in the Economic Impact study, which are based largely on guesses about tourist impacts with less analysis than is presented here to back them up. It seems that the best approach in such circumstances is to use the best estimates we can get and err on the side of caution. Basing decisions about whether to hold the Olympics on claims about large job creation when our best estimate (even if imperfect) is that the impacts will be small, seems foolhardy. In all of the specifications presented here, the best estimates are at least an order of magnitude smaller than the 244,000 Person Years reported in the Bid Committee's advertising.

Table 1: Estimated Coefficients on Olympic Related Variables

With Log of Employment Rate as the Dependent Variable

Variable	1	2	3
PREOLY	.019 (.012)	.014 (.012)	.018 (.012)
OLY	.0057 (.021)	-.0066 (.020)	.0055 (.021)
POSTOLY	-.0080 (.010)	-.011 (.0099)	-.0081 (.010)
R^2	.942	.939	.942
Number of Observations	1484	1484	1484

PREOLY = 1 in each of the two years just prior to an Olympic year in the hosting state or province. OLY = 1 in the Olympic year in a hosting state or province. POSTOLY = 1 in each of the 5 years just after an Olympic year in a hosting state or province.

Standard errors in parentheses.

Specification 1: All western states (as specified in the text) used as the comparison for Salt Lake City and all western provinces used as comparison for Calgary Olympics.

Specification 2: All western states used as comparison for Salt Lake City and all Canadian provinces used as comparison for Calgary Olympics.

Specification 3: Mountain western states used as comparison for Salt Lake City and all western provinces used as comparison for Calgary Olympics. Mountain western states are the same as the list of western states in the text except that California, Oregon and Washington are dropped.

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