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JUSTIFICATION FOR
GOVERNMENT INVOLVEMENT
IN THE HOSTING OF SPORTS
EVENTS: DO PROJECTED
IMPACTS MATERIALISE?



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JUSTIFICATION FOR GOVERNMENT INVOLVEMENT IN THE HOSTING OF SPORTS EVENTS: DO PROJECTED IMPACTS MATERIALISE?

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ABSTRACT

Major sporting events are said to generate substantial economic impacts to host cities. Estimates of these impacts are typically used as justification for government involvement in the staging of such events. The majority of independent academic research, however, has found that ex-ante projections of economic impacts for host cities from major sporting events rarely materialise. This paper considers the realised economic impacts of fifteen major sporting events hosted in sixteen New Zealand cities between 1997 and 2009. Realised economic impacts are found to be the exception, not the rule.

Keywords: Economic impact analysis; major sports events; local economic development

JEL Classification: L83, R58

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1. INTRODUCTION

Internationally, all levels of government have become increasingly involved in the financing of sports events and facilities over time. The most-often cited pieces of supporting evidence presented as part of proposals for these projects and as justification for government involvement in these projects have been economic impact studies. These studies are typically presented as central components of claims that events stimulate economic development through the attraction of spending from outside the locality, thus sustaining or creating employment, incomes, and economic growth.

The New Zealand Government formally acknowledged the importance of the hosting of events to New Zealand when the Major Events Development Fund was established in 2006, as part of the Ministry of Economic Development, to help organisations and governing bodies attract, develop, and retain strategically important events (New Zealand Major Events, 2012a). The application process for the Major Events Development Fund reveals that applicants are expected to demonstrate evidence of ‘immediate and direct economic impact to New Zealand by generating ... at least a 10:1 return on government investment based on robust economic impact assessments’ (New Zealand Major Events, 2012b, p.7).

Much of the scholarly literature, however, has failed to find evidence of realised tangible economic impacts associated with professional sports facilities, sports franchises and major events on host cities in North America and Europe. There is little question that claims of tangible economic impacts, including job and income creation, can influence decisions made to commit public funding towards the construction of sports facilities and the hosting of sporting events (Coates, 2007). This has led to increased scrutiny of projected economic impacts by economists, taxpayers and the media.

This paper seeks to evaluate the validity of these claims in a New Zealand context. Specifically, we examine the realised impact of major sporting events on (i) employment in the hospitality sector, and (ii) real GDP in host cities. Employment in the Accommodation, Cafes and Restaurant (ACR) sector and real GDP are used as dependent variables for ex-post models that include event hosting characteristics as explanatory variables. The analysis seeks to inform future decisions of whether or not to commit public spending towards such activities on these grounds.

2. LITERATURE REVIEW

The impacts of the hosting of large events, known in the literature as mega-events, have commonly been justified by similar claims to those associated with stadiums and franchises, including increased tourism, job creation, and economic growth. Porter (1999), when summarising the argument, noted the following rationale used by event proponents:

“‘You may not go to the event,’ they say, ‘but those who do bring hundreds of millions of dollars into the community and that, in turn, generates several times as much spending in subsequent months as those enriched in the first wave of spending spend their new-found wealth’” (Porter, 1999, p. 61).

The empirical literature on the impact of sporting events on local economies has focused largely on the impact of mega events including the Olympic Games and FIFA World Cup Finals on local and national host economies. There has been some work on examining smaller-scale events on local economies, but this has been largely based on estimates of economic impact rather than ex-post empirical analysis (Gratton, Dobson, and Shibli, 2000; Gratton, Shibli, and Coleman, 2006; Mondello and Rische, 2004).

Kasimati (2003) reviewed the literature on the economic impacts of the Olympic Games. It was found, perhaps unsurprisingly, that ex-ante studies projected significant impacts, with economic growth, increased tourism and greater employment as major impacts. Such studies were more often than not commissioned by interested parties, which possibly explained the optimism of the studies (Kasimati, 2003). Ex-post studies of the same events failed to find any evidence of these impacts (Kasimati, 2003). An analysis of the impact of the 1996 Olympic Games on the host city of Atlanta (Georgia), and surrounding counties using a difference-in-differences method found positive impacts on both the level and growth of employment, although there did not appear much in the way of evidence of a wage effect (Hotchkiss, Moore, and Zobay, 2003).

Baade and Matheson (2004) estimated a predictive ex-post model for the change in income of host cities in the 1994 FIFA World Cup Finals held in the United States. Of the 13 host cities, only four experienced gains in income, while the remainder experienced losses. The estimated overall effect on host cities was a net loss of over US\$9 billion (Baade and Matheson, 2004). Hagn and Maennig (2009) utilised several methods from the literature, including those adopted by Coates and Humphreys (1999 and beyond), Baade and Matheson (2000 and beyond) and Hotchkiss, et al., (2003), as well as an extended differences-in-differences method, to determine the impact of the 2006 FIFA World Cup Finals on host cities' unemployment rates in Germany. None of the methods utilised in the study detected any impacts on unemployment in host cities (Hagn and Maennig, 2009).

Porter (1999) evaluated the ex-ante impacts of the US Super Bowl in an ex-post study. Six Super Bowls for three hosts in the U.S. were examined; only one positive and statistically significant result out of 18 possible measures of impacts associated with the events on real sales expenditure was found, and it was concluded that ex-ante predictions of sales impacts were grossly exaggerated (Porter, 1999).² Using an ex-post methodology, Baade and Matheson (2003) found that ex-ante Super Bowl studies commissioned by the National Football League (NFL) were substantially inflated, in some cases by as much as 1,000%. Explanations for these results included the inclusion of gross rather than net spending (thus ignoring the substitution effect), failure to consider leakages from the host economy, and disregarding potential displacement effects and crowding out of local spending (Baade and Matheson, 2003).

Baade and Matheson (2000) assessed the economic impact of the Daytona 500 by measuring the impact on annual taxable sales in Volusia County, the host county of the Daytona

² For each of the six Super Bowls, separate one-month, two-month, and three-month time-span variables were used as explanatory variables in an equation to predict real sales.

International Raceway. Results indicated that annual taxable sales increased by an average of US\$41.77 million between 1997 and 1999 (Baade and Matheson, 2000). Baade and Matheson (2001) investigated the impacts of Major League Baseball's All-Star games on employment and sales in host cities from 1973-1997 using an ex-post econometric methodology. Rather than consistently boosting jobs, the event had a mixed effect on employment. 10 cities experienced decreases in employment, and 13 cities experienced increased employment, for an average decrease across all cities of 8,000 jobs per year. Sales data from San Diego, Oakland and Anaheim (California) indicated that sales fell almost US\$30 million below ex-ante projections on average (Baade and Matheson, 2001).

Two ex-post analyses of note for specific New Zealand events have been undertaken, with interestingly consistent results when one considers the international evidence presented thus far in this review. Garnham (1996) examined the effect of the Taranaki rugby team winning the Ranfurly Shield on the city of New Plymouth. Significant substitution effects of spending were found, there was a negligible effect on sales in the city despite increased numbers of visitors, and survey respondents felt that the Shield's impact on the community was primarily psychological rather than economic in nature (Garnham, 1996).

Despite pre-event expectations of increased revenues for businesses from the hosting of the America's Cup in 1999-2000 in Auckland, downtown businesses did better than restaurants and cafés in the outer suburbs of the city. The evidence suggested that the net impact on business across the wider Auckland area was generally uncertain (Johnston and Switzer, 2002).

3. THE EVENTS

During the period from 1997 to 2009, 15 internationally oriented events were hosted in New Zealand. The details of each event, including when it occurred and the host city for the event(s), can be seen in Table 1. Many of these events were promoted as generating substantial economic benefits to host cities. These claims have been justified by commissioned economic impact studies to measure the projected effects of event-related spending. Projected impacts for many of these events are also found in Table 1.

Table 1: Major Sporting Events hosted in New Zealand, 1997-2009

Event	Date(s) of Event	Host City	Projected Economic Impact (NZ\$ million)
Netball World Championships	September – October, 1999	Christchurch	-
FIFA U-17 Football (Soccer) World Championships (Men)	November, 1999	Nationwide	-
America's Cup	October, 1999 – March, 2000	Auckland	639.6 (McDermott Fairgray Group Ltd. and Ernst & Young, 2000)
Volvo Ocean Race Stopover	January, 2002	Auckland	16.4 (Auckland Tourism Events and Economic Development Ltd, 2011)
America's Cup	October, 2002 – March, 2003	Auckland	528.6 (Market Economics Ltd., 2003)
IRB Rugby Sevens (New Zealand Round)	Inaugural tournament: February, 2000 (hosted annually)	Wellington	8.6 ("Sevens tournament brings Capital an \$8.6m windfall," 2001)
British and Irish Lions Rugby Tour	June – July, 2005	Nationwide	135.2 (Vuleitch, 2005)
Volvo Ocean Race Stopover	February, 2006	Wellington	-
UCI World Mountain Bike and Trial Championships	August, 2006	Rotorua	21.1 (Sports Impact Ltd., 2007)
A1GP World Cup of Motorsport (New Zealand Round)	Inaugural race: January 2007 (hosted annually)	Taupo	25 (Curtis, 2009)
Netball World Championships	November, 2007	Auckland	12 (New Zealand Government, 2007)
World Bowls Championships	January, 2008	Christchurch	4 (Christchurch City Council, 2008)
Hamilton 400 (V8 Supercars New Zealand Round)	Inaugural race: April 2008 (hosted annually)	Hamilton	28 (Horwath HTL, 2008)
FIFA U-17 Football (Soccer) World Championships (Women)	October – November, 2008	Nationwide	30 ("Official Draw this Weekend Set to Kick Off FIFA U17 Women's World Cup," 2008)
Tri Nations Rugby ³	Annually in June-August, hosted in multiple cities	Auckland, Wellington, Christchurch and Dunedin.	12.75 (NZ vs South Africa) (Howard, 2008)

³ Estimates of economic impact for 2010 Tri Nations games hosted in New Zealand included US\$8m in Auckland, US\$11m in Wellington and US\$12m in Christchurch (Stuff, 2010).

As a percentage of national GDP, these events were no more than 0.6% of nominal GDP in the year in which the event was hosted. Outside the two America's Cup regattas, the next largest event (the British and Irish Lions Tour) was less than one tenth of a percent of nominal GDP in 2005.

One could argue that the initial direct impact of a new event or stadium is most likely to be detected in the immediate time period that the event takes place. In the case of an event, a substantial direct injection of tourist expenditure will be evident in the local economy immediately, either in that month or quarter. Unless it is a large and irregular event, then such an injection of event-related spending is likely to be difficult to detect when using annual data. The case for indirect effects being detectable in ex-post analyses is considerably weaker than the case for direct effects. Indirect effects of either events or facilities are difficult to detect in an ex-post analysis as there is no known time frame within which the indirect effects filter through the local economy. As such, the longer the time frame, the less likely the effects are to be detectable. One might reasonably expect the likelihood of detecting a statistically significant change in economic activity to be greater if the focus is on local area economic activity as opposed to national economic activity.

There are two hypotheses to be tested within the following analysis: that the hosting of internationally-oriented sports events stimulates (i) employment in the Accommodation, Cafes and Restaurants sector, and (ii) real GDP for host economies.

4. METHODOLOGY

The appropriateness of economic impact analysis in the hosting of sports franchises and events has been the focus of intense debate within the literature. Many aspects of the technique have come under closer scrutiny, including the appropriateness of assumptions (including the relevance of multipliers), the use (and abuse) of the studies, and not the least of which has been the consistent failure of pre-event projections to materialise in host economies (Coates and Humphreys, 1999; Cowen, 1999; Crompton, 1995, 2006; Delaney and Eckstein, 2003; Hudson, 2001; Matheson, 2009).

Given these concerns, an ex-post analysis that uses after-the-fact data to determine the realised impacts is a necessary and appropriate step in evaluating the credibility of ex-ante estimates. This approach has been adopted by several researchers within the field (Baade, Baumann, and Matheson, 2008b; Baade and Dye, 1990; Baade and Matheson, 2001; Coates and Humphreys, 1999, 2001, 2002, 2003; Hudson, 1999; Lertwachara and Cochran, 2007; Santo, 2005) and is regarded as traditional (Baade and Matheson, 2004).

The appropriate composition of such models is an important consideration. Coates and Humphreys (various years) devised the most extensive sports-related variable set in the literature alongside a somewhat limited set of local area control variables (predominantly fixed city effects alongside the change in population and a lagged dependent variable), whereas Hudson (1999) used a limited sports landscape variable set alongside the most theoretically comprehensive set of location-specific controls utilised in this field of research.

Sports-related variables used by Coates and Humphreys included dummy variables for stadium construction, the presence of franchises and franchise entry and exit activity for three of the major league sports for standard metropolitan statistical areas (SMSA's) in the United States. By contrast, Hudson only used a count variable for the number of professional sports franchises in the city. The method adopted in this analysis is a combination of the two methods through the adoption of key variables from separate models estimated within the literature.

Like many previous studies that have measured the realised outcomes of events and facilities, the goal of this analysis is not to examine the role of key drivers of economic activity; rather, it is to control for as many theoretically important factors as possible, with the focus on whether event-specific variables impact significantly on local economic activity. To this end, the research has its limitations. Potential lack of explanatory power is possible due to omitted variables including population (despite the use of net migration as a proxy), as well as other local area characteristics. As Baade, Baumann and Matheson (2008a) put it:

“Given the number and variety of controls found in regional growth models and the inconsistency of coefficient size and significance, any critic can claim that a particular regression suffers from omitted-variable bias. However, it is far more challenging to specify the model that remedies the problem” (Baade, Baumann, and Matheson, 2008a, p. 633).

4.1. The Models

Borrowing from the literature, separate panel models for territorial local authority (TLA) employment in the (i) Accommodation, Cafés and Restaurants sector and (ii) TLA real GDP are developed. The general forms of each of these models are as shown below in equations 1 and 2 below:

$$EMP_ACR_{it} = \alpha_i x_{it} + \beta_i EVENT_{it} + \delta_i + \varphi_t + e_{it} \quad (1)$$

$$GDP_{it} = \alpha_i x_{it} + \beta_i EVENT_{it} + \delta_i + \varphi_t + e_{it} \quad (2)$$

where:

EMP_ACR_{it} is the level of employment in the aggregated Accommodation, Cafés and Restaurants sector for TLA i in quarter t ;

GDP_{it} is the level of real GDP;

x_{it} are TLA-specific control variables;

$EVENT_{it}$ are event-specific variables;

δ_i are cross-section fixed effects; and

φ_t are period-specific fixed effects.

The α_i 's and β_i 's are parameters to be estimated, and the e_{it} are the error terms.

The x_{it} variables in models 1 and 2 include:

$SHARE_AFF_{it}$, which is the share of TLA employment in the Agriculture, Forestry and Fisheries sector for TLA i in quarter t ;

$SHARE_MANUF_{it}$, which is the employment share of the Manufacturing sector;
 $SHARE_TTS_{it}$, which is the employment share of the combined Trade and Transport Services sector;
 $SHARE_SERV_{it}$, which is the employment share of the combined private and public service sector;
 NM_{it} , which is the TLA's net migration; and
 $LQ_EMP_ACR_{it}$, which is the TLA's location quotient of Accommodation, Cafés and Restaurants sector employment. There are also separate TLA-specific time trends for each city ($TREND_i$) included as further location-specific control variables. The definitions and summary statistics of location-specific dependent and independent variables used in models 1 and 2 are detailed in Table 2. Variables are all taken from the Infometrics regional database, unless specified otherwise.

The location-specific controls in the models include TLA industry mix, which is represented by the four industry employment share variables ($SHARE_AFF$, $SHARE_MANUF$, $SHARE_TTS$, and $SHARE_SERV$), a selection that is consistent with the industry mix variables used by Hotchkiss, et al. (2003). Depending upon the relationship with the dependent variable in question, the signs on the parameter estimates are expected to vary. Net migration (NM) controls for changes in TLA demographic characteristics, and one would expect that greater net migration would potentially increase both employment in the hospitality sector and real GDP. The employment analysis of equation (1) also includes a hospitality sector location quotient (LQ_EMP_ACR) to control for the concentration of TLA employment in the sector across TLA's⁴. The sign on the employment concentration coefficient is expected to be positive – the greater the concentration of employment, the greater the level of employment in the hospitality sector.

The $EVENT_{it}$ variables used in variations of models 1 and 2 include:

NWC_99HH_{it} , which denotes the host TLA i for the 1999 Netball World Championships in quarter t ,

$U17WCM_99HH_{it}$, which denotes the host TLAs for the 1999 Under-17 Men's Football World Championships in quarter t ,

AC_99HH_{it} , which denotes the host TLA for the 1999-2000 America's Cup in quarter t ,

$VOLVO_02HH_{it}$, which denotes the host TLA for the 2002 Volvo Ocean Race stopover in quarter t ,

AC_02HH_{it} , which denotes the host TLA for the 2002-2003 America's Cup in quarter t ,

$IRBSEVENSHH_{it}$, which denotes the host TLA for the annual International Rugby Board World Sevens (New Zealand leg) in quarter t ,

⁴ The location quotient is measured using the following formula:

$$LQ_{EMP_ACR} = \frac{EMP_ACR_{i,t} / EMP_TOTAL_{i,t}}{EMP_ACR_{NZ,t} / EMP_TOTAL_{NZ,t}}$$

If the location quotient equals 1, this means that TLA i has the same concentration of employment in the construction sector as the nation. This can be interpreted to mean that the employment in the construction sector in the TLA meets the needs for local demand. If the location quotient is less than 1, this can be interpreted to mean that employment in the hospitality sector for the TLA is insufficient to meet local demand. Likewise, if the location quotient is greater than 1, this suggests that local employment is more than sufficient to meet demand.

LIONS_05HH_{it}, which denotes the host TLAs for provincial matches during the 2005 British and Irish Lions Rugby Tour in quarter *t*,
LIONS_05TESTHH_{it}, which denotes the host TLAs for Test matches (against New Zealand) during the 2005 British and Irish Lions Rugby Tour in quarter *t*,⁵
VOLVO_06HH_{it}, which denotes the host TLA for the 2006 Volvo Ocean Race stopover in quarter *t*,
WMB_06HH_{it}, which denotes the host TLA for the 2006 World Mountain Biking Championships in quarter *t*,
A1GPHH_{it}, which denotes the host TLA for the New Zealand leg of the A1GP Championships in quarter *t*,
NWC_07HH_{it}, which denotes the host TLA for the 2007 Netball World Championships in quarter *t*,
WBC_08HH_{it}, which denotes the host TLA for the 2008 World Bowls Championships in quarter *t*,
V8HH_{it}, which denotes the host TLA for the Hamilton V8 Supercars Race in quarter *t*,
U17WCW_08HH_{it}, which denotes the host TLAs for the 2008 Under-17 Women's Football World Championships in quarter *t*, and
TNHH_{it}, which denotes the host TLA for annual Tri Nations rugby Test matches in quarter *t*.
 The definitions and summary statistics of event-specific variables used in models 1 and 2 are detailed in Table 3.

⁵ The impacts of the Lions Tour are split into provincial matches and Test matches. This is mainly due to claims from researchers that Test matches generate greater interest as the touring team is at full strength for these matches and thus are likely to have greater impacts than provincial matches where fringe/reserve players are more likely to be playing.

Table 2: Summary statistics for location-specific dependent and independent variables (x_{it})

Variable	Description	Industry category	Mean	Standard Deviation	Minimum	Maximum
EMP_ACR	Level of TLA hospitality sector (Accommodation, Cafes and Bars) employment in quarter t .	H	3981.857	4017.386	947.0	19898.0
GDP	Quarterly level of TLA real gross domestic product, in millions (1995/6 prices).	-	1161.855	1379.421	176.0	6684.2
SHARE_AFF	Quarterly share of the TLA employment in the agriculture, forestry and fisheries sector.	A	3.809	4.180	0.081	19.958
SHARE_MANUF	Quarterly share of TLA employment in the manufacturing sector.	C	12.173	3.534	3.418	22.218
SHARE_TTS	Quarterly share of TLA employment in the trade and transport sectors combined.	F, G and I	23.188	2.960	13.641	30.225
SHARE_SERV	Quarterly share of employment in the combined private and public services sector.	J, K L ,M, N O P, and Q	46.871	8.534	28.876	72.834
NM	Quarterly net migration.	-	103.499	574.007	-1380.0	5163.0
LQ_EMP_ACR	Quarterly location quotient of TLA hospitality sector (Accommodation, Cafes and Bars) employment.	-	1.126	0.467	0.598	3.137

Table 3: Summary statistics for event-specific variables ($EVENT_{it}$)

Variable(s)	Description	Mean	Standard Deviation	Minimum	Maximum
NWC_99HH	1999 Netball World Championships host TLA dummy variable.	0.003	0.050	0	1
U17WCM_99HH	1999 Under 17 Men's Football World Championships host TLA dummy variable.	0.005	0.071	0	1
AC_99HH	1999-2000 America's Cup host TLA dummy variable.	0.003	0.050	0	1
VOLVO_02HH	2002 Volvo Ocean Race stopover host TLA dummy variable.	0.001	0.035	0	1
AC_02HH	2002-2003 America's Cup host TLA dummy variable.	0.003	0.050	0	1
IRBSEVENSHH	International Rugby Board World Sevens host TLA dummy variable.	0.013	0.111	0	1
LIONS_05HH	2005 British and Irish Lions Rugby Tour provincial game host TLA dummy variable.	0.009	0.093	0	1
LIONS_05TESTHH	2005 British and Irish Lions Rugby Tour Test match host TLA dummy variable.	0.004	0.061	0	1
VOLVO_06HH	2006 Volvo Ocean Race stopover host TLA dummy variable.	0.001	0.035	0	1
WMB_06HH	2006 World Mountain Biking Championships host TLA dummy variable.	0.001	0.035	0	1
A1GPHH	A1GP host TLA dummy variable.	0.004	0.061	0	1
NWC_07HH	2007 Netball World Championships host TLA dummy variable.	0.001	0.035	0	1
WBC_08HH	2008 World Bowls Championships host TLA dummy variable.	0.001	0.035	0	1
V8HH	Hamilton 400 V8 Supercars host TLA dummy variable.	0.003	0.050	0	1
U17WCW_08HH	2008 Under 17 Women's Football World Championships host TLA dummy variable.	0.005	0.071	0	1
TNHH	Tri Nations Rugby host TLA dummy variable.	0.033	0.177	0	1

All of the event variables are host-specific dummy variables. The coefficients on the event variables in model estimation are thus interpreted as the quarterly effects on the TLAs that hosted these events, and as such (if ex-ante predictions of positive economic impacts are realised in host economies) the signs are expected to be positive.

For each model, data for 16 TLAs in New Zealand is utilised, as shown in Table 4 along with key quarterly economic indicators.

Table 4: Territorial Local Authorities (TLAs) Quarterly Economic Indicators

Territorial Local Authority (TLA)	EMP_ACR, Full Time Equivalents (FTE)	Average Real GDP (1995/96 prices), \$m
Whangarei	1,239.9	409.7
North Shore City	3,183.2	1,407.0
Waitakere	1,607.0	716.4
Auckland City	15,597.0	5,578.5
Hamilton City	3,485.3	981.9
Taupo	2,135.1	217.2
Tauranga City	2,291.0	600.1
Rotorua	2,863.4	429.2
Napier City	1,721.2	326.6
New Plymouth	1,882.1	729.5
Palmerston North	2,284.8	514.9
Wellington City	7,330.6	2,667.9
Nelson City	1,417.5	297.0
Christchurch	11,079.0	2,418.7
Dunedin City	3,411.1	685.2
Invercargill	1,224.9	359.8

Levels of the dependent variables and several independent variables are utilised in this analysis, so these variables must be tested for the presence of unit roots that are sometimes present in levels of such variables as employment and GDP. The presence of non-stationary variables in a model can potentially lead to spurious regression results. Results of Augmented Dickey Fuller (ADF) panel unit root tests for each of the variables (with individual effects and linear trends) are as shown in Table 5, and suggest that the variable specifications chosen are stationary and appropriate for use in these models.

Table 5: Augmented Dickey Fuller (ADF) Panel Unit Root Tests

Variable	Statistic (Fisher chi-square)	Prob.	Cross-sections	Obs.
<i>Null: Unit root (assumes individual unit root process)</i>				
EMP_ACR	55.375	0.006	16	747
GDP	45.063	0.063	16	719
SHARE_AFF	51.512	0.016	16	744
SHARE_MANUF	77.459	0.000	16	766
SHARE_TTS	118.159	0.000	16	758
SHARE_SERV	84.821	0.000	16	716
NM	108.581	0.000	16	704
LQ_EMP_ACR	101.238	0.000	16	767

The majority of studies in the literature to date have utilised annual data. The use of quarterly data enables one to narrow the timeframe between changes in economic activity, thus we should expect greater accuracy in the estimation of realised outcomes and a higher chance of actually detecting the effects of short-term major sporting events on the local economy. The sample time period for the data set is from 1997:1 to 2009:2. This time period has been described by the Reserve Bank of New Zealand as a period of renewed growth.

“In 1998 the New Zealand economy entered a period of significant growth, which by 2006 had become one of the longest and strongest growth periods the country had seen. It also occurred in the context of a significantly diversified and deregulated low-inflation economy.”(Reserve Bank of New Zealand, 2007, p.25).

5. RESULTS

This section details the results of the estimation of models 1 and 2 detailed above. As the data is in balanced panel form (16 cross sections across 50 quarters), pooled OLS models were initially estimated. Diagnostic tests for pooled models included autocorrelation (Durbin-Watson) and heteroskedasticity (White’s test). Panel-specific tests were also undertaken, including tests for joint significance of differing group means for fixed effects, the Breusch-Pagan LM test for random effects, the Hausman test for which of the fixed- or random-effects specifications was appropriate, and tests for redundant fixed-effects. In each case, the preferred specifications were found to be those with fixed cross section and period effects. In each of the initial fixed cross-section and effects models for employment and real GDP, groupwise heteroskedasticity ($p < 0.001$), autocorrelation ($p < 0.001$) and cross-sectional dependence ($p < 0.001$) were all found to be present, so the panel models were re-estimated as Prais-Winsten regressions with correlated panel-corrected standard errors (PCSEs). The results from the PCSE models are reported below.⁶

⁶ Coefficients for individual TLA trends, cross-section fixed effects and period fixed effects are not reported, but are available upon request from the author.

The analysis of the realised effects of hosting internationally oriented events on local economies begins with the estimation and analysis of the impact on employment in the Accommodation, Cafes and Restaurants sector (model 1). One might reasonably expect that the most likely place for direct economic impacts to occur through the hosting of events of this nature will be reflected in this sector during the period of the event. Surveys conducted for the 2005 Lions Tour showed that 43% of overall foreign exchange earnings were in the Food and Beverage and Accommodation sectors combined (Vuletich, 2005). Likewise, we examine closely the impact of these events on real GDP (model 2) to determine whether the spending associated with these events is detectable in local GDP figures during the quarter in which the event takes place. The parameter estimates for each of these models are as shown in Tables 6 and 7.

**Table 6: Accommodation, Cafés and Restaurants Employment
Results – Parameter Estimates**

	Model 1: Prais-Winsten PCSE, cross-section and period fixed effects 736 observations 16 cross-sectional units Time-series length = 46 Dependent variable: EMP_ACR		Model 1(a): Prais-Winsten PCSE, cross-section and period fixed effects 736 observations 16 cross-sectional units Time-series length = 46 Dependent variable: EMP_ACR	
<i>Variable</i>	<i>Coefficient</i>	<i>p-value</i>	<i>Coefficient</i>	<i>p-value</i>
C	353.96	0.599	591.47	0.370
SHARE_AFF	17.57	0.092	15.47	0.131
SHARE_MANUF	-8.89	0.340	-12.56	0.177
SHARE_TTS	-11.84	0.291	-19.35	0.088
SHARE_SERV	-21.80	0.009	-20.91	0.009
NM	-0.03	0.696	-0.03	0.680
LQ_EMP_ACR	2086.41	0.000	2066.69	0.000
NWC_99HH	-34.39	0.870	-33.26	0.875
U17WCM_99HH	43.76	0.325	37.76	0.414
AC_99HH	388.14	0.333	403.42	0.316
VOLVO_02HH	-164.39	0.702	-163.53	0.704
AC_02HH	462.21	0.250	461.57	0.252
IRBSEVENSHH	-28.52	0.469	-30.50	0.441
LIONS_05HH	-15.39	0.851	-20.11	0.799
LIONS_05TESTH H	55.06	0.694	38.00	0.787
VOLVO_06HH	-60.72	0.615	-62.12	0.609
WMB_06HH	-78.48	0.247	-74.80	0.260
A1GPHH	-97.52	0.048	-94.18	0.049
NWC_07HH	-93.41	0.074	-93.99	0.064
WBC_08HH	248.73	0.246	245.35	0.254
V8HH	165.10	0.002	-	-
V8HH_Y1	-	-	374.05	0.000
V8HH_Y2	-	-	-156.53	0.015
U17WCW_08HH	-42.15	0.612	-54.16	0.496
TNHH	34.32	0.549	-	-
TNHH_AUS	-	-	68.07	0.425
TNHH_SA	-	-	-6.10	0.917
	R-squared	0.990	R-squared	0.990

Of the event-specific variables in Table 6, only three of the 16 coefficients are found to be significantly different from zero – A1GPHH, which is negative (p-value = 0.048); NWC_07HH, which is also negative (p-value = 0.074); and V8HH, which is positive (p-value = 0.002). The A1GP result indicates that there was a fall in the level of employment in the hospitality sector in the Taupo TLA, which typically thrives on tourism given its central North Island location and the timing of the event during the summer months. This result may reflect crowding out of regular tourism, although it is also possible that its timing coincided with the onset of the global financial crisis, which may have impacted on tourist numbers into the area. A negative coefficient for the 2008 Netball World Championships on Auckland may well reflect the fact that the event was only hosted in New Zealand at short notice after the original host, Fiji, was unable to host the event due to political instability. The positive coefficient for the V8 Supercars race in Hamilton indicated that there was an increase in sector employment during the 2008:2 and 2009:2 quarters in which the race was hosted of approximately 165 jobs. Given the mixed outcomes of the race in Hamilton, this result warrants further investigation.

Model 1 was thus re-estimated as model 1(a), with the key differences being the separation of the V8HH variable into the two years (V8HH_Y1 and V8HH_Y2) and the separation of the Tri-Nations rugby tests (TNHH) into team-specific variables for New Zealand-Australia matches (TNHH_AUS) and New Zealand-South Africa matches (TNHH_SA). Of the event variables, there are no major changes to sizes and levels of significance. For the V8 Supercar race, in the first year there was a significantly positive (p-value = 0.000) increase in employment of 374 FTEs, while in the second year there was a significantly negative (p-value = 0.015) fall in employment of 156 jobs. This is in line with what was experienced after the inaugural 2008 race where anticipated economic impacts failed to eventuate, along with a fall in visitor numbers (Ihaka, 2010; Pepperell, 2010), which likely resulted in a correction to employment levels for the 2009 race. Neither of the TNHH_AUS or TNHH_SA coefficients were found to be significantly different from zero ($p \geq 0.425$).

What is particularly striking across Models 1 and 1(a) in Table 6 is the lack of significance for the substantial majority of the events, in particular the large events (i.e. both America's Cup regattas and the Lions Tour). It would appear that if there were gains in employment resulting from the event, they weren't in the hospitality sector. We now turn to the impact on local GDP in Table 7.

Table 7: GDP Results – Parameter Estimates

	Model 2: Prais-Winsten PCSE, cross-section and period fixed effects 736 observations 16 cross-sectional units Time-series length = 46 Dependent variable: GDP		Model 2(a): Prais-Winsten PCSE, cross-section and period fixed effects 736 observations 16 cross-sectional units Time-series length = 46 Dependent variable: GDP	
<i>Variable</i>	<i>Coefficient</i>	<i>p-value</i>	<i>Coefficient</i>	<i>p-value</i>
C	666.70	0.000	665.43	0.000
SHARE_AFF	-5.15	0.065	-5.13	0.066
SHARE_MANUF	-4.79	0.052	-4.81	0.051
SHARE_TTS	-6.65	0.025	-6.66	0.025
SHARE_SERV	-1.67	0.380	-1.63	0.386
NM	-0.03	0.079	-0.03	0.078
NWC_99HH	36.64	0.301	36.81	0.302
U17WCM_99HH	15.35	0.311	15.00	0.328
AC_99HH	111.55	0.176	112.36	0.173
VOLVO_02HH	-120.70	0.193	-120.43	0.194
AC_02HH	99.22	0.225	99.50	0.223
IRBSEVENSHH	5.32	0.735	5.24	0.739
LIONS_05HH	11.31	0.520	10.95	0.533
LIONS_05TESTHH	-29.93	0.399	-31.15	0.380
VOLVO_06HH	-11.85	0.805	-11.87	0.805
WMB_06HH	-10.89	0.570	-10.73	0.573
A1GPHH	30.44	0.008	30.44	0.008
NWC_07HH	-20.63	0.047	-20.66	0.047
WBC_08HH	-23.01	0.545	-23.01	0.546
V8HH	-0.47	0.974	-0.54	0.970
U17WCW_08HH	39.69	0.091	39.18	0.097
TNHH	-21.71	0.099	-	-
TNHH_AUS	-	-	-19.17	0.314
TNHH_SA	-	-	-24.49	0.072
	R-squared	0.998	R-squared	0.998

For Model 2 in Table 7, four of the 16 event-related coefficients were found to be significantly different from zero. These included A1GPHH, which is positive (p-value = 0.008); NWC_07HH, which is negative (p-value = 0.047); U17WCW_08HH, which is positive (p-value = 0.091); and TNHH, which is negative (p-value = 0.099). The A1GP race (\$30.44m) and the 2008 Under 17 Women’s Football World Championships (\$39.69m) have results that are consistent with

expectations (and a coefficient remarkably similar to the ex-ante projections for the event in Table 1 in the case of the A1GP). The A1GP result runs counter to the corresponding finding in Table 6, suggesting that while jobs may not have been created in the hospitality sector, there was enough of an impact elsewhere to generate a positive effect on the Taupo area's GDP. The 2007 Netball World Championships result (-\$20.63m) is consistent with the corresponding negative coefficient for employment in the Accommodation, Cafés and Restaurants sector in Table 6. The Tri-Nations rugby coefficient (-\$21.71m) runs counter to expectations of some \$12-\$16m per Test match. Model 2 was subsequently re-estimated as model 2(a) in which the TNHH variable was separated into matches against Australia (TNHH_AUS) and against South Africa (TNHH_SA). Results from model 2(a) indicate that there is not a great deal of change in the other coefficients, but there is an interesting outcome for the separate Tri-Nations matches. Hosting test matches against Australia were not significant (p-value = 0.314) but test matches against South Africa were associated with a statistically significant negative impact on the host city's GDP of approximately \$24.5m (p-value = 0.072). These results suggest that, given the choice of hosting Australia or South Africa, cities might prefer hosting the Wallabies rather than the Springboks.

As identified throughout the analysis thus far, a common thread throughout this analysis is the lack of significance of the two America's Cup regatta coefficients in both of the Accommodation, Cafés and Restaurants sector employment and real GDP models. The 1999-2000 America's Cup was forecast to have an overall (direct, indirect and induced) impact of in excess of \$473 million on the Auckland region, "...and will have had a significant impact on the region's growth rate for the year ending June 2000" (McDermott Fairgray Group Ltd. and Ernst & Young, 2000, p. iii). While it is unrealistic to expect this entire impact to occur during the event period (impacts are likely to have occurred prior to, during and possibly after the event itself), one would nonetheless reasonably expect a sizeable portion of this impact to occur during the event. Average annual real GDP (in 1995/6 prices) in Auckland City throughout this period was \$22.3 billion, and a \$473m impact would be as much as 2.12% of real GDP if the entire projected impact was to materialise in the local economy. Results from this analysis suggest that the quarterly impact of the 1999-2000 America's Cup regatta on the Auckland City TLA was insignificant during the two quarters in which racing occurred. Likewise, the 2002-2003 regatta was estimated to contribute \$450 million to the Auckland region (Market Economics Ltd., 2003). Results from this analysis suggest that the impact on the Auckland City TLA's real GDP was statistically insignificant during the two quarters. Likewise, coefficients for all of the three events with multiple hosts – the 1999 U17 Men's World Football Championships, the 2005 Lions Tour and the 2008 U17 Women's World Football Championships – were also statistically insignificant. Taken across both models, it would appear that many of these events failed to deliver realised economic impacts to their host cities.

There are some caveats that must be mentioned when considering these results. Firstly, these are quarterly estimates, and many of the events were held in very short time spans, ranging from a one day event (rugby matches), a weekend (IRB Sevens, V8 Supercar racing), a month (U17 Football World Championships, Lions Tour) to a maximum of six months for the America's Cup

regattas. As such, it is very much possible that these coefficients could be influenced by other occurrences within the host TLA during that time. This possibility is controlled for to some extent by the presence of the TLA's employment structure, net migration, fixed TLA effect, fixed quarterly period effect and the TLA's time trend, but one cannot rule out that other factors could be influencing the findings of the models.

Secondly, the variables are intended to measure the realised impact during the event itself, and not leading into or post-event. In the case of the America's Cup regatta in 1999/2000, for instance, one could well argue that there were possibly impacts prior to the race itself, such as the construction of the teams lodging and the America's Cup village on the Auckland Viaduct, as well as post-event effects including changes in demand for boat-building, among other sailing-related activities. These findings do not necessarily encompass all of the possible impacts as the time-frame within which to expect impacts is largely unknown. What is known, however, is when the event is held, and that a large proportion of the overall spend associated with an impact is most likely to occur when the event itself occurs.

Even with these caveats, the evidence for significant positive impacts upon host economies from this analysis is hardly compelling. The presence of gains for only one of fifteen events for hospitality sector employment, and two of fifteen events for real GDP should be enough to at least have policymakers questioning the worth of outlaying scarce public funds for such events on the grounds of economic impact projections.

5.1. Robustness of Results

These results, in general, are largely consistent with international research into events that have found an absence of realised impacts associated with the hosting of events. Nonetheless, there is a readily available robustness test for these results with the inclusion of a lagged dependent variable in the model estimation. It has been argued in the literature that lagged dependent variables capture important unobserved factors that are specific to the host city, and their exclusion from a model may potentially result in parameter estimates being affected by omitted variable bias (Coates and Humphreys, 2003). As such, models 1 and 2 are re-estimated as models 1(b) and 2(b) with lagged dependent variables, the results of which are presented in Table 8 below.

Table 8: Accommodation, Cafés and Restaurants Employment and GDP Results with inclusion of a lagged dependent variable – Parameter Estimates

	Model 1(b): Prais-Winsten PCSE, cross-section and period fixed effects 736 observations 16 cross-sectional units Time-series length = 46 Dependent variable: EMP_ACR		Model 2(b): Prais-Winsten PCSE, cross-section and period fixed effects 736 observations 16 cross-sectional units Time-series length = 46 Dependent variable: GDP	
<i>Variable</i>	<i>Coefficient</i>	<i>p-value</i>	<i>Coefficient</i>	<i>p-value</i>
C	-396.60	0.618	444.65	0.016
EMP_ACR(-1)	0.44	0.000	-	-
GDP(-1)	-	-	0.46	0.000
SHARE_AFF	20.12	0.106	-4.69	0.090
SHARE_MANUF	-7.23	0.527	-2.76	0.263
SHARE_TTS	-8.99	0.478	-6.86	0.018
SHARE_SERV	-11.95	0.155	-1.07	0.520
NM	-0.05	0.440	-0.01	0.592
LQ_EMP_ACR	1900.95	0.000	-	-
NWC_99HH	-29.37	0.889	42.12	0.211
U17WCM_99HH	35.37	0.513	12.25	0.468
AC_99HH	372.93	0.343	41.74	0.618
VOLVO_02HH	-141.04	0.772	-136.25	0.247
AC_02HH	428.46	0.281	53.76	0.524
IRBSEVENSHH	-48.23	0.249	-10.83	0.580
LIONS_05HH	-48.42	0.602	1.48	0.942
LIONS_05TESTHH	52.50	0.736	-12.90	0.759
VOLVO_06HH	-81.12	0.506	-16.52	0.757
WMB_06HH	-23.25	0.778	-13.23	0.554
A1GPHH	-41.28	0.482	48.97	0.001
NWC_07HH	-136.07	0.019	-28.10	0.016
WBC_08HH	213.77	0.383	-42.82	0.318
V8HH	149.91	0.041	12.25	0.446
U17WCW_08HH	-126.70	0.175	19.91	0.431
TNHH	89.03	0.162	-9.77	0.541
	R-squared	0.997	R-squared	0.999

The impact of the inclusion of the lagged dependent variable on event coefficients for the Accommodation, Cafes and Restaurants sector in model 1(b) in Table 8 above results in only two statistically significant event coefficients: NWC_07HH, which is negative (p-value = 0.019), and V8HH, which is positive (p-value = 0.041). When compared with the coefficients estimated in model 1 in Table 6, differences include the change to non-significance of the A1GP coefficient (p-value = 0.482), a 46% larger negative impact of the 2007 Netball World Championships of 42.66 FTEs, and a 9% lower positive impact for the V8 Supercar race of 15.18 FTEs. As was the case for Table 6, all other events remained statistically insignificant.

Including a lagged dependent variable in model 2(b) for real GDP sees only two event coefficients remaining statistically significant: A1GPHH, which is positive (p-value = 0.001), and NWC_07HH, which is negative (p-value = 0.016). Viewed alongside the results from model 2 in Table 7, the positive A1GPHH coefficient is 61% larger (by \$18.53m) and the negative NWC_07HH coefficient is 36% larger (by \$7.46m). The other two events that were significant in Table 7, U17WCW_08HH (p-value = 0.091) and TNHH (p-value = 0.099) are no longer significant in Table 8 with the inclusion of the lagged dependent variable (p-values > 0.43).

The inclusion of a lagged dependent variable in each of the models indicates that the results can be considered robust in that at least half of the same events in each model that were found to be significant without a lagged dependent variable were also significant with a lagged dependent variable. All of the insignificant event coefficients in models 1 and 2 remained insignificant in models 1(b) and 2(b).

6. CONCLUSION

Results from this analysis indicate that despite economic impact studies projecting substantial economic impacts, in the clear majority of cases (at least twelve of the fifteen events for employment in the Accommodation, Cafes and Restaurants sector, and at least eleven of fifteen events for real GDP) the realised economic impacts from hosting major sports events were not significantly different from zero. While many events may not have resulted in realised positive impacts, they didn't result in negative realised impacts, either. If the expectation from hosting events of this nature is the creation of intangible benefits such as civic pride or image enhancement, this analysis indicates that these benefits don't translate into realised tangible economic impacts.

Projections of economic impacts from economic impact studies should thus be viewed with caution. Of the significant coefficients across the variations of the two models, the employment impacts in the Accommodation, Cafés and Restaurants sector and the impacts on GDP were complementary for only one event: the negative impact associated with the hosting of the 2007 Netball World Championships. Of the statistically significant event coefficients across the two models, less than half were positively signed. As mentioned earlier, it is possible that part of the overall impacts of events could well occur outside the event period. Findings of largely

insignificant realised impacts during the event period would suggest that potential pre- and post-event impacts are likely to be inconsequential. Viewed in this light, these results are hardly compelling evidence that the hosting of events are effective economic stimuli for local economies.

Overall, the argument for projected economic impacts that emanate from the hosting of internationally-oriented sporting events is not persuasive as far as justifying government involvement in such projects. The return on an investment in an event-hosting project in tangible economic terms (that is, sector-specific employment and GDP) is far from overwhelmingly positive. The outcome from a particular event appears to be dependent upon the context in which the project is undertaken. If tangible economic outcomes (i.e. increases in employment and/or GDP) are the sole intention of event hosting, the results from this analysis suggest that the hosting of events has largely failed to deliver on these grounds for host TLA's. As it is, events are not only justified on economic grounds, but on wider socio-economic and sporting participation arguments. Results from this analysis suggests that tangible economic benefits are generally not forthcoming as a result of hosting international events, thus government spending should not be justified on the basis of an argument that emphasises tangible economic impacts.

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