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Bowling in Hawaii: Examining the Effectiveness of Sports-Based Tourism Strategies

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Abstract

We use daily airplane arrival data from Hawaii's Department of Business, Economic Development, and Tourism to determine the net change in tourism for a variety of sporting events. We find two events generate a positive and significant net impact on arrivals: Honolulu Marathon and Pro Bowl. We estimate that the Honolulu Marathon produces between 2,183 and 6,519 in net arrivals while the Pro Bowl attracts about 5,595 to 6,725 in net arrivals. At the upper end of our estimates, the Honolulu Marathon and the Pro Bowl attract a nearly identical number of visitors despite the fact that the HTA spends nearly two-thirds of its budget on the rights to the Pro Bowl and spends nothing for the Hawaii Marathon. Neither event attracts the number of net arrivals claimed by its sponsor, and other sporting events do not generate any identifiable impact on tourist arrivals whatsoever.

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Introduction

Few states rely on tourism more heavily than Hawaii. Over 14% of the state's labor force is employed in the arts, entertainment, and recreation industry or the accommodation and food services industry. This figure is 5.5 percentage points above the national average and second only to Nevada. Another 2.7% of the labor force is employed in related transportation fields, the highest percentage in the country (Bureau of Labor Statistics, 2008). Indeed, the very name of Hawaii's Department of Business, Economic Development, and Tourism shows the significance of the industry to the overall economic climate in the state.

The Hawaii Tourism Authority (HTA), was established 1998 "as the lead state agency for Hawaii's visitor industry. This same act also established the Tourism Special Fund, a set percentage of transient accommodations tax collections that is assessed on hotels, vacation rentals and other accommodations. The HTA uses this fund to market, develop and support Hawaii's visitor industry. Among its responsibilities as the state's tourism agency, the HTA is charged with the following:

- setting tourism policy and direction from a statewide perspective;
- developing and implementing the state's tourism marketing plan and efforts;
- administering programs and activities to sustain a healthy visitor industry;
- developing and monitoring implementation of the State Tourism Strategic Plan;
- coordinating tourism-related research, planning, promotional, and outreach activities with the public and private sectors. (HTA, 2007, pg. 3)

In 2007, the HTA's budget was roughly $70 million, the majority of which ($37.5 million) was devoted to general marketing towards leisure visitors. Over 10% of the

agency's budget ($7.7 million) was dedicated specifically to sports marketing. HTA gave assistance to a variety of sporting events in 2007, including canoe racing, fishing, surfing championships, and a volleyball tournament (HTA, 2007). The agency also subsidizes a series of Professional Golfers Association (PGA) tournaments, the Ironman Triathlon, and a college bowl game (the Hawaii Bowl). The largest event hosted by the HTA is the National Football League's (NFL) Pro Bowl, an annual game between all-star teams from each conference which takes place after the Super Bowl in late January or early February. Not only is the Pro Bowl the state's marquee event, it also consumes a disproportionate amount of the HTA's annual budget. In 2004, the agency paid the NFL $5.3 million for the rights to host the game, compared with $2.1 million for its slate of PGA tournaments, and $585,000 for all other events combined (Schaefers, 2004).

This raises two questions. First, is the public funding for promotion and attraction of sports tourism well spent? Second, is the amount spent efficiently allocated across events? We use daily airplane arrival data from Hawaii's Department of Business, Economic Development, and Tourism to determine the net change in tourism for a variety of sporting events. Daily arrival data allows us to isolate the impact of these sporting events, while controlling for the typical fluctuations that occur across different months and days of the week. Although arrival data prevent us from estimating the dollar impact, which is the more relevant indicator of economic success, we find two events generate a positive and significant net impact on arrivals: Honolulu Marathon and Pro Bowl. We estimate that the Honolulu Marathon produces 2,183 to 6,519 in net arrivals while the Pro Bowl attracts about 5,595 to 6,725 in net arrivals. At the upper end of our estimates, the Honolulu Marathon and the Pro Bowl attract a nearly identical number of

visitors despite the fact that the HTA spends nearly two-thirds of its budget on the rights to the Pro Bowl and spends nothing for the Hawaii Marathon. Neither event attracts the number of net arrivals claimed by its sponsor, and other sporting events do not generate any identifiable impact on tourist arrivals whatsoever.

Background

The HTA justifies spending on sporting events on three grounds. First, they contend that these events attract athletes, spectators, officials, and media which increases revenue for Hawaiian accommodations, restaurants, and retail establishments. For example, the HTA estimated that the 2007 Pro Bowl attracted 27,625 visitors to Hawaii resulting in $28.03 million in visitor spending and $2.72 million in tax collections. (HTA, 2007, pg. 22) Second, the HTA suggests that sporting events serve to publicize Hawaii to prospective tourists. “The positive media and publicity generated from national and international TV/ media coverage promotes Hawaii as a desirable sports venue and an attractive visitor destination.” (HTA, 2007, pg. 22) Third, these events may improve the quality of life of the Island’s residents by allowing them opportunities to watch or participate in major sporting events.

Sports economists have frequently dealt with similar claims. The question of whether sporting events directly lead to increases in economic activity has been the most widely explored in this literature. As opposed to economic impact studies commissioned by the sports teams or leagues, independent economists examining an area’s economy before, during, and after major sporting events tend to find little or no economic impact

from hosting major events. Economists cite three primary reasons for the lack of economic impact: the substitution effect, crowding out, and leakages.

The substitution effect occurs when consumers spend money at a mega-event rather than on other goods and services in the local economy. A local Hawaii resident who goes to the Pro Bowl or a PGA tournament is spending money at the event that likely would have been spent elsewhere in the local economy in the absence of the game. Therefore, the local consumer's spending on a sporting event is not new economic activity, rather a reshuffling of local spending. For this reason, most economists advocate that spending by local residents be excluded from any economic impact estimates, and the HTA's own reports on the economic impact of the Pro Bowl mention only the 27,000 visitors to the Islands, not the remaining 23,000 locals who fill out the rest of the 50,000 total spectators for the game (HTA, 2007).

Even including only out-of-region visitors in impact studies may still result in inflated estimates if a large portion of the non-local fans at a game are "casual visitors," that is out-of-town guests who go to a sporting event, but are visiting the host city for reasons other than the sporting event itself. For example, a college professor at an academic conference may buy a ticket to a local game, and therefore the ticket would be counted as a direct economic impact of the sports contest. The professor, however, would have come to the city and spent money on hotels and restaurants in the absence of the sporting match, and again the money spent at the game substitutes for money that would have spent elsewhere in the local economy.

Similarly, *ex ante* estimates may be biased upwards if event guests engage in "time-switching," which occurs when a traveler rearranges a planned visit to a city to

coincide with a mega-event. It is possible that someone who has always wanted to visit Hawaii might decide to plan a trip during the Pro-Bowl. While the Pro-Bowl did influence the tourist's decision about *when* to come, it did not affect the decision *whether* to come. Therefore total tourism spending in Hawaii is unchanged, and the Pro-Bowl simply affects the timing of such spending.

In the case of mega-events, the amount of new spending that is new to the economy is thought to be quite large in comparison to the total amount of spending, since these "premier" events are thought to attract large audiences from outside the local economy, many of whom come specifically for the event. As noted previously, the attendance at the 2007 Pro Bowl was 50,410, just over half of whom were estimated to have traveled to Hawaii for the game whereas only 5% to 20% of fans at a typical Major League Baseball (MLB) regular season game, for example, are visitors from outside the local metropolitan area (Siegfried and Zimbalist, 2000).

A second source of bias is "crowding out," which results from the congestion caused by a mega-event that dissuades regular recreational and business visitors from coming to a city during that time. While a city's hotels may be full of fans during the Pro Bowl, if the city's hotels are generally full of vacationers or conventioneers anyway, the Pro Bowl simply displaces other economic activity that would have occurred. In other words, the economic impact of a mega-event may be large in a gross sense but the net impact may be small. Scores of examples of this phenomenon exist. As a case in point, during the 2002 World Cup in South Korea, the number of European visitors to the country was higher than normal, but this increase was offset by a similar sized decrease in the number of regular tourists and business travelers from Japan who avoided South

Korea due to World Cup hassles. The total number of foreign visitors to South Korea during the World Cup in 2002 was estimated at 460,000, a figure identical to the number of foreign visitors during the same period in the previous year. (Golovnina, 2002)

A third source of bias comes from leakages. While money may be spent in local economies during mega-events, this spending may not wind up in the pockets of local residents. The taxes used to subsidize these events, however, are paid for by local taxpayers. The economic multipliers used in *ex ante* analyses are calculated using complex input-output tables for specific industries grounded in inter-industry relationships within regions based upon an economic area's normal production patterns. During mega-events, however, the economy within a region may be anything but normal, and therefore, these same inter-industry relationships may not hold. Since there is no reason to believe that the usual economic multipliers are the same during mega-events, any economic analyses based upon these multipliers may be highly inaccurate.

In fact, there is substantial reason to believe that during mega-events, these multipliers are highly overstated, which overestimates the true impact of these events on the local economy. Hotels, for example, routinely raise their prices during mega-events to three or four times their normal rates. The wages paid to a hotel's workers, however, remain unchanged, and indeed workers may be simply expected to work harder during times of high demand without any additional monetary compensation. As a hotel's revenue increases without a corresponding increase in costs, the return to capital (as a percentage of revenues) rises while the return to labor falls. Capital income is far less likely to stay within the area in which it is earned than labor income, and therefore, one

might expect a fall in the multiplier effect during mega-events due to these increased leakages (Matheson, 2004).

While *ex ante* estimates often do a credible job in determining the economic activity that occurs as a result of a mega-event and may also address the issue of the substitution effect by excluding spending by local residents, they generally do a poor job of accounting for crowding-out and almost never acknowledge the problems associated with the application of incorrect multipliers. For these reasons, numerous studies have looked back at the actual performance of economies that have hosted mega-events and have compared the observed economic performance of host cities to that predicted in *ex ante* studies. *Ex post* analyses such as Porter (1999), Baade and Matheson (2001; 2004; 2006), Coates and Humphreys (2002), Coates (2006), Coates and Depken (2006), Hagn and Maennig (2007a;2007b), Jasmand and Maennig (2007), and Baade, Baumann, and Matheson (2008), similarly uncover little relationship between hosting major sporting events and real economic variables such as employment, personal income, personal income per capita, and taxable sales.

As noted previously, the HTA also suggests that sporting events serve to publicize Hawaii to prospective tourists. Sports fans may enjoy their visit to the city and return later raising future tourist revenues for the area. Corporate visitors, it is claimed, may relocate manufacturing facilities and company headquarters to the city. Television viewers might decide to take a trip to the host city at some time in the future based on what they see during the broadcast of the mega-event. Finally, hosting a major event might raise perception of the city so that it becomes a “major league” or “world class” city and travel destination. All of these claims are potentially true although little

empirical research has conclusively demonstrated any long-run connections between hosting mega-events and future tourism demand, and there are not even any anecdotal examples of companies moving corporate operations to a city based on the hosting of a sporting event.

Ritchie and Smith (1991) do find that name recognition of Calgary rose significantly as a result of the 1988 Winter Olympics but also document that the boost was potentially short-lived. Similarly, Tieglund (1999) shows that rather than a boom in tourism following the 1994 Winter Olympic Games, in fact, 40% of the full-service hotels in Lillehammer went bankrupt.

Other studies that attempt to quantify the media effects of large events often derive benefits from the media exposure that defy credulity. One study of the Borussia Mönchengladbach soccer team in Germany asserted the value of a single national broadcast of a soccer match played in Mönchengladbach to be equal in value to twenty targeted 30-second tourism advertising spots directed to the same size audience.

While advertising benefits to mega-events certainly exist, two caveats must be mentioned. First, the presence of a mega-event may bring with it intangible costs as well as benefits. For example, the publicity associated with a sporting event may not always place a city in a positive light. Following the riots that occurred during the National Basketball Association finals in Detroit in the early 1990s, the city's national image basked in the glow of car fires and burning buildings rather than the goodwill associated with an NBA championship. The bribery scandal that surrounded the 2002 Winter Olympics in Salt Lake City certainly didn't enhance the city's reputation. Similarly, the

international reputations Munich and Atlanta were tarnished by the terrorist events that occurred during the Olympic Games held in their respective cities.

Finally, the HTA notes that these events improve the quality of life of Hawaii's residents by allowing them opportunities to watch or participate in major sporting events. Again, it is clear that sports do bring some intangible benefits to local residents. As Rudy Perpich, the former governor of Minnesota, once quipped, "Without professional sports, Minneapolis would just be a cold Omaha." Similarly, while Hawaii is a tropical paradise, it is also small and isolated without the range of cultural amenities that other larger and more interconnected states offer. Of course, directly measuring these quality of life benefits is fraught with difficulty and academic studies are mixed on the subject. As noted previously, sports don't appear to make local residents richer, but they may make them happier. Carlino and Coulson (2002) find that housing rental prices are higher in cities with professional sports teams indicating a higher willingness of buyers to pay for housing in cities with these amenities. Of course, cities with professional teams are generally larger metropolitan areas, which offer many other cultural attractions for which renters would also be willing to pay a premium.

Contingent valuation studies of professional sports franchises (Johnson, Groothius, and Whitehead, 2001; Johnson, Mondello, and Whitehead; 2006), stadiums and arenas (Groothius, Johnson, and Whitehead, 2004), and mega-events (Atkinson, et al., 2008; Walton, Longo, and Dawson, 2008) also find that citizens are exhibit a willingness to pay for sports teams and events beyond simply purchasing tickets. Maennig's (2007) ex post analysis of the 2006 World Cup in Germany similarly concludes that claims of "increased turnover in the retail trade, overnight

accommodation, receipts from tourism and effects on employment [are] mostly of little value and may even be incorrect. Of more significance, however, are other (measurable) effects such as the novelty effect of the stadiums, the improved image for Germany and the feelgood effect for the population." (Maennig, 2007, p. 1)

The Data

The analysis of the economic impact of sporting events in Hawaii is problematic due to the annual nature of the events. Most *ex ante* analyses of sporting events are based on changes in the sports environment. For example, Coates and Humphreys (2002) and Baade and Matheson (2001; 2006) estimate the economic impact of all-star games and post-season play in U.S. professional sports by analyzing annual data, and their analyses rely on the fact that either by design or the random nature of team success, these events take place in different cities year after year. Therefore, these studies can estimate the impact of an event by examining a local economy in one year that an event is held in comparison with the next year when the big game is played in a different city. Similarly, Coates and Depken (2006) and Baade, Baumann, and Matheson (2008) examine monthly taxable sales data and again rely on differences in the numbers or types of games played during specific months to estimate the impact of major sporting events on tax receipts.

Table 1 lists the events examined in this study: Pro Bowl, Hawaii Bowl, Hula Bowl, Ironman Triathlon and several golf events. These events are chosen because of their prominence and notoriety and due to the funding they receive from the HTA. One final sporting event is also included, the Honolulu Marathon, despite the fact that is does not receive direct funding from the state. This marathon attracts over 25,000 runners

annually, including over 15,000 entrants from Japan, regularly making this race one of the ten most popular marathons in the world. The Honolulu Marathon Association estimated that the 2007 race generated $108.9 million in visitor spending. (Tsai, 2008) Table 1 also shows, however, that the major events held in Hawaii, take place annually and in the same month each year (although there is often some variability in the exact time within each month). Thus, use of annual or monthly data is not acceptable in measuring the economic impact of the major sporting events that take place in Hawaii.

However, Hawaii's Department of Business, Economic Development, and Tourism provides daily arrival data. These data include arrivals at all Hawaiian airports and range from January 1, 2004 to May 18, 2008. Arrival data are split into domestic and international arrivals. Over the sample frame the average number of arrivals is 22,716 per day, with domestic arrivals typically accounting for three-quarters of all arrivals. These data offer two advantages over taxable sales data that are common to the impact analysis literature. First, daily data greatly reduce the amount of statistical noise compared to impact studies that use quarterly or monthly data. Second, a very large majority of visitors to Hawaii arrive by plane, which improves our measurement of the tourism effect of these sporting events. Indeed, Hawaii's remote provides an almost unique opportunity to examine the effects of sporting events on overall tourism for an economy. Of course, while daily arrival data allow us to isolate the impact of the aforementioned sporting events, we cannot estimate the dollar impact, which is ultimately the most relevant indicator of economic success.

The Model

In order to examine the impact of the individual sporting events on arrivals to Hawaii, we use intervention analysis on an ARIMA model as outlined in Box and Tiao (1975). Others have employed similar techniques to analyze a wide array of economic problems in sports including the effects of the most recent players' strikes on MLB attendance (Schmidt and Berri, 2002; Matheson, 2006) and the impact of professional sports on taxable sales in cities in Florida (Baade, Baumann, and Matheson, 2008). Intervention analysis provides a formal test for the change in the mean of a series as a result of an exogenous shock at a specific point in time.

The general intervention ARIMA(P,D,Q) model for the arrival data is

$$y_t^* = \sum_{p=1}^{P} \Phi_p y_{t-p}^* + \sum_{q=1}^{Q} \Theta_q \varepsilon_{t-q}^* + \sum_{m=1}^{12} \alpha_m MS_m + \sum_{d=1}^{6} \beta_d DS_d + \sum_{e=1}^{E} \delta_s EVENT_s + \varepsilon_t^*,$$

where y_t^* is the first-differenced daily arrival in time period t, P is the number of lagged values of y_t^* in the model known as the autoregressive (AR) dimension of the model, ε_t is an error term, Q is the number of lagged values of the error term representing the moving average (MA) dimension of the model, and z_t is an independent variables representing the effect of various sporting events of other exogenous economic events such as natural or man-made disasters. D is the number of times y_t is differenced to create y_t^*. The model also includes a vector of monthly dummy variables (MS_m) and a vector of daily dummy variables (DS_d) to account for seasonal and daily differences in arrivals. The constant term is omitted because all months are included in MS_m.

Because the arrival data are non-stationary, we use the first difference of daily arrivals in our estimations. Augmented Dickey-Fuller and Phillips-Perron tests reject the existence of a unit root for the first differenced data. The autoregressive and moving average dimensions of the models are determined through trial and error testing. Only the

optimal autoregressive and moving average structures, as determined by the Akaike Information Criterion, are presented in the results. Estimations performed on undifferenced data, which we do not report here, returned similar results, which suggests that the data are not "over-differenced."

$EVENT_s$ contains the controls for sporting events. Table 1 presents these events and the dates they were held. For those traveling to Hawaii for any of these sporting events, it is uncertain when they would arrive. Because of the distance, it is unlikely that people would arrive the same day of the event. But it is unclear exactly when arrivals would increase prior to a sporting event. For example, golf tournaments typically have four rounds that are held over four days, and some have preliminary events prior to the first round. Also, it is likely many travelers arrive several days prior to the event to see some of the other attractions in Hawaii and to alleviate jet lag. Coates and Humphreys (2005) face a similar issue when estimating the novelty effect of new stadiums, and used a series of *F*-tests to determine the best specification. We begin as Coates and Humphreys (2005) by creating seven dummy variables for each event: a dummy for arriving one day prior, a dummy for arriving two days prior, and so on up to seven days prior.[1] Because we observe each event multiple times (either four or five), the model should identify any systematic net increase in the number of arrivals. We also include a control for the 2006 Hawaii Earthquake, which occurred on Sunday, October 15th. Because the dependent variable is a daily difference, each of these events is also differenced.

[1] For four-day golf tournaments, we count backwards from the final round.

Table 2 presents the model with seven dummy variables for each of the following events: Pro Bowl, other bowls (Hula and Hawaii), a golf event, Ironman Triathlon, Honolulu Marathon, and the Maui Marathon. We also present three specifications of the dependent variable: total arrivals, domestic arrivals, and international arrivals. Although not presented for brevity, daily, monthly, and yearly dummies are included in the model, so each coefficient can be thought of as a net difference from what is typical on that particular day, month, and year. Only two events produced statistically significant estimates: Pro Bowl and Honolulu Marathon. For brevity, we omitted the results for other bowls, golf events, Ironman Triathlon, and Maui Marathon, but full results are available on request. Coates and Humphreys (2005) take another step and perform a series of *F*-tests to determine the ideal specification in terms of the number of pre- or post-event periods to include. We do the same, and the net impacts of the Pro Bowl and Honolulu Marathon (or any of the statistically insignificant events) do not change substantially with the inclusion of anywhere from 3 to 7 days of arrivals prior to each event.

The Pro Bowl has a positive and significant impact on arrivals for each of the three days prior to the game. The largest positive estimate is about 2,593 and occurs three days prior to the game. This is almost a 12% increase in tourist arrivals from an average February day. The domestic and international specifications suggest the vast majority of these extra tourists are domestic travelers. Using only the statistically significant controls for arrivals in the three days prior to the event, the Pro Bowl appears to increase net arrivals into Hawaii by 6,725 visitors.

The Honolulu Marathon, which is one of the world's largest, also produced positive and significant net impacts for each of the three days prior to the game. The

largest positive estimate is about 2,510 and occurs two days prior to the race. This is about a 10.7% increase from an average December day. Unlike the Pro Bowl, in this case the positive net impacts are primarily driven by international travelers. Again using only the statistically significant controls for arrivals in the three days prior to the race, we estimate the net impact of the Honolulu Marathon is 6,519 tourists, roughly the same magnitude as the Pro Bowl.

For both the Hawaii Marathon and the Pro Bowl, the "crowding out" effect is clearly evident. While there is little reason to doubt the HTA's estimates that 27,000 visitors attend the Pro Bowl, the arrival statistics indicate that only about 6,500 extra visitors arrive in Hawaii in the time period prior to the Pro Bowl. Either three-quarters of the out-of-state fans were coming to Hawaii anyway, despite the Pro Bowl, or roughly 20,000 Pro Bowl fans displaced other tourists. Similarly, although the Honolulu Marathon attracts 15,000 Japanese runners, the net increase in arrivals in the period prior to the race is less than half this figure.

Taking the idea of crowding out one step further, both the Pro Bowl and Honolulu Marathon also exhibit a statistically significant decline in tourism 5 or 6 (Honolulu Marathon) or 7 days (Pro Bowl) before the event. One possible explanation for this result is, again, that regular tourists are crowded out by sports tourists. Due to its distant location, regular tourists often spend periods in the state of at least one week. If visitors cannot find hotel accommodations during the following weekend after their arrival due to a sporting event, they are unlikely to make the choice to arrive in the previous week in the first place. These events may be replacing regular visitors planning on staying an entire week with sports visitors staying only for the weekend of the event, an outcome

that would certainly negatively impact the economy. Including the statistically significant negative results in the week prior to the events reduces the net increase in arrivals for the ProBowl and Honolulu Marathon to 5,596 and 2,183, respectively.

It is fair to mention one caveat to the results presented here. It is impossible with the available data to determine whether any of the displaced visitors reschedule their trips to other weeks. It is theoretically possible that the Pro Bowl may increase tourism during periods other than the week of the game by displacing tourists from the week of the Pro Bowl to another time. Still, it is clear that crowding out is an obvious problem that is not typically addressed by *ex ante* economic impact analyses.

Conclusions

City and states often use spectator sports as a vehicle for economic growth. Hawaii has a government agency that is devoted to attracting, and in some cases, financing sporting events in order to increase tourism in the short term and to raise the state's profile in the long term. Compared to other economic impact analyses, Hawaii offers an interesting case study because the availability of daily arrival data and the state's remote location, which allows us to isolate the impact of hosting a variety of sporting events net of typical fluctuations in tourism.

We find two events generate a positive and significant net impact on arrivals: Hawaii Marathon and Pro Bowl. The HTA spends roughly two-thirds ($5.3 million) of its budget for the rights to the Pro Bowl. Based on results presented in this paper, this investment results in between 5,596 and 6,725 extra tourists to Hawaii. In comparison, the Hawaii Marathon, which receives no direct funding from the HTA, attracts between

2,183 and 6,519 extra tourists. Unlike the Pro Bowl, much of net tourism caused by the Honolulu Marathon is due to participants. While there are some costs and inconveniences associated with the Marathon, they are likely to be small in comparison to the Pro Bowl even before figuring the $5.3 rights fee million to bring the event to Hawaii.

Of course, the power of the NFL to extract higher rents from the HTA than the Honolulu Marathon Association despite the fact that the race could quite reasonably make the claim that it brings in a similar or higher number of visitors should come as no surprise to economists. Unlike the NFL's control over its brand, no single organization can claim a monopoly on the distance of 26.2 miles, the length of a marathon. Even though we ultimately cannot quantify the dollar effect of these sporting events, it seems apparent that the Marathon is a bargain compared the large investment necessary to bring the Pro Bowl to Hawaii.

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The Impact Of A Mega-Event On Host Region Awareness: A Longitudinal Study
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Mega-events and impacts on tourism; the predictions and realities of the Lillehammer Olympics
Author: Teigland, Jon
Source: Impact Assessment and Project Appraisal, Volume 17, Number 4, 1 December 1999 , pp. 305-317(13)

Coates and Humprheys CEP paper

Table 1: Event Dates

	2004	2005	2006	2007	2008
Football					
Pro Bowl (NFL)	Feb.8	Feb.13	Feb. 12	Feb. 10	Feb. 10
Hula Bowl (NCAA)	Jan. 17	Jan. 22	Jan. 21	Jan. 14	Jan. 12
Hawaii Bowl (NCAA)	Dec. 24	Dec. 24	Dec. 24	Dec. 23	-
Golf					
Mercedes-Benz Championship	Jan. 8 – Jan. 11	Jan. 6 – Jan. 9	Jan. 5 – Jan. 8	Jan. 4 – Jan. 7	Jan. 3 – Jan. 6
Sony Open	Jan. 15 – Jan. 18	Jan. 13 – Jan. 16	Jan. 12 – Jan. 15	Jan. 11 – Jan. 14	Jan. 10 – Jan. 13
Mastercard Championship	Jan. 22 – Jan. 25	Jan. 20 – Jan. 23	Jan. 19 – Jan. 22	Jan. 18 – Jan. 21	Jan. 17 – Jan. 20
Turtle Bay Championship	-	Jan. 27 – Jan. 30	Jan. 26 – Jan. 29	Jan. 25 – Jan. 28	Jan. 24 – Jan. 27
Wendy's Champions Skins Game	Jan. 29 – Feb. 1	Feb. 3 – Feb. 6	Feb. 2 – Feb. 5	Jan. 11 – Jan. 14	Jan. 21 – Jan. 24
SBS Open	-	Feb. 23 – Feb. 26	Feb. 15 – Feb. 18	Feb. 14 – Feb. 17	Feb. 13 – Feb. 16
Fields Open	-	-	Feb. 22 – Feb. 25	Feb. 21 – Feb. 24	Feb. 20 – Feb. 23
marathons/distance					
Honolulu Marathon	Dec. 12	Dec. 11	Dec. 10	Dec. 9	-
Maui Marathon	Sep. 19	Sep. 18	Sep. 17	Sep. 16	-
Ironman Triathlon	Oct. 16	Oct. 15	Oct. 21	Oct. 13	-

Note: The sample frame is from January 1, 2004 to May 18, 2008, which predates the 2008 Hawaii Bowl and any of the 2008 marathons/distance competitions.

Table 2: Results

	Arrivals	Domestic	International
Pro Bowl, arriving one day prior	1644.990**	1324.702**	61.760
	691.913	578.885	411.230
Pro Bowl, arriving two days prior	2488.252**	2188.193**	106.070
	1022.774	993.264	406.639
Pro Bowl, arriving three days prior	2592.887**	2354.060**	-11.210
	1176.258	1116.841	527.628
Pro Bowl, arriving four days prior	1506.319	1668.760	-340.971
	1283.392	1292.500	444.601
Pro Bowl, arriving five days prior	597.149	617.630	-199.439
	842.998	1478.277	356.295
Pro Bowl, arriving six days prior	-173.118	-512.118	234.773
	731.093	492.684	416.741
Pro Bowl, arriving seven days prior	-1129.745**	-836.494**	-389.660
	476.365	328.084	406.893
Honolulu Marathon, arriving one day prior	2444.159***	195.128	1905.783***
	371.263	342.959	373.459
Honolulu Marathon, arriving two days prior	2510.093***	-289.422	2565.808***
	622.667	574.328	549.844
Honolulu Marathon, arriving three days prior	1565.117**	-617.865	2104.550***
	788.391	748.180	488.145
Honolulu Marathon, arriving four days prior	-521.388	-1520.288*	967.460**
	802.512	877.828	393.638
Honolulu Marathon, arriving five days prior	-2538.379***	-2409.535**	-89.663
	882.167	1021.849	352.286
Honolulu Marathon, arriving six days prior	-1797.939*	-1506.344	-221.281
	995.278	1084.790	380.825
Honolulu Marathon, arriving seven days prior	-631.369	-788.673	221.964
	731.718	846.106	453.460
2006 Hawaii Earthquake	-7014.407***	-6057.394	-951.434
	1799.301	8612.219	923.001
AR(1)	0.678***	0.671***	-0.742***
	0.024	0.024	0.060
MA(1)	-0.920***	-0.870***	0.276***
	0.050	0.048	0.056
MA(2)	-0.080**	-0.130***	-0.492***
	0.034	0.033	0.026
log Likelihood	-13563.24	-13245.59	-12542.14

Note: Dummy variables for each month and each day except Wednesday are included but not presented here. In addition, *, **, and *** represent statistical significance at the ten, five, and one percent thresholds, respectively.