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A Note on the Effects of Popular Music Concerts on Hospitality Sales: The Case of Waterfront Concerts in Bangor, Maine*

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Abstract: This piece examines the local tourism-related expenditures made by attendees at large, outdoor popular music concerts held from 2010 to 2012 in Bangor, Maine. A regression analysis of the relationship between monthly taxable retail sales—e.g., restaurant and lodging sales—and the number of concertgoers is used to estimate local spending figures of between $33.81 and $52.31 per attendee on restaurant meals, and $18.92 to $23.12 per concertgoer on lodging in the Bangor region. Results suggest that an estimated 29 to 31 percent of attendees spend the night in the local area, which is very similar to the share of concertgoers who travel more than two hours to attend shows.

Keywords: popular music concerts, tourism expenditures, economic impact, taxable retail sales data

JEL Codes: R11, Z11, R15

1. INTRODUCTION

Economic impact analysis (via input-output, regional applied computable general equilibrium, and systems econometric time series modeling) is frequently used by regional scientists to examine the effects of an exogenous change in regional final demand. Common applications of economic impact studies include the analysis of new plant openings and business closures, the economic contribution of entire industrial sectors (e.g., economic impact of biotechnology), and the effects of tourists (e.g., recreational visitors) and special events (e.g., festivals) on a region's economy. A vast academic literature has covered numerous aspects of economic impact analysis methods and applications.

When applied to the study of a special event, economic impact analysis involves coming up with estimates of the number of attendees and expenditures per person (these factors determine the change in final demand; i.e., the event's direct impact); and then estimating the event's multiplier effects using a regional economic model. For some types of events, the estimates of the "number of spending units" and "spending per unit" can exhibit substantial variability depending on how the information is collected (English, 2000; Weiler et al., 2002). Even when the number of attendees is known (e.g., the event requires a ticket or the number of visitors can be accurately counted), it can be a challenge coming up with per-person expenditure figures.

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The purpose of this study is to develop regression-based estimates of the expenditures per-person made by attendees at popular music concerts held in Bangor, Maine. Although these results may not be applicable to the regional economic impacts of concerts and other types of tourism events held elsewhere, the study demonstrates the utility of a regression-based approach that examines the relationship between monthly taxable retail sales—e.g., restaurant and lodging—and the number of people attending the performances. Such an approach might be appropriate for the analysis of other types of tourism events because it is relatively low cost, provided that retail sales and visitor count data are readily available, and it overcomes many of the limitations of survey-based expenditure estimates.

A rich literature exists on the economic impacts of tourism events (Ritchie, 1984; Long and Perdue, 1990; Tyrrell and Johnston, 2001), but very few studies have looked specifically at visitor spending related to popular music concerts (Gazel and Schwer, 1997). The most common approaches to measuring visitor expenditures are conducting surveys of tourists and/or local businesses, and developing expenditure models that, for example, could be used to estimate overall visitor spending from secondary data on a measure such as taxable lodging receipts (Frechtling, 2006). The biggest challenges encountered when conducting such studies include reducing measurement errors (e.g., survey recall and unrepresentative visitor samples) and being able to separate "new" expenditures from spending that would have occurred in the region even in the event's absence (McHone and Rungeling, 2000; Stynes and White, 2006). For example, Tyrell and Johnston (2001) note that counting all expenditures related to a folk festival in Newport, Rhode Island, would have overstated by almost 100 percent its "net" economic impact, which properly accounts for the spending of locals as compared to those from outside the region.

Along with the aforementioned limitations of using survey-based expenditure figures, Baade, Baumann, and Matheson (2008) discuss "crowding out" and "leakages" as additional deficiencies of this approach.[1] Crowding out describes a phenomena by which area residents are likely to stay away from tourism-related businesses located near the event's venue, which could reduce the spending of locals and, therefore, offset the impacts of those involved in the event. Leakages occur when expenditures related to an event do not translate into local economic activity. In an analysis of the local impacts of sports teams, Siegfried and Zimbalist (2002) note that only 29 percent of NBA players live in the city where they play. For our analysis of popular music concerts, none of the artists live in the region (i.e., Bangor, Maine) where the venue is located. This means that a survey-based approach, if it did not account for the leakages occurring via the payments to the performing artists, could overstate the events' economic impacts.

As an alternative to survey-based approaches, Baade, Baumann, and Matheson (2008) examine the impacts of professional sports—e.g., large events and labor disputes—on the economies of selected cities in Florida using regression analysis of taxable retail sales data. They note that taxable sales data are "ideally suited" for the analysis of the impacts of large events because of the direct connection between the events and tax collections (i.e., attendees purchase goods and services that are subject to the tax) and the fact that monthly taxable sales data are available for individual municipalities. This makes it possible to isolate the effect of narrowly focused and short-term events on local economic activity. Taxable retail sales data have also been used to examine, among other things, the impacts of sports teams and events in Texas

[1] Baade, Baumann, and Matheson (2008) also discuss the "substitution effect," which is similar to the challenge of measuring "new" economic activity to the area (McHone and Rungeling, 2000; Tyrrell and Johnston, 2001).

(Coates and Depken, 2006), and a ban on indoor smoking in New York City (Hyland, Cummings, and Nauenberg, 1999).

Perhaps the most well-known academic study on the economic impacts of popular music concerts is the analysis by Gazel and Schwer (1997) that focused on three Grateful Dead performances held in Las Vegas, Nevada. They estimated local expenditures based on voluntary intercept (i.e., self-selection) surveys of about 1,000 concertgoers (out of 111,554 attendees). Although Gazel and Schwer (1997, p. 44) note that the "peculiarities" of a Grateful Dead concert "precluded the selection of a completely random sample" from the population of all attendees, they conducted interviews of individuals (that were not self-selected) in a small control group and found no significant differences in expenditures between the sample and control group.

The Gazel and Schwer (1997) study reported a very large range in the total economic impacts associated with Grateful Dead tourists, from an estimated $12.2 million to $22.9 million. The reason for this large spread is that they used a "conservative" estimate—assuming that survey respondents reported expenditure figures for their entire party—and an "optimistic" estimate, which assumes respondents reported individual expenditure figures (as they were instructed on the survey). These issues that sometimes surface when conducting survey-based economic impact studies—such as obtaining and testing for a random sample, and interpreting survey responses—are not present in regression-based expenditure studies that rely on visitor counts and secondary retail sales data.

The rest of the paper is organized as follows. The next section presents a brief overview of popular music concerts and the region of analysis; as well as a discussion of the study's conceptual framework and data used in the regression models. This section is followed by the regression results. After that, we use the estimated coefficients of the regression analysis to estimate the percentage of concertgoers who purchase lodging in the Bangor area, which helps determine the cutoff in driving time that separates the people who stayed overnight in the region and those who returned home after the concerts. The final section of the paper provides a summary and conclusions.

2. ROCK STARS AND REGRESSION MODELS

Large popular music concerts (e.g., festivals and shows by well-known artists) are often significant tourism events that create substantial fan interest and economic activity. The top 25 grossing music tours of 2012, as tracked by *Billboard* magazine, generated a combined $1.8 billion in ticket sales.[2] More important to the places where concerts are held, the 1,381 individual shows that made up these top-grossing tours had a total attendance of over 19.6 million people. The ability of popular music artists to draw fans who reside outside the region to cities and other places where the venues are located means that spending on concert tickets—counted in the $1.8 billion in gross revenue noted above—is typically accompanied by additional local expenditures on food and beverages, lodging, and retail purchases.

Waterfront Concerts, located in Bangor, Maine, provide an ideal setting for examining the hospitality spending of concertgoers. The venue hosted 41 outdoor shows from 2010 to 2012, and featured acts such as Bob Dylan, Barenaked Ladies, Def Leppard, Jason Aldean, and

[2] http://www.billboard.com/articles/news/1481408/top-25-tours-of-2012, accessed on May 17, 2013.

Godsmack. The performers cut across a wide range of tastes and popular music genres (e.g., country, rock and roll, alternative).

The number of attendees at a typical show is relatively large compared to the region's population (the City of Bangor had about 33,000 residents as of the 2010 Census), which might make it easier to isolate—in a statistical model—the spending of concertgoers. Furthermore, Bangor has relatively few (other) events per year that attract numbers similar to those who attend the Waterfront Concerts. Although Bangor does not have a lot of large tourism events, the region is a service center with enough restaurants and lodging establishments to accommodate the attendees at most concerts. The relative lack of hospitality businesses in the areas immediately surrounding the Bangor Economic Summary Area, defined below, means that the region will be able to capture the spending—if it occurs—of concertgoers from outside the local area. Finally, the availability of monthly taxable retail sales data from Maine Revenue Services makes this type of analysis possible in Maine.

The following two regression models are used to examine the relationship between taxable restaurant and lodging sales, respectively, and the number of attendees at music concerts in a given month *t*:

(1) $Restaurant_t = \beta_0 + \beta_1 Concert\ Attendees_t + \beta_2 Casino\ Activity_t + \beta_3 General\ Merchandise\ Sales_t + \beta_4 Acadia\ Visitors_t + \beta_5 Restaurant\ Elsewhere_t + \varepsilon_t$

(2) $Lodging_t = \alpha_0 + \alpha_1 Concert\ Attendees_t + \alpha_2 Casino\ Activity_t + \alpha_3 General\ Merchandise\ Sales_t + \alpha_4 Acadia\ Visitors_t + \alpha_5 Lodging\ Elsewhere_t + \varepsilon_t$

The dependent variables in the two regression models—*Restaurant* and *Lodging*—are monthly values for restaurant and lodging taxable retail sales in the Bangor Economic Summary Area (ESA).[3] The Bangor ESA, as defined by Maine Revenue Services (the agency that reports the taxable retail sales data) includes the city itself and some surrounding communities. Although some concertgoers might purchase food and lodging outside the Bangor ESA—either by choice or necessity (a couple of very large shows were believed to "sell out" local lodging establishments)—the nature of this region (i.e., service center with relatively few large events) makes it an appropriate unit of analysis.

The explanatory variable of key interest, labeled as *Concert Attendees*, is the number of fans who attended concert events. As noted above, Waterfront Concerts has produced 41 shows between 2010 (its inaugural year) and the end of 2012, with the concerts taking place during "warm weather" months.[4] Between July of 2010 (the month of the first show) and September of 2012 (the month of the last show in 2012), a total of 15 months had shows and the busiest month, with a total of six concerts, was September 2011 (B.B. King, Carnival of Madness, Lady Antebellum, Dropkick Murphys, Reba McEntire, and George Thorogood). Table 1 shows the number of events by year, as well as the top concerts in terms of attendance. The estimated coefficients corresponding to the *Concert Attendees* variable in Equations (1) and (2) will provide estimates of the average spending of concertgoers on restaurant meals and lodging.

[3] The restaurant sales variable has an average value of $14.2 million between January 2000 and September 2012, and the measure of lodging sales has an average value of $2.63 million over the same period.

[4] The concert venue is an outdoor pavilion. Shows took place between July-October 2010; April-September 2011; and May-September 2012.

Table 1: Waterfront Concert Events by Year

Year	Number of Events	Highest Attendance
2012	17	Jason Aldean, Zac Brown, Journey
2011	17	Toby Keith, Lady Antebellum, Lynyrd Skynyrd
2010	7	Godsmack, Alan Jackson, Lynyrd Skynyrd

Note: Information provided by Waterfront Concerts.

The fact that concerts took place only during "warm weather" months raises some concern that the impacts ascribed to the *Concert Attendees* variable could be capturing other economic activity that is seasonal in occurrence. A couple of steps are taken to guard against this possibility. First, the data set covers the period of January 2000 to September 2012 and, in a separate analysis, January 2004 to September 2012. Having several years of data prior to the first performance means that the regression analysis should be able to distinguish between additional local expenditures (between April and October) attributed to the concertgoers and seasonal increases in expenditures that occurred in earlier years. Second, and perhaps more important, several of the control variables described below—especially *Acadia Visitors*, *Restaurant Elsewhere* and *Lodging Elsewhere*—account for seasonal swings in restaurant and lodging sales.

The variable labeled *Casino Activity* measures the amount of revenue generated monthly by Hollywood Casino of Bangor, which is the city's only casino and one of its most popular attractions (in terms of net gaming revenue). This variable controls for differences over time in the amount of spending by casino patrons on restaurant meals and lodging, which can help isolate the impacts of the concertgoers (Gabe, 2007). The casino began operations in November 2005 and its monthly net gaming revenue averaged $4.34 million between its first month and September 2012 (revenue figures are from the Maine Gambling Control Board), with a range of $1.97 million (November 2005) to $6.30 million (July 2008). As of 2009, Hollywood Slots attracted an average of 50,000 to 60,000 visitors per month (Cook, 2010). The regression coefficients corresponding to the *Casino Activity* variable in Equations (1) and (2) will provide estimates of the average expenditures on restaurant meals and lodging per $1.00 spent at the casino in Bangor.

The variable labeled *General Merchandise Sales* is used to control for the amount of money spent per month in department stores (e.g., Macy's and JC Penney) and general merchandise retailers (e.g., Wal-Mart and Target) located in the Bangor ESA. This variable has an average value of $34.7 million per month between January 2000 and September 2012 (sales figures are from Maine Revenue Services). General merchandise sales were 10.00 times larger than lodging sales in Bangor in 2012, which is much higher than the statewide ratio of 4.21 (general merchandise sales divided by lodging sales). This suggests that, compared to the state as a whole, Bangor is more aptly characterized as a retail service center than a vacation destination. The Bangor region tends to capture retail activity from areas in northern Maine and parts of Atlantic Canada, and the extent to which these shoppers also spend money in restaurants and lodging establishments is captured by the explanatory variable measuring the amount of general merchandise sales per month.

The variable labeled *Acadia Visitors* is a monthly count of visitors to Acadia National Park. Although Acadia is located about 50 miles from the concert venue, the Bangor region is economically affected by Acadia because many of its visitors fly into the Bangor airport or drive through the area *en route* to the park. Thus, the number of park visitors per month, which ranges from fewer than 15,000 in the winter months to well over 500,000 in the summer (counts are from the National Park Service), is a proxy for the number of (summer) tourists who pass through the Bangor region.

The final explanatory variables included in Equations (1) and (2)—*Restaurant Elsewhere* and *Lodging Elsewhere*—account for the amounts of monthly restaurant and lodging sales occurring outside of the Bangor ESA, but elsewhere in Maine. These variables, based on data from Maine Revenue Services, control for overall economic conditions in Maine's hospitality sector, which would affect sales in the Bangor region, as well as broader macroeconomic trends and seasonal swings in restaurant and lodging sales.[5]

3. REGRESSION RESULTS

Table 2 presents regression results on the effects of popular music concert attendees on taxable restaurant sales in the Bangor ESA. Three regression models are estimated, and each model uses data from January 2000 to September 2012 (153 observations) and January 2004 to September 2012 (105 observations); thus, there are six sets of results. The values in parentheses are Newey-West (1987) robust standard errors, used to correct for heteroskedasticity and serial correlation that are often present in time-series regression models.

The first regression model includes the *Concert Attendees* variable by itself, and the R^2 values of .220 to .272 suggest that the month-to-month variation in the number of concertgoers explains about one-quarter of the variation in taxable restaurant sales in the Bangor ESA. The next two sets of regression models—one controls for restaurant sales outside the Bangor ESA but elsewhere in Maine, and the other controls for the number of visitors to Acadia National Park (see footnote 5)—have adjusted R^2 values ranging from .69 to .79.[6]

The regression results show a positive and statistically significant relationship between monthly taxable restaurant sales and the number of concert attendees. More specifically, the estimated coefficients (from the models controlling for other factors that might explain restaurant sales in the Bangor ESA) corresponding to the *Concert Attendees* variable suggest that a one-person increase in concert attendance is associated with between $33.81 (i.e., estimated coefficient from the model that controls for restaurant sales elsewhere in Maine) and $52.31 (i.e., estimated coefficient from the model that controls for the number of Acadia visitors) in additional restaurant sales.[7]

[5] The number of visitors to Acadia National Park is highly correlated with the amount of restaurant (r=.87) and lodging (r=.95) sales occurring elsewhere in Maine. This is not surprising given the high seasonality of tourism in Maine and the importance of Acadia to the state's tourism economy. Given these high correlations, the *Acadia Visitors* variable is not used in the same regressions as *Restaurant Elsewhere* and *Lodging Elsewhere*.

[6] The R^2 values may have been influenced (i.e., lowered) by the Great Recession that took place during the period of analysis. If the recession led to a structural change in the determinants of hospitality sales, an analysis that is beyond the scope of this paper, the estimated coefficients corresponding to the explanatory variables might have changed over the period.

[7] This range of expenditures, and others reported in the paper, is based on the smallest and largest of the four regression coefficients estimated from the models that include other control variables. We could also construct confidence intervals around each of the point estimates.

Table 2: Regression Results: Effects of Waterfront Concert Attendees on Bangor ESA Restaurant Sales

Time Period Analyzed	Jan 2000 to Sept 2012	Jan 2004 to Sept 2012	Jan 2000 to Sept 2012	Jan 2004 to Sept 2012	Jan 2000 to Sept 2012	Jan 2004 to Sept 2012
Variable	Estimated Coefficients					
Intercept	13,911,700* (381,957)	14,752,100* (236,154)	8,763,800* (313,213)	9,898,040* (297,396)	9,725,980* (346,926)	11,031,700* (315,104)
Concert Attendees	185.7* (20.91)	141.4* (14.00)	33.81* (9.673)	44.53* (10.01)	47.08* (9.648)	52.31* (10.35)
Casino Activity	NA	NA	0.421* (0.056)	0.269* (0.038)	0.537* (0.063)	0.339* (0.042)
General Merchandise Sales	NA	NA	0.008* (0.001)	0.006* (0.001)	0.012* (0.001)	0.010* (0.001)
Acadia Visitors	NA	NA	NA	NA	2.622* (0.292)	3.174* (0.394)
Restaurant Elsewhere	NA	NA	0.019* (0.002)	0.019* (0.002)	NA	NA
Adjusted R^2	.220	.272	.791	.716	.755	.692
Number of Observations	153	105	153	105	153	105

Notes: Newey-West (1987) standard errors are in parentheses. The superscript * indicates statistical significance at a 1-percent level.

Other results from the analysis of taxable restaurant sales in the Bangor ESA uncover positive and statistically significant associations with gaming activity at the local casino, general merchandise sales, the number of visitors to Acadia National Park, and restaurant sales elsewhere in Maine. Although figures are not publicly available for the average amount spent per person at the casino, the regression results suggest that the average patron (spending $90.00[8]) at Hollywood Casino would spend between $24.21 and $48.33 on meals in the Bangor area.

Moving to the results shown in Table 3 that focus on taxable lodging sales in the Bangor ESA, we see that the regressions with the *Concert Attendees* variable by itself have R^2 values of .24 and .27. The next two sets of regression models examining monthly lodging sales have adjusted R^2 values ranging from .79 to .86, which are slightly higher than found in the analysis of taxable restaurant sales in the Bangor ESA.

The regression results reveal a positive and statistically significant relationship between taxable lodging sales and the number of concert attendees. Using results from the models that control for other factors that might explain monthly lodging sales in the Bangor ESA, we find that a one-person increase in concert attendance is associated with an additional $18.92 to $23.12 in taxable lodging sales. The regression results also show a positive relationship between lodging sales and gaming revenues at Hollywood Casino, the number of visitors to Acadia National Park and the amount of lodging sales elsewhere in Maine. The regression results uncover a statistically significant relationship between lodging and general merchandise sales in the Bangor ESA in only one of the four regressions, and this effect—suggesting that shoppers spend $1.00 on lodging for every $1,000 of general merchandise sales—is very small in magnitude.

The estimated coefficient corresponding to the *Casino Activity* variable suggests that a patron spending $90.00 at Hollywood Casino would spend an average of $8.64 to $15.93 on lodging. A comparison of this effect (midpoint of $12.29) to the marginal effect on lodging associated with concertgoers (midpoint of the low and high estimates is equal to $21.02) suggests that concert attendees spend 71 percent more on lodging; that is, concertgoers are about 1.7 times more likely than casino visitors to spend the night lodging in the Bangor ESA. A similar analysis focusing on restaurant sales indicates that concert attendees spend 18.7 percent more than Hollywood Slots patrons on meals. The regression results pertaining to the *General Merchandise Sales* variable suggest that, although shopping and eating in restaurants appear to be complements, the amount of general merchandise sales occurring in a month has very little bearing on sales at local hotels and motels. These results are consistent with Bangor's characterization as a retail service center, as noted above.

4. HOW MANY CONCERTGOERS SPEND THE NIGHT IN BANGOR?

Regression analysis of the relationship between monthly hospitality sales—i.e., taxable restaurant and lodging sales—and attendance figures at shows produced by Waterfront Concerts suggests that concertgoers spend between $33.81 and $52.31 on restaurant meals (midpoint of $43.06), and $18.92 to $23.12 on lodging in the Bangor ESA. The figure for average spending on hotels and motels can be used to estimate the percentage of concertgoers who spend the night

[8] The 2012 "State of the States" report by the American Gaming Association shows that Maine (i.e., Hollywood Casino) had $59.45 million in gaming revenue in 2011. This amount applied to an estimated 55,000 visitors per month (Cook, 2010) translates into an average expenditure of about $90.00 per patron.

Table 3: Regression Results: Effects of Waterfront Concert Attendees on Bangor ESA Lodging Sales

Time Period Analyzed	Jan 2000 to Sept 2012	Jan 2004 to Sept 2012	Jan 2000 to Sept 2012	Jan 2004 to Sept 2012	Jan 2000 to Sept 2012	Jan 2004 to Sept 2012
Variable	Estimated Coefficients					
Intercept	2,493,190* (103,965)	2,699,480* (84,654)	1,481,580* (93,761)	1,688,400* (133,529)	1,258,500* (101,393)	1,539,960* (120,855)
Concert Attendees	93.52* (7.126)	82.65* (5.953)	18.92* (6.052)	23.12* (5.752)	19.56* (5.765)	19.49* (5.479)
Casino Activity	NA	NA	0.127* (0.018)	0.096* (0.021)	0.177* (0.025)	0.116* (0.024)
General Merchandise Sales	NA	NA	-0.000078 (0.0004)	-0.0002 (0.0005)	0.001* (0.0003)	0.001 (0.0004)
Acadia Visitors	NA	NA	NA	NA	3.398* (0.132)	3.680* (0.169)
Lodging Elsewhere	NA	NA	0.018* (0.001)	0.017* (0.001)	NA	NA
Adjusted R^2	0.239	0.265	0.827	0.789	0.863	0.853
Number of Observations	153	105	153	105	153	105

Notes: Newey-West (1987) standard errors are in parentheses. The superscript * indicates statistical significance at the 1-percent level.

Table 4: Waterfront Concert Attendees by "Drive Time" from Bangor

Drive Time	2012	2011	2010	All Three Years
Less than 30 minutes	19.5%	29.0%	34.4%	25.9%
30 to one hour	13.5%	22.0%	22.3%	18.3%
One to two hours	27.5%	29.4%	30.8%	28.8%
Two to three hours	16.3%	10.4%	8.2%	12.6%
Three to four hours	6.0%	2.7%	1.7%	4.0%
Four hours or more	17.2%	6.5%	2.5%	10.4%

Notes: Counts of concertgoers by zip code are based on information provided by Waterfront Concerts. Zip codes are matched to the county of residence (Forward Sortation Area in Canada) of the concertgoers, and driving times between these places and the venue are from Google Maps.

in the Bangor ESA, which provides an indication of those attendees who visit from out-of-town. Previous research on event-related economic impacts suggests the importance of distinguishing between the expenditures made by visitors and locals (McHone and Rungeling, 2000; Frechtling, 2006; Tyrrell and Johnston, 2006), with the latter more subject to substitution (e.g., spending money at the event that would have been used to purchase other local goods and services) and crowding out (e.g., local residents stay away from congested events and, thus, spend less money) effects (Baade, Baumann, and Matheson, 2008).

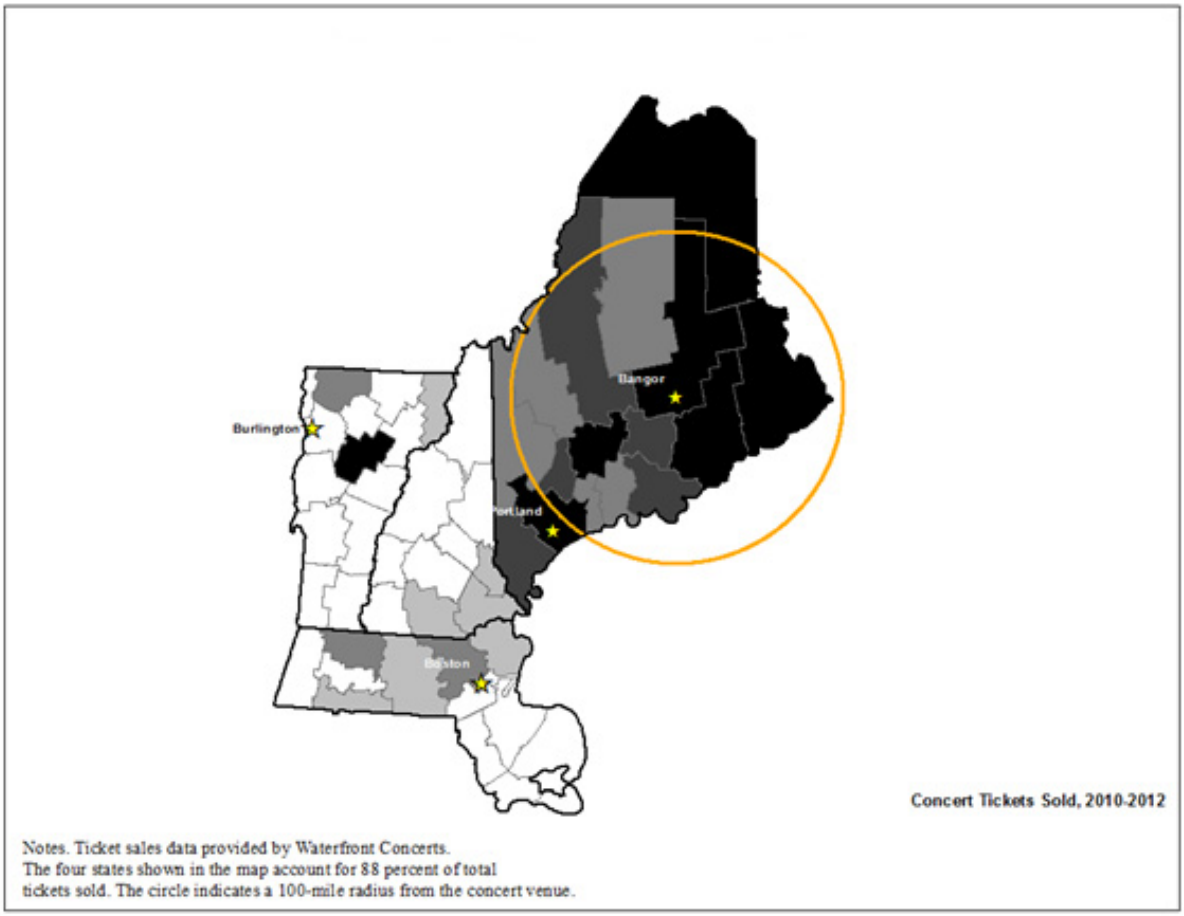
For the purposes of estimating the percentage of concertgoers who spend the night in Bangor, we will use the midpoint of the $18.92 to $23.12 range for lodging sales; that is, $21.02 per attendee. Using information from the American Automobile Association (AAA) and websites of hotels and motels located in Bangor, we calculated an average nightly rate of between $136.49 and $146.49 per room.[9] This means that, based on the regression results with a midpoint of $21.02 spent on lodging per concertgoer and an assumption of two people per hotel room (i.e., double occupancy), an estimated 28.7 percent to 30.8 percent of concert attendees stayed overnight in a hotel in the Bangor area. To put these estimates into perspective, we examine the distances from Bangor that would account for between 28.7 percent and 30.8 percent of concertgoers, which suggests a cutoff distance between those attendees who stay overnight in Bangor and those who return home after the shows.

Table 4 and Figure 1 provide information on the origins of Waterfront Concert attendees based on ticket sales data (zip codes) provided by the venue. The table shows the percentages of concert attendees, by distance to the venue, for 2010, 2011, and 2012. Distances are figured between the exact location of the venue and the "county seat" of the county (Forward Sortation Area in Canada) where the ticket holder resides.[10] This information is available for nearly every ticket sold to all 41 events included in the analysis. Focusing on the percentages of concert attendees who live more than, say, three hours from the venue, we see that the "reach" of the shows extended in each year of the concert series. For instance, the percentage traveling more

[9] The average of $136.49 is based on the AAA Tour Guide for Maine and hotel/motel websites. The upper end of the range adds $10.00 to this average room rate to account for the high demand for accommodations on concert nights. A Bangor-area lodging employee noted that "We typically charge about $10 more on concert nights because of premium demand" (Neff, 2012).

[10] Matching the zip codes of the concertgoers to their counties of residence lowers the precision of the distance estimates.

Figure 1: Market for Popular Music Concerts in Bangor, Maine



than this amount of time increased from 4.2 percent in 2010 to 23.2 percent in 2012. Over all three seasons, an average of 14.4 percent of concertgoers traveled more than three hours to the venue. Our finding of an estimated 28.7 percent to 30.8 percent of concertgoers spending the night in Bangor, considered along with the information presented in Table 4, suggests that attendees traveling more than about two hours (27 percent of concertgoers, across all three years) are those who purchase accommodations in the area. This result seems plausible given that concerts typically end between 10:30 and 11:00 PM.

Figure 1 is a map of northern New England states, showing most of the market for popular music concerts in Bangor, Maine. The 54 counties of Maine (ME), Massachusetts (MA), New Hampshire (NH), and Vermont (VT)—each with a minimum of five tickets purchased—account for about 88 percent of the tickets sold to Waterfront Concert events between 2010 and 2012. The remaining 12 percent of tickets are associated with addresses in Canada and other U.S. states. The 27 percent of concertgoers who travel two hours or more to shows is made up of these 12 percent of tickets sold outside of the four states shown in Figure 1, as well as tickets associated with addresses located in southern Maine, New Hampshire, Massachusetts, and Vermont. As a frame of reference, the map shows a 100-mile radius around Bangor, which roughly corresponds with places located within a two-hour drive of the venue. Outside this radius, the map shows relative hot spots for ticket sales (i.e., more ticket sales compared to

surrounding counties) along the (Interstate 95) corridor between Portland and Boston, and counties located to the west of Boston.

5. SUMMARY AND CONCLUSIONS

Popular music concerts can have sizable local economic impacts by attracting fans from outside the region and capturing the spending of local residents who might have otherwise left the area to see their favorite artists. In 2012, the top 25 grossing popular music tours generated $1.8 billion in ticket sales. Along with the money spent on tickets, some concertgoers make expenditures on hotels and motels, food and beverages, and retail purchases. The types of spending that they attract, along with the large-scale—yet temporary—nature of concerts, makes analyzing the impacts of popular music shows similar to examining the impacts of other types of tourism events.

This paper examined the hospitality sector (e.g., lodging and restaurants) expenditures made by concertgoers at popular music shows—including artists such as REO Speedwagon, Jason Mraz, Gov't Mule and Big Time Rush—held in Bangor, Maine. Insights from previous studies on the impacts of tourism events were used to inform our estimates of the per-person spending of concertgoers. In particular, an econometric-based analysis of the relationship between monthly taxable retail sales and the number of concert attendees provided an estimate of the average lodging and restaurant sales associated with the concerts. Baade, Baumann, and Matheson (2008) note that an analysis of local taxable retail sales is ideal to examine the impact of large events, as such an approach helps address the issues of "crowding out" and "substitution" effects that characterize many survey-based tourism impact studies. In our case, if the concert-related expenditures would have otherwise occurred even in absence of the shows, the regression analysis would have likely revealed no statistical relationship between taxable retail sales and the number of individuals attending concerts.

A comparison of our regression results—showing lodging expenditures of about $21.00 per attendee—to information about where concertgoers reside suggests that a driving time of about two hours is the cutoff for people who spend the night in the Bangor area versus those who drive home after a show. Although surveys of concertgoers would be needed to determine exactly who spent the night in the Bangor region, a finding of "all" or "none" of the concertgoers staying in Bangor would not seem plausible: our result of between 29 and 31 percent of the attendees—roughly equivalent to those located more than about two hours away—staying in Bangor seems realistic given the nature of the events (e.g., concerts end between 10:30 and 11 PM) and the popularity of the artists, which enhances their ability to attract fans from outside the local area.

To use the results of our study in an economic impact analysis, we would multiply the estimated per-person expenditure figures for lodging and restaurant sales by the total number of concert attendees. The aggregate lodging expenditures can be interpreted as originating from outside the region, as discussed above, and our estimate per attendee is consistent with overnight visitors as being those who travel more than two hours to attend shows. The estimated expenditures on food and beverages can also be thought of as "new" economic activity, as the regression-based approach makes a direct connection between the additional hospitality sales and the event (Baade, Baumann, and Matheson, 2008). The aggregate expenditures on food and beverages as well as lodging make up the concerts' direct impact on local hospitality sales, and multiplier effects could be estimated using an economic impact model.

Our research design and analytical results make several contributions to the literature on the economic impacts of tourism events and, more specifically, popular music concerts. First, as noted in the introduction, very few academic studies have examined the impacts of rock music concerts (Gazel and Schwer, 1997; Arik and Penn, 2005) and these studies have focused on individual events or festivals—not a concert series over multiple years. Thus, our results provide new evidence on the expenditures made by concertgoers, which could be used in a regional economic model to estimate economic impacts in general equilibrium.

Second, our analysis, which borrows from other studies that have examined retail sales data (Hyland, Cummings, and Nauenberg, 1999; Coates and Depken, 2006; Baade, Baumann, and Matheson, 2008), demonstrates the utility of a regression-based approach to estimating visitor expenditures. This method could be applied to other studies in which the tourism "event" of interest is large relative to the region's size, narrowly focused, and short-term in duration (Baade, Baumann, and Matheson, 2008); and cases for which monthly retail sales data are available for the region where it is located. As the Waterfront Concerts held in Bangor, Maine, meet all of these criteria, the rock music concerts provided an ideal case for the method used.

Finally, our analysis used the regression results pertaining to lodging expenditures per concertgoer along with information on the attendees' county of origin to estimate the driving time cutoff between those who spent the night in Bangor and those who returned home after the concerts. Although a driving time of more than two hours for overnight visitors may not apply to other types of events or concerts held in other places, the approach provides an example of how one piece of information used in an economic impact analysis—in this case, lodging expenditures—can be "ground truthed" by another—in this case, a person's place of origin. In survey-based tourism event economic impact studies, the lodging expenditure information provided by respondents could be used along with published room rates to estimate the percentage of event goers who stayed in the region, which could be evaluated relative to their locations of origin. This extra step in the analysis could improve the accuracy of visitor expenditure figures used as key inputs to tourism event economic impact studies.

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