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Exclusive Dealing and Its Effects: The Impact of Large Music Festivals on Local Music Venues

Scott Hiller
University of Colorado at Boulder

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Department of Economics

University of Colorado at Boulder
Boulder, Colorado 80309

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Abstract

In this paper I consider the use of exclusive contracts among four of the United States' most prominent music festivals to examine their influence on local music venues. Exclusive dealing questions have long been thought to either increase efficiency as theorized by the Chicago school, or cause a dampening of competition by restricting the options of competitors. Empirical analysis has been limited to a few industries and the effects are inconclusive. By utilizing a unique industry and multi-year dataset, as well as variation in the use of exclusive dealing across the country as determined by the location of large music festivals, this paper adds to the paucity of empirical analysis of exclusive dealing and provides new insight into an ignored sector of the music industry. Results show that exclusive contracts correlate with a decrease in the number of venues in affected cities by nine to 35 percent, with smaller cities being disproportionately impacted. The distinct negative impact appears to be unique in the literature. This paper shows the potential for competition dampening and proves that exclusive dealing is not only efficiency enhancing, but can be anticompetitive.

Keywords: Competitive effects, exclusive contracts, exclusive dealing, music industry

JEL Codes: L11, L42, L82

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1 Introduction

In June of 2010 Illinois Attorney General Lisa Madigan opened an antitrust investigation of the popular Chicago music festival, Lollapalooza (Knopper, 2010). The basis for this investigation is the exclusivity clause which artists playing the festival must sign, restricting them from playing any public or private concerts within 300 miles of the festival for 180 days prior to and 90 days past the summer event. Among four leading music festivals in the US this is a common requirement, only varying in one of the four festivals (Kot, 2010). This one differing festival is crucial, however, allowing for exploitation of the cross variation between clauses to ensure the interpretation of exclusive dealing as competition dampening. The implicit concern of the Illinois Attorney General and many venues trying to attract musicians is that these massive festivals violate antitrust laws and diminish the ability of local music venues to compete. This paper directly addresses this concern by empirically examining the impact of exclusive dealing on the ability of venues within the radius of these clauses to compete.

The massive annual music festival is relatively new to the US. Despite the success of Woodstock, the model was largely not continued from year to year in the United States as it was in Europe.[1] Beginning in the early 2000's, however, four of the largest current music festivals in the US were held annually. These festivals have very similar three day formats, attract bands from a variety of music genres, and are the largest in the country. Bands from most contemporary genres are represented; including popular music, rock, independent, folk, rap, hip-hop, punk, and more. Coachella (2001) in Indio, California; Austin City Limits (2002) in Austin, Texas; Bonnaroo (2002) held in Manchester, Tennessee; and Lollapalooza (2005) conducted annually in Chicago have attracted many bands and large audiences while maintaining the exclusive contracts mentioned above (Kot, 2010).[2]

Exclusive dealing is used as a form of vertical integration by firms that cannot legally integrate, or would prefer to have an exclusive relationship without integrating. Exclusivity can be enforced in various ways, but most important for this paper are contractual agreements, specifically music festivals using exclusivity clauses when contracting with musicians. The classical view of exclusive dealing is laid out by the Chicago school (Bork, 1978; Posner, 1981): exclusivity allows the upstream firm in the deal to invest in the downstream firm without fear of free-riding by other upstream firms, creating an environment where the dealer can reduce costs and increase efficiency. Conversely, several authors have addressed the possibility of decreased competition as a result of exclusive dealing. The concern is that firms employing this practice can foreclose competitors or deter entry into a market (Aghion and Bolton, 1987; Bernheim

[1] For examples see Glastonbury and Isle of Wight Music Festivals in England or Roskilde in Denmark.

[2] Lollapalooza began as a travelling festival from 1991 through 1997, but became a stationary three day festival in 2005.

and Whinston, 1998). Such concerns reflect the issue addressed in the antitrust laws and the implicit reason for the Illinois Attorney General's investigation into Lollapalooza.

There is a question of actual enforcement of this clause by the festivals. In 2012, Coachella music festival began the unique practice of repeating its performance over consecutive weekends. The exact same lineup of bands played the opening weekend and then performed again the very next weekend so that the festival could sell twice the tickets for the event. In most cases bands would likely look to book additional performances in southern California in between weekends, however, anecdotal evidence by booking agents suggested that performing in the area was limited to "Las Vegas and San Francisco" because of the radius clause.[3] Further anecdotal evidence from interviews with venue operators suggests that some exceptions to exclusive dealing clauses are made, but only for venues owned by companies that operate a festival. These exceptions should do nothing to deter the notion that this clause is used as an anticompetitive practice.

Music venues face two possible effects from the presence of these music festivals. The first is that the clause diminishes the ability of smaller firms affected by the contracts to attract enough popular bands to fill their schedule, perhaps leading to shut down. The second, and less obvious possibility is that these festivals create local demand for the bands and various genres of music involved, therefore generating a wider base of artists which can play the regional music venues and stimulating local demand through increasing heterogeneity of preferences. The potential for a demand change means the results of this paper cannot be soley interpreted as an exclusive dealing result, but as the effect of the festival clause and demand considerations. However, given the expectation of a positive effect on demand, any venue effect should be seen as a lower bound impact from exclusive dealing. In the Results section I explore several tests used to assign the effects. In addition to regression discontinuity and falsification tests, I exploit the difference in one festival's clause from all others in order to firmly attribute any competition dampening effect to exclusive dealing.

It is important to consider whether these exclusive deals are common practice for the concert industry. Do music venues also enact such a strenuous clause? From interviews conducted with venue managers this does not seem to be the case. A venue may restrict the band from playing another location in the same city for up to a week, but its difficult to see how this would greatly restrict a band. Bands may perform in a city for multiple nights but the logistics of travel, set up expenses, and transaction costs would seem to dictate that bands perform in the same location for each concert. These deals do not prevent promotional appearances at local establishments by the band during their stay. In total, the festival clauses are much more restrictive than any venue clause found, and seem to be an atypical agreement in concert production.

[3] http://www.gpb.org/news/2012/04/24/marooned-in-l-a-for-a-week-coachella-bands-make-do (Accessed 4/24/2012)

Two recent papers expand the condition under which entry can be restricted by exclusive dealing. Segal and Whinston (2000) show that if discriminatory offers are allowed, an upstream firm can reach its exclusion threshold as long as the fee paid to buyers is not greater than their gains from exclusion. If true, the efficiency arguments do not account for a decreasing payment to buyers, and therefore welfare can in fact decrease with the practice. The paper does have the very limiting assumption that contracts cannot ever be breached. According to Simpson and Wickelgren (2007) the lack of breach is a flaw in their argument, and they allow breach and payment of damages in their paper. With the assumption that buyers are Bertrand competitors, refusing the exclusive dealing contract from a seller would only pass on benefits to the final consumer. The conclusion then is that the seller and buyer benefit from the seller monopolizing the upstream through an exclusive contract.

Lafontaine and Slade (2008) provide an overview of empirical work on exclusive dealing. They find a paucity of studies and minor effects on competition. The primary problem of empirical studies of the topic revolves around a lack of industries to study and data difficulties in those that exist. Empirical studies began with an analysis of insurance rates, where Marvel (1982) finds that exclusive-dealing contracts are used to protect manufacturer's property rights in non-brand-specific promotional investments. Slade (1998); Sass (2005); Rojas (2011) have addressed exclusive dealing questions within the beer industry, where exclusive dealing is common but may vary geographically or by law. These papers find little evidence of anti-competitive effects within this industry caused by exclusive dealing. In addition, Rojas uses the pass-through rate of exogenous state taxes to assert that the practice can result in higher welfare, primarily from efficiency gains.

This paper takes advantage of the unique geography of music festivals across the US and compares differences in the number of music venues in cities affected by these contracts to those outside of their influence. The areas falling within the radius of these music festival clauses are not obviously different in characteristics from those outside and so the null hypothesis tested is that after controlling for demographics there is no difference between cities within a festival radius from outside of that range. Therefore, I create a model using the differences in similar cities to isolate the effect of exclusive dealing. With panel data, regional and time fixed effects allow further control of area or year specific variation.

My contribution to the literature is purely empirical, first providing insight into the sector of the music industry concerned with concert production, a significant revenue generator. While much has been written on the effect of file sharing on record labels and their sales, little work has been done on concerts. This paper also adds to the dearth of work done on empirical analysis of exclusive dealing, where the industries and structure of markets has not varied much across the few existing papers that have examined the problem. Considering the lack of work in this

area, a unique dataset is needed to provide a contribution. For this I've assembled a completely original record of venues across United States cities. The final contribution of this paper will be to provide some tangible evidence in the investigation of the antitrust policy and potential prosecution in Illinois. The dampening of competition and foreclosure effects hypothesized in the theoretical literature make intuitive sense, but have not been persuasively shown in any practical applications. Claims against Lollapalooza, and transitively the other major festivals in the US are worthy of investigation in order to determine whether a significant anti-competitve impact does exist.

The data reveal that there was very little difference in the number and growth of music venues in areas affected by music festivals and those outside of their range before their permanent presence.[4] After the festivals began the venue characteristics of the two areas change, and my results show that exclusive dealing by the four largest rock festivals in the United States create a substantial and significant negative effect on number of music venues in cities within a festival's influence, all else held constant. I estimate the impact ranges from a low of about 9 percent decrease in the number of venues against the predicted mean to a high estimate of about 35 percent. Further analysis shows the effect differs depending on the size of the city. These results are robust to alternative models. Finally, I estimate a structural model to isolate how the exclusive dealing clause affects local venues. The results of this model strengthen the evidence of a competition dampening effect through the clause and act as a complement to the preceding models. However, strong assumptions must hold to justify the results of the structural model.

The remainder of this paper is organized as follows: Section 2 provides background on concert production and a priori predictions of exclusive dealing effects. In Section 3 I create the models to be estimated. Section 4 introduces the data and provides some initial summary statistics. Section 5 provides results, and Section 6 concludes.

2 Background

The music industry is comprised of two primary sources of revenue: recording and distribution of albums by musicians is the most widely studied and well understood sector of these. Specifically, the most extensively researched question in the last 15 years has been the effect of file sharing on record labels and their sales (Liebowitz, 2004; Zentner, 2006; Oberholzer-Gee and Strumpf, 2007), and then the related question of how file sharing affects the frequency and quality of music releases (Waldfogel, 2011).

Concert production has received much less attention: Mortimer et al. (2012) have explored

[4]Table 2 shows summary statistics for venue operation prior to these festivals.

the potential effect of file sharing on concert activities, and in so doing researched how this aspect of the music industry is operated. Connolly and Krueger (2006) review the concert booking process, finding that artists get most of their revenue from touring the country and putting on concerts. Album production typically involves labels taking on the cost of production of an album and paying a very small percentage of its sale price to the artist. Artists usually organize tours through promoters, who finance the events and take 15 to 30 percent of ticket and merchandise revenue in addition to their contractually agreed upon guarantee. For the venue, in addition to a rental fee their primary income comes from concessions and parking. The incentives of the band and promoter are not well aligned with the venue because ticket prices are typically irrelevant to venue profit, and in fact lower prices are likely more beneficial to venues (Mortimer et al., 2012). Fixed costs for a venue consist of lighting and sound systems which can be purchased or rented. In addition, venues must pay one of several representatives of copyright owners a monthly fee, based on venue capacity, as a guarantee against copyright infringement.[5]

The large music festival attracting national artists began in the United States in 1954 with the Newport Jazz Festival (Brant, 2008). The Monterey Pop Festival was a popular production in the late 1960's, and Woodstock, probably the most famous of all rock festivals took place in 1969. However, despite the popularity of these events no major production was put on annually in the US until the early 2000's. Production of these events involves renting (or on rare occasion, buying) the necessary space, hiring temporary staff and establishing outdoor stages.

While there are many music festivals in the United States catering to a wide variety of music genres, there are four major music festivals examined in this study. They all present a diverse range of musical performers, with the largest focus being on rock music. For the purposes of this paper music festivals refers to large, primarily rock and popular music productions. Bonnaroo takes place on farmland in Manchester, Tennessee, a rural area between Nashville and Chattanooga. Coachella, a festival started at the same time and roughly the same size takes place in Indio, California with the surrounding Los Angeles metropolitan area nearby. Chicago and Austin round out our locations providing different geography, culture, population size, density and business conditions between each of the four cities.

There are no obvious distinct characteristics that make a city a prime location for a festival, so these cities should be comparable to all others in the US. The variation in locations provides evidence for plausibly exogenous placement of these festivals. Nevertheless, the paper does not depend on the festival locations alone for identification. Even if the specific area is chosen for its unique qualities, it is almost certain that there are cities within these exclusivity radii that are

[5]ASCAP, BMI, and CSAC are the three primary organizations referenced here. Fixed fees are required to account for the possibility that bands "cover" a copyrighted song so that royalties will be collected without the necessity of monitoring each event.

not. These cities could be affected by the exclusive dealing without plausibly being the reason for the music festivals to locate nearby.

There are, of course, many smaller music festivals and temporary productions in the US that lack the size and demand of these major events. For scale, Lollapalooza has capped the number of attendees of its event in 2008 and 2009 at 225,000 people. Local and regional festivals cannot come close to matching these numbers. I am not able to obtain contract information for all of these small festivals, so their use of exclusive dealing clauses is unknown. Additionally, there are a considerable number of music festivals in the US, all smaller in size than the four studied that have started and then failed to operate annually. An illustrative example is Vegoose, operated from 2005-2007 by the same promoter as Bonnaroo, this festival was stopped by poor attendence (40,000 tickets sold) and a lack of profitability.[6] This paper justifies excluding smaller festivals by arguing that they are less likely to be capable of restricting access to their artists, and even assuming exclusivity clauses that are similarly severe the smaller number of musicians and tickets sold will mean a negligible impact on surrounding venues.

Before proceeding, I need to review the possible effects of the festivals on local venues in the surrounding areas: the efficiency gains as laid out by the Chicago school, and possible reduction of venues by reducing the ability to compete among local venues. While an efficiency enhancement is possible, it will not lead to an increase in competition, simply no decrease. Increases in competition could result from a demand increase, but restricting the ability to hire bands will not improve venue operatin. Alternatively, a decrease in venues is a plausible effect because of the restriction of supply. As festivals sign popular musicians to play their event the productions are removing these bands from the possible pool of bands local firms can provide to their customer base. Given that popular bands are in limited supply, this constraint could affect on a venue's ability to attract customers and therefore compete in a city.

Beyond the exclusive dealing aspect of any festival impact there are also demand considerations for the venues. Economic theory provides the possibility of positive and negative effects. First, consider an area not known for music diversity, where demand is generally limited to a few genres and well known bands. In this scenario entry and operation of a music festival could cause a positive demand shock. Upon entry these festivals will then attract many locals, as seen by their extremely high attendance figures.[7] The locals in attendance are then exposed to the new types of music available to them. A resulting widening of music taste in these areas is therefore plausible, leading to a more extensive base of bands and genres of music that can be booked by the local music venues.

If the affected area is instead one of existing diversity in demand for music, the bands

[6] http://www.knoxnews.com/news/2008/may/06/superfly-c-pull-plug-vegoose/ (Accessed 6/1/2011).

[7] Coachella's attendance in excess of 200,000 is generally indicative of attendance in each of these festivals.

playing these festivals would not be new to the consumers, adding little to the base. In that case, simply assuming that the marginal benefit of seeing a musician or genre of music declines in the number of times the performance is seen means a decreased demand for surrounding local venues. This assumption is easily justified, at least in the short run. Most musicians are not quick to debut new songs, so seeing the same show repeatedly would almost certainly result in decreasing marginal utility.

An additional source of decreasing demand could come from a budget constraint for the amount of music seen in a year. Anecdotal evidence of ticket prices shows the festivals to be considerably more expensive than a typical individual concert by one of its participants. For example, a weekend pass to Coachella in 2011 was $319.[8] This is in addition to any food, drink, and memorabilila purchases made while attending the festival. Some additional purchases are likely due to the closed nature of these festivals and their length; which extends well beyond the average concert. A survey of ticket prices for Coachella headliners that toured after the festival in 2011: The Arcade Fire, The Strokes, and The Black Keys found average prices before service fees of $45, $44, and $39.[9] While service fees add considerably to ticket prices in most concerts, these are three of the bands that headlined the festival and are therefore considered to be in highest demand and likely priced higher than most other performers. It is clear that these festivals are considerably more expensive than an individual concert, and any consumer attending one would spend a larger than average portion of their music budget on this festival. All of these effects would lead to a reduction in demand for other concerts that are held by local firms.

Disentangling the demand and exclusive dealing effects is difficult. If the demand effect is positive, the results of this paper can be seen as a lower bound of the impact of exclusive dealing. Where demand effects are negative, appropriate association is more difficult. Additional tests in Section 5.3 show that the most likely demand effect is positive, making the results showing correlation between decreased venues and exclusive dealing the most feasible explanation.

3 Empirical Model Specification

In order to measure the impact of the exclusivity clauses I create several models using city characteristics that are plausibly relevant to the number of venues which locate there, and ensure robustness through alternative specifications. Each model has number of venues in a city as the dependent variable, and includes an indicator for whether a city is within a festival radius. The panel data set allows for fixed effects in time and region, as well as further control

[8] http://consequenceofsound.net/2011/01/coachella-2011-is-about-to-sell-out/ (Accessed 4/23/2011).

[9] Tour dates found on Songkick.com, ticket prices found on venue websites.

variables for each individual festival.

The baseline model is

$$\begin{aligned} Venues_{it} =& \beta_0 + \beta_1 Festival_{it} + \beta_2 FIT_{it} + \beta_3 PrimaryCity_{it} \\ &+ \beta_4 Metro_{it} + X_{it}\Theta + \alpha_t + \gamma_j + \epsilon_{it} \end{aligned} \tag{1}$$

Where all variables are measured by city i in year t. The variable of interest is an indicator which accounts for a city being in a festival radius. This is done in two ways. Equation 1 contains the general festival indicator, where the variable equals one if the city is within a radius of any of the four festivals. In most of the models tested FIT_{it} represents the interaction term included. Each festival indicator is interacted with a city's population, the year, or both in order to test how exclusive dealing effects may vary with those measures. X is a matrix of control variables including the log of county income, city and county population, and percentage of the population that is between ages 18 and 44. The vectors α_t and γ_j are year and region fixed effects.[10] $PrimaryCity$ indicates that a festival is located here, acknowledging that there could be something unique about that location that affects the number of venues which also drew the festival to the area. There is also an indicator for a city located in an Metropolotian Statistical Area ($Metro$) without being the major city in that area; anticipating that any cities beside the most populous city in an MSA will likely have less venues, all else equal, because businesses would primarily locate in the largest city in the area.

The alternative model is:

$$\begin{aligned} Venues_{it} =& \beta_0 + \beta_1 ACL_{it} + \beta_2 Bonnaroo_{it} + \beta_3 Coach_{it} + \beta_4 Lol_{it} + \beta_5 PrimaryCity_{it} \\ &+ \beta_6 Metro_{it} + InterTerms_{it}\Pi + X_{it}\Theta + \alpha_t + \gamma_j + \epsilon_{it} \end{aligned} \tag{2}$$

Equation 2 contains individual indicators for each of the four festivals. $Interterms_{it}$ is a matrix of interaction terms on the individual festival fixed effects. In addition, a measure of the local radio market is used as a control for music demand in the area. Accounting for radio preferences allows for more city specific control of heterogeneity in music tastes. Music tastes vary from region to region and even city to city, radio measures help to control for the diversity of music tastes. Each of the above specifications are then run with the variable $ConcInd$, which is explained in the Data Section.

Before proceeding it is useful to review the variables of interest and their expected impacts. The central objective of the empirical strategy is to isolate the effects of exclusive dealing on a

[10] City level fixed effects were also tested, but 1349 observations were completely determined using that model due to 0 venue observations. When the sample was limited to positive venues, city fixed effects provided results which were largely consistent with the full model. City land area was used as a time invariant variable in an alternative model, providing estimates similar to those presented in the results section.

city's music venues by controlling for demographics and music demand. The null hypothesis is that coefficent estimates on the $Festival$ variable, and alternatively individual variables (ACL, $Bonnaroo$, $Coach$, and Lol) are zero. A negative estimate for these variables shows that all else held constant, cities inside a festival's range have fewer venues than outside. Theory indicates that competition is reduced because of increased fixed costs of entry or decreased variable profits of operating in a market controlled by the exclusive dealing firm. Alternatively, a positive effect would indicate that all else held constant, some demand effect is swamping any exclusive dealing dampening; in this case the demand increase would be due to a change in local preferences.

$PrimaryCity$ should have a positive effect if the cities where festivals locate have unique qualities that allow for a greater number of venues. The $Metro$ variable is anticipated to deliver a negative result. Firms likely make the reasonable assumption that most concert consumers build some travel within a metropolitan area into their costs for music. This fact, coupled with the largest population in the area should cause venues to locate in the most populous city in an MSA over its smaller counterparts, all else constant.

4 Data

To answer the research question, data is needed that measures how music venues are distributed across time and between American cities. Songkick.com has collected data on concerts and music tours dating back over 30 years. This company provided me their concert data from 1998 through 2009 in 259 major US cities. Seven of those 259 American cities, all with a population over 100,000, did not provide suitable data for determining venues. Additionally, Anchorage, Alaska and Honolulu, Hawaii are excluded due to possible difficulties attracting touring bands which are unrelated to a music festival. New Orleans is excluded after 2004 because a fundamental change in the city's economy seems likely as a result of Hurricane Katrina. There are 249 cities remaining for the entire sample over the 12 year period. From this data I can determine the number of dedicated venues dependent on touring acts; culling sports venues, theaters devoted primarily to performance arts, and small venues with occasional concerts. Entry and exit over time, and differences across regions, should allow me to determine and control for general trends in the US market, and then separate those trends from any effects caused by the music festivals.

The dataset was verified by exploring the web presence of each individual music venue, and all firms not devoted to concerts as a product were eliminated. In the case of some music venues which were no longer operational this included looking for reviews on popular sites such as yelp.com, and exploring news stories containing information about the venue in question. There is some concern in the collection of data in the early years of the data set, as the company was

not in existence until 2006. Songkick collected data from around the world accumulating over one million past shows before going online.[11] Additionally, past shows can be added by users. As a verification of the accuracy of the website, I performed an audit of the city of Denver. In 2010 every concert listed by the music venues in the paper's dataset was included on the website, Songkick maintained perfect accuracy of the listings in Denver. However, they do not claim to document every concert in the past. Fortunately, not every show need be recorded in order to determine the number of venues in a city, simply enough to determine if a venue is dedicated to music performances in a year. Nevertheless, this paper will use the exclusion of earlier years as a robustness test for each measure.

All models must control for demographics as well as variation in exclusive dealing. As mentioned, city and county level population statistics and county level controls are from the US Census American Community Survey. This project is a series of smaller surveys conducted annually to track community characteristics. Local preferences of music are controlled for in a smaller sample using some various measures of radio listening.[12] All population variables are divided by 100,000.

A complete account of all variables and their sources can be found in the text and are also recorded in Appendix A at the end of this paper. The number of venues is the dependent variable in each specification, measured within city i and period t. The venues in the sample have similar characteristics in terms of size and concert bookings. Concert capacity ranges from 400-5,000, with the vast majority of venues falling between 1,000-3,000 in capacity. A venue must demonstrate a commitment to revenue derived from concerts, specifically producing performances similar to those in the festivals. Each venue, therefore, must have performances by artists that have also played at least one of the festivals over their lifespan in order to be considered for the sample.

The $Metro$ variable is an indicator reflecting the fact that the city analyzed is not the primary city in its metropolitan area. The $Percentage18-44$ variable records what fraction of the population of a city is between those ages. Each model is also tested with a radio measure as a control for local concert demand. A variety of measures were tried, but the variable used here is a concentration index. The variable uses eleven broad categories of station format within a city to measure concentration, much like a Herfindahl-Hirschman Index. The variable $ConcInd$ is the sum of squares of the percentages of each of these eleven categories broadcast to a given city. Values of the index range from .08 to .54, with a larger number representing a less diverse radio network within a city. $ConcInd$ should have a negative relationship with the number of venues. A higher value likely indicates a weaker customer base for the music market in general,

[11] History found at http://www.songkick.com/info/about (accessed 3/23/2011).

[12] Data obtained through confidential communication with the Media Bureau of the Federal Communications Commission.

and concerts more specifically.

4.1 Summary Statistics

Table 1 provides summary statistics for variables used in the full empirical models, showing cities within a festival radius are quite similar to those without.[13] Because of the length of the sample any city that is counted within a radius was initially outside of the festivals as they did not exist in the late 1990's. One questionable difference between samples is the fact that the county population mean is significantly higher in the summary statistics inside of a clause range. This number is heavily influenced by the Los Angeles area, the Chicago area, and the largest counties in Texas all falling within a festival radius.

The summary statistics in Table 2 describe the cities affected and unaffected before the festivals enter. Of course, any vastly different statistics before the festivals came into existence would call into question the legitimacy of any comparisons in venues between the two. Because 2001 is included, the composition of cities is just slightly different than in Table 1 as some cities were within the radius of Coachella and Bonnaroo in that year and are not included in this measure. As the table shows these pre-existing differences did not exist. The average number of venues is slightly larger within, but the difference is not statistically significant. In fact, the only statistically significant difference in relevant variables is in county population which was seen in the entire sample, and explained above.

Table 3 notes the changes that occurred after the festivals were established. The venue difference is still not significant, however the cities outside now have the higher average. The demographics remain similar. The average number of entries declined in both areas and exits increased. The average net entry fell by more outside of festival radii, but the difference is not statistically significant. Entry and exit are only truly measured for 3 years in the 1998-2001 sample, as 1998 establishes the baseline for the number of venues in each city. Additionally, the entry and exit numbers are calculated by a venue's appearance or exit from the data. If a firm temporarily shut down or simply changed names, the entry and exit statistics cannot account for that. Fortunately, entry and exit measures are only summary statistics, the number of venues is the important statistic for analysis.

Entry continued to exceed exit throughout this period. Any story of exclusive dealing in this paper is not one where growth of music venues was eliminated, growth was instead inhibited by the actions of the much larger music festival. Therefore, any effect is of reduced growth in comparison to what should be expected by cities of the given demographics. This can be seen

[13]Table 19 in Appendix A details the variables used in the summary statistics, and Table 20 explains any additional variables used in the Results section.

as exclusive dealing dampening competition, but not eliminating it.

5 Results

The Results section is divided into the estimates of the maximum likelihood model relating the number of venues in a city to the characteristics most likely to affect them, and then the various robustness checks that ensure their accuracy. There are two estimation methods reported. Considering the number of festivals is nonnegative count data with many zero observations, Poisson estimation is an appropriate candidate. The Poisson does have an equidispersion assumption, so a negative binomial approach is also reported in this paper to allow for variance which differs from the mean. In all of the following tables fixed effects are omitted for space, but year and regional fixed effects are included in each model. Tables 4-10 present the raw results from the three specifications. Because these are maximum likelihood specifications, each coefficient is interpreted as the log difference in count outcomes of the dependent variable from a one unit change in the independent variable, holding all else constant. Tables 13-18 give the marginal effects associated with each of these tables in terms of difference from the mean. For ease of interpretation the marginal effects are referenced in the body of the results section. These estimates represent the positive or negative movement away from the predicted mean number of venues associated with a unit change in the variable of interest, all else held constant.

5.1 Baseline Results

The first results reference the baseline model outlined in Equation 1. Results for this model appear in Table 4 and the associated marginal effects in Table 16. Columns one and two show parameter estimates using the single festival indicator for any city within a festival radius. These results utilize the entire sample. As expected, not being the primary city in a metropolitan area is quite important to how many venues are in a city. $Metro$ estimates are significant and range from a .8 decrease in venues to a 1.2 decrease. One explanation for this substantial effect is opening and movement of venues toward the largest and likely most attractive city in the metropolitan area.

The estimate for city population is significant and certainly more substantial than county population, which is not precisely estimated. Interestingly, inflation adjusted income is never significant as a predictor of venues. Unlike most industries, concert production is not helped greatly by income. The concerts in these venues are not expensive and what the data shows to be more important is the age composition of people in an area. Several age ranges were tested, but predictably the most influential is the percentage of people in the range of 18-44,

on the order of .09 additional venues for each additional percentage point. This late youth to maturing adult age range is coveted for its disposable income and desire for entertainment, and the estimates reinforce their importance in the number of venues. The final control variable is the indicator for a city playing host to the festival, the $PrimCity$ indicator. This variable should capture any effect of the unique characteristics specific to a city which attracted one of these major events, but is not precisely estimated and irrelevant.

Also in this table are results for two different forms of the primary variable of interest. Columns one and two show estimates for the single $Festival$ indicator. The estimates, which are significant, show a .37 to .41 decrease in venues from the mean, holding all else constant. This impact is important given the predicted mean over the entire sample of about 1.6 venues. These estimates are consistent with the idea that the exclusive dealing clauses are effective, and that their purpose is to limit competition in order to drive demand to the festivals. If the results are accurate there is certainly some force decreasing the number of venues here, on the order of an approximately 24 percent decrease compared to the predicted mean.

Columns three and four use an indicator for each individual festival to distinguish effects between festivals. With the exception of the negative binomial estimate of Lollapalooza in column four, all of the estimates are significant. The marginal effects are similar across festivals, with Coachella showing the largest negative effect and Lollapalooza and Bonnaroo the smallest.

The possibility remains that cities are affected differently by exclusive dealing depending on size or year. Table 4 includes an interaction term, $FestivalPop$, relating the $Festival$ indicator to a city's population. The $Festival$ indicator shows a strong negative estimate, but the effect is clearly lessened in larger cities. Specifically, the impact of a festival is about a .4 venue marginal decrease. When the interaction is considered, for every 100,000 person increase in a city's population there is an associated lessening festival impact of .07. It appears that larger cities are better able to avoid the effects of the clauses, and indeed may even experience a net gain in venues.

One explanation for this counterintuitive relates to the depth of the market in individual cities. If there is a threshhold of music demand and diversity of preferences that must exist within a city to allow for a venue to operate, a festival could help to surpass that threshhold. Although the supply of some popular bands may be restricted, the net effect will be exposure to additional genres of music allowing for more venues to cater to diverse preferences. This would be more likely in larger cities, due to the probability that more people would be exposed to the music of the festival and diversify their preferences. Smaller cities would have the same supply constraints on their venues from the festivals' exclusive dealing clauses, but are less likely to be able to reach the threshhold due to their lower populations; making a negative effect on venues more likely.

Using individual festival indicators and interactions, that impression is reinforced at every point. Cities influenced by Austin City Limits and Bonnaroo have the largest mitigating effect from population increases. These results are encouraging to the exclusive dealing interpretation. Coachella and Lollapalooza take place in two of the largest cities in the US. The surrounding metropolitan areas have a consumer base for music that was almost surely well established before their festivals started, and therefore unlikely to benefit from any demand shock of the festival. Because of this industry maturity the effect on the cities does not vary greatly by size in these areas. In contrast, Bonnaroo takes place in rural Tennessee. The surrounding 300 mile radius falls largely within southern states. While the southern fixed effect is excluded from the table, it is negative and significant when compared to all other regions. The surrounding 300-mile radius is known more for its country and bluegrass history than a variety of "jazz, Americana, hip-hop, electronica, and just about any contemporary music you can think of."[14] By attracting visitors from the surrounding area the festival could be expanding local exposure to this music, and therefore increasing the base of bands venues can book. Bonnaroo is helping to counteract this regional paucity in larger cities, while the smaller cities do not benefit greatly from any demand boost.[15]

5.2 Controlling for Music Demand with Radio

The results in Table 5 include a measure for radio in the years 2002-2005, 2007, and 2009. Radio in this instance is a simple proxy for music taste varying by metropolitan area. A number of papers have noted the positive relationship between the diversity of radio formats and total listeners in the market. Rogers and Woodbury (1996) use 1987 data and find a positive relationship of just under 20 percent between an increase in the number of stations and the corresponding change in number of formats. Further, they find that an increase of formats is associated with about a 22.5 percent increase in listeners. Using a more extensive 243 market dataset from 1993 to 1997, Berry and Waldfogel (1999b) test the same premise with regards to firm organization. The authors find a weakly positive relationship between increased formats and increased listeners. They note that although their evidence is weaker than the cross sectional evidence of Rogers and Woodbury (1996) and Berry and Waldfogel (1999a), their panel data may suffer from measurement error in formats.

Following their premise, this paper then makes a common assumption to justify decreases in concentration as a proxy for diverse music demand, namely that if the demand exists in a city to make a format profitable then additional firms using that format will enter the market.

[14] Quoted from description at http://Bonnaroo.com (accessed 3/24/2011).

[15] Additionally, a model including year-festival interactions to test the varied impact of a festival clause by year was tested. No table is included because under this model there is a notable lack of significance in the year-festival interaction estimates, so any of the trends mentioned are not definitively different from zero.

Additionally, if the market will support a radio format then music venues can expect concert demand in that same genre. The more concentrated the radio market the less diverse the demand for music. A homogenous population limits the genres consumers demand and means a smaller group of artists that each venue can book. With this specific control of taste on such a small scale, the impact of exclusive dealing is further isolated. The radio data only covers six of the twelve years, but the similarity of the estimates to the original model proves this sufficient to interpret the model and the associated effect of festivals as being properly specified.

The control variables are not overtly affected by the addition of this index, showing generally the same significance and magnitude as existed when they were excluded. Turning again to the general festival indicator in columns one and two, the effect is to strengthen slightly the negative impact from being located in a festival radius. In results not reported here, adding the radio measure strengthens already large positive regional effects (compared to the South) for the Midwest and Northeast, and further decreases the already weak estimate of the West indicator. So accounting for taste in music on the city level certainly does not diminish the effect of exclusive dealing, and in fact demand is likely more accurately measured than is possible using fixed effects alone.

Estimates of the parameters on individual festivals are all strengthened very slightly. Looking at Austin City Limits, Coachella, and Lollapalooza all estimates are now negative, significant, and with a slightly greater impact. Conversely, the interaction terms, not reported here for space lose most of their effect. Although still significant, the results are so small as to remove any serious effect from population increases. It is worth noting that the models using radio measures are done with a considerably smaller sample size, about half of the observations available to the full sample. Overall, including this measure for music taste and diversity seems to encourage the possibility of anticompetitive effects from the festival clauses.

5.3 Robustness Results

The first robustness tests answer two questions, whether the radius clause is at work here or if there is simply some other factor related to the festival or area driving the difference. The initial step is to see if there are demand shocks in the region coming from the festivals. Additionally, I will investigate whether or not there is some fundamental difference between cities in and outside before these festivals started.

The question of a demand effect makes interpretation of the results on exclusive dealing clause more difficult. In general, if a festival has a net positive or no demand effect then the results can be seen as entirely attributable to exclusive dealing. Fortunately for this study Coachella's exclusive dealing clause differs from the others, in that instead of a 300 mile radius

around the festival, the clause names many specific Southern California counties (Kot, 2010). This creates an effective radius of approximately 200 miles around Indio, California. In the first two columns of Table 7, with marginal results in Table 15, I test the impact on venues that comes with a city being in this distance which would fall under exclusive dealing in any of the other festivals, but does not with Coachella's clause. The variable $CoachExclusion$ measures the effect of being immediately outside of the festival's radius. Clearly, the impact is substantial, and would seem to indicate that the demand effect is causing a positive influence on number of venues in the absence of the clause.[16] The final two columns estimate a similar model, but compare the effect of being from 201-300 miles away from the other festivals with all other cities within those radii. These cities, covered by a clause unlike Coachella, show no significant difference from those within 200 miles of a festival. If demand effects were the primary cause of the venue dampening this difference should not exist. The fact that it does encourages interpretation of an exclusive dealing effect

Table 8 addresses other possibilities. The first three columns include a variable designed to test the mileage impact. Any city between 301-400 miles of a festival was not included in the original Festival variable, but is now counted with the $FourHundredFestival$ variable to see if there is a similar effect on these cities just outside of any clause. Table 6 gives a brief description of the cities meeting this requirement. If the only impact is a demand shock to a region then the estimates should be similar to the baseline. If, however, the festival clause is responsible then the estimates should be near zero. In columns one and two the $FourHundredFestival$ indicator is not significant or important. The estimates are -.04 and .08. So while these cities could still potentially have some extremely small demand effects there is no indication that they are negatively impacted by the radius as those cities within 300 miles appear to be. These results help to identify the original estimates of the impact as specifically caused by the clauses.

The second issue is a possible fundamental distinction in cities inside and out, beginning before the festivals. Are the cities simply different or did these festivals change the climate for music? The $EverFest$ variable in columns three and four of Table 8 is an indicator only used in the years 1998-2001, equal to one if the city will be within a radius in the future. This sample is smaller than the original as it only includes cities outside of the festivals' impact through 2001, and any city in this time period which will soon have to contend with exclusive dealing. All cities in the Coachella or Bonnaroo ranges will only be in the sample through 2000 as those festivals started in 2001. The variable estimates the effect of being in a festival radius before the festivals began, so a significant result here would call into question any impact on venues. Again, neither of these estimates are significant and the sign switches between specifications, reaching a marginal value of .077 with the negative binomial and a -.084 with Poisson. This

[16]The same test was performed for $CoachExclusion$ against all of the other festivals in the study. The result was not as substantial, but still quite large and significant.

test shows it is impossible to attribute any of the difference in the venues to being in a radius before the festivals began, holding all else constant. The cities in a festival radius were not fundamentally different beforehand.

There is some concern about collection of the early years of the dataset. To ensure results are not being driven by noise in the first years of the sample, Table 9 drops any observations before 2001. Of course, this does not allow for any trending in venues before the festivals began, but does allow for a comparison of the estimates with the complete set. As is clear and encouraging the control variables have not been greatly impacted by dropping 1998-2000. Still significant are population, *Metro*, percentage of young adult population, and the primary city indicator. In addition, the magnitudes are similar to the original model, proving dropping the early data does not greatly move the results and justifying the collection of the first three years of the data. Further, a small movement in any control variable is warranted, given that the pre-festival trends can no longer be accounted for in this model.

The variables of interest are also largely unaffected. The estimate on the *Festival* variable has a slightly more substantial impact than in the original interaction of the baseline, reaching a marginal decrease of almost .57. Considering the individual festival indicators in columns three and four the effects only strengthen. Each festival shows an identical trend to that in the baseline. The only plausible explanation remaining that could affect our results is the possibility that there is some longer trend beginning before 1998 not being picked up in the sample. It is clear, however, that the results on exclusive dealing are not being driven by any errors in the early years. All estimates are still consistent with the early analysis. Finally, in results not included here, I exclude 2008-2009 from the model to test the possibility that the global recession drove some of the results. Estimates in that model were consistent with all others, showing any effect from the recession was similarly felt by all firms regradless of festival clauses.

Table 10 tests specifications to help determine a separation of demand and exclusive dealing effects with marginal results in Table 18. The first two columns include a variable for the area in the Ohio Valley that had overlapping exclusive dealing effects from 2005 through 2009 with Bonnaroo and Lollapalooza. This overlap variable shows an increase in venues over other cities affected by the two festivals of about .15, or about five percent given a mean of three venues in this area and time period. This area was affected by the Bonnaroo clause since its inception in 2001, and added Lollapalooza's clause in 2005. The addition should not have had a significant effect, given some overlap of bands which played each festival and these festivals never taking place more than 60 days apart, making substantial additional loss from the second clause unlikely. This overlap effect is therefore most likely from a demand increase.

The third and fourth columns of Table 10 contain the variable for any city within 201-300 miles of the festival city. This specification is run only against those cities immediately outside

of the clause border, at 301-400 miles away. At this distance any demand effect should be dampened, and the expectation would be of a decrease in venues from exclusive dealing. The sample is much smaller leading to lower significance, but the coefficients on the 201 to 300 variable are negative and given the mean number of venues in this sample of 1.48, represent a decrease in venues from four to seven percent. If taken as a representation of an area affected only by the exclusive dealing clause then the exclusive dealing effects are somewhere between 11 and 77 percent of the broad effects found earlier. These numbers are smaller than the sample at large, however, at one seventh the observations derived from only 66 cities also lack much of the explanatory power of the larger sample. The negative effect on venues is consistent across all models tested, and most importantly shows that in the absence of demand effects the exlcusive dealing clause is the most likely cause of a venue decrease.

5.4 Structural Analysis

Structural models relate the optimal decisions made by agents in an economy to the parameters of interest in an empirical analysis. The question of venue numbers lends itself to structural analysis, particularly because the number of venues in a city is directly related to the market size and other characteristics of that city. Specifically, entry and exit decisions must be made based on the profitability of the marginal firm. The marginal firm will enter if the fixed cost of operating is less than the variable profits they could earn. Conversely, the marginal firm will exit if the fixed costs are greater than they can earn.

I use the model from Bresnahan and Reiss (1991) which utilizes number of firms and size and characteristics of a city to isolate the components of each aspect of the profit function. The BR model leverages the fact that an increase in market participation beyond the observed number of firms, n, would lead to a negative profit for the last entrant.

$$\Pi_n \geq 0; \Pi_{n+1} < 0 \tag{3}$$

Barriers to entry are estimated using a variant of the Bresnahan and Reiss functional form and these profit assumptions, and compared in and outside of the festival areas.

The structural model of Bresnahan and Reiss (1991) has the form:

$$\Pi = S(Y, \beta)V(Z, W, \lambda) - F(year, \delta) + \epsilon \tag{4}$$

Of course, the S(Y, β) and V(Z, W, λ) functions must be specified to create a unique model for the concert industry. First, S(Y, β) is the size of the market for the product. V(Z, W, λ) is the variable profit of each firm in a market. Finally, the F(year, δ) function is the fixed cost that must be paid when operating in a market. All of these functions are specialized for data in the concert industry, and functional forms tested until an appropriate form is found.

The S(Y, β) function in this paper is of the form:

$$S(Y,\beta) = Population_{it} + \beta_1 PopCounty_{it} + \beta_2 Age_{it} + \beta_3 Region_{it} + \beta_4 Metro_{it} \quad (5)$$

The size function establishes the importance of the various characteristics of market size and specifically what is important to determining the market for live music. In this case greater population is clearly beneficial. A younger population should bring greater participation in this market as most concert genres target a youthful crowd.

The V(Z, W, λ) function is of the form:

$$V(Z,W,\lambda) = Venues_{it-1} + \lambda_1 Income_{it} \quad (6)$$

The previous year's number of venues operating in the city is included to indicate the possibility of a declining variable profit when more firms are operating in the city.

Finally, fixed costs are of the form:

$$F(year,\delta) = \delta_0 + \delta_{it} year + \delta_{it} year * Festival_{it} \quad (7)$$

Time fixed effects have been included in the fixed costs in this model. As Toivanen and Waterson (2005) mention this is an ad hoc method of parameterizing the time dummies, but provides a reasonable choice for placement of year effects.

I tested the festival indicator in each of the size, variable profit, and fixed cost functions.[17] In each case the festival presence causes a negative effect on profits. However, some estimates in the models where the festival indicator is contained in size and variable profit were unreasonable, and seem to indicate an improperly specified model. Placing the festival variable in fixed costs provides the same result for the variable of interest and also appears reasonably specified in the estimates of other coefficients.

The effect within fixed costs can be interpreted as exclusive dealing causing a barrier to operation for local venues, thereby deterring venues from entering or remaining operational. The model is estimated by maximum likelihood using Poisson estimation, following the profitability assumption outlined earlier. The results are displayed in Tables 10 and 11, with only the relevant fixed costs variables included for space. There are year indicators for years one through twelve, or 1998-2009. These are interacted with another indicator, Delta, based on the number of venues in the city and the Festival variable outlined earlier. The variables in Tables 10 and 11 can then be interpreted as a festival's presence increasing or decreasing the fixed costs local venues must pay in order to operate. The results reinforce the idea that smaller cities are more adversely affected than larger cities. From 2001-2003, or years 4-6, the estimates show a decrease in fixed costs within a festival area. Post 2003 all coefficients show an increase in fixed costs. The clause

[17] Alternative models available upon request.

could take these few years to begin to create the barriers to entry, thereby decreasing the overall number of venues in these areas. In cities with greater numbers of venues, represented by the Delta2 and Delta3 variables, the effect on fixed costs is neglible and often negative.[18] This is consistent with the idea that larger cities are not affected in the same way as smaller cities, and potentially benefit from the festival's impact.

5.5 Exclusive Dealing Example

This paper has reported various specifications and estimates measuring the exclusive dealing impact on local firms. In order to illustrate the effect on a specific city I will create an example. Using the general Festival indicator found in columns one and two of all tables with a population interaction term, and evaluating at the mean value of all indepedent variables, the predicted number of venues is 1.634. The marginal effect of the exclusive dealing clause in this model is between -.37 and -.41. All else equal, the average city inside of a festival radius has a predicted value of about 1.234 venues, or approximately a 25 percent decrease when compared to a city outside. As population increases this effect diminishes. For every 100,000 person increase above the mean population, the effect is lessened by about .07. Of course, the population coefficient is also significant and positive, at about .075 venue increase per 100,000. These two effects working together, holding all other variables at their mean value, show that a 275,000 person increase beyond the average would elminate the predicted effect of the festival. This implies that smaller cities are disporportionately affected by the exclusive dealing, and in fact at some level of population the total number of venues in a city may benefit from a festival's presence. Again, this result can be explained if increased demand effects are more prevalent in larger cities, swamping the supply constraints from exclusive dealing. In this scenario, smaller cities are more strongly influenced by the constraint on supply and do not benefit from heterogeneous preferences.

6 Conclusion

The exclusive dealing that the four major American music festivals engage in has some negative effect on the local music venues in the affected cities; either through foreclosure, dampening competition, or increased barriers to entry. By attracting artists to their events with larger payouts and bigger crowds the festival locks the artist into a short-term exclusive deal preventing further concerts in the area. The benefits to the festival are clear, forcing local residents to buy passes to the event if they want to enjoy their favorite band in the near future drives up demand.

[18] Due to convergence issues there are three deltas: an indicator for one firm, an indicator for two or three firms, and an indicator for three or more firms.

And then because of the typically brief nature of a concert tour venues will likely have trouble booking those acts again in the same year.

Estimates from the models show that the number of venues in affected areas falls by .15 and .56 venues when compared with comparable cities outside of their range, or a nine to 35 percent decrease against the predicted mean. The effects are more strongly felt in less populated cities, with larger cities avoiding the brunt of the clause. Looking at each festival individually helps to distinguish the effects. The greatest festival impact comes from Coachella, where the decrease is approximately .7 to .9 venues per city within the range and the cities around Coachella do not seem to have the same diminishing effect with population. With various robustness checks it is apparent that this effect comes primarily from exclusive dealing and not from fundamental differences in the area or demand shocks resulting from the events. However, this is not uniformly true. The Bonnaroo festival shows a negative impact for smaller cities, but the total effect of the festival in this area seems to be an increased number of venues. I put forward the idea that prior to the festival's entry larger cities which fall under the exclusive dealing of Bonnaroo exhibited more homogenous preferences and a developing concert industry. Therefore, the festival has a positive effect on demand in these cities and causes a surge in venues in this area when compared to their counterparts.

Finally, I use a variant of the Bresnahan and Reiss (1991) model to isolate the effects as an increase in fixed costs. Strong assumptions make estimation difficult, but results from the model which appears properly specified reinforce the established conclusions. Smaller cities are inordinately affected by the exclusive dealing clause, where venues face larger barriers to operation. In the larger cities, after a settling period any effect is negligible. Further work on this topic could evaluate the decision making of festivals. Specifically, do the festivals use their competitive advantage to promote quality artists and expand demand or simply present established acts that would perform in local venues without the festival, thereby reducing competition without broadening preferences.

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Table 1: Summary Statisics Within and Without

Within				**Without**			
Variable	**Mean**	**Std. Dev.**	**Obs**	**Mean**	**St Dev.**	**Obs**	**T-stat**
Venues	1.658	3.068	777	1.649	2.748	2200	-.272
Population	334,000	530,134	777	302,068	647,708	2200	-1.27
ACL	0.257	0.437	777	0	0	2200	-27.4***
Bonnaroo	0.162	0.369	777	0	0	2200	-20.49***
Coach	0.416	0.493	777	0	0	2200	-39.3***
Lol	0.167	0.373	777	0	0	2200	-20.88***
Northeast	0	0	777	0.12	0.325	2200	10.37***
Midwest	0.19	0.393	777	0.19	0.392	2200	.097
West	0.416	0.493	777	0.359	0.48	2200	-2.9**
South	0.394	0.437	777	0.331	0.269	2200	-13.2***
Income	43,112.27	9237.48	777	43,965.34	9369.07	2200	2.3*
CountyPopulation	2,560,711	3,214,136	777	992,547	1,380,134	2200	-18.37***
Median_age	33.4	2.3	777	34.9	3	2200	11.8***
Entries	0.094	0.366	777	0.123	0.383	1956	1.7*
Exits	0.055	0.265	777	0.084	0.315	1956	2.1*

Notes: T-test - H_0: $\mu_{within} - \mu_{without} = 0$
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2: Summary Statistics from 1998-2001

Within				**Without**			
Variable	**Mean**	**Std. Dev.**	**Obs**	**Mean**	**St Dev.**	**Obs**	**T-Test**
Venues	1.42	2.88	289	1.412	2.46	447	.68
Population	316,181	517,576	289	282,302	635,915	447	-1.04
Northeast	0	0	289	0.148	0.355	447	7.12^{***}
Midwest	0.256	0.437	289	0.139	0.346	447	-3.9^{**}
West	0.349	0.478	289	0.389	0.488	447	1.05
South	0.395	0.439	289	0.328	0.197	447	-9.14^{***}
Income	44,578.47	9,437.40	289	44,909.44	9,209.39	447	.6
CountyPopulation	2,155,851	2,944,547	289	783,741	802,656	447	-9.3^{***}
Median_age	32.85	2.1	99	34.643	2.784	150	5.5^{***}
Entries	0.112	0.325	193	0.137	0.382	299	1.4^{*}
Exits	0.047	0.274	193	0.061	0.225	299	-.12

Notes: T-test - H_0: $\mu_{within} - \mu_{without} = 0$
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3: Summary Statistics from 2002-2009

Within				**Without**			
Variable	**Mean**	**Std. Dev.**	**Obs**	**Mean**	**St Dev.**	**Obs**	**T-Test**
Venues	1.674	3.105	727	1.79	2.805	1265	.68
Population	335,255	529,668	727	305,498	680,078	1265	-1.04
Northeast	0	0	727	0.139	0.346	1265	10.9^{***}
Midwest	0.199	0.4	727	0.187	0.39	1265	-.5
West	0.395	0.489	727	0.361	0.481	1265	-1.7^{*}
South	0.406	0.447	727	0.313	0.191	1265	-16.3^{***}
Income	43,059.63	9,371.91	727	43,558.79	9,292.06	1265	1.1
CountyPopulation	2,485,576	3,167,533	727	829,695	805,513	1265	-17.5^{***}
Median_age	33.522	2.421	727	35.255	3.052	1265	13.1^{***}
Entries	0.091	0.367	727	0.114	0.379	1265	1.2^{*}
Exits	0.056	0.269	727	0.1	0.344	1265	2.8^{**}

Notes: T-test - H_0: $\mu_{within} - \mu_{without} = 0$
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4: Results excluding Radio Measure

	Poisson Venues	Neg Bi Venues	Poisson Venues	Neg Bi Venues
Population	0.0295***	0.108***	0.0262***	0.0974***
	(0.00186)	(0.0274)	(0.00175)	(0.0275)
CountyPop	0.00408*	-0.00315	0.0106***	0.00126
	(0.00178)	(0.00221)	(0.00195)	(0.00251)
Metro	-1.204***	-0.839***	-1.195***	-0.822***
	(0.0831)	(0.0975)	(0.0818)	(0.0977)
Percentage18-44	0.0994***	0.0827**	0.101***	0.0832**
	(0.0101)	(0.0305)	(0.0107)	(0.0302)
Festival	-0.354***	-0.418**		
	(0.0916)	(0.140)		
FestPop	0.0648***	0.0609		
	(0.0140)	(0.0311)		
ACL			-0.697***	-0.740**
			(0.169)	(0.236)
Bonnaroo			-0.520**	-0.452*
			(0.169)	(0.223)
Coach			-1.240***	-0.827***
			(0.173)	(0.191)
Lol			-0.510***	-0.375
			(0.141)	(0.192)
ACLPop			0.100***	0.102***
			(0.00987)	(0.0307)
BonPop			0.224***	0.216***
			(0.0305)	(0.0500)
CoachPop			0.0176*	0.000980
			(0.00815)	(0.0297)
LolPop			0.0362**	0.0207
			(0.0121)	(0.0313)
[1em] Constant	-1.858	-1.791	-0.460	-1.469
	(1.673)	(1.751)	(1.692)	(1.786)
Observations	2947	2947	2947	2947
Log Likelihood	-5213.9	-4408.8	-4977.2	-4368.2

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5: Results including Radio Measure

	Poisson Venues	Neg Bi Venues	Poisson Venues	Neg Bi Venues
Population	0.0270***	0.0598*	0.0219***	0.0481**
	(0.00205)	(0.0249)	(0.00213)	(0.0178)
Metro	-1.233***	-0.872***	-1.216***	-0.848***
	(0.117)	(0.124)	(0.111)	(0.121)
Percentage18-44	0.112***	0.125***	0.117***	0.121***
	(0.00805)	(0.00948)	(0.00772)	(0.00841)
Festival	-0.422***	-0.613***		
	(0.101)	(0.146)		
FestivalPop	0.0638***	0.0939**		
	(0.0142)	(0.0290)		
ConcInd	-0.0887***	-0.0520***	-0.0761***	-0.0471***
	(0.0104)	(0.0101)	(0.00974)	(0.00954)
ACL			-0.615**	-1.040***
			(0.210)	(0.244)
Bon			-0.798***	-0.751**
			(0.219)	(0.257)
Coach			-1.689***	-1.195***
			(0.320)	(0.243)
Lol			-0.418*	-0.480**
			(0.174)	(0.172)
Observations	1468	1468	1468	1468
Log Likelihood	-2555.4	-2222.7	-2441.6	-2200.9

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Time and Region Fixed Effects, as well as Population Interaction terms are included in the model, but excluded from the table for space

Table 6: Summary statistics - Cities 301-400 miles

Variable	**Mean**	**Std. Dev.**	**N**
Venues	1.398	1.929	244
Population	2550301	259509	244
Metro	0.242	0.429	244
FourHundredACL	0.098	0.298	244
FourHundredBon	0.443	0.498	244
FourHundredCoach	0.332	0.472	244
FourHundredLol	0.127	0.334	244

Table 7: Coachella ED Test - Marginal Effects

	Poisson Venues	Neg Bi Venues	Poisson Venues	Neg Bi Venues
Population	0.0885***	0.0885***	0.104***	0.179***
	(0.00806)	(0.00806)	(0.00871)	(0.0213)
CountyPop	-0.00659	-0.00660	-0.00715	-0.00404
	(0.00545)	(0.00545)	(0.00445)	(0.00302)
Metro	-0.852***	-0.852***	-0.883***	-0.276
	(0.217)	(0.217)	(0.150)	(0.177)
LogIncome	4.887***	4.887***	1.474***	1.121**
	(0.552)	(0.552)	(0.297)	(0.381)
Percentage18-44	0.409	0.409	0.0596*	0.0437
	(0.241)	(0.241)	(0.0263)	(0.0235)
CoachExclusion	1.427***	1.427***		
	(0.140)	(0.140)		
201 - 300			-0.0116	0.0686
			(0.106)	(0.115)
Constant	-68.86***	-68.86***	-17.09***	-13.12***
	(10.68)	(10.68)	(3.067)	(3.830)
Observations	514	514	1053	1053
Log Likelihood	-485.6	-485.6	-1571.6	-1386.1

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Time and Region Fixed Effects are included in the model, but excluded from the table for space

Table 8: Festival Robustness Tests

	Poisson Venues	Neg Bi Venues	Poisson Venues	Neg Bi Venues
Population	0.0304***	0.134***	0.0339***	0.158***
	(0.00201)	(0.0189)	(0.00451)	(0.0476)
CountyPop	0.00704***	-0.00509*	0.00615	-0.00364
	(0.00152)	(0.00205)	(0.00333)	(0.00454)
Metro	-1.361***	-0.825***	-1.409***	-0.872***
	(0.0838)	(0.0968)	(0.174)	(0.195)
Percentage18-44	0.0931***	0.0784**	0.0487	0.0215
	(0.00993)	(0.0291)	(0.0520)	(0.0215)
FourHundredFest	-0.00106	0.0705		
	(0.0821)	(0.0798)		
PrimCity	0.368**	-0.214		
	(0.138)	(0.326)		
EverAny			0.0748	-0.0900
			(0.146)	(0.137)
Constant	-3.464*	-2.374	-6.976	-6.906
	(1.691)	(1.669)	(4.540)	(3.908)
Observations	2947	2947	729	729
Log Likelihood	-5299.9	-4418.7	-1264.3	-1021.1

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Time and Region Fixed Effects are included in the model, but excluded from the table for space

Table 9: Post 2000 Robustness Tests

	Poisson Venues	Neg Bi Venues	Poisson Venues	Neg Bi Venues
Population	0.0288***	0.0774**	0.0231***	0.0614**
	(0.00183)	(0.0280)	(0.00193)	(0.0228)
CountyPop	0.00153	-0.00233	0.0180***	0.00536
	(0.00250)	(0.00245)	(0.00344)	(0.00292)
Metro	-1.109***	-0.812***	-1.143***	-0.793***
	(0.0952)	(0.103)	(0.0920)	(0.0996)
Percentage18-44	0.109***	0.129***	0.113***	0.126***
	(0.00620)	(0.00834)	(0.00610)	(0.00757)
Festival	-0.383***	-0.558***		
	(0.0920)	(0.142)		
FestivalPop	0.0721***	0.0913**		
	(0.0139)	(0.0308)		
PrimCity	-1.185*	-0.679*	0.276	-0.295
	(0.510)	(0.323)	(0.284)	(0.264)
ACL			-0.629***	-0.855***
			(0.173)	(0.220)
Bonnaroo			-0.610***	-0.638**
			(0.172)	(0.225)
Coach			-1.744***	-1.149***
			(0.292)	(0.216)
Lol			-0.446**	-0.568***
			(0.148)	(0.157)
ACLPop			0.0944***	0.127***
			(0.0103)	(0.0260)
BonPop			0.243***	0.275***
			(0.0306)	(0.0452)
CoachPop			0.0146	0.0344
			(0.00872)	(0.0255)
LolPop			0.0276	0.0543*
			(0.0143)	(0.0245)
Constant	-1.280	-0.276	1.161	0.441
	(1.872)	(1.788)	(1.864)	(1.739)
Observations	2218	2218	2218	2218
Log Likelihood	-4011	-3360.3	-3796.3	-3325.8

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Time and Region Fixed Effects are included in the model, but excluded from the table for space

Table 10: Two Hundred to Three Hundred Mile Test

	Poisson Venues	Neg Bi Venues	Poisson Venues	Neg Bi Venues
Population	0.139***	0.150***	0.148***	0.178***
	(0.0285)	(0.0299)	(0.0218)	(0.0254)
CountyPop	0.0909***	0.108***	0.0293*	0.0211*
	(0.0125)	(0.0181)	(0.0115)	(0.0104)
Metro	-1.724***	-1.581***	-0.0819	-0.0675
	(0.414)	(0.417)	(0.193)	(0.163)
Percentage18-44	0.0927***	0.0951***	0.121***	0.145***
	(0.00761)	(0.00878)	(0.0183)	(0.0220)
Overlap	0.156	0.146		
	(0.165)	(0.178)		
PrimCity	-5.470***	-6.541***		
	(0.505)	(0.998)		
201 to 300			-0.00294	-0.0516 *
			(0.019)	(0.021)
Constant	-6.148	-2.361	-11.79**	-11.09**
	(4.067)	(5.863)	(4.272)	(3.394)
Observations	241	241	453	453
Log Likelihood	-419.4	-418.3	-645.7	-636.1

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Time and Region Fixed Effects are included in the model, but excluded from the table for space

Table 11: Structural Model

	(1) Original Specification	(2) Including Radio Measure
DeltaFest1Year4	-0.112	
	(0.457)	
DeltaFest1Year5	-0.170	-0.105
	(0.393)	(0.401)
DeltaFest1Year6	-0.0731	-0.0253
	(0.371)	(0.378)
DeltaFest1Year7	0.0305	0.0630
	(0.352)	(0.357)
DeltaFest1Year8	0.0794	0.121
	(0.323)	(0.329)
DeltaFest1Year9	0.106	
	(0.323)	
DeltaFest1Year10	0.0627	0.0901
	(0.314)	(0.320)
DeltaFest1Year11	0.102	
	(0.310)	
DeltaFest1Year12	0.105	0.110
	(0.303)	(0.306)
DeltaFest2Year4	0.0988	
	(0.324)	
DeltaFest2Year5	0.179	0.173
	(0.279)	(0.284)
DeltaFest2Year6	-0.0332	-0.0179
	(0.289)	(0.294)
DeltaFest2Year7	-0.0220	-0.0218
	(0.307)	(0.314)
DeltaFest2Year8	-0.0597	-0.0861
	(0.276)	(0.282)
DeltaFest2Year9	-0.133	
	(0.268)	

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 12: Structural Model - Continued

	(1) Original Specification	(2) Including Radio Measure
DeltaFest2Y10	-0.00844	-0.0190
	(0.246)	(0.251)
DeltaFest2Y11	-0.104	
	(0.250)	
DeltaFest2Y12	-0.0523	-0.0345
	(0.251)	(0.255)
DeltaFest3Y4	0.0106	
	(0.182)	
DeltaFest3Y5	-0.0109	-0.0108
	(0.165)	(0.172)
DeltaFest3Y6	-0.0104	-0.0108
	(0.159)	(0.165)
DeltaFest3Y7	0.0365	0.0250
	(0.160)	(0.166)
DeltaFest3Y8	-0.120	-0.123
	(0.146)	(0.153)
DeltaFest3Y9	-0.0762	
	(0.147)	
DeltaFest3Y10	-0.0952	-0.103
	(0.148)	(0.155)
DeltaFest3Y11	-0.131	
	(0.146)	
DeltaFest3Y12	-0.0824	-0.0944
	(0.148)	(0.154)
Observations	2701	1468

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Other results are excluded for space, but available by request

Table 13: Results without Radio - Marginal Effects

	Poisson Venues	Neg Bi Venues	Poisson Venues	Neg Bi Venues
Population	0.034***	0.116***	0.028***	0.101***
	(0.00)	(0.03)	(0.00)	(0.03)
CountyPop	0.005*	-0.003	0.011***	0.001
	(0.00)	(0.00)	(0.00)	(0.00)
Metro	-1.192***	-0.804***	-1.113***	-0.767***
	(0.08)	(0.09)	(0.07)	(0.09)
Percentage18-44	0.113***	0.089**	0.108***	0.087**
	(0.01)	(0.03)	(0.01)	(0.03)
Festival	-0.373***	-0.408***		
	(0.09)	(0.12)		
FestivalPop	0.074***	0.065*		
	(0.02)	(0.03)		
ACL			-0.564***	-0.573***
			(0.10)	(0.13)
Bonnaroo			-0.445***	-0.386**
			(0.11)	(0.15)
Coach			-0.873***	-0.642***
			(0.07)	(0.11)
Lol			-0.438***	-0.331*
			(0.10)	(0.14)
ACLPop			0.107***	0.107***
			(0.01)	(0.03)
BonPop			0.241***	0.225***
			(0.03)	(0.05)
CoachPop			0.019*	0.001
			(0.01)	(0.03)
LolPop			0.039**	0.022
			(0.01)	(0.03)

Table 14: Results with Radio - Marginal Effects

	Poisson Venues	Neg Bi Venues	Poisson Venues	Neg Bi Venues
Population	0.027***	0.060*	0.022***	0.048**
	(0.00)	(0.02)	(0.00)	(0.02)
CountyPop	0.005	0.000	0.019***	0.008*
	(0.00)	(0.00)	(0.00)	(0.00)
Metro	-1.233***	-0.872***	-1.216***	-0.848***
	(0.12)	(0.12)	(0.11)	(0.12)
Percentage18-44	0.112***	0.125***	0.117***	0.121***
	(0.01)	(0.01)	(0.01)	(0.01)
Festival	-0.422***	-0.613***		
	(0.10)	(0.15)		
FestivalPop	0.064***	0.094**		
	(0.01)	(0.03)		
ConcInd	-0.089***	-0.052***	-0.076***	-0.047***
	(0.01)	(0.01)	(0.01)	(0.01)
ACL			-0.615**	-1.040***
			(0.21)	(0.24)
Bon			-0.798***	-0.751**
			(0.22)	(0.26)
Coach			-1.689***	-1.195***
			(0.32)	(0.24)
Lol			-0.418*	-0.480**
			(0.17)	(0.17)
ACLPop			0.000***	0.000***
			(0.00)	(0.00)
BonPop			0.000***	0.000***
			(0.00)	(0.00)
CoachPop			0.000***	0.000
			(0.00)	(0.00)
LolPop			0.000***	0.000*

Table 15: Coachella ED Test - Marginal Effects

	Poisson Venues	Neg Bi Venues	Poisson Venues	Neg Bi Venues
Population	0.036***	0.036***	0.083***	0.137***
	(0.01)	(0.01)	(0.01)	(0.02)
CountyPop	-0.003	-0.003	-0.006	-0.003
	(0.00)	(0.00)	(0.00)	(0.00)
Metro	-0.399***	-0.399***	-0.667***	-0.206
	(0.10)	(0.10)	(0.11)	(0.13)
LogIncome	1.979***	1.978***	1.182***	0.858**
	(0.35)	(0.35)	(0.25)	(0.29)
Percentage18-44	0.165*	0.165*	0.048*	0.033
	(0.08)	(0.08)	(0.02)	(0.02)
CoachExclusion	0.999***	0.999***		
	(0.20)	(0.20)		
201 - 300			-0.009	0.054
			(0.08)	(0.09)

Table 16: Festival Robustness Test - Marginal Effects

	Poisson Venues	Neg Bi Venues	Poisson Venues	Neg Bi Venues
Population	0.035***	0.144***	0.035***	0.149***
	(0.00)	(0.02)	(0.01)	(0.04)
CountyPop	0.008***	-0.005*	0.006	-0.003
	(0.00)	(0.00)	(0.00)	(0.00)
Metro	-1.349***	-0.797***	-1.232***	-0.736***
	(0.08)	(0.09)	(0.17)	(0.16)
Percentage18-44	0.107***	0.085**	0.050	0.020
	(0.01)	(0.03)	(0.05)	(0.02)
FourHundredFest (d)	-0.041	0.079		
	(0.10)	(0.10)		
PrimCity	0.511*	-0.208		
	(0.23)	(0.28)		
EverFest			0.077	-0.084
			(0.15)	(0.13)

Table 17: Post 2000 Robustness Test - Marginal Effects

	Poisson Venues	Neg Bi Venues	Poisson Venues	Neg Bi Venues
Population	0.034***	0.084***	0.024***	0.064***
	(0.00)	(0.01)	(0.00)	(0.01)
CountyPop	0.002	-0.003	0.019***	0.006*
	(0.00)	(0.00)	(0.00)	(0.00)
Metro	-1.144***	-0.795***	-1.058***	-0.745***
	(0.05)	(0.08)	(0.05)	(0.07)
Percentage18-44	0.129***	0.141***	0.121***	0.132***
	(0.00)	(0.01)	(0.00)	(0.01)
Festival	-0.430***	-0.568***		
	(0.05)	(0.09)		
FestivalPop	0.085***	0.100***		
	(0.01)	(0.02)		
PrimCity	-0.832***	-0.543***	0.336	-0.268
	(0.06)	(0.15)	(0.23)	(0.20)
ACL			-0.525***	-0.649***
			(0.09)	(0.12)
Bonnaroo			-0.502***	-0.511***
			(0.08)	(0.14)
Coach			-1.130***	-0.843***
			(0.05)	(0.08)
Lol (d)			-0.393***	-0.468***
			(0.07)	(0.10)
ACLPop			0.100***	0.132***
			(0.01)	(0.02)
BonPop			0.259***	0.287***
			(0.02)	(0.05)
CoachPop			0.016*	0.036*
			(0.01)	(0.02)
LolPop			0.029**	0.057*
			(0.01)	(0.02)

Table 18: 200 to 300 Miles - Marginal Effects

	Poisson Venues	Neg Bi Venues	Poisson Venues	Neg Bi Venues
Population	0.139***	0.150***	0.142***	0.174***
	(0.03)	(0.03)	(0.02)	(0.03)
CountyPopulation	0.091***	0.108***	0.033**	0.023*
	(0.01)	(0.02)	(0.01)	(0.01)
Metro	-1.724***	-1.581***	-0.139	-0.102
	(0.41)	(0.42)	(0.20)	(0.17)
Overlap	0.156	0.146		
	(0.17)	(0.18)		
201 to 300			-0.052	-0.106
			(0.13)	(0.12)

Appendix A: Variable Lists

Table 19: Variable List from Summary Statistics

Variable	**Description and Data Source**
Venues	The number of venues in a city. Source: Derived from Songkick.com
Population	Population of the city. In results, value is divided by 100,000. Source: US Census, American Community Survey
ACL	Indicator variable for a city within 300 miles of Austin, TX. In summary statistics represents percentage of sample in this range.
Bonnaroo	Indicator variable for a city within 300 miles of Manchester, TN. In summary statistics represents percentage of sample in this range.
Coach	Indicator variable for a city within Coachella's ED range. Specified counties in southern California. In summary statistics represents percentage of sample in this range.
Lol	Indicator variable for a city within 300 miles of Chicago, IL. In summary statistics represents percentage sample in this range.
Directional Indicators	Indicators determined by region
Income	Median Household Income in county containing a given city. CPI adjusted (2000 base year). Source: US Census, ACS
CountyPop	Population of the county containing a given city. In results, value is divided by 100,000. Source: US Census, ACS
Median_age	Median age in county containing a given city. Source: US Census, ACS
Entries	Number of entries in the city in a year. Source: Songkick.com
Exits	Number of exits in the city in a year. Source: Songkick.com

Table 20: Additional Variable List from Results

Variable	Description and Data Source
Metro	Indicator assigned to non-primary cities in an Metropolitan Statistical Area
LogIncome	Log of the median income in county containing a given city. Source: US Census, ACS
Percentage18-44	Percentage of population in county containing a given city aged 18-44. Recorded in whole numbers Source: US Census, ACS
Festival	Primary variable of interest. General indicator for a city within a festival radius.
ConcInd	Concentration Index of Radio described in text. Much like an HHI. Source: FCC, obtained by confidential communication with the Media Bureau
PrimCity	Indicator for the city a festival is held in. Limited to Austin, Chicago, and Los Angeles.
FourHundredFestival	Indicator for any city between 301-400 miles of a festival or 250 miles from Coachella.
EverFest	Indicator for a city within a festival range in the years before the festival started.
EverAny	Indicator for a city that will fall under a festival radius in the future, but hasn't yet.
FestivalPop	An interaction of the festival indicator and City Population.
ACLPop	An interaction of the ACL indicator and City Population.
BonPop	An interaction of the Bonnaroo indicator and City Population.
CoachPop	An interaction of the Coachella indicator and City Population.
LolPop	An interaction of the Lollapalooza indicator and City Population.
CoachExclusion	Indicator for any city that falls outside of Coachella's clause, but would be in the radius of the other festivals in this sample.
201 - 300	Indicator for a festival affected by a radius clause that is within 201 - 300 miles.
Overlap	Indicator for any city that falls in both the Bonaroo and Lolapalooza radii.