Music scenes to music clusters: the economic geography of music in the US, 1970 – 2000

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Abstract. Where do musicians locate, and why do creative industries such as music continue to cluster? This paper analyzes the economic geography of musicians and the recording industry in the US from 1970 to 2000, to shed light on the locational dynamics of music and creative industries more broadly. We examine the role of scale and scope economies in shaping the clustering and concentration of musicians and music industry firms. We argue that these two forces are bringing about a transformation in the geography of both musicians and music industry firms, evidenced in a shift away from regionally clustered, genre-specific music scenes, such as Memphis or Detroit, toward larger regional centers such as New York City and Los Angeles, which offer large markets for music employment and concentrations of other artistic and cultural endeavors that increase demand for musicians. We use population and income to probe for scale effects and look at concentrations of other creative and artistic industries to test for scope effects, while including a range of control variables in our analysis. We use lagged variables to determine whether certain places are consistently more successful at fostering concentrations of musicians and the music industry and to test for path dependency. We find some role for scale and scope effects and that both musicians and the music industry are concentrating in a relatively small number of large regional centers.

Introduction

Why do people and firms locate where they do? This question has vexed economic and geographic thinkers for ages. In the agricultural era, people located around river deltas and other sources of fertile, productive soil. With the rise of trade, villages, towns, and nascent cities grew up along ports, river-ways, and transport routes. During the industrial age, giant agglomerations of factories, shops, warehouses, offices, and people swelled near sources of raw materials and major transportation routes. With the rise of globalization and technology-based knowledge industries, many contend that physical constraints on location have been weakened or eliminated. More recently, we hear that the "world is flat" (Friedman, 2008), as both firms and people have far less reason to cluster (for a critique see Leamer, 2007).

But locational clustering continues in the face of globalization. Porter (2000) counters that clustering remains important as firms take advantage of networks, suppliers, markets, and related factors, referring to this as a "location paradox" (Porter, 2006). Research on high-technology industries finds that even knowledge-based industries like hardware and software (Saxenian, 1994) and biotechnology (Cortright and Mayer, 2001)—which are far less tied to natural resources or capital-intensive infrastructure—tend to cluster around universities, networks of related firms and

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entrepreneurial talent, end-users, venture capital and specialized services. An important line of economic theory and research has found that such colocation in knowledge-intensive industries generates benefits in terms of knowledge spillovers that increase the efficiency of both innovation and commercialization (Jaffe, 1986; Lucas, 1988; Romer, 1986; 1990).

Music is a classic creative industry (Caves, 2002), and having already undergone a 'digital crisis', it is uniquely suited to provide insights into the economic geography of other knowledge industries that are currently entering one (eg newspaper, publishing, and film). The music industry can give us insights into the economic and geographic changes in industries in which a physical product is becoming a digital product, with all the challenges that transformation entails for market participants. Music is also characterized by a small, widely understood set of firms—bands, other performers, record labels, and so on. This makes it particularly suited to research that can be applied to other, more complex knowledge industries such as broadcasting, software and biotechnology.

Why would creative activities like the arts, entertainment, or music continue to cluster? Although musicians do not make use of raw materials and do not have to go to work in giant, capital-intensive factories, several studies note considerable concentration in locations of music production (Florida and Jackson, 2008; Scott, 1999). So if musicians do not, to paraphrase Lucas (1988), 'fly apart', why do they cluster in specific places?

Our research examines the location of musicians and their industry in the late 20th century. Drawing from previous studies, it tests a variety of theories and propositions about musicians and their industry and about why they continue to cluster. In the past, musicians were seen to cluster in location-specific scenes based on specific genres, like Dixieland jazz in New Orleans, country in Nashville, and Motown in Detroit. A wide body of research has documented the rise of music scenes in multiethnic crossroads locations, so it might be expected that musicians cluster around areas of ethnic and cultural diversity (eg Connell and Gibson, 2002; Mark, 1998; Southern, 1997). In recent decades, music scenes have emerged in college towns where music talent is located, students have free time to form and play in musical acts, and there is considerable demand for live music performance. We argue that such locationally based scenes are less important today and that the economic geography of music is being reshaped by two key interacting forces that act on places: economies of scale and economies of scope (Andersson and Andersson, 2006).

Building on Andersson and Andersson (2006), we argue that musicians and music industry firms will be attracted to larger places where scale economies can take place. This is reinforced by a shift in the economics of music industry revenues from music recordings to live performance (see Connolly and Krueger, 2005). We also argue that larger places will benefit from related scope economies. A broad artistic, cultural, and entertainment economy can provide demand for musicians who may be employed by or perform in cultural enterprises from dance to radio to television to commercial jingles. Currid (2007) shows how venues, clubs, recording studios, and performance spaces act as conduits for economic and social networks. Churches and religious institutions may play a similar role in providing greater music employment in some regions. In this sense, our research argues that we may be seeing a shift in the geography of music from locally constituted and genre-specific music scenes to music clusters in larger regions that offer scale economies in the form of larger, multigenre and cross-genre markets for performance and experience and scope economies that stem from the concentration and spillover effects of related artistic and creative producers and industries. We orient our empirical research and methods to test explicitly for the effects of

these scale and scope economies on the distribution of musicians and music industry firms, while controlling for other factors.

To explore these possibilities, we examine the location of musicians and music establishments in the US from 1970 to 2000. We begin by charting the regional location of musicians and music industry establishments at the metropolitan level. We separate professional musicians from all musicians, where the latter also include a share of self-employed musicians, based on an assumption that the two work under different conditions.

To probe for these effects, we examine the influence of scale-related factors such as population and income, scope-related factors such as other artistic fields and disciplines, as well as the historical location of musicians and music establishments. We examine these relationships over time using lagged variables to probe for temporal autocorrelation. We also look closely at the role of outliers on our findings.

Theory and concepts

Music is one of the world's defining cultural products. From early touchstones such as spirituals and Tin Pan Alley to the post-WWII explosion of popular music genres like rock and roll and hip hop, it has been a major influence on culture, fashion, and society in general ever since uniquely American styles of music emerged in the 19th century.

Levitin (2006) notes that music is one of the few universal cultural norms: we do not know of any society throughout human history that lacked music. Cowen (1998) and Bull (2005) identify music's unique accessibility in that it can be consumed with either full or partial attention (at a concert or while commuting or driving a car), and almost everyone is at least a casual listener and buyer. Kittler (1999) relates technology development to music. Connolly and Krueger (2005) note the ways that research on music offers useful insight into economics and social science more broadly and Attali (1985) shows the close connection between music and (political) society from a historical perspective.

There is now a significant, growing literature on arts, culture and the creative industries. Caves (2002) defines creative industries as those that produce intangible products that are idiosyncratic and for which demand is impossible to determine in advance. Such industries benefit from a geographically concentrated economic structure that includes cultural producers, agents, gate keepers, and other market actors. Markusen (2004) outlines the specialization of creative activity across locations. Florida (2002) documents the clustering and concentration of the creative class and its effect on innovation and economic outcomes. Scott (1999; 2000) notes that dense production agglomerations are a key characteristic of originality and innovation in culture industries and that, in the recorded music industry specifically, commercially effective forms of creativity are positively related to agglomeration. The research stream of evolutionary economic geography suggests that the concentration of creative industries, in fields like fashion design, stems from the fact that they learn locally but compete globally. This suggests that the gains from local spillovers increase the number of firm entries, while global competition may restrict the localized industry from growing overall. In the long run, these factors can lead to regional lock-in effect in certain creative industries (Wenting and Frenken, 2007).

Historians have also noted the tendency of musicians and artists to cluster together (eg Mark, 1998). The term 'music scene' originally described the musical genres associated with mid-20th-century crossroads music locations that brought diverse rural talent into contact with larger audiences, performance venues, recording studios, radio stations, managers, and record labels. The scenes in Memphis, New Orleans, Detroit,

and Chicago were built by entrepreneurs who constructed studios like Sun, Stax, and Motown to commercialize the fruits of artistic agglomeration and cross-pollination in these cities. Bennett and Peterson define music scenes as "the context in which clusters of producers, musicians, and fans collectively share their common musical tastes and collectively distinguish themselves from others" (2004, page 1). Silver et al (2005, page 6) add that scenes are "modes of organizing cultural production and consumption" that "foster certain shared values and tastes, certain ways of relating to one another and legitimating what one is doing or not doing."

Lloyd and Clark (2000) chart the rise of the 'entertainment city', where opportunities for consumption of unique artistic and cultural goods become increasingly important. Glaeser et al (2001) note the rise of the 'consumer city.' Negus (1999) highlights the role of major labels for different types of genres and artists, with a focus on the corporate business style. The role of organizational structure and project-based creative activities is further developed in Lorenzen and Fredriksen (2005) and Sedita (2008). Connell and Gibson (2002) provide extensive work on the close connection between music and place, in terms of cultural expressions, immigration groups, and so on. Molotch (2002) details the effects that local character and tradition can have on products, noting that songwriters have long tried to distinguish themselves by capturing the distinctive essence of a place, which he refers to as "place in product".

Florida and Jackson (2008) find that the location of the music industry is potentially shaped by two forces. On the one hand, they note the concentration of music industry employment and establishments in major centers like New York, Los Angeles, and Nashville. On the other, they find some dispersal of musicians in smaller locations, including rural and exurban areas. Recent work by Leyshon (2009) also suggests that technology shifts and, especially, the introduction of new recording and mixing software has had a strong effect on recording-industry location patterns, embedding the music industry further into established agglomerations.

However, in this paper we argue that the effects of scale and scope economies are still important and play a major role in transforming the economic geography of the music industry. Economies of scale appear when the production implies large fixed costs or when there is a need for a larger marketplace in order to support the economic activity. In a narrow sense, this can be seen in the location of professional musicians, whose employment often is related to fixed investments such as concert halls, performance venues, or recording studios. On a broader level, such economies of scale will be reflected in larger markets, which can increase overall demand for music and related musical activities by providing more people, more venues, and a broader range of tastes. From a theoretical perspective, live music is highly distance sensitive, which means that producer and consumer need to meet in the same place in order for production and consumption to take place. This implies that the market place needs to be big enough to provide a sufficient number of such meeting places. However, employed, or professional, musicians might be relatively more dependent on size, since the activities of their employers include higher fixed costs (recording studios, music halls, theaters, and so on) than those of self-employed musicians. Meanwhile, self-employed musicians, who can relocate at a lower transaction cost, might be more flexible when deciding on location. To test for scale economies, we look at the effects of population size, empirically testing to see whether musicians and musical groups are drawn to major population centers that provide greater access to scale through bigger markets and more diverse audiences. We expect the location of professional musicians to be related to recording studios, music halls, and film and TV production, which all represent considerable fixed costs. For self-employed musicians, the location needs to offer enough venue

places and performing opportunities. For those not yet able to live off their music, the location also needs to offer complementary jobs.

Economies of scope stem from the ability to take advantage of other related and colocated activities. These will be evident in places where musicians can get involved in a number of different production processes. Economies of scope are reflected in related arts and cultural disciplines—for example, more dance troupes or musical theatre productions increase demand for musicians. Because musicians typically mix sources of income (Pew, 2004), a musician may play in his or her own band, perform in a group, or support a dance troupe or musical theater, while also working as a professional studio musician. We test directly for these scope economy effects, examining the role of other artistic and cultural industries and occupations on the location of musicians and music industry firms. Since other research has found that churches and religious institutions play a role in creating opportunities for musicians (eg Connell and Gibson, 2002; Southern, 1997), we also examine their role in music locations.

In addition, we plan the effects of path dependency—that is, the effect of the historical concentrations of musicians and music industry assets. Some locations have a long history of fostering musicians and music genres. We expect path dependency to be particularly strong for the recording industry, since changing location implies sunk costs in lost networks as well as major fixed costs. We test for a certain degree of path dependency in the distribution of musicians and music industry firms, since regions with historically strong concentrations would suggest an advantage as locations for both.

The following hypotheses will be tested:
(1) The theoretical framework suggests that we can expect an overrepresentation of musicians and the recording industry in bigger cities due to the distance sensitivity in the consumption of live music and the high fixed costs related to recording production, which both demand a big market place and a larger number of venue places.
(2) According to theory we can expect gains to be made from collaboration/coproduction with other related cultural productions, which we can assume will be in the same regions. If it was merely a scale effect, we would expect to see similar-sized clusters in cities of the same size. But we expect to see an overrepresentation of musicians and the recording industry where other cultural industries are located.
(3) Based on theory we can expect the current location of musicians and recording industry to be a function of their past location and the past location of related cultural industries. We expect to see a positive and significant relationship between past location patterns and the ones we see today.

Research and methods
To investigate these issues, we analyze the location of musicians and music establishments in the US from 1970 to 2000, examining the factors that affect the location of all musicians, professional or employed musicians, and the recording industry. We use three distinct time points, that reflect the evolution of the music industry over some thirty years and through different genres and systems of technology (from albums to CDs to digital music).

We employ dependent, explanatory, and control variables in our analysis. We begin by describing our dependent variables.

Dependent variables
Recording industry. This variable is based on industry data and is a location quotient for recording industry establishments. It is not fully compatible over time. The first year is for 1977 and is defined as 'phonographic record makers' and is based on the

Standard Industrial Classification. The same definition applies to the 1990 variable, but by 2000 the definition has changed to 'recording industry' and is now based on the North American Industry Classification System definition. While the change of definition over time is unfortunate, we still believe this is the best variable available. These data are from the Census Bureau's County Business Patterns series.

Musicians. This variable is based on occupation and is a location quotient for employed and self-employed (ie self-reported) musicians for the years 1970, 1990, and 2000, based on data from the US Census Public Use Micro Sample (PUMS). Self-employed musicians in this sense are musicians without a formal employer.

Much of location theory focuses on location of firms. However, we must remember that in the case of the self-employed, the firm and individual are the same unit, implying that the location preference will be a function of both.

Professional musicians. We include a separate variable for professional (or employed) musicians. It differs from the musician's variable, which includes a large number of self-employed musicians. Professional musicians are those who are formally employed by a firm (and not just short-term) to work as musicians and thus may be more likely to be drawn to concentrations of venues or recording studios. This variable is a location quotient for employed musicians and singers based on data from the United States Bureau of Labor Statistics (BLS) for 2000. Older BLS data are not available, so we cannot use lagged versions of this variable.

Explanatory variables:
A series of variables probes for the effects of scale economies on the location of musicians.

Population. This variable tests for economies of scale effects related to population size. It represents total population by metropolitan region, taken from the 2000 US Census.

Income per capita. This also reflects scale economies created by income. It may be a better proxy for this than population, as income levels vary significantly by location. Drawn from 2000 US Census data, it includes proceeds from wages and salaries plus self-employment income; interest, dividends, rents, royalties, estates, trusts; social security or railroad retirement income, Supplemental Security Income, public assistance, welfare payments, retirement, survivor, or disability pensions; and all other income.

Other variables examine scope economy effects.

Artists. The first of these is artists. Based on industry data, it is a location quotient for the number of employees in the industry of independent artists, performing arts, spectator sports, and related industries. We use PUMS data from 1970, 1990, and 2000. We include this variable based on the assumption that musicians and the music industry can gain from interaction with similar creative activities, a kind of economies of scope effect. It is important to note that this variable does not include musicians of any sort. We also include earlier years for this industry to probe for path dependency.

Dancers. Based on occupational data, this variable is a location quotient for employed and self-employed dancers and choreographers. We use PUMS data for the years 1970, 1990, and 2000. As for artists, we see the dancers variable as a scope effect and also test for path dependency over time.

Broadcasting industry. This variable is based on industry data and is a location quotient for the number of employees in the broadcasting industry. We use PUMS data for 1970, 1990, and 2000. The broadcasting variable also aims to capture scope economy effects.

Churches. This variable is based on industry and is a location quotient for the number of employees within churches (religious organizations). We use PUMS data for 1970, 1990, and 2000. Based on theory, we can assume religious institutions to have an effect on the fostering of musicians. In some regions, religious institutions may even play an

important role in doing so. We also include churches over time, to control for path dependency effects over time.

We would have liked to include the number of venue places per capita in the analysis, but unfortunately the data are not available. The only related variable would have been 'bars', and because not all bars provide live music, we decided to exclude it.

Control variables
Human capital. This variable is based on educational attainment, measured as the percentage of the regional labor force with a bachelor's degree and above, calculated using 2000 US Census data. We use it as a control variable for the regional characteristics related to market and demand structure.
College population. This variable is based on the share of population enrolled in college, based on 2000 US Census data. This is another control variable to probe for the regional demand characteristics.
Service economy employment. This variable is the service economy's share of employment, based on 2000 BLS data. Many musicians are self-employed, and often a second job is required to supplement music income. We use this variable to control for the effects of the availability of service jobs on music geography.
Foreign-born population. This is the foreign-born share of population by metro area, calculated from the 2000 US Census data. Earlier studies have shown that regions with large immigration groups have been more efficient in fostering music genres and scenes (Connell and Gibson, 2002). This variable aims to probe for such effects.

Methods
We use a series of methods to examine the role of scale and scope economies on the geography of music. We provide descriptive statistics in the form of regional shares, location quotients, maps, and plots to get a general picture of the location of all musicians, professional musicians, and recording industry establishments from 1970 to 2000. We use bivariate correlational analysis for our dependent and independent variables to check for correlations between the present and the past. We use multivariate regression analysis, a combination of a distributed lag and cross-section model, to probe for the factors affecting the location of musicians, professional musicians and the recording industry. Each regression is run with and without lagged variables, to explicitly probe both for path dependency effects in relation to music activities and for scope effects from other creative activities. By including lagged variables from different time periods, we can not only determine the role of path dependency but also examine whether certain time periods have had a stronger influence on the current location patterns. We will test for collinearity effects to rule out that the lagged variables include the same type of information.

Findings
We now turn to the main findings of our analysis. Figure 1 maps the location quotients for all musicians, professional musicians, and recording industry establishments for 2000. Table 1 shows the share of all musicians, professional musicians, and recording industry establishments for available years between 1970 to 2000 by the top three, top ten, and top twenty locations.

Both the distribution of talent and music (recording industry) establishments were concentrated. In 1970 the top three locations for musicians accounted for 10.4% of total musicians; the top ten for 17.8% and the top twenty for 23.7%. By 2000 the top three accounted for 15.2%, the top ten, 26.9%, and the top twenty, 37.6%.
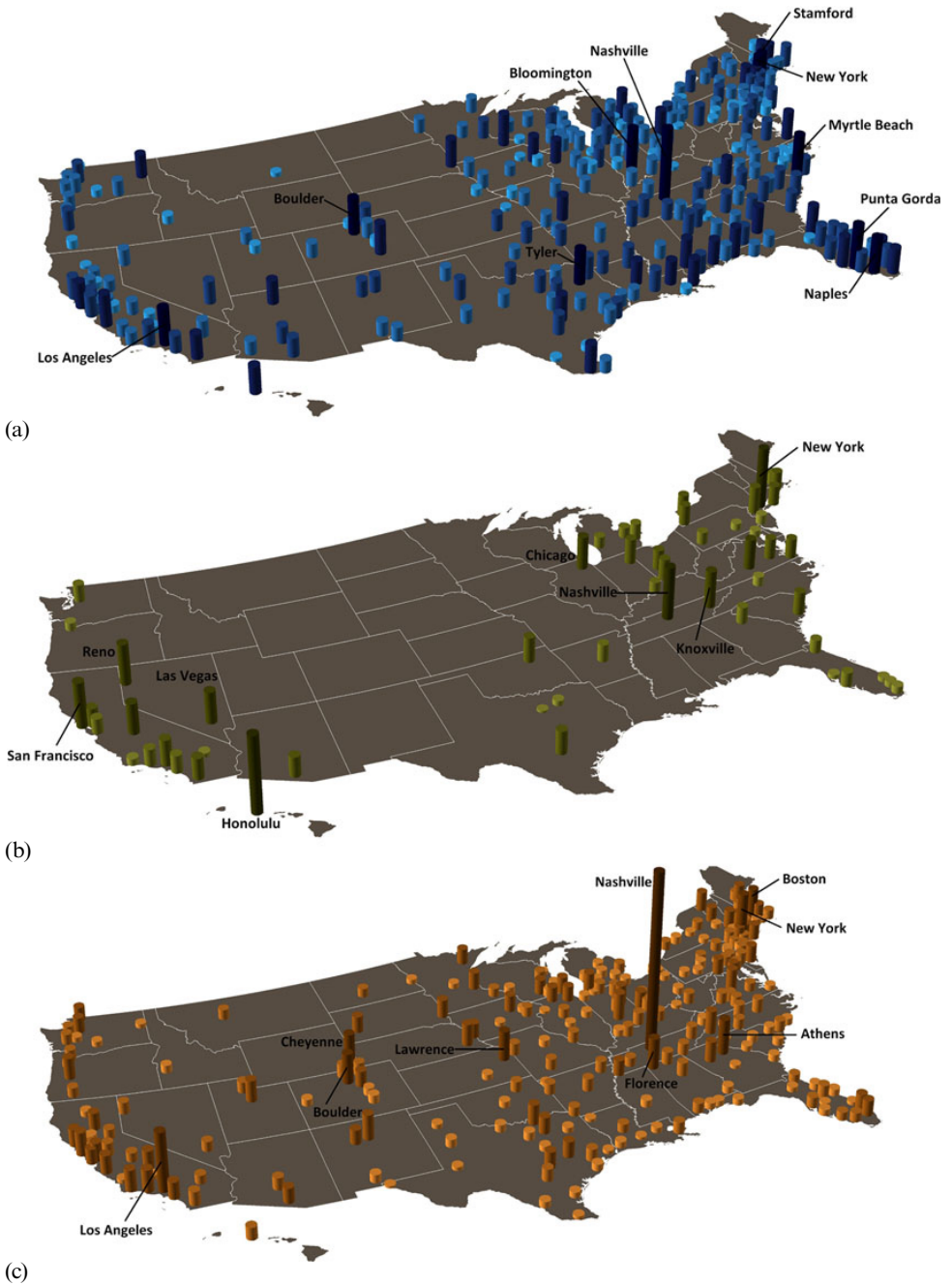
Figure 1. [In color online, see http://dx.doi.org/10.1068/a4253] (a) Musicians, (b) professional musicians, (c) recording industry by location quotient (darker borders indicate higher location quotients) [source: 2000 US Census Public Use Micro Sample data for (a), 2000 US Bureau of Labor Statistics data for (b), 2000 US Census Bureau data from the County Business Patterns Series for (c)].

Table 1. Shares of musicians, professional musicians, and recording industry establishments, 1970–2000 (source: see text).

Locations	Musicians			Professional musicians	Recording industry establishments		
	1970	1990	2000	2000	1977	1990	2000
Top three	10.5	20.4	15.2	11.9	51.4	38.2	38.5
Top ten	17.8	34.4	26.9	27.4	66.4	54.5	52.6
Top twenty	23.7	47.2	37.6	41.8	76.1	67.7	63.9

Los Angeles and New York City were consistently the top two locations for musicians (based on share of national employment) from 1970 to 2000. Chicago displaced Detroit in third place. Washington, DC, Nashville, Boston, Atlanta, Philadelphia, San Diego, and Houston rounded out the top ten locations for musicians in 2000. Baltimore, Dallas, Oakland, Seattle, and Tampa have fallen off the list since 1970.

Turning now to employed or professional musicians, in 2000 the top three regions accounted for 11.9%, the top ten for 27.4%, and the top twenty for 41.8%. But the locations for professional musicians differed considerably from those for musicians in general. Honolulu topped the list, followed by New York City and Nashville. Interestingly, Los Angeles did not make the top ten, which was rounded out by San Francisco, Reno, Knoxville, Chicago, Las Vegas, Fresno, and Lynchburg. Professional musicians tended to be overrepresented in tourist destinations, which provide greater-than-average opportunities for relatively stable employment in music. Nashville's ranking reflected both its role as a center for recording and musical performance and the presence of session musicians, employed by country music and Christian record labels on a semi-permanent basis.

The recording industry was considerably more concentrated than musicians. In 2000 the top three locations accounted for 38.5% of all establishments, the top ten for 52.6%, and the top twenty for 63.9%. Los Angeles, New York, and Nashville were the top three locations for the recording industry, accounting for nearly 40% of the entire industry. Miami, Chicago, Nassau (a suburb of New York City), Atlanta, Orange County (a suburb of Los Angeles), Greenville, South Carolina, and Washington, DC, rounded out the top ten. Since 1970, Bergen County, NJ (a suburb of New York), Detroit, Philadelphia, and San Francisco have fallen out of the top ten.

Figure 2 plots musicians, professional musicians, and recording industry establishments against population. Observations above the line are regions that had a higher share of the music variable than their population share would predict. Here the positions of Los Angeles and New York City stand out, showing significant over-representation for their population size. New York City is well above the line for all three music variables. Los Angeles is in the same superstar class, significantly over-represented for both musicians and recording industry establishments, although it is slightly underrepresented for professional musicians. Among the smaller centers, Nashville stands out, overrepresented for all three variables and most dramatically for recording industry establishments. Chicago, on the other hand, is notable for its underrepresentation. It is significantly underrepresented for both musicians and recording industry establishments, and for professional musicians it has only the share expected for its size.

Figure 3 provides box plots for musicians and recording industry establishments between 1970 and 2000. These box plots show the median, quartiles, outliers, and

(a)

(b)
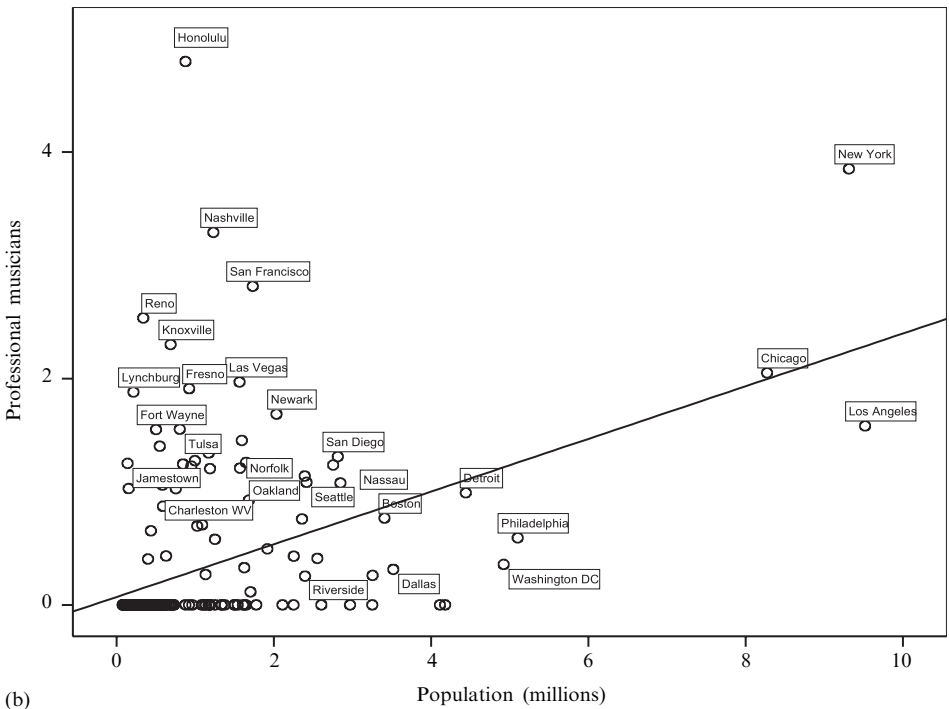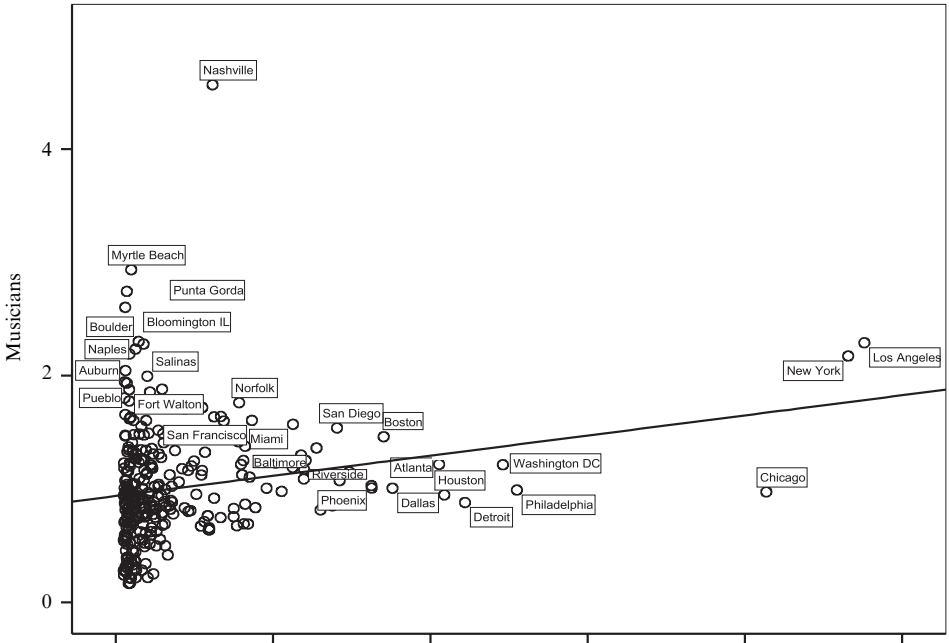
Figure 2. (a) Musicians, (b) professional musicians, and (c) recording industry establishments versus population (source: see text).
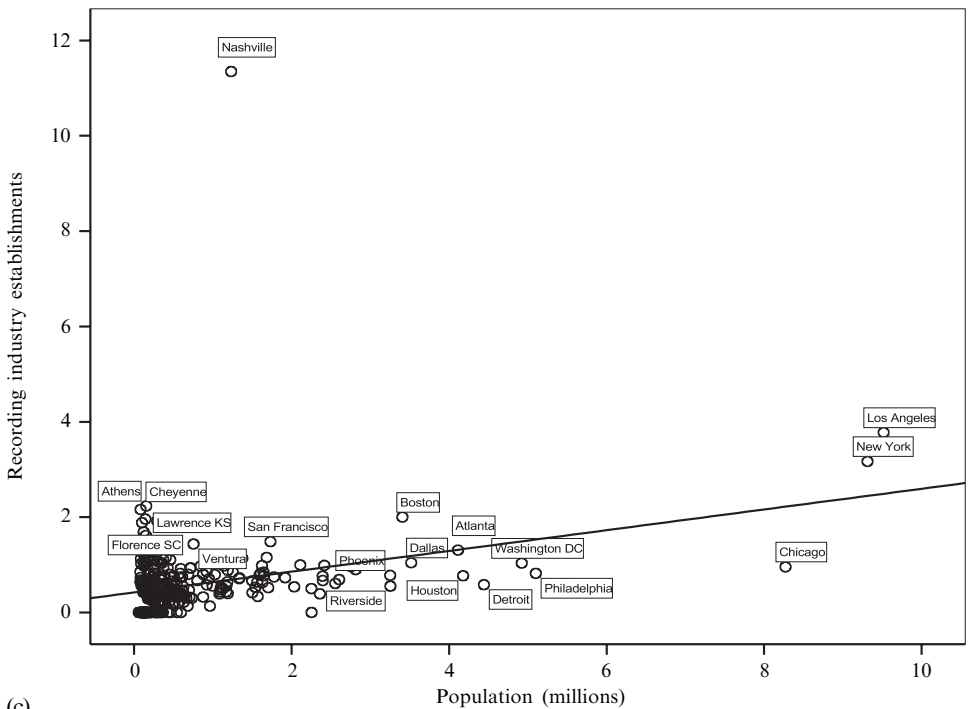
(c)

Figure 2 (continued).

extreme values for a scale variable. The interquartile range is the difference between the 75th and 25th percentiles and corresponds to the length of the box.

The box plots illustrate the rise of Nashville as a center for both professional musicians and the recording industry, in line with the findings of Scott (1999) and Florida and Jackson (2008). They further confirm the dominance of New York City, Los Angeles, and Nashville as recording industry clusters and the role of Las Vegas as a location for professional musicians. The plots also show an overrepresentation of professional musicians in smaller regions, including tourist destinations like Naples, Myrtle Beach, Punta Gorda, and Bloomington, home to a leading music conservatory.

Correlational analysis

To further identify the factors that influence these patterns of regional concentration, we proceed with a bivariate correlational analysis between musicians, professional musicians, the recording industry, and other key variables in our analysis. Table 2 summarizes the results.

Interestingly, the three key music variables—all musicians, professional musicians and recording industry establishments—are only moderately correlated with one another. The correlation between musicians and professional musicians is 0.329; between musicians and recording industry establishments, 0.413; and between professional musicians and recording industry establishments 0.386. This indicates that musicians and professional musicians are located in different types of regions and that only a share of the musicians are drawn to recording industry centers.

The highest correlations are between musicians and artists (0.458) and between professional musicians and population (0.447). Generally speaking, the correlations between the music variables and artists are consistently highest, which suggests that economy of scope can be a driving force for the location of musicians in general and

(a)

(b)
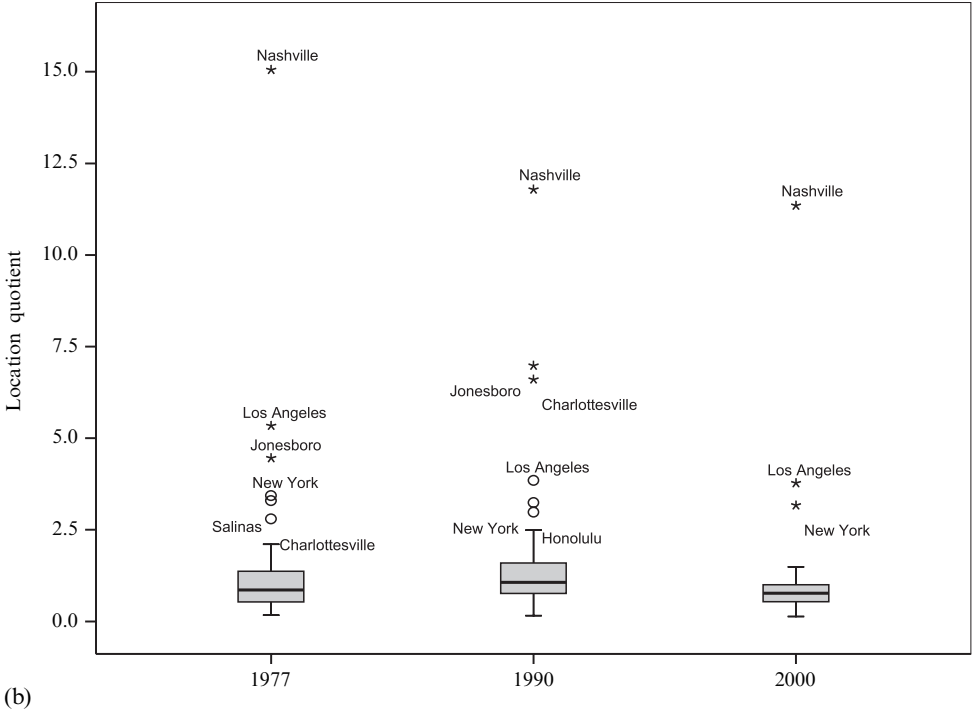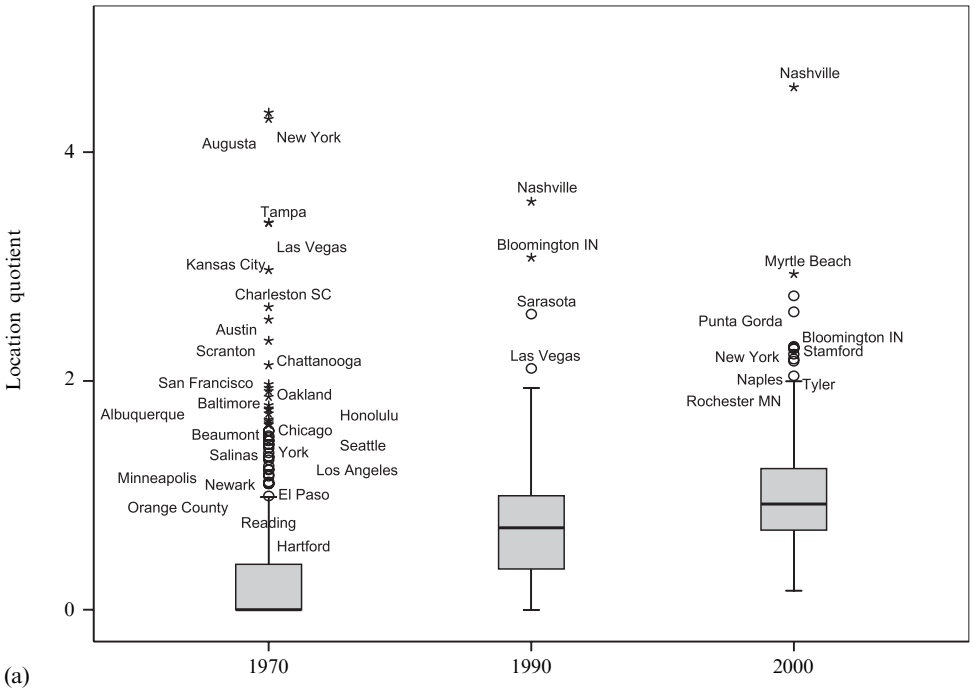
Figure 3. Box plots for concentrations of (a) musicians and (b) recording industry establishments, 1970 – 2000 (source: see text).

Table 2. Correlations for the music industry (2000) (source: see text).

Variable	Musicians	Professional musicians	Recording industry establishments
Musicians	na	0.329**	0.413**
Professional musicians	0.329**	na	0.386**
Recording industry	0.413**	0.386**	na
Population	0.263**	0.447**	0.321**
Income per capita	0.285**	0.192**	0.237**
Foreign-born population	0.255**	0.301**	0.190**
Service jobs share	0.042	0.077	0.148**
Human capital	0.187**	0.100	0.288**
Percentage of population in college	−0.021	−0.035	0.104
Churches	0.116*	−0.091	−0.047
Artists	0.458**	0.298**	0.479**
Dancers	0.052	0.305**	−0.011
Broadcasting industry	0.184*	0.085	0.136*

* $p < 0.05$ level; ** $p < 0.01$ level. na is not applicable.

Table 3. Correlations for the music industry and lagged variables (source: see text).

Variable	Musicians, 2000	Professional musicians, 2000	Recording industry establishments, 2000
Music industry			
Musicians			
1990	0.264**	0.288**	0.413**
1970	0.223**	0.397**	0.282**
Recording industry			
1990	0.297**	0.325**	0.613**
1977	0.349**	0.344**	0.675**
Lagged variables			
Dancers			
1990	0.020	0.310**	0.066
1970	0.141*	0.480**	0.090
Broadcasting industry			
1990	0.105	0.085	0.120*
1970	0.271**	0.376**	0.283**
Churches			
1990	−0.016	−0.065	0.065
1970	0.189**	0.288**	0.298**
Artists			
1990	0.046	0.231**	0.028
1970	0.176**	0.406**	0.196**

* $p < 0.05$ level; ** $p < 0.01$ level.

that musicians connect with other types of creative activities. The correlations between music and population, income, and foreign-born population are reasonably high. Surprisingly, the correlations between musicians, on the one hand, and human capital and college population, on the other, are low. The music variables also register weak correlations with service job share, churches, and the broadcasting industry.

Musicians in general are significantly, though weakly, correlated with professional musicians (0.329) and recording industry establishments (0.413). Musicians also exhibit weak correlations with population (0.263), income per capita (0.285), and foreign-born

population (0.255). Musicians are not significantly correlated with the share of service jobs or the percentage of the population in college.

The variable for professional musicians is significantly (if somewhat weakly) correlated with the other two music variables—0.329 with musicians and 0.386 with recording industry establishments—and more strongly with population (0.447). Professional musicians also exhibit weak correlations with foreign-born population (0.301), artists (0.298), and income per capita (0.192). Professional musicians are not significantly correlated with service jobs share, human capital, the percentage of population in college, churches, or the broadcasting industry.

The recording industry is significantly (if somewhat weakly) correlated with musicians in general (0.413) and professional musicians (0.386), and more strongly with artists (0.479). Recording industry establishments also exhibit weak correlations with human capital (0.288), income per capita (0.237), foreign-born population (0.190), service job share (0.148), and the broadcasting industry (0.136). It is not significantly correlated with the percent of the population in college or with the presence of churches.

Table 3 shows the correlation coefficients between the music variables in 2000 and lagged versions of the other variables. The correlations are significant for all three music variables but strongest for recording industry establishments. This path dependency is not surprising, given the recording industry's relatively high fixed costs, especially compared with musicians, who can migrate to other regions at relatively little cost. It is interesting to note that the correlation between professional musicians and all musicians and artists is weaker with the more recent 1990 lagged variable (0.231) than with the older 1970 one (0.406). The variables that were nonsignificant are left out of the regressions reported below.

Multivariate regression analysis

We now turn to a fuller, multivariate analysis of the factors that affect our three music variables. The aim is to examine the effects of scale and scope economies on the geography of music. We chose to eliminate the two variables that did not exhibit significant evidence of a correlation with any of the music variables—percentage of population in college and churches in 1990. Each of the regressions is run with and without lagged variables to examine to what extent the past, in terms of musicians and recording industry but also in terms of other related creative industries, has an effect on the current music geography. Table 4 summarizes the key results of our ordinary least squares estimations.

The first model is for all musicans (including self-employed). It generates an R^2 adjusted of 0.313. The findings indicate that musicians are significantly associated with the presence of the recording industry. They are also related to the presence of churches and artists. Population, income per capita, and foreign-born population are all insignificant. Interestingly and perhaps surprisingly, the variable for professional musicians is also insignificant in this model.

Next we introduce a series of lagged variables to test for path dependency and endogenous effects. Keeping all the existing variables in the model, we add the lagged variables to check for changes in the significance levels and R^2 adjusted values. To what extent is there evidence of path dependency in the presence of musicians and the recording industry? Adding the lagged variables increases the R^2 adjusted value slightly (by just 0.014). Surprisingly, where musicians were located in 1970 or even 1990 does not appear to affect the location of musicans in 2000. In fact, when we add the lagged variables, the coefficient for recording industry establishments ceases to be significant. There is little evidence of path dependency in the location of musicians.

Table 4. Multivariate regression analysis (source: see text)

Variable	Musicians, 2000		Professional musicians, 2000		Recording industry establishments, 2000	
	without lag	with lag	without lag	with lag	without lag	with lag
Musicians	na	na	0.159	0.091	0.550**	0.116
			(1.657)	(1.027)	(5.236)	(1.669)
Professional musicians, 2000	0.077	0.055	na	na	0.278**	0.114*
	(1.657)	(1.027)			(3.687)	(2.132)
Recording industry establishments, 2000	0.201**	0.13	0.210**	0.185*	na	na
	(5.236)	(1.669)	(3.687)	(2.132)		
Population	-2.6×10^{-8}	-4.6×10^{-8}	1.55×10^{-7}**	1.11×10^{-7}**	4.90×10^{-8}	1.08×10^{-8}
	(−1.033)	(−1.650)	(4.439)	(4.439)	(1.175)	(0.379)
Income per capita	0.005	0.005	0.003	0.006	−0.012	−0.003
	(0.601)	(0.670)	(0.268)	(0.560)	(−0.927)	(0.144)
Foreign-born population	0.785	0.653	1.027	0.981	−1.501*	−1.213*
	(1.756)	(1.414)	(1.598)	(1.645)	(−2.035)	(−2.616)
Churches, 2000	0.366**	0.312**	0.010	0.124	−0.130	−0.200
	(3.371)	(3.029)	(0.070)	(0.911)	(0.787)	(−1.891)
Artists, 2000	0.335**	0.330**	−0.056	−0.100	0.455**	0.273**
	(4.579)	(4.237)	(−0.515)	(−0.959)	(3.709)	(3.407)
Musicians						
1990		0.010		0.028		0.156*
		(0.135)		(0.297)		(2.146)
1970		0.001		0.005		−0.032
		(0.017)		(0.067)		(−0.539)
Recording industry esablishments						
1990		0.037		0.046		0.236**
		(0.939)		(0.910)		(7.371)
1977		0.040		−0.001		0.287**
		(1.127)		(−0.022)		(9.456)
Broadcasting						
1990		0.064		−0.087		−0.129
		(0.845)		(−0.892)		(−0.129)
1970		0.087		−0.007		0.036
		(1.262)		(−0.078)		(0.507)
Churches, 1970		−0.038		0.094		−0.009
		(−0.409)		(0.784)		(−0.099)
Dancers, 1970		0.002		0.083**		−0.037**
		(0.165)		(5.006)		(−2.765)
Artists						
1990		−0.034		0.113		0.029
		(−0.767)		(1.964)		(0.635)
1970		0.032		−0.049		0.007
		(0.463)		(0.554)		(0.105)
R^2 adjusted	0.313	0.327	0.270	0.411	0.358	0.751

* $p < 0.05$ level; ** $p < 0.01$ level. Data based on 227 observations. na is not applicable.

The second model is for professional musicians. Here the R^2 adjusted is 0.27. Two variables are significant: population and recording industry. When lagged variables are added to the model, the R^2 adjusted value increases from 0.27 to 0.41. However, the only lagged variable that is significant is dancers for 1970, a relationship for which there is no clear explanation.

The third model is for recording industry establishments. The R^2 adjusted is 0.358. The coefficients for professional musicians and overall artistic concentrations are both significant. The coefficient for foreign-born population is negative and significant, and a variance inflation factor test suggests that the negative relationship is not due

to any collinearities in the model. When Nashville, an extreme outlier, is excluded, the coefficient for foreign-born becomes insignificant.

This model becomes considerably stronger when lagged variables are added, with an R^2 adjusted of 0.75. Clearly, recording industry location exhibits considerable path dependence. The coefficients for recording industry establishments in 1970 and 1990 are both significant at the 0.01 level. It appears that concentrations of recording industry establishments are highly dependent on the past. It should also be noted that when they are added to the model, the coefficient for musicians becomes insignificant and that for professional musicians weakens considerably.

Thus, we find evidence that path dependency is much stronger for recording industry establishments than for musicians themselves. One likely reason is that musicians are more mobile. Musicians can pick up and move easily. They can migrate at a much lower cost and can perceive benefits to moving among locations where the recording industry and other employment opportunities are located. Recording industry establishments are less mobile because of higher fixed costs. They will tend to develop cost advantages to scale and agglomeration and lock in to those advantages over time. Musicians who wish to record can travel to these locations when the need arises.

Conclusions

Our research has explored the location of musicians and the music industry, tracking and analyzing the locational trends of all musicians, professional musicians, and recording industry establishments between 1970 and 2000. In general terms, we assumed that the location of musicians and the recording industry would be driven by economies of scale and economies of scope. We formulated three hypotheses:

(1) Musicians and recording industry establishments should be overrepresented in bigger cities, due to economies of scale and the distance sensitivity of live music production and consumption.

(2) Musicians and recording industry establishments should be overrepresented in the very same locations due to gains from collaboration/coproduction with other related cultural industries (economies of scope).

(3) The current location of musicians and recording industry establishments depends on their and related industry establishment locations in the past.

We probed for this by looking specifically at the scale effects of population and income and the scope effects of related artistic and cultural industries, while controlling for other factors. We also examined the extent to which music clusters are path dependent—that is, whether they are influenced by previous concentrations and are generally stable over time.

The results of our analysis suggest that both musicans and the music industry are highly concentrated, confirming our first hypothesis. Nashville has emerged over time as a primary location for both professional musicians and the recording industry, alongside New York and Los Angeles. Generally speaking, music becomes more concentrated as we move up the value chain from all musicians to professional musicians to the recording industry. This could be expected, since the more fixed the costs involved in the production, the larger the gains from being located in bigger market places. Many activities related to recording and professional musicians are related to higher fixed costs, which in the end need to be covered. Self-employed musicians can move across regions with a lower degree of sunk costs involved. Our findings suggest that both scale and scope economies play significant roles in the economic geography, but that each operates in different ways and through different channels. Scale economies in the form of population size are significantly related to the location of professional musicians, but are not related to the concentration of all

musicians or to the recording industry. Our analysis also finds that the relation between population and musicians or the recording industry holds for only the very large regions, not more generally for all regions. In other words, we saw major scale effects, but this holds only for the very large regions. Two large metropolitan areas—New York City and Los Angeles—remain leading centers for musicians and the recording industry. Chicago's role and status has decreased over time, along with a cohort of other large regions. Income has little effect on music location.

Scope economies that stem from colocation with and from other creative industries also seem to play a significant role, confirming our second hypothesis. The location of artistic industries that more broadly employ individuals related to artistic activities plays a significant role in explaining the location patterns of musicians and the recording industry. These variables have the strongest effect on musicians and the recording industry, not on the distribution of professional musicians.

Furthermore, professional musicians appear to cluster around the recording industry as expected. Musicians (including those who are self-employed) also cluster around the recording industry, in addition to artistic clusters and religious institutions. The recording industry is concentrated around professional musicians, broader artistic concentrations, and population.

When examining the third and last hypothesis, we find evidence of considerable path dependency in the recording industry, which is likely due to the higher fixed costs of recording industry hardware and infrastructure. However, there are no significant results for our lagged musician variable to explain the current location of musicians in general and professional musicians. Neither do we find any impact on the current location pattern of musicians from earlier locations of broadcasting, recording industry establishments, churches, or artistic industries in general. In other words, we can accept our third hypothesis in relation to the recording industry location pattern.

Control variables like human capital, college population, service industry jobs, or foreign-born population—which are proxies for market size and type—appear to have little, if any, effect on the location of musicians and the recorded music industry.

Basically, our findings suggest that the geography of musicians and the music industry are shaped by a series of interacting forces. The 'big three'—New York, Los Angeles, and Nashville—appear to have consolidated their locational advantages in music over time. The first two are large, diverse metropolitan areas that combine large markets for music performance with substantial concentrations of music industry 'hardware' and related commercialization functions, as well as substantial concentrations of related artistic and entertainment industry that provide opportunities for employment and other spillover benefits. Nashville has consolidated its role as a center for recorded music and professional musical talent.

To a certain extent, our results are surprising. We would have expected a stronger impact from the scale effects of larger markets, scope effects of related creative sectors and activities, and also from historical concentration or path dependency. Taken together, the scale-related and scope-related variables generated an R^2 adjusted value of approximately 0.30, and with the added lagged variables this number hardly changed for musicians. Path dependency was however stronger for the recording industry (R^2 adjusted increased from approximately 0.36 to 0.75 with lagged variables), which is in line with what we could expect, since it would involve huge sunk costs to relocate such activities. One should also remember that path dependency probably still matters in selected regions, but our results suggest that this does not hold for the current distribution of musicians in general.

The relationship between musicians and the recording industry is also interesting. Our analysis suggests that musicians are only loosely linked to their 'industry' and have

considerable degrees of freedom to locate away from the infrastructure required to commodify and commercialize recorded music. This is likely to accelerate in an era of digital downloading where more value is extracted from performance than from recorded music.

We also find that musicians are quite mobile—evident in the rapid rise and fall of specific locations for musicians outside the 'big three' over time. While the recording industry appears locationally stable, the locations for musicians rise and fall fairly dramatically over time. The musical world is not becoming any 'flatter', so to speak: The top twenty locations accounted for 37.6% of musicians and 41.8% of employed musicians in 2000. Yet, the specific locations have changed dramatically since 1970.

While musicians have every reason to 'fly apart', to paraphrase Lucas (1988), they do not. They continuously cluster and aggregate over time. And the way they do so is very interesting: Outside the big three, music locations appear to form and reform almost in real time as musicians seek out and cluster in new places. Part of this is a function of the shift, over time, away from the dominance of recorded music to performance and the consumption of experiences. This shift is evident both in the rise of tourist destinations like Honolulu, Las Vegas, Reno, and others as musical clusters and in the persistence of the clusters of New York City and Los Angeles.

Music poses intriguing implications and interesting challenges for the theory of location in an era of creative, knowledge-driven production where traditional inputs, infrastructures, and transportation costs matter far less, if they matter at all. It is clear from the case of music that population matters, but only to a degree. Income and human capital play virtually no role—a finding that exposes a striking difference from other knowledge-based sectors like software or biotechnology. Furthermore, the geography of music is distinguished by constant change and churn. Clusters of musicians appear to rise and fall rapidly, forming and reforming almost in real time. Yet a small number of regions have locked up top positions. The factors that attract and shape concentrations of musicians, outside the top three locations, appear rather fleeting. Locations rise and fall relatively quickly. The geography of music is at once stable and unstable, highly mobile and concentrated.

This allows us to detail areas that hold opportunities for further research. While the presence of musicians does not appear to be easily predicted by conventional economic analysis variables, there may be other explanations. Musicians may be attracted and retained by specific amenities such as live music venues (for which we did not have data in this analysis), recorded music shops, or musical instrument stores. Our analysis also did not take into account the variegated nature of scenes. Musicians may be attracted by the presence of a small core of musicians doing exciting work in a particular genre such as the Baltimore experimental music scene or the Atlanta pop-rap and R&B scene, which in an era of inexpensive, professional-sounding home recording technology, is not necessarily accompanied by the professional recording infrastructure captured in our variable. Other factors such as availability of grants and other funding or regulatory environment (eg licensing of music venues) may also play a role.

Most of all, we believe there is a great deal to be learned by studying the institutional structure and behavior of musicians and the music industry. We echo Connolly and Krueger (2005), who stress that research on music can uncover important insights into economics—though we add geography and sociology to the list. This paper argues that modeling the location of musicians will lend greater insight into the factors influencing the location of other highly mobile creative professionals and other human capital. We wish to encourage more research on this important and understudied subject and hope our analysis and findings spur more interest and analysis in this subject.

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