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Emoting with their feet: Bohemian attraction to creative milieu†

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Abstract

Creative class theory posits that creative people are attracted to places most conducive to creative activity. The association of the share of employment in the arts with various indicators of economic dynamism provides plausible support for this conjecture. We explicitly test this conjecture by modeling the 1990 share of employment in the arts at the county level, and then use the residual from this regression to explain differences in various measures of economic dynamism between 1990 and 2000. Our results support the hypothesis that an unobserved creative milieu that attracts artists increases local economic dynamism.

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1. Introduction

A central conjecture of the creative class theory is that creative people are attracted to those places most conducive to creative activity. Workers in highly creative occupations supposedly move to those places able to support rich opportunities for social and cultural interaction. In contrast to the more venerable innovative milieu construct that initially focused on creative interaction among workers and between firms and research institutes to examine innovation and economic competitiveness, members of the creative class seek to imbue creativity in all aspects of their lives. The posited parallel between interaction that fulfills personal lives and interaction that energizes productive lives has spawned a growing number of initiatives to promote urban creative milieus that give rise to 'creative cities.'

However, creative milieu remains an amorphous construct relative to the concrete identification of actors, structures and mechanisms comprising innovative milieus. Knowledge spillovers in a creative milieu are characterized as 'spillacrosses',

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recognizing the diverse set of actors that may contribute ideas from a range of knowledge domains (Stolarick and Florida, 2006). This greater diversity of knowledge also differentiates creative milieus from artistic milieus. A creative milieu is a place where 'face-to-face interaction [among a critical mass of entrepreneurs, intellectuals, social activists, artists, administrators, power brokers or students] creates new ideas, artefacts, products, services and institutions and, as a consequence, contributes to economic success.' (Landry, 2000, 133). Yet, the mere agglomeration of a diverse set of creative agents in a place may not be sufficient to ensure interaction across diverse domains that define a creative milieu.

Evidence to date linking creative milieu to economic success has been suggestive. An association between the share of employment in the arts and specialization in high-tech industry or the rate of new firm formation provide plausible support for the conjecture that a vibrant creative milieu increases economic competitiveness (Florida, 2002a; Lee *et al*., 2004). The focus on 'Bohemians' (visual, applied and performing artists and authors) in these studies addresses the problem of conflating inputs and outcomes in the isolation of creative milieu. Since Bohemians are not reasonably expected to have a direct influence on high-tech industry or entrepreneurial dynamism, their association stems from common unobserved factors that could include creative milieu. Unfortunately, the available findings are unable to refute alternative explanations making them inconclusive and thus unproductive for informing local development policy.

This article provides an explicit test of the hypothesis that the same unobservable factors that attract a relative abundance of Bohemians positively influence local economic dynamism. The success of this approach depends on the validity of characterizing arts occupations as an indicator species, whose relative abundance or scarcity indicates the environmental level of creative milieu. Two characteristics of arts occupations are compelling. Most importantly, creativity is the essential job function of the arts occupations, more so than any other occupational group. If a creative milieu does confer competitive advantages, then artists would have a strong incentive to move to the most creative places. Second, high levels of self-employment and the exceedingly high labor content of arts output makes it more likely that Bohemians are able to realize their locational preferences, as they tend to be more footloose than other workers. If creative people are in fact attracted to creative places, then the location decisions of artists should reveal these preferences. Alternatively, no association between economic dynamism and a relative surplus of Bohemians would refute their validity as indicators of creative milieu.

We define our study area as all counties in the continental US, delineating an inclusive geography of Bohemia. This choice is clearly at odds with the accepted wisdom that the arts are predominantly central place functions that are rare in non-metropolitan areas. We identify a significant number of rural counties with high arts employment shares making our findings more compelling. Since these non-traditional art magnets are most dependent on the location decisions of footloose artists, non-metro arts specializations should be especially effective in flushing out an alleged creative milieu. Additionally, the structural simplicity of non-metro economies imparts a more direct relationship between creative milieu and any observed economic dynamism. From a purely empirical basis, the greater variation in the non-metro arts employment share increases the likelihood of identifying a significant creative milieu effect if it exists.

Relying on a residual as the principal explanatory variable of interest puts a premium on generating an error structure that allows valid inference. Both the arts share of employment and the various output measures are likely to display varying degrees of spatial dependence. If the dependent variables measuring artist employment and other indicators of economic dynamism in a given location are a function of neighboring locations, then estimates of the factors explaining these outcomes may be biased and inconsistent. On the other hand, if unobserved factors are correlated between counties, then there may be gains in efficiency if spatial error structure is appropriately modeled. Our findings, after testing then controlling for various types of spatial dependence evident in the data, support the hypothesis that an unobserved creative milieu that attracts artists increases local economic dynamism.

2. Beyond the tautology of creative people in creative places

'Creativity' as an explanation for differences in regional performance is prone to fuzzy conceptual logic (Markusen, 2006). Within the creative class construct, a creative place is identified as one that has a high share of nominally creative workers in its workforce (Florida, 2002b). This high share seemingly confirms a capability for eliciting creativity. Unfortunately, the class of nominally creative workers is defined using broad occupational categories that conflates high human capital requirements with creativity and includes some detailed occupations with little requirement for either (Markusen, 2006, McGranahan and Wojan, 2007). Yet, the reason that creativity is of most interest is the belief that the stimulation of creative energies in a place will generate new economic opportunities that are resilient to the cost minimization logic of globalization. Assessing the role of creativity in a regional development strategy must ultimately address outcomes. In this section, we review the literature linking creativity to competitiveness in a place, and suggest how the location preferences of artists may provide an empirical means for identifying this link.

2.1. Creative milieu and economic dynamism

The two dominant views on how the local environment shapes economic dynamism can be traced back to Marshall and Jacobs. The Marshallian view that 'the secrets of industry are in the air' examines innovation among geographically proximate firms within an industry (1920). This view has emphasized the importance of a support environment that may include actors outside of the industry. However, in this view the interaction that is critical to creativity and innovation is industry specific, similar to more modern variants including the work on *innovative milieus* and new industrial spaces (Moulaert and Sekia 2003). This interaction is possible because of the informal networks that develop in a place, often reliant on trust and reciprocity. But this 'milieu' is not thought to be instrumental in attracting creative people to a place:

> There is no reference to improving the non-(market) economic dimensions of the quality of life in local communities or territories. This becomes particularly clear when the meaning of culture is considered: culture is 'economic culture' or 'community culture' to the extent that it

> is functional to improving the competitiveness of the local or regional economy. (Moulaert and Sekia, 2003, 295)

In contrast, insights from Jacobs (1961) have stressed the importance of the cross-fertilization of ideas to innovation, both between industries and between economic actors and the wider community. The emphasis on serendipity in this creative process favored large urban areas. Jacob's concern that the dominant urban design principles following the Second World War worked to impede this serendipity puts the essential elements of a creative milieu in stark relief. In this view, uncreative places are highly dependent on the automobile, partitioned into single-use tracts that often result in the segregation of the population by class or wealth. Creative places would be characterized by a high degree of human-scale interaction: street-level interaction resulting from the co-location of housing and commercial activity; diversity in the housing stock and in commercial space that would retain affluent residents amongst working class residents, and support emerging activities that tend to be economically marginal alongside established businesses; and common civic spaces providing venues for chance interaction marked with a sense of place.

Florida's conception of the creative city relies heavily on Jacob's concept of human-scale interaction but also finds a way to incorporate Marshall. The critical difference with Marshall is the assumption that secrets adhere to occupations as well as to industries. An agglomeration of workers tackling the same types of problems creates a 'buzz' similar to firms in an industrial district exploring around a common engineering problem. However, potentially productive interactions also occur across creative occupations (Stolarick and Florida, 2006). If creative workers seek out creative experience in all aspects of their lives then this cross-fertilization is more likely, provided venues for social and cultural interaction outside of work are available. In contrast, creative workers in places lacking these opportunities for human-scale interaction will forego this cross-fertilization.

Yet, the idea that creativity is a powerful unifying influence, aligning the aspirations and preferences of very different types of creative workers is strongly contested. Empirically, Markusen's (2006) in-depth study of artists questions the putative affinity between high-tech industry and the arts, noting that high-tech centers such as Silicon Valley and Chicago have a relative deficiency of artists. This doubt is reinforced conceptually in an analysis of the knowledge bases that differentiate occupations within an aggregate creative class (Hansen *et al.*, 2005). Engineers, scientists and artists are likely to display different migration tendencies given differences in the spatial scale pertaining to synthetic, analytic and symbolic knowledge bases that underlie their work, respectively. Occupations reliant on an analytic knowledge base that is highly codified will be most mobile and thus most receptive to policies attracting talent. In contrast, workers in creative industries having an affinity for the amenities of large cities may be much less mobile given the dual tacit/codified nature of symbolic knowledge.

The creative class critiques do not deny that interactions across domains or knowledge bases may be important to innovation and growth. Indeed, empirical evidence strongly supports the diversity arguments of Jacobs relative to the specialization arguments of Marshall in explaining the comparative advantage of cities (Glaeser *et al.*, 1992). Rather, the main concern is with the policy

recommendations suggesting that any city can develop this advantage by attracting a diverse set of creative workers by appealing to a single, albeit complex, creative ethic. From this perspective, the attraction of artists may say little about the rest of the economy.

The tautological view holds that creative workers will compare opportunities for creative interaction and concentrate in creative places. A parallel, testable hypothesis is that greater opportunities for human-scale interaction increase economic dynamism. The critical intermediate step requires that human-scale interaction, this creative milieu, is disproportionately attractive to artists (Florida, 2002a; Lee *et al*., 2004).

2.2. Flushing out creative milieu

We find a strong analogy between the signal role of artists in identifying a creative milieu and the work in ecology on the role of indicator species in identifying complex environmental conditions (Landres *et al*., 1988). In both cases, the environmental phenomena of interest are observable, although very costly or difficult to measure. Similarly, the relative prevalence of an easily observable quantity (i.e. species or occupation) hypothetically provides information on the environmental phenomena of interest. The frequent application of the indicator species model within a natural science paradigm that is much more hostile to fuzzy conceptual logic provides robust criteria for identifying flaws in the 'geography of Bohemia' methodology of Florida (2002a) and Lee *et al*. (2004) and for specifying a more valid analogue.

The failure to conform with two guidelines for valid indicator species studies may impair statistical inference in Florida (2002a) and Lee *et al*. (2004). First, an indicator species analysis should develop a strategy that accounts for natural variability in population attributes. Reliance on the *Bohemian index*—the arts employment share—simply as an explanatory factor of high-tech specialization (Florida, 2002a) or new firm formation (Lee *et al*., 2004) fails to control for confounding factors that may be associated with both the explanatory and outcome variable. That is, a putative 'creative milieu' may be explained by an observable omitted variable. The primary omitted variable suspect in Florida (2002a) and Lee.*et al*. (2004) is the size of the university sector given a potentially strong association with both the arts employment share and economic dynamism, particularly related to support of the analytic knowledge base (Hansen *et al*., 2005). Second, merely assuming that the location behavior of artists is germane in only the largest metro areas omits potentially pertinent observations, possibly biasing results. The admonition to investigate the biology of an indicator species in detail has its parallel in investigating the urban ecology of an indicator occupation in detail. In the next section, we establish the relevant geography for testing the posited relationship between Bohemians and creative milieu, and examine factors related to the variability of the arts employment share.

3. An inclusive geography of Bohemia

Arriving at the most appropriate geography for examining the location preferences of Bohemians is not trivial. It requires balancing the selection of those types of places, where the concentration of artists follows a systematic process thus increasing statistical power, against the desire for an inclusive, unbiased sample.

Table 1. Arts Employment across the settlement hierarchy

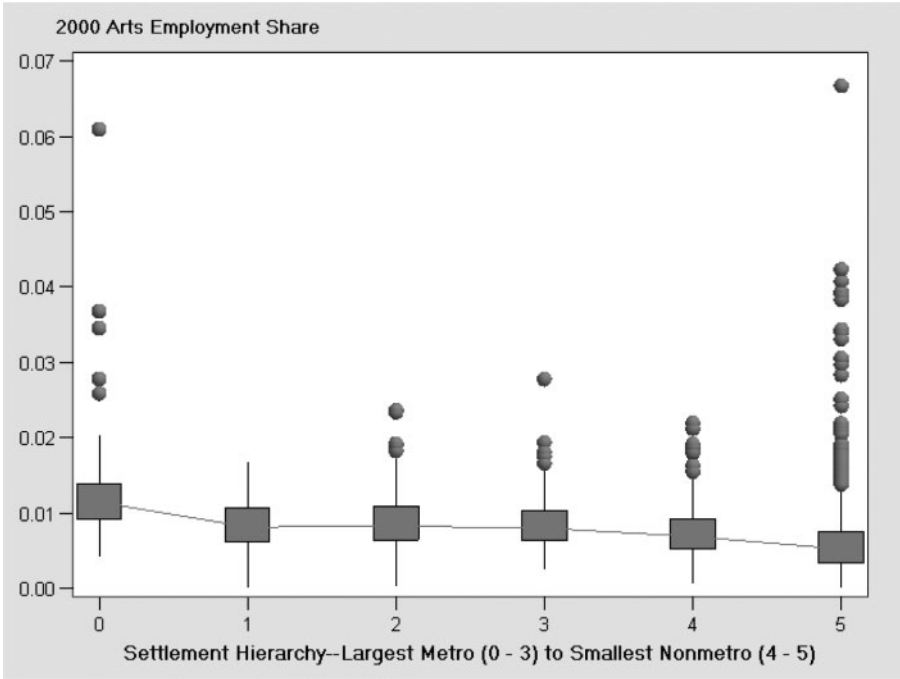
Settlement hierarchy	1990	2000	Growth
0. Central city metro areas > 1 million			
Arts employment	796,538	859,633	7.92%
Total employment	54,813,418	59,384,093	8.34%
Share	1.45%	1.45%	−0.39%
1. Surrounding counties metro areas > 1 million			
Arts employment	37,358	52,781	41.28%
Total employment	4,302,519	5,626,721	30.78%
Share	0.87%	0.94%	8.03%
2. Intermediate metro 250k–1 million			
Arts employment	260,267	306,817	17.89%
Total employment	25,184,100	28,868,027	14.63%
Share	1.03%	1.06%	2.84%
3. Small metro < 250,000			
Arts employment	81,005	99,700	23.08%
Total employment	9,001,699	10,372,818	15.23%
Share	0.90%	0.96%	6.81%
4. Non-metro with place of more than 10,000			
Arts employment	31,269	40,163	28.44%
Total employment	4,239,240	4,813,523	13.55%
Share	0.74%	0.83%	13.12%
5. Non-metro no place of more than 10,000			
Arts employment	107,885	136,933	26.92%
Total employment	17,233,147	19,732,270	14.50%
Share	0.63%	0.69%	10.85%

3.1. Trends in artist location across settlement size[2]

Past research has limited analysis to major metropolitan areas (Heilbrun, 1992; Florida, 2002a and 2002b, Markusen, 2006). The common belief that the arts are overwhelmingly urban activities is confirmed by the location of 89.4% of all arts occupations in metro areas (Table 1).

On the basis of these percentages of the arts share of employment, Florida's analysis of Bohemia in the largest 50 Metropolitan Statistical Areas (MSAs) appears reasonable. Clearly, if artist location in much of the US were rare, indistinguishable from random dispersal, then the likelihood of identifying a statistical association between artist location and economic dynamism would be reduced.

2 For the purposes of this study, arts occupations are defined by the most detailed occupational classification available at the county level for 2000. Within the 94 detailed occupations included in the Census STF4 file, 'Art and design workers' and 'Entertainers and performers, sports and related worker' are the only two categories that are not substantially co-mingled with non-arts occupations. Fortunately, 511 detailed occupations are available at the county level for 1990 from the EEOC special tabulation of the Census, which allows constructing comparable measure for the 2 years despite significant changes in the Standard Occupational Classification. The corresponding 1990 occupational categories are 'Designers', 'Painters, sculptors, craft-artists and artist printmakers', 'Photographers' and 'Artists, performers and related workers, n.e.c.', 'Musicians and composers', 'Actors and directors', 'Dancers' and 'Athletes'. The 2000 aggregation does not allow purging athletes from the data series, though they comprise a minimal share of the total, nor does it allow the inclusion of authors who are co-mingled with the considerably larger number of technical writers.



Source: Census of Population, 2000, STF4 data files

Figure 1. Boxplot of arts share across settlement hierarchy. See Table 1 for category descriptions.

However, Florida's own finding that the arts are highly concentrated in the largest 50 metro areas suggests the possibility that artist location across the settlement hierarchy is highly concentrated. Examining the arts share distribution (Figure 1) demonstrates that the recognized large metro centers in New York, Los Angeles and San Francisco have arts magnet peers in nearly all of the settlement types. Arts magnets are found in smaller metro areas (e.g. Santa Fe), the largest non-metro counties (e.g. Ulster County NY, containing Woodstock), extending down to completely rural counties (e.g. San Juan and San Miguel counties in Colorado containing Silverton and Telluride, respectively). Limiting the analysis to large metro areas exacerbates small sample problems and biases the findings by giving undue influence to places like New York City and Los Angeles. At the same time, one cannot assume that processes across the settlement hierarchy with respect to artist location and creative milieu are identical. Factors associated with the location of arts activity in past research are now discussed along with insights from anecdotal accounts of small arts towns and findings of different location proclivities for rural and urban members of the creative class.

3.2. Controlling for natural variability—traditional factors associated with artist location

If artists tend to concentrate in areas endowed with factors that boost economic dynamism, then the association between the arts employment share and this dynamism

identified by Florida (2002a) and Lee *et al.* (2004) may be spurious. Factors identified in past research increasing the demand for, or supply of, artists in a location are summarized subsequently.

Conventional demand factors associated with the level of arts activity at the state-level include the size of metropolitan areas and income per capita (Heilbrun, 1996). In addition, greater ethnic diversity, measured as the share of the population made up of Hispanics and non-whites, was also associated with greater arts activity, thought to result from a wider range of genres supported by a more diverse population (Heilbrun, 1996). Both these findings reinforce the accepted wisdom that the arts are predominantly an urban phenomenon. However, the size of the tourism sector was also associated with increased arts activity, that may help to mitigate otherwise thin markets for the arts in rural areas. The one factor thought to be associated with the supply of artists was the educational attainment of the population, which Heilbrun interprets as a proxy for area attractiveness to footloose professionals.

Findings from the emerging creative class literature are more commonly interpreted as factors affecting supply, given its focus on an area's attractiveness to creative professionals. Florida (2002a) examines the correlation between the employment share in the arts (his *Bohemian index* referenced earlier) and various indices constructed for the 50 largest MSAs with a population of more than 700,000. As with Heilbrun, educational attainment and ethnic diversity are associated with greater arts activity. However, ethnic diversity is measured as the percent of population that is foreign born (a *melting pot index*). In combination with the positive association between the Bohemian index and a *gay index* (percentage of households in which a householder and an unmarried partner are both of the same sex), Florida posits than an area's tolerance of foreign cultures and alternative lifestyles is a strong draw for artists, as well as other members of the creative class.

In non-metropolitan counties, McGranahan and Wojan (2007) identify a strong association between natural and recreational amenities and the share of highly creative occupations in the local workforce. These characteristics may factor into the location decisions of non-metro artists. They also found that the rural creative class is older and more likely to be married compared with urban peers, suggestive of the lifecycle choices of rural artists identified in anecdotal accounts (Markusen and Johnson, 2006).

Anecdotal accounts provide the richest source of information on the factors motivating the non-metropolitan location of artists. In the popular literature, John Villani's (1998) guide to small arts towns in America identifies a number of genuine rural towns that contain distinctive arts communities. Consonant with Jacob's notion of human-scale interaction, special note is made of the historic buildings and old town squares that contribute to distinctive village street scenes. The book also identifies the 'third places' contributing to the social and cultural interaction of these arts towns such as coffee houses, bookstores and microbreweries. Stirring vistas or waterfront is present in many of these towns, rounding out the factors that may attract artists. However, the book's main function is to serve as a travel guide for those interested in rural arts tourism, identifying charming bed and breakfasts and independent hotels in these towns.

Markusen and Johnson (2006) examine the role that artists' centers play in promoting and sustaining a local arts community. The study provides a detailed look at the importance of an arts infrastructure (e.g. gallery, performance and rehearsal space; collective provision of darkrooms, kilns or other expensive arts equipment;

focal points for arts education, for interaction of professional and amateur artists and for exchange with the wider community) for both rural and urban communities in Minnesota. The report speculates on the lifecycle choices of artists that results in the concentration of artists under the age of 34 in Minneapolis, while artists over 55 are more prominent in northern and central Minnesota. Schooling, training and a richer set of arts experiences pull young artists into the city, while the lower cost of living and the possibilities for a high quality of life in amenity-rich rural areas may be attractive to artists that have established their reputations in urban arts markets.

4. Model specification

Linking the location of Bohemians to a creative milieu is a two-step process. The first step requires modeling the arts employment share as a function of observable county level characteristics (Z),

$$\textit{Arts employment share}\ (1990) = f(Z) + v \tag{1}$$

The residual (v) from this regression will contain measurement, sampling and specification error along with effects associated with unobserved factors and white noise. The extent to which the unobserved effects represent an 'artistic milieu'—a surplus of Bohemians beyond what would be expected—will depend on the explanatory power of the model and consensus on the appropriate specification of equation (1). This approach does not solve potential omitted variable problems, but it does make the empirical derivation of artistic milieu transparent. In the second step, the ostensible artistic milieu (v^*) is included in a regression to explain an indicator of economic dynamism, along with observable county attributes (X),

$$\textit{Economic dynamism} = g(X) + \theta v^* + e. \tag{2}$$

A positive association between the artistic milieu and an indicator of economic dynamism (θ) would support the hypothesis of a common unobserved factor—a creative milieu—that both attracts artists and benefits local economic activity by attracting more creative workers in other fields. Differences between an artistic and creative milieu are outlined in Table 2, along with a comparison with innovative

Table 2. Typology of interactive milieus

Interactive milieu	Sectoral focus	Principal knowledge bases	Artists potential indicators?	Performance outcomes
Artistic	Arts	Symbolic	Yes	Population growth stimulated by consumption amenity
Innovative	Single or linked set of industries	Synthetic Analytic	No	Industry competitiveness
Creative	Dispersed across sectors	Symbolic Synthetic Analytic	Yes	Attraction of creative class Regional competitiveness

milieus, which are not thought to be associated with the arts employment share. The details of this strategy are provided below.

4.1. Explaining the arts share of employment

Following the earlier discussion, our model of art sector employment is based on two broad sets of conditions. First, we expect the arts share to be higher where demand for the arts is likely to be high. Thus, the proportion of the young adult population in college, employment in business services (more likely to employ designers than other industries), the lodging payroll, the prevalence of smaller lodging establishments (based on anecdotal evidence, a more suitable setting for artists), the proportion of young adults with at least a high school degree and median household income are all expected to be associated with a larger arts share of employment. We also included the share of employment in manufacturing, expecting that large shares in manufacturing would dampen the arts share.

Second, we expected, given their relative mobility, that the arts share of employment would be associated with residential amenities. Some measures may apply particularly to artists: the percent foreign born (Florida's 'diversity index'), the percent non-family households, an approximation of Florida's 'tolerance' or gay index, the number of non-profit organizations, the number of historic preservation sites, the presence of a winery and (negatively) the presence of big-box retailers.

Natural amenities included four measures of climate: average January temperature, average January days of sun, temperate Julys and average July humidity (coded negatively). Expected to be most relevant in non-metropolitan areas are measures of landscape. Following landscape preferences literature, areas with topographic variation, water area and a mix of forest and open land are all expected to be positively associated with share of arts employment—the mix of forest and open land is captured by including both forest and the square of forest, with the expectation of a positive and a negative coefficient, respectively (see Ulrich, 1986).

Rural residence contains a tension. On the one hand, there is little point in living outside a metropolitan area unless one has access to the outdoors, a quality that increases as population density decreases. On the other hand, services become less available as population density declines. Population density and its square were included on the expectation of a u-shaped relationship, with artists most concentrated in counties with some degree of density. The relationship of arts employment share to density in metropolitan counties is more ambiguous. The proportion of the employed residents commuting outside the county is expected to have a negative effect on arts share, given the lower level of interaction typical of 'bedroom communities'. Finally, population growth 1980–1990 may capture some local amenities not included in the study. Descriptive statistics for these variables are provided in Table 3.

4.2. Indicators of economic dynamism

In the second stage, we estimate the impact of the first stage residual on several variables that address different dimensions of growth and development. The comparative importance of the arts share residual in these regressions provides valuable information in characterizing parallels between artistic and creative milieu.

Table 3. Descriptive statistics for arts employment share equation variables

Variable	Description and source	*N*	Mean	SD	Minimum	Maximum
BOHEMSH90	Arts employment share, 1990[a]	3135	0.00597	0.003814	0	0.037005
College enrollment	Percent 18–25 population enrolled in college[b]	3135	23.98216	14.48488	0	92.57315
Producer services	Percent business services, 1990[b]	3135	5.278235	3.013499	0	51.11648
Lodging payroll	1990 Payroll in all lodging establishments[d]	3135	6006.22	46734.49	0	1809747
Lodging size index	Number of lodging estabs/herfindahl employment concentration[d]	3115	48.06584	186.1942	0	5812.78
HS completion, age 25–44	Percent high school diploma or more, 1990, ages 25–44[b]	3066	82.24716	9.01038	39.66768	98.71371
Median household income	Ln of median household income, 1990[a]	3075	3.138591	0.254794	2.151181	4.08234
Manufacturing	Percent manufacturing, 1990[b]	3135	18.48827	10.60255	0	53.67465
Foreign born (%)	Percent population foreign born[b]	3102	0.0245	0.038586	0	1
Nonfamily households	Percent of all households non-family[b]	3102	0.113853	0.02815	0	0.39949
Nonprofit organizations	Number of tax exempt non-profit organizations[f]	3107	40.71291	152.4586	0	4244
Historical registrations	1990 National historic registrations[e]	3135	17.77129	40.84095	0	1161
Winery	Winery in county[d]	3135	0.057097	0.232065	0	1
Big box retailers	Number of retail establishments w/ $>$ 100 employees[d]	3135	2.533971	7.925711	0	217
January temperature	January temperature (*Z*-score)[c]	3107	0.003021	0.993994	−2.62742	2.80765
January sun-days	January days of sun (*Z*-score)[c]	3107	0.000991	0.996282	−3.11652	3.44725
Moderate July	July residual temperature[c]	3107	0.002462	0.996879	−2.85779	6.50064
July low humidity	July humidity ($-1 \times Z$-score)[c]	3107	−0.00963	0.999787	−1.64342	2.87475
Terrain variation	Multiplicative topography elevation and peakedness[c]	3107	5.945929	4.952801	1	20
Land in forest	Percent of land in forest[c]	3107	36.56271	30.32346	0	97.28653
Forest squared	Square of percent of land in forest[c]	3107	2256.05	2531.08	0	9464.67
Water area	Ln of water area (*Z*-score)[c]	3107	0.022234	0.9775	−2.35103	2.37209
Population density	Population density, 1990 (Ln)[b]	3067	5.668869	1.595532	0.889337	12.91529
Density squared	Square of Ln of 1990 density[b]	3067	34.68096	18.80329	0.790919	166.8047
Commuting rate	Percent commute outside county, 1990[b]	3135	27.74442	17.43661	0.874636	88.5485
Population change, 1980–90	Ln of population change, 1980–90[b]	3073	4.630261	0.155947	2.61105	5.572147

[a]1990 EEOC Special Tabulation of the Census of Population.
[b]1990 Census of Population.
[c]McGranahan 1999.
[d]1990 Enhanced County Business Patterns.
[e]National Park Service· National Register Information System.
[f]Rupasingha *et al*. (2006).

The dependent variables in the second stage are net growth in the creative class[3] other than Bohemians, net firm growth, net employment growth and net migration. Growth rates for all variables were computed over the 1990–2000 interval.

Estimating the growth in the creative class over the decade allows a direct test of the central conjecture that creative people are attracted to creative places. By estimating the association between an ostensible creative milieu and the attraction of workers in creative occupations, this exercise is able to confirm whether an unobserved factor attracts both artists and other creative professionals. However, this test is not fully satisfying as the dependent variable is still an input, not an outcome of creative activity. To examine whether an ostensible creative milieu is associated with the attraction of talent that enables creative interaction, we examine the association between an ostensible creative milieu and net growth in the number of establishments, standardized by total nonfarm, private sector employment (Armington and Acs, 2002). An increasing number of establishments serve as a proxy for entrepreneurial dynamism, commingling firm formation with firm failure.

Net employment growth is commonly used as an indicator of economic dynamism that commingles the positive attributes of competitiveness with the generation of new opportunities and the negative attributes associated with low productivity growth and greater wage flexibility. A positive association between the arts share residual and net employment growth would support alternative interpretations. Nevertheless, its common use as a benchmark of economic performance would help corroborate the creative milieu interpretation of the residual.

Estimating the association between the arts share residual and net migration could support alternative interpretations of artistic milieu. The strongest case for an alternative interpretation would come from a positive association with net migration and an indeterminate result for the other indicators. In this instance, unobserved factors related to consumption amenities could explain an attraction of artists only associated with net migration. This interpretation would support the consumer city—or consumer village in non-metro counties—construct (Glaeser *et al.*, 2001).

Many of the independent variables used in the arts share equation are also used in the second stage equation. Descriptive statistics of variables not included in the first stage are provided in Table 4. With the exception of the density squared variable, all of the settlement and natural amenities variables are included in the indicator equations. Economic structure variables now include employment shares in farming, mining and recreation, in addition to manufacturing and producer services. For the human capital variable, we replace the HS completion, age 25–44 variable with the college graduate, ages 25–44 variable, and remove the college enrollment variable. The indicator equations also include a number of demographic variables related to age-composition and racial composition. Given the strong association between the creative class employment share and employment growth identified in previous work, we also included the Creative class (excl. artists) employment share. The spatial lag of the arts employment share (W*bohemsh90) is included in the outcome equations.

3 We use a modified definition of the creative class that has a stronger association with employment growth and has stronger construct validity relative to Florida's original measure. The modified measure excludes most health care and education occupations, and those detailed occupations within the original creative class summary occupations requiring little creativity. The construction of this recast measure is documented in McGranahan and Wojan (2007).

Table 4. Descriptive statistics for outcome equation variables

Variable	Description and source	*N*	Mean	SD	Minimum	Maximum
Icc_wo_b9000	Ln(creative class minus Bohemians 2000/ Creative class minus Bohemians 1990)[d,e]	3135	0.235712	0.215961	−1.27508	1.363928
nest9000empcbp	Change in number of establishment 1990–2000/ Total non-farm private sector employment[b,c]	3134	0.017558	0.037752	−0.20000	0.725849
lemp9000	Change in jobs 1990–2000 (Ln of 100× ratio)[a,e]	3135	4.732887	0.136893	4.186995	5.68437
lnetm9000	Ln of net migration, 1990–2000[a,e]	3069	4.672554	0.123956	4.172733	5.573755
Farming (%)	Percent agriculture, 1990[a]	3135	7.514322	8.76729	0	68.69159
Mining	Percent mining, 1990[a]	3135	1.748483	3.923698	0	42.18643
Recreation	Percent recreation industry, 1990[a]	3135	7.33802	3.421404	0.890208	39.06977
College graduate, ages 25–44	Percent college graduate ages 25–44[a]	3135	16.49321	7.607234	3.053435	60.96939
Pop. Age 8–17	Percent population ages 8-1,7 1990[a]	3135	16.72796	2.368383	5.420642	32.61633
Pop. Age over 62	Percent population ages 62 Plus, 1990[a]	3135	17.70544	4.952039	1.382148	40.2201
Native American	Percent native American, 1990[a]	3066	1.431395	5.980954	0	93.12256
Black	Percent black, 1990[a]	3066	8.414846	14.1798	0	85.86615
Hispanic	Percent Hispanic, 1990[a]	3066	4.499956	11.13914	0	97.216
Creative class (excl. artists)	Percent creative class minus Bohemians, 1990[d]	3135	0.123392	0.047519	0.018349	0.436965

[a]1990 Census of Population.
[b]1990 Enhanced County Business Patterns.
[c]2000 Enhanced County Business Patterns.
[d]1990 EEOC Special Tabulation of the Census of Population.
[e]2000 Census of Population, STF4.

The parameter estimates of interest in the outcome equations are those associated with the residual from the arts share equation (RESIDUAL).

We test our hypotheses using all counties in the data set ($N = 3{,}036$), a sub-sample including only of non-metropolitan counties ($n = 2{,}242$), and a sub-sample including only metropolitan counties ($n = 794$). This provides some indication of the robustness of the model (Table 9). Additionally, some insight may be gained as to the structural stability of the parameters.

4.3. Spatial issues

Neighbors generate spatial externalities. Social patterns—including migration, commuting and residential location—depend on the cumulative outcome of agents' decisions, and the nature and timing the externalities may cause (Irwin and Bockstael, 2004). Spatial process models are frequently used to measure the effects of externalities and other dependencies caused by social interaction across space

(see Anselin *et al.*, 2004 for a recent review). Assuming that the determinants of Bohemian location and economic dynamism are measurable using linear, first-order expansions of an arbitrary function, the spatial process models considered here are:

$$\textit{Spatial lag model}: \mathbf{y} = \rho\mathbf{W}\mathbf{y} + \mathbf{X}\boldsymbol{\beta} + \boldsymbol{\varepsilon}, \boldsymbol{\varepsilon} \sim \textit{iid}(\mathbf{0}, \boldsymbol{\Omega}), \tag{3}$$

$$\textit{Spatial error model}: \mathbf{y} = \mathbf{X}\boldsymbol{\beta} + \boldsymbol{\varepsilon}, \boldsymbol{\varepsilon} = \lambda\mathbf{W}\boldsymbol{\varepsilon} + \mathbf{u}, \mathbf{u} \sim \textit{iid}(\mathbf{0}, \boldsymbol{\Omega}), \tag{4}$$

where $\mathbf{W}$ is a $n \times n$ matrix identifying spatial relationships between observations[4]; $\mathbf{y}$ is an $n \times 1$ vector of dependent variables (Bohemian share or indictors of economic dynamism), $\mathbf{X}$ is an $n \times k$ matrix of observable county attributes (including v^* in the second-stage regression); $\boldsymbol{\beta}$ is a $k \times 1$ vector of parameters relating Bohemian share or indictors of economic dynamism to explanatory factors; ρ and λ are spatial lag and error autoregressive terms, respectively; and $\boldsymbol{\Omega}$ is a (possibly non-spherical) covariance matrix. When $\rho \neq 0$, ordinary least squares (OLS) estimates are inconsistent and biased. When $\lambda \neq 0$, OLS estimates are unbiased and consistent, but efficiency is compromised. The spatial lag and error models are estimated using Kelejian and Prucha's (1998, 1999) General Method of Moment (GMM) procedures. To attend to problems due to non-spherical disturbances in 1 and 2, Davidson and MacKinnon's (1993) heteroskedastic-consistent jackknife covariance estimator is used to calculate standard errors.

5. Results: explaining Bohemian location

5.1. Spatial diagnostics and model selection

Robust Lagrange Multiplier (LM) residual diagnostics provide evidence about the type of spatial dependence—spatial lag or spatial error (Florax and de Graff, 2004). Specifically, the null hypothesis is $\rho = 0$ under the assumption that $\lambda \neq 0$ for the spatial lag process. For the spatial error process, the null hypothesis is $\lambda = 0$ under the assumption that $\rho \neq 0$. In the forward model specification search, model specification (3: spatial lag) or (4: spatial error) is selected based on the magnitude of the robust LM tests. For the first-stage regression, the null hypothesis of spatial lag or error independence was tested using the OLS residuals and the weighting matrix. Spatial dependence between the residuals was detected using the metropolitan and non-metropolitan sub-samples, as well as the entire data set at the 5% level (Table 5). The first-stage regression was re-estimated as a spatial error model using Kelejian and Prucha's GMM approach.

In the second stage non-metropolitan ($n = 2{,}242$) and pooled county regressions ($N = 3{,}064$), business establishment growth in a given location is positively influenced

4 Continuous spatial representations (as opposed to discrete or contiguous representations) are useful for modeling knowledge or information spillovers, since they originate locally then tend to decay over space (Fingleton, 2003). An inverse distance matrix defined connectivity between counties. The elements of $\mathbf{W}$ are $w_{ij} = d_{ij}^{-\delta}$, where d_{ij} is the distance between the centroid of county i to neighbor j, and δ is a decay parameter describing the 1990 Bohemian residential patterns over space. The distance $d_{ij} = [(x_i - x_j)^2 + (y_i - y_j)^2]$, where x and y are Cartesian coordinates of county centroids. The decay parameter was estimated using the non-parametric procedure described by Fotheringham *et al.* (2002). The optimal bandwidth (δ) was 1.25. The spatial weights matrix was row-standardized so that the elements of each row of W summed to one. Standardization has the dual effect of reducing neighborhood interactions to relative terms, and facilitating estimation.

Table 5. Robust Lagrange multiplier (LM) tests for spatial lag and error[a]

	First stage regression		Second stage regression	
	Spatial error	Spatial lag	Spatial error	Spatial lag
Combined				
Bohemsh90	47.83	9.51		
Employment			242.54	74.66
Creative class			62.17	14.19
Net firms			38.12	41.10
Net migration			205.58	56.32
Non-metro				
Bohemsh90	5.86	0.004		
Employment			175.65	11.44
Creative class			46.50	0.40
Net firms			1.96	12.58
Net migration			176.78	5.01
Metro				
Bohemsh90	12.41	5.96		
Employment			0.02	35.56
Creative class			0.47	39.12
Net firms			0.26	5.81
Net migration			0.07	30.99

Notes: [a]LM tests are $\sim\chi^2$ with 1 degree of freedom. Critical value at the 5% level of significance is 3.84.

by business growth in surrounding counties. Significant spillover is apparent in the second-stage metropolitan counties ($n = 794$), suggesting positive feedback/feed-forward effects of economic growth between these counties. Residual pattern analysis suggests these scenarios should be modeled using the spatial lag processes specification (3). The dominance of the LM error statistics for the remaining scenarios suggests significant spillover effects of unobservable factors between counties,[5] and that model (4) is the appropriate specification in the second-stage regressions.

5.2. Observable characteristics attracting artists

Table 6 provides coefficient estimates for variables hypothesized to be associated with the arts employment share for all counties, and for sub-samples of metro and non-metro counties. Differences between metro and non-metro estimates do not appear to be large; however, a Chow test of the equality of metro and non-metro coefficients is strongly rejected.[6] There are some strong similarities between the preferences of metro and non-metro artists, but with some notable differences.

College towns and university cities are powerful draws for artists (College enrollment). This result alone raises questions about conjectures of Florida (2000a) and Lee *et al*. (2004) as this provides an instance of an observable covariate with arts employment that may be associated with economic dynamism, omitted from their

5 Some empirical studies interpret the error autocorrelation coefficient as explaining knowledge spillovers attributable to agglomeration economies (Cohen and Paul, 2005).

6 In the spatial econometrics literature, this test is used to identify spatial regimes (Anselin, 1988).

Table 6. First stage regression (*bohemsh90* is dependent variable)

	Non-metro counties		Metro counties		All counties	
Variable	Estimate	*t*-test[a]	Estimate	*t*-test	Estimate	*t*-test
Constant	−0.023364	−4.93	−0.016030	−3.68	−0.019457	−5.74
Art demand measures						
College enrollment	0.000019	3.67	0.000042	5.02	0.000026	5.84
Producer services	0.000527	6.09	0.000259	2.43	0.000369	4.36
Lodging payroll	0.000013	0.60	0.000003	1.67	0.000001	0.64
Lodging size index	0.000012	2.64	0.000002	2.19	0.000003	2.88
HS completion, age 25–44	0.000054	3.58	0.000096	3.35	0.000068	5.09
Median household income	0.000788	1.31	0.000976	0.94	0.001067	2.00
Manufacturing	0.000017	1.89	−0.000003	−0.16	0.000003	0.39
Community amenities						
Foreign born (%)	0.001823	0.65	0.005027	0.91	0.004060	1.63
Nonfamily households	0.019103	3.68	0.010121	1.17	0.019744	4.24
Nonprofit organizations	0.000003	0.28	0.000001	0.47	0.000000	−0.26
Historical registrations	0.000001	0.22	0.000001	0.42	0.000002	0.89
Winery	0.000210	0.66	−0.000115	−0.36	0.000035	0.16
Big box retailers	−0.000179	−2.00	−0.000039	−1.91	−0.000053	−2.33
Climate						
January temperature	−0.000019	−0.17	0.000539	3.19	0.000116	1.17
January sun-days	0.000294	2.01	0.000112	0.79	0.000259	2.26
Moderate July	0.000146	0.98	0.000401	2.20	0.000292	2.40
July low humidity	0.000310	1.80	0.000281	1.48	0.000366	2.67
Landscape						
Terrain variation	0.000055	2.40	0.000018	0.60	0.000047	2.38
Land in forest	0.002190	2.05	0.001718	1.06	0.002300	2.53
Forest squared	−0.002257	−1.91	−0.002738	−1.42	−0.002190	−2.21
Water area	0.000043	0.49	0.000010	0.08	0.000086	1.15
Settlement						
Population density	0.000655	1.25	0.002096	2.54	0.000905	2.68
Density squared	−0.000030	−0.55	−0.000122	−2.00	−0.000038	−1.33
Commuting rate	0.000004	0.60	−0.000002	−0.36	−0.000002	−0.43
Population change, 1980–90	0.002835	3.06	−0.000173	−0.26	0.001524	2.27
Spatial error coefficient	0.198354	7.97	0.142044	4.46	0.257626	11.97
N	2,242		794		3,036	
Adj. R^2	0.33		0.51		0.44	

Notes: [a]*t*-tests calculated using jackknifed standard errors.

analyses. Other shared characteristics of metro and non-metro arts magnets include a specialization in business services (Producer services) and the presence of an educated population (HS completion, age 25–44). Given the relatively low human capital threshold of a high school degree, this might better explain an aversion to poorly educated locales. The negative effect of large retail establishments (Big box retailers) in both samples is surprising, as the debate over large establishments threatening traditional main streets has focused on rural areas. This variable may be picking up similarities in automobile dependent planning in both samples, which the findings suggest tend to repel artists. Finally, arts magnets are also characterized by diversity in lodging options (Lodging size index) in both metro and non-metro counties. This

finding suggests that artists locate in metro and non-metro areas able to promote high value tourism characterized by the small independent hotels and bed and breakfasts picked up by this variable.

Some of the differences between metro and non-metro areas in their attractiveness to artists were expected. Natural amenities such as mountain topography (Terrain variation), dry winters (January sun-days) and combinations of forest and open space (Land in forest and Forest squared) are more strongly associated with artist location in non-metro areas. However, metro artists tended to locate in warmer cities (January temperature and Moderate July). Population growth in the previous decade (Population change, 1980–1990) was associated with a larger arts share in non-metro areas, but not associated with the metro arts share. This is consistent with artists moving to amenity rich rural areas that have also seen substantial population growth, and artists not flocking to the fastest growing metro counties.

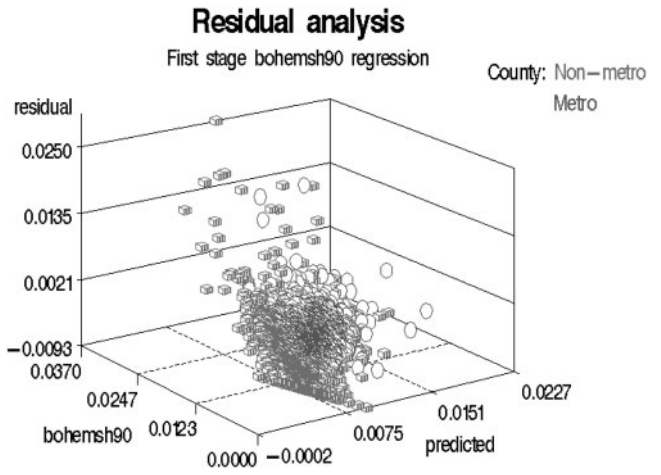
Unexpected results and differences include the effect of population density and the effect of percent non-family households (a rough proxy for Florida's gay index) on the arts employment share. The rural creative class as a whole demonstrates a strong proclivity for counties of moderate density. However, population density does not have a significant association with the non-metro arts employment share. Instead, moderate density (at least relative to other metro areas) in metro counties was associated with artist location. Since some of the more notable metro arts magnets (LA, NYC, San Francisco) are the most densely populated areas in the US, this result is surprising. Finally, the share of the population in non-family households did have a positive effect on the arts employment share in non-metro counties but not in metro counties. Data on same sex couples were not available in the published 1990 Census, and this variable serves as a rough proxy for Florida's gay index. The positive result in non-metro counties warrants closer study of the components that make up this variable, available in the 2000 Census. This would also shed light on the unexpected result for metro counties.

The ability of the arts employment share equations to explain a substantial share of variation satisfies the guideline that factors explaining variability in the indicator are controlled (Landres *et al.*, 1988). The unexplained variation in the arts employment share, an ostensible creative milieu, is the critical output of this first stage, examined more closely subsequently.

5.3. The arts share residual—statistical and spatial distribution

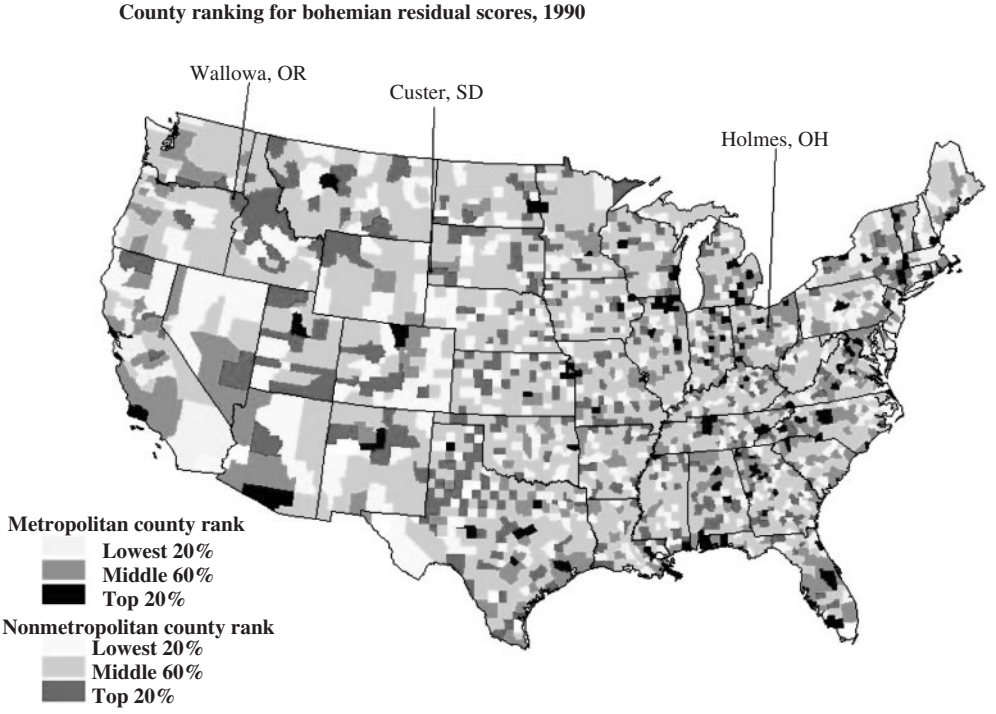
The pattern of the arts share residual, plotted against actual and predicted values, is consistent with the results of the Chow test for parameter equivalence between metropolitan and non-metropolitan counties (Figure 2). The magnitude and variability of the residual effects are greater in non-metropolitan counties relative to metropolitan counties.

Residuals from the first-stage metropolitan and non-metropolitan regression were grouped into quintiles and mapped to get some sense of the spatial distribution (Figure 3). Clusters of metropolitan counties with relatively high residual values are apparent in the Taos–Santa Fe region encompassing the Sangre de Cristo Mountain range and the Denver–Fort Collins corridor. There are numerous metropolitan clusters located throughout the Great Plains, and Midwest, particularly in Minnesota, Kansas and Illinois. The metropolitan counties surrounding Nashville are dominated by high residual values, perhaps reflecting the attractive pull of the musical tradition associated



Sources: authors' estimates.

Figure 2. First-stage residual, actual and predicted values of the artist employment share (BOHEMSH90) in 1990.



Sources: authors' estimates.

Figure 3. Spatial distribution of residuals from the first-stage regression, metro- and non-metropolitan counties.

with this city. Other metropolitan areas with relatively large residuals are located in or around the Smokey Mountains and New York's Hudson Valley.

The spatial distribution of the residuals associated with the first-stage regression including only non-metropolitan counties has some surprises, some of which may be attributed to sampling error from counties with very small workforces. On the one hand, prior expectations about high-amenity regions in the Mountain West are confirmed. In addition, large residuals in the Catskills of New York, the Ozarks in Missouri and some counties flanking the Great Lakes are consistent with anecdotal accounts of concentrations of artists in these regions. However, strong residual patterns also emerge in the Texas and Oklahoma panhandle, through the heart of Nebraska, and into the Dakotas. Our failure to identify an artistic renaissance in this region suggests this result may stem from sampling error. Since occupational data are compiled from the 1 in 6 long-form sample of the decennial census, the estimated number of workers in relatively rare occupations may be imprecise in counties with few workers, prevalent in the Great Plains. We retain these counties in the analysis, as censoring very small counties would be arbitrary. This will tend to dilute the effect of the ostensible creative milieu on economic dynamism in the non-metropolitan sample, especially given the relatively poor economic performance of many small Great Plains counties in the 1990s.[7]

5.4. Intangible factors that attract artists boost economic dynamism

Table 7 provides parameter estimates for the four outcome equations using the non-metropolitan sample. The two central parameters of interest are the ostensible creative milieu (RESIDUAL) and the share of employment in the Creative class (excl. artists). We first discuss the association between the creative class share and indicators of economic dynamism, as this is central to the argument that attracting creative workers boosts local economic growth. The results confirm a strong positive effect of a larger creative class employment share on net migration (*lnetm9000*), employment growth (*lemp9000*) and net increase in number of business establishments (*nest9000empcbp*). The parameter estimates in Table 8 find similar effects in metro areas for net migration and employment growth, but no significant effect with respect to firm formation. It is notable that the creative class variable is much more powerful in explaining differential performance across counties than is our proxy for human capital (College graduate, ages 25–44), with the exception of the metro *nest9000empcbp* equation. The negative

7 The more genuine surprise is the dispersal of rural counties throughout the U.S. with large residuals. To get some sense why these areas might be attractive to artists, counties with residuals in the top 5% were isolated. Here, we discuss three examples identified in Figure 3. Holmes County, Ohio is home to the 'largest Amish population in the world'. (http://www.amishtraditions.com/about_holmes_co.htm). Forty-five percent of the forty-thousand citizens residing in Holmes are of Amish descent, making it a popular tourist destination. There are also at least 15 family-owned wood shops and galleries, focusing on production of handcrafted furniture. Custer County, South Dakota is located in the Black Hills of southwestern South Dakota. The tourism and recreation industries play a prominent role in the economy. Local attractions include archeological sites and wildlife. Performances at the Black Hills playhouse have entertained Custer residents year-round, staging off-Broadway musicals since 1946. Other performing groups entertain tourists by staging western re-enactments. Wallowa County, Oregon owns the moniker of the 'Bronze Capital of the West'. (http://www.wallowacountychamber.com/). There are 20 art galleries registered with the Wallowa chamber of commerce, specializing in bronze casting and sculpture, and glass blowing. Outdoor recreation is a popular pastime for locals and tourists. The county flanks the Snake River, and is home to the scenic Wallowa mountain range.

Table 7. Stage two (outcome), non-metropolitan regressions with bohemsh90 residual

	lcc_wo_b9000		*nest9000empcbp*		*lemp9000*		*lnetm900*	
Variable	Estimate	*t*-test	Estimate	*t*-test	Estimate	*t*-test	Estimate	*t*-test[a]
CONSTANT	−2.5485	−8.99	−0.2079	−2.54	3.3385	17.59	3.3270	19.01
Settlement								
Density, 1990 (ln.)	0.0095	1.09	−0.0066	−2.87	0.0023	0.42	−0.0081	−1.76
Commuting (%)	0.0029	7.88	0.0006	7.63	0.0024	12.71	0.0020	11.68
Pop. change, 1990–2000	0.4946	9.12	0.0532	3.26	0.3291	8.23	0.2718	7.19
Natural amenity								
Topography	0.0048	3.16	0.0007	2.29	0.0031	3.39	0.0027	3.41
Forest land (%)	0.2954	3.93	0.0085	0.74	0.1914	4.25	0.1918	5.16
Forest squared	−0.2879	−3.79	−0.0213	−1.70	−0.2049	−4.65	−0.1813	−4.79
Water area	0.0146	2.60	0.0002	0.25	0.0040	1.28	0.0044	1.58
January temperature	−0.0084	−1.00	−0.0015	−1.17	0.0063	1.08	0.0220	4.27
January sun days	0.0077	0.93	0.0035	2.11	0.0037	0.63	0.0082	1.65
Temperate July	0.0114	1.35	0.0032	1.83	0.0010	0.19	0.0050	0.99
Low humidity	0.0199	1.98	−0.0034	−1.94	0.0133	2.19	0.0190	3.66
Industry								
Farming (%)	−0.0015	−0.99	−0.0002	−0.88	−0.0017	−2.42	−0.0012	−1.98
Mining	−0.0059	−3.43	−0.0006	−2.51	−0.0063	−5.40	−0.0057	−5.66
Manufacturing	−0.0001	−0.17	−0.0001	−0.67	−0.0012	−2.56	0.0000	0.04
Producer services	0.0293	7.52	0.0002	0.12	0.0010	0.45	0.0011	0.58
Recreation	0.0101	4.50	−0.0001	−0.15	0.0054	3.69	0.0038	2.93
College graduate, ages 25–44	0.0116	8.61	0.0002	0.94	−0.0014	−1.90	−0.0018	−2.75
Median household income (ln)	0.1422	3.63	−0.0158	−2.66	−0.1050	−4.76	0.0056	0.31
Demography								
Pop. Age 8–17	0.0067	1.80	0.0014	1.89	0.0055	2.57	−0.0045	−−2.51
Pop. Age over 62	0.0015	0.95	0.0000	−0.17	−0.0012	−1.27	0.0043	5.03
Native American	0.0006	0.62	−0.0005	−2.37	−0.0012	−2.42	−0.0005	−1.37
Black	−0.0020	−3.86	−0.0002	−3.46	−0.0026	−7.85	−0.0013	−4.85
Hispanic	−0.0018	−2.34	−0.0004	−3.25	−0.0018	−3.84	−0.0011	−2.96
Creative class (excl. artists)	−5.5465	−15.77	0.1999	2.74	0.6487	3.71	0.4466	2.94
RESIDUAL	4.5718	2.77	1.1758	2.78	2.0699	2.07	1.7087	1.97
W*bohemsh90	−0.2445	−0.06	−1.2851	−1.40	−0.5527	−0.20	−1.1307	−0.44
Spatial error coefficient	0.4304	18.72	0.7139	5.13	0.6368	35.20	0.6132	32.90
N	2,242		2,242		2,242		2,242	
Adj. R^2	0.35		0.32		0.72		0.56	

Notes: [a]*t*-tests calculated using jackknifed standard errors.

effect of the 1990 creative class share on creative class growth (*lcc_wo_b9000*) is consistent with earlier findings and appears to be an artifact of regression to the mean.[8]

The statistical significance of the ostensible creative milieu (RESIDUAL) on creative class growth (*lcc_wo_b9000*) provides an explicit test of the conjecture that artists and other creative class workers are attracted by the same unobserved characteristics. The conjecture is confirmed in both the metro and non-metro samples. The magnitude

8 Quantile regression from an earlier analysis confirms that this finding should not be interpreted as strong convergence of creative class occupations (McGranahan and Wojan 2007).

Table 8. Stage two (outcome), metropolitan regressions with bohemsh90 residual.

	lcc_wo_b9000		*nest9000empcbp*		*lemp9000*		*lnetm900*	
Variable	Estimate	*t*-test	Estimate	*t*-test	Estimate	*t*-test	Estimate	*t*-test[a]
CONSTANT	−1.2768	−3.33	−0.1555	−2.33	1.5281	4.03	1.1055	2.89
Settlement								
Density, 1990 (ln.)	−0.0399	−4.45	−0.0073	−5.10	−0.0360	−6.34	−0.0381	−6.83
Commuting (%)	0.0035	9.15	0.0006	7.46	0.0019	7.65	0.0020	8.37
Pop. change, 1990–2000	0.2294	2.65	0.0299	2.49	0.1905	2.63	0.1737	2.59
Natural amenity								
Topography	0.0006	0.38	0.0002	0.78	−0.0002	−0.22	0.0003	0.27
Forest land (%)	0.1324	1.60	0.0020	0.15	0.1232	2.23	0.1143	2.10
Forest squared	−0.2259	−2.24	−0.0040	−0.22	−0.1685	−2.54	−0.1393	−2.07
Water area	0.0069	0.93	0.0013	1.23	0.0033	0.72	−0.0008	−0.18
January temperature	0.0296	3.00	0.0016	0.83	0.0139	1.97	0.0207	3.00
January sun days	−0.0054	−0.70	−0.0001	−0.05	−0.0027	−0.49	−0.0026	−0.52
Temperate July	−0.0054	−0.68	0.0002	0.14	−0.0083	−1.68	−0.0111	−2.23
Low humidity	−0.0012	−0.12	−0.0003	−0.27	0.0014	0.22	0.0045	0.70
Industry								
Farming (%)	−0.0031	−1.00	−0.0013	−2.95	−0.0036	−1.93	−0.0020	−1.13
Mining	−0.0063	−1.80	−0.0013	−2.29	−0.0050	−2.11	−0.0011	−0.26
Manufacturing	0.0015	1.41	−0.0001	−0.69	0.0002	0.34	0.0019	2.76
Producer services	0.0077	1.62	−0.0005	−1.04	−0.0045	−1.84	−0.0030	−1.11
Recreation	0.0015	0.43	0.0004	0.87	0.0061	2.52	0.0072	3.27
College graduate, ages 25–44	0.0069	4.11	0.0004	1.46	0.0001	0.12	0.0005	0.54
Median household income (ln)	0.0964	1.71	0.0090	0.54	−0.0409	−0.99	0.0490	1.23
Demography								
Pop. Age 8–17	0.0112	2.08	0.0016	1.85	0.0079	2.28	0.0030	0.82
Pop. Age over 62	−0.0037	−1.91	−0.0001	−0.17	−0.0032	−2.76	0.0021	1.67
Native American	−0.0074	−2.41	0.0008	0.62	−0.0064	−3.23	−0.0052	−2.67
Black	−0.0022	−2.62	0.0001	0.23	−0.0021	−3.90	−0.0012	−2.30
Hispanic	−0.0013	−1.61	0.0000	0.01	−0.0007	−1.37	−0.0003	−0.64
Creative class (excl. artists)	−1.3670	−3.11	0.0310	0.27	0.6906	2.41	0.6634	2.30
RESIDUAL	4.9128	1.99	1.0332	1.60	1.2875	0.80	0.1628	0.11
W*bohemsh90	5.2643	1.25	−0.4910	−0.86	2.9596	1.08	1.0455	0.41
Spatial error coefficient	0.5776	7.83	0.3029	3.55	0.5168	6.73	0.5414	6.14
N	794		794		794		794	
Adj. R^2	0.40		0.46		0.55		0.54	

Notes: [a]*t*-tests calculated using jackknifed standard errors.

of this parameter in both metro and non-metro samples suggests that a vibrant creative milieu is a critical asset in local development strategies aimed at attracting talent.

However, metro and non-metro differences are more pronounced, when comparing the magnitude and significance of the ostensible creative milieu (RESIDUAL) with the other indicators of economic dynamism. The relationship with net firm formation (*nest9000empcbp*) is arguably the most important in assessing economic dynamism given the claim that a creative milieu will generate new products and services (Landry, 2000, 133). This association is confirmed for the non-metro sample (Table 7) but cannot be confirmed for the metro sample (Table 8—the reported *t*-statistic of

Table 9. Stage two (outcome), regressions with bohemsh90 residual, all counties

	lcc_wo_b9000		*nest9000empcbp*		*lemp9000*		*lnetm900*	
Variable	Estimate	*t*-test	Estimate	*t*-test	Estimate	*t*-test	Estimate	*t*-test[a]
CONSTANT	−2.2473	−6.53	−0.1525	−2.97	3.7070	16.03	3.5001	15.99
Settlement								
Density, 1990 (ln.)	0.0057	0.79	−0.0059	−3.98	−0.0093	−2.32	−0.0182	−5.16
Commuting (%)	0.0036	11.46	0.0006	11.23	0.0022	12.87	0.0021	13.28
Pop. change, 1990–2000	0.3671	4.84	0.0379	4.14	0.2686	5.05	0.2380	4.66
Natural amenity								
Topography	0.0034	2.29	0.0005	2.41	0.0018	2.20	0.0016	2.22
Forest land (%)	0.2743	4.05	0.0091	1.11	0.2001	5.44	0.1860	5.92
Forest squared	−0.2668	−3.81	−0.0179	−1.83	−0.2190	−5.88	−0.1810	−5.53
Water area	0.0113	2.16	0.0006	0.72	0.0027	0.96	0.0019	0.77
January temperature	0.0108	1.14	−0.0012	−1.13	0.0114	2.14	0.0256	5.43
January sun days	−0.0018	−0.21	0.0025	1.87	0.0016	0.32	0.0058	1.35
Temperate July	0.0019	0.26	0.0028	2.00	−0.0039	−0.90	−0.0017	−0.43
Low humidity	0.0159	1.54	−0.0022	−1.94	0.0137	2.53	0.0175	3.71
Industry								
Farming (%)	−0.0004	−0.31	−0.0004	−1.68	−0.0027	−4.62	−0.0017	−3.27
Mining	−0.0059	−3.56	−0.0008	−3.88	−0.0071	−6.66	−0.0057	−6.03
Manufacturing	−0.0003	−0.39	−0.0002	−2.30	−0.0015	−3.70	0.0001	0.37
Producer services	0.0216	4.43	−0.0006	−0.89	−0.0026	−1.69	−0.0011	−0.64
Recreation	0.0063	2.96	0.0002	0.36	0.0054	4.09	0.0043	3.65
College graduate, ages 25–44	0.0110	9.61	0.0002	1.02	−0.0017	−2.86	−0.0016	−2.91
Median household income (ln)	0.1954	5.03	−0.0072	−1.18	−0.0984	−4.80	0.0097	0.56
Demography								
Pop. Age 8–17	0.0089	2.46	0.0014	2.25	0.0058	3.01	−0.0029	−1.72
Pop. Age over 62	−0.0002	−0.14	−0.0001	−0.60	−0.0026	−3.11	0.0033	4.21
Native American	0.0005	0.49	−0.0005	−2.27	−0.0017	−3.39	−0.0009	−2.45
Black	−0.0023	−4.57	−0.0002	−2.85	−0.0027	−9.46	−0.0014	−5.73
Hispanic	−0.0016	−2.06	−0.0003	−3.05	−0.0018	−4.38	−0.0011	−3.29
Creative class (excl. artists)	−3.9498	−13.12	0.1376	2.37	0.7110	4.57	0.6357	4.50
RESIDUAL	4.6144	3.07	1.1364	3.13	2.2682	2.62	1.5486	2.00
W*bohemsh90	4.1528	0.96	−1.3497	−1.80	1.3871	0.59	0.0219	0.01
Spatial error coefficient	0.6405	35.86	0.7457	7.82	0.6205	47.54	0.5869	44.47
N	3,036		3,036		3,036		3,036	
Adj. R^2	0.36		0.31		0.52		0.53	

Notes: [a]-tests calculated using jackknifed standard errors.

1.60 corresponds to a *P*-value of 0.1097, failing the 10% significance threshold). Although we cannot identify the components of this creative milieu (greater human-scale interaction, better restaurants, etc.) it does appear to increase entrepreneurial dynamism in non-metro counties.

The metro and non-metro comparison adds additional insight in interpreting the effect of creative milieu on net migration and employment growth. The 1990 Creative class (excl. artists) share has a positive impact on both outcome indicators for both metro and non-metro counties. This likely represents faster growth in knowledge intensive industries over the decade and the greater ability for creative workers to create new employment opportunities. Yet, the creative milieu in metro areas had no impact

on net migration or employment growth. This suggests that places attracting artists tended to be growth constrained relative to the fastest growing edge cities. In contrast, the creative milieu in non-metro counties also contributed to net migration and employment growth. This could result from the induced effect of attracting more creative workers, increasing the competitiveness of local firms or increasing consumption amenities desired by migrants and new employees. Regardless of the precise channels through which the creative milieu operates, the implications of this analysis are direct: non-metro environments conducive to arts activity also tend to promote faster rates of growth.

6. Implications of Bohemian attraction to creative Milieu

The largest benefit of empirically deriving an ostensible creative milieu has been the sharpening of an amorphous construct in the literature. Our results support two definitions of creative milieu that have been discussed but never differentiated. What we will call a 'weak definition' of creative milieu requires that unobserved interaction attract a diverse set of creative workers (Florida, 2002a, 2002b). The weak definition supports the central conjecture that creative people are attracted to creative places. What we will call a 'strong definition' of creative milieu additionally requires that interaction across these diverse creative domains increase the economic dynamism of the local economy (Landry, 2000; Lee *et al*., 2004; Stolarick and Florida, 2006). Our findings are consistent with the weak definition in both metropolitan and non-metropolitan counties. To wit, those places with a surplus of Bohemians beyond that predicted by observable characteristics related to supply and demand for artists experienced faster rates of growth of other members of the creative class between 1990 and 2000. However, evidence of a strong creative milieu is conclusive only in the non-metropolitan sample, where a surplus of Bohemians was also associated with faster rates of new firm formation and employment growth. The findings in metro areas are suggestive but are not reliable enough to conclude that a creative milieu contributes directly to economic dynamism. These mixed results have important implications for evaluating past critiques of the creative class thesis, for directions of further research and for policy.

At one level, support for the weak definition of creative milieu seemingly dismisses the critiques by Hansen *et al*. (2005) and Markusen (2006) that the location proclivities of constituent occupations within the creative class are likely to be very different. The analysis provides the most definitive evidence to date that growth of the creative class is associated with a creative milieu. However, the test of the theory necessarily utilizes an aggregate creative class construct. The composition of creative class growth associated with creative milieu was not examined. Growth induced by a creative milieu might be limited to particular types of creative workers, such as those primarily concerned with symbolic knowledge bases. Though possible, this type of creative class growth would not be expected in rural areas (Hansen *et al*., 2005), reducing the plausibility of this alternative explanation. Decomposing the creative class into occupations primarily concerned with analytic, synthetic or symbolic knowledge could resolve this debate empirically.

Moving beyond the attraction of creative workers, our strong definition of creative milieu is more germane to the policy debate animated by discussion of the creative class.

For metro areas, our findings are unsatisfying as they identify a potentially large effect, but one that fails to meet conventional standards of reliability. Given the point estimate, metro counties in the top decile of creative milieu would generate close to twice the number of new establishments per worker compared to metro counties in the bottom decile. This is confirmed in the sample, where the top decile generated three establishments per hundred workers, on average, compared to 1.6 establishments generated in the bottom decile. Unfortunately, the standard error associated with the point estimate is large. The prudent conclusion is to suspend judgment on the existence of a strong creative milieu in metro areas.

On the one hand, this result makes the claimed association between entrepreneurship and creative milieu identified in Lee *et al*. (2004) tentative. On the other, our results cannot refute this association (Ziliak and McCloskey, 2004). The argument put forward by Malanga (2004) of a fabricated arts-innovation nexus to justify large, wasteful expenditures on cultural amenities appears premature, especially given definitive evidence of a strong creative milieu in non-metro counties. Replication of this analysis in other time-periods or countries may provide valuable information. However, it may be that structural complexity disadvantages the identification of a strong creative milieu in cities, generally. Spatial lag in the metro equations is a tell-tale sign of the importance of clustering and agglomeration, which may swamp effects from a creative milieu.

Our indeterminate results on the existence of a strong creative milieu in metro areas will not be welcomed by opposing sides in the creative cities debate. However, arts communities may benefit the most from the caution inherent in the findings. Public spending on the arts, justified on the basis of increased regional competitiveness may very well be wasteful if directed to high visibility projects that do nothing to increase human-scale interaction. At the same time, evidence of a weak creative milieu ensures a city's attractiveness to artists is an important indicator of its ability to retain and attract creative workers. Any metropolitan region pursuing a creative economy strategy in earnest should engage local artists in devising the best ways to encourage the social and cultural interaction that engender creative milieus. The research community can contribute to this effort by empirically examining the evolution of creative milieus across all cities.

It is important to stress that our definitive findings of a strong creative milieu in non-metro counties do not resolve the debate over the importance of local arts communities to regional innovation and competitiveness. Our main contribution is empirical confirmation that a relative surplus of Bohemians is likely to reveal a vibrant creative milieu. Our empiricism is intentional in first generating an ostensible creative milieu variable that is then confirmed by an association with indicators of economic dynamism. This indefiniteness does not allow concluding that a particular strategy for promoting the arts will increase economic dynamism.

Rather, these non-metro results demonstrate a true contribution of place to economic dynamism where a creative milieu effect is not conflated with the density of creative agents randomly 'rubbing elbows' in the city (Stolarick and Florida, 2006). In contrast to more conventional studies examining industrial location or the geography of innovation, our explanation of regional performance does not rely on the location of particular *quantities* in a place (e.g. human capital, R&D spending, transportation infrastructure) but on a proxy for a particular *quality* of place. Our reliance on a residual makes the analysis susceptible to omitted variable critiques, where creative

milieu is reduced to a misspecification error. However, we know of no other technique allowing a generalizable analysis of processes thought to be reliant on interaction.

Confirming that our empirically derived proxy for creative milieu is reliant on interaction will require qualitative research. A central difficulty in doing case study research in rural communities is the identification of informative cases. By comparing 'creative places'—identified by a large arts share residual—with similarly situated 'uncreative places', a relatively small number of cases should generate useful insights regarding the intangible factors critical to rural development strategies premised on the attraction of talent. However, practice in the area of cultural community development has far out-paced applied rural research on the arts, dating back to at least the 1930s (Strom, 2001). Our findings bolster longstanding and newly emerging efforts to 'accept the goodness of art where we are, and expand its worth in the places where people live' (Gard, 1968, 4).

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