Recasting the Creative Class to Examine Growth Processes in Rural and Urban Counties

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[1] The views expressed here are those of the authors, and may not be attributed to the Economic Research Service or the U.S. Department of Agriculture.

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ABSTRACT: Richard Florida's *Rise of the Creative Class* makes a compelling argument that regional development now depends on novel combinations of knowledge and ideas, that certain occupations specialize in this task, that people in these occupations are drawn to areas providing a high quality of life, and thus the essential development strategy is to create an environment that attracts and retains these workers. Our analysis of recent rural development in rural U.S. counties, which focuses on natural amenities as quality of life indicators, supports the creative class thesis. A repetition for urban counties also shows a strong relationship between creative class presence and growth, although natural amenities play a smaller role. However, our results depend on a recast creative class measure, which excludes from the original Florida measure many occupations with low creativity requirements and those involved primarily in economic reproduction. Our measure conforms more closely to the concept of creative class and proves to be more highly associated with regional development than the original Florida measure.

Introduction

Richard Florida's *Rise of the Creative Class* makes a compelling argument that recent urban economic development has depended largely on novel combinations of knowledge and ideas, that certain occupations specialize in this task, that people in these occupations are drawn to areas providing a high quality of life, and thus the essential urban development strategy is to attract and retain these workers. Florida bases much of his argument on interviews and focus groups, which he backs up with geographic data on where employment in occupations identified as part of the Creative Class is most prevalent. The high rankings of cities such as San Francisco, Austin and Seattle demonstrate the statistical similarities of these places that seemingly capture an essential dimension in differentiating creative center exemplars from creative backwaters.

In this article, we address three major limitations in Florida's analysis. First, while Florida focuses his attention on metropolitan areas, particularly the largest areas, we ask whether the creative class explanation applies to regional development more generally. In particular, we ask whether rural economic development is also dependent on the novel combination of ideas that puts a premium on the attraction and retention of creative individuals. In addition to testing the potency of the creative class construct for understanding development in rural (nonmetropolitan) U.S. counties, we are also able to

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identify outdoor amenities that tend to attract such workers to rural counties. To learn by contrast, we apply the same model developed for rural counties to urban (metropolitan) counties. These results also show a link between creative class presence and subsequent growth and suggest a process in line with Garreau's (1992) "edge city" model of urban development. Because our unit of urban analysis is the county rather than the metropolitan area, our analysis does not pertain directly to Florida's main concern, metropolitan area development.

The second limitation addressed in this paper relates to the measurement of creative class. Our research strategy puts a premium on having a valid construct for testing the creative class hypothesis, as a weak construct may fail to identify a true contribution to rural growth. Florida's creative class measure has two problems that are especially evident in a rural context. First, Florida relies on the 22 summary occupations in the 1999 Occupational Employment Survey to define employment that *generally* requires a high level of creativity. Using ONET (U.S. Department of Labor), which estimates functional requirements for more than 1000 detailed occupations, and the more detailed occupational categories available from the 1990 and 2000 U.S. Censuses of Population, we screen from Florida's summary categories several detailed occupations that apparently require relatively little creativity. Including these occupations would tend to blur the creative class measure particularly in rural areas, where empirical evidence of a spatial division of labor suggests that these lower skilled occupations are more concentrated (MASSEY 1984, WOJAN 2000).

In addition, although a premise of Florida's work is that the creative class is relatively footloose, some occupations included in the definition, most notably "education, training, and library occupations" and "healthcare practitioners and technical occupations," are involved in economic reproduction and locate largely to provide essential services to a population. In rural areas, the perverse result is that high employment shares in these occupations can indicate a dearth of economic development. In recasting the creative class, we drop these two broad occupational categories. Comparing results using our recast creative class measure with Florida's original measure provides strong assurance that our measure is a more valid construct.

The third limitation we address relates to statistical analysis. While Florida presents corroborative evidence on the relationship between creative class and growth, he never fully tests the creative class thesis in a multivariate framework. Here, we model growth (including the growth of the creative class) using a system of simultaneous equations, which addresses the endogeneity of population and employment growth while also controlling for influences from a number of local attributes. This approach allows a critical examination of the most cutting critique of Florida's analysis: that he is merely substituting employment in highly skilled occupations as a proxy for the endowment of human capital (GLAESER 2005). Our analysis confirms a strong independent influence on employment growth from both the initial share employed in the recast Creative Class occupations and its growth over the decade. By contrast, the statistical association with human capital variables is quite weak.

The analysis also identifies possibilities for advancing rural development strategy. First, not all rural areas are likely to benefit from a strategy to attract creative workers. Rural areas most attractive to creative workers tend to have sufficient density to provide a reasonable level of services, appealing landscapes and other natural amenities, and growth in surrounding areas. Yet, adjacency to a metropolitan area does not appear to be a prerequisite. Second, the analysis provides intriguing evidence that attracting creative workers may be influenced by local development strategies. The one missing prerequisite for making these findings actionable is the ground-truthing of this phenomenon parallel to Florida's qualitative analysis of the urban creative class. Having supplied the first step in identifying the rural potential of the creative class, we conclude with a discussion of research needed for rural strategies to realize this potential.

The Creative Class Thesis and the Rural Context

FLORIDA'S (2002) central argument has two parts: 1) the creative class is now a primary source of economic growth in our country, and 2) the creative class tends to locate in (metropolitan) areas with particular amenities. For the first part, Florida draws on ROMER (1990), MOKYR (1990) and others in arguing for the central role of creativity in economic growth and details the rise of creative class occupations nationally over the last century. Others have linked creativity to human capital and related its operational

referent, population education levels, to urban economic growth (see for example, GLAESER, 2005). Florida sees his approach as distinct from human capital theory, in that he "…identifies a type of human capital, creative people, as being key to economic growth…" (p. 223). However, no indication is given of what other type(s) of human capital there might be. From Florida's operationalization of creative class, it is apparent that no typically high education occupation has been excluded. Rather, certain technician occupations have been added on the basis that they appear to have assumed more decision making responsibilities over time (p. 70). In sum, Florida leaves the distinction between human capital theory and the creative class thesis vague both theoretically and empirically. We return to this issue below.

In describing the most attractive areas for the creative class, FLORIDA (2002) cites, "vibrant urban districts, abundant natural amenities and comfortable suburban 'nerdistans' for those so inclined (p. 11)." Much of the book concerns the character of vibrant urban districts, which Florida argues are associated with a relatively high degree of tolerance on the part of the local community. However, natural amenities also get their play:

> My focus groups and interviews with Creative Class people reveal that they value active outdoor recreation highly. They are drawn to places and communities where many outdoor activities are prevalent—both because they enjoy these activities and because their presence is seen as a signal that the place is amenable to the broader creative lifestyle (p. 173).

While Florida is referring to the availability of outdoor recreation for the urban creative class, our contention is that the appeal of natural amenities and associated recreational opportunities is sufficiently strong for many in the creative class to locate in rural areas rich in outdoor amenities and that this movement is associated with rural growth in employment and population migration.

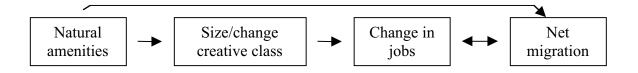There is prior evidence of the movement of creative class into rural areas. BEYERS and LINDAHL (1996) document the option of rural location arising from more effective and cheaper telecommunications, small parcel delivery and commuter air

services. They identify "quality-of-life" as a prime reason for the location decisions of small, export-oriented producer services companies in rural areas. In work identifying the location patterns of "producer services industry nodes" in nonmetropolitan counties, GOE (2002) finds that specialized recreation counties have a distinct advantage, consistent with the interpretation that quality-of-life attributes are an important draw for highly skilled workers.

HEENAN (1991) provides a number of examples to support his contention that major advances in telecommunications are creating a "footloose economy that permits firms to locate where they want to be, not where the traditional centers of finance dictate they have to be." The relocation of some highly successful urban entrepreneurs and the ability of some rural areas to attract and retain corporate headquarters points to the development potential of rural lifestyle amenities. Additional anecdotal evidence of the importance of amenities to skilled workers locating in rural areas comes from an OECD (2002) report on the high-amenity province of Siena, Italy, home to a large number of cutting-edge, entrepreneurial businesses.

There is also evidence of the important role that natural amenities and outdoor recreation facilities have in shaping the overall patterns of growth and decline in rural counties (MCGRANAHAN, 1999; DELLER *ET AL*, 2001). A recent study found that natural amenities are associated with employment growth indirectly, through their effects on net migration, suggesting that it is not recreation jobs but the appeal of amenities that is drawing people to high-amenity areas (MCGRANAHAN, 2005). At the other end of the amenity spectrum, it appears that out-migration is creating a loss of jobs.

In the present study, we explore the validity of both parts of Florida's argument in a rural context: 1) Is the size and growth of the creative class a source of employment growth in rural areas? And 2) is the location of the rural creative class dependent on local natural amenities? Our focus on natural amenities stems in part from our focus on rural areas. People choosing the countryside for residence are to some extent forsaking urban amenities for access to the outdoors, so these natural amenities should be especially salient in rural areas. The basic relationships we test for nonmetropolitan counties (and later metropolitan counties) in 1990-2000 are:

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┌──────────┐      ┌──────────┐      ┌──────────┐      ┌──────────┐
│ Natural  │  →   │Size/change│  →  │Change in │ ←→  │   Net    │
│amenities │      │creative class│   │  jobs    │      │migration │
└──────────┘      └──────────┘      └──────────┘      └──────────┘
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Before specifying the model in detail, however, we need to turn to the measurement issues relating to the creative class.

Recasting the Creative Class

Our initial concerns with construct validity arise from the specific types of functions associated with the Creative Class that are then measured using much more general occupational categories. The conceptual foundations of the construct are provided in the following excerpt:

> The distinguishing feature of the Creative Class is that its members engage in work whose function is to "create meaningful new forms." I define the creative class as consisting of two components. The Super Creative Core of this new class includes scientists and engineers, university professors, poets and novelists, artists, entertainers, actors, designers and architects, as well as thought leadership of modern society: nonfiction writers, editors, cultural figures, think-tank researchers, analysts and other opinion-makers…Beyond this core group, the Creative Class also includes "creative professionals" who work in a wide range of knowledge-intensive industries such as high-tech sectors,

financial services, the legal and healthcare professions, and business

management. These people engage in creative problem solving, drawing

on complex bodies of knowledge to solve specific problems (FLORIDA

2002, pp. 68-9).

However, the specific occupations above that are generally recognized as highly creative are represented in the data by broad, ambiguous categories. For instance, the "Education, training and library occupations" group used as a component of the Super Creative Core includes both university professors and teacher aides. The descriptive statistics that Florida provides merely demonstrate that cities described throughout the book as places that understand this development dynamic and actively foster the growth of a creative workforce generally have a higher share of Creative Class workers. The focus on the top-ranked cities throughout the analysis weakens claims regarding the generality and validity of the measures. Since the rankings confirm expectations, the analysis does not critically assess the construct validity of the Creative Class measure comprised of employment in several summary occupations.

The use of summary occupations in Florida's Creative Class introduces the possibility of low construct validity owing to excessive aggregation. Table 1 below reproduces the summary occupations making up Florida's occupational classes. It also provides information on the "creativity" typically required by detailed occupations within each summary occupation. This information is derived from the "Thinking Creatively" element of the 2004 ONET content model, described as "developing, designing or creating new applications, ideas, relationships, systems or products, including artistic contributions." The ONET compendium, previously known as the *Dictionary of Occupational Titles*, is produced by the Employment and Training Administration, Department of Labor and provides comprehensive information on the functional requirements of more than a thousand detailed occupations. The creativity measure provides a quantitative, though arguably imperfect, reference for assessing the creativity requirements among summary occupations that typically require a high degree of education (see MILLER, ET AL. 1980 and SPENNER 1987 for critiques of the *Dictionary of Occupational Titles*).

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[Table 1 about here]

The summary occupations in the Creative Core have the highest mean creativity score with the exception of Management Occupations in the Creative Professionals category. However, within the Creative Core, higher mean creativity is also characterized by high standard deviation. In fact, some detailed occupations within these summary occupations apparently require relatively little creative thinking. In addition, some summary occupations in the Creative Professionals category appear to be misclassified. "Business and financial operations occupations" and "legal occupations" both have mean creativity scores significantly lower than other Creative Class summary occupations as well as some Service Class summary occupations. These findings seriously challenge the construct validity of the Creative Class measure.

Do Less Creative Occupations Inflate Florida's Rural Creative Class?

Rural specialization in lower-skilled execution tasks and urban specialization in higher-skilled conception tasks is well established in the regional science literature (MASSEY 1984, WOJAN 2000). It is thus reasonable to assume that many of the nominally creative occupations with low creativity requirements make up a larger share of the rural creative class. We empirically test this hypothesis by examining the size of the metro and nonmetro classes at different creativity thresholds. If a sharply articulated spatial division of creative labor does exist, we would expect to see much of the rural creative class disappear as the threshold increases. This exercise is demonstrated in Table 2 below. For those occupations with the highest requirements for creative thinking, we do see a more dramatic decline in the rural Creative Class. While 13.2% of the Creative Class in metropolitan areas are found hyper-creative occupations scoring 5 or higher on the scale, only 7.3% of the rural Creative Class are in such occupations.

[Table 2 about here]

However, if rural employment were concentrated in nominally Creative Class occupations engaged primarily in tasks of execution, we would expect to see a much larger drop-off in the rural Creative Class over the first two thresholds. In fact, the drop-off in both Metropolitan and Nonmetropolitan areas is surprisingly similar. Between 11 to 12 percent of the Creative Class are employed in occupations that rate less than 2 on the "Thinking Creatively" scale (i.e., roughly the average of "Personal Care and Service

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Occupations") and more than 41 percent of the Creative Class are in occupations that rate less than 3. The mean "Thinking Creatively" score for all creative class occupations was 3.32 in metro counties and 3.11 in rural counties. While inclusion of workers employed in occupations that generally require little creativity erodes the construct validity of the measure, it does not appear to explain significant inflation in rural Creative Class employment relative to urban areas.

Economic Reproduction vs. Economic Development

The other serious problem with construct validity arises from the conceptual emphasis on the location choices of creative workers while including a large number of occupations that are dispersed to fill the needs of local populations. The three questions that get to the heart of the issue of the importance of the Creative Class to an economic development strategy are:

> How do we decide where to live and work? What really matters to us in
>
> making this kind of life decision? How has this changed—and why?
>
> (FLORIDA 2002, p. 217).

The validity of the construct is undermined by the inclusion of occupations that are not footloose but are employed in a place to provide essential services for the population. For example, healthcare practitioners and school teachers are included in summary occupation groups that partially comprise the creative class definition. In fairness to Florida, both occupation groups generally require high levels of creativity, so their inclusion would appear to be justified on the basis of job requirements. In addition, the inclusion of these occupational groups is likely to have little effect on the Creative Class ranking of metropolitan areas, as their employment shares are likely to be very similar across cities.

These problems of construct validity are likely to be less benign in rural areas. First, the smaller share of highly educated individuals in rural counties ensures that healthcare practitioners and teachers will make up a higher share of a purportedly footloose Creative Class. Second, the ubiquity of these workers suggests they are likely to comprise the great majority of Creative Class workers in declining counties with few alternative opportunities for highly skilled workers. Third, the shrinking employment

denominator in declining counties may lead to the perverse result that Creative Class shares actually increase over time in such counties. And finally, this same phenomenon may result in declining counties having a larger nominal Creative Class share compared with some growing counties that are successful in attracting genuine footloose creative workers. Inclusion of occupations supplying services essential to economic reproduction will thus confound any inferences regarding the Creative Class contribution to economic development. This assertion is confirmed below following the specification of our alternative Creative Class measure.

Recasting the Creative Class and Comparison to the Original

The solution to the problems of construct validity discussed above is to purge occupational employment characterized by either little creative thinking or engaging primarily in functions of economic reproduction. Our solution is imperfect. Detail is limited in county-level data, but the 94 occupational categories used in STF4 files from the 2000 Census of population provide a substantial improvement over the 22 categories used by Florida.[i] Moreover, in any categorization, some decisions are somewhat arbitrary. A comparison of the occupational make-up of the original Florida and recast Creative Class is provided below.

[Table 3 about here]

The recast measure excludes the summary "health care practitioners and technical occupations" group and schoolteachers and aides in the "Education, training, and library" occupational group. We argue that the economic reproduction characterization does not apply to college professors and "librarians, curators and archivists" occupations as their services are often provided to a non-resident population. Purging legal support occupations and judges while retaining lawyers might also be questioned. However, the important role that lawyers play in devising solutions to new problems created by economic development is a compelling argument for their inclusion. "Life, physical, and social science technicians" are excluded from the recast classification due to generally low requirements for creative thinking, although technicians in "architecture and engineering occupations" are retained due to higher requirements for creative thinking. This same justification for exclusion applies to "business operations specialists" and

"other financial specialists" within the "business and financial operations" occupational group.   Within "management occupations," "farmers and farm managers" are excluded due to low creativity requirements of farmers as reported in ONET that make up the great majority of this category. However, management positions in public administration that would be appropriately excluded given the economic reproduction criterion are not separated from other management positions in the classification and are retained.[ii]

The recast creative class would be expected to score higher on the ONET "Thinking Creatively" measure given the purging of occupations with low creativity requirements. However, a number of highly creative jobs in excluded education and health practitioner occupations employ a large number of people, so the economic reproduction criteria would tend to decrease the "Thinking Creatively" score. For the nation as a whole, the mean score for the recast classification was 3.68, but only 3.28 for the original Florida classification.

Figure 1B below plots the share of employment in the original creative class against the share of employment in the recast classification for metropolitan counties. Our earlier supposition that the recast classification would have little impact on the ranking of metropolitan areas is confirmed. The Spearman rank correlation of the two measures is 0.974 for metropolitan counties. The main difference between the two measures is their relative range and variance. The coefficient of variation for the Florida measure is 24.67 compared with 32.86 for the recast measure. If the share of workers in the creative class does have an effect on growth, then the greater relative variance in the recast measure should estimate this phenomenon with more precision .

[Figure 1 about here]

The inability of the Florida measure to differentiate between an inflated share of Creative Class employment owing to a lack of opportunity in rural counties and Creative Class employment resulting from robust growth is best demonstrated by Figure 1A. For nonmetro counties, the Spearman rank correlation coefficient drops to 0.806. The significant number of counties southeast of the regression line indicates relatively high shares from the original measure that correspond to low shares using the recast measure. All of the counties farthest southeast of the regression line are in the Great Plains, and all but Golden Valley County, Montana experienced population loss between 1990 and

2000. The very small size of many of these counties reinforces our argument that counties lacking meaningful opportunities for creative workers may nevertheless possess a considerable share of Creative Class employment as defined by Florida.

Figure 1A also identifies Pitkin County, Colorado—containing Aspen—and Tompkins County, New York—containing Ithaca and Cornell University—ranking highest in shares of both the recast and original Florida measure. This finding supports the stylized description of the rural creative class being most concentrated in the Mountain West and Northeast. However, the map in Figure 2 of creative class shares in 2000 depicts a more complex and variegated story. Even the Great Plains states contain a significant number of counties ranking in the top quartile. Universities and colleges are common fixtures in the top five percent of counties. Jefferson County, Iowa, one of the rural Midwestern creative class magnets, contains Maharishi International University hinting at a more interesting creative class story. As a draw for Transcendental Meditation adherents, the county has attracted a large number of urban professionals who have started or are employed in more than 100 software development and professional service firms located there. Llano County in the Texas Hill Country does not contain a large college or university but is an amenity rich location in Austin's exurban fringe. Robust growth in the number of artists residing in the county over the 1990s is representative of rural 'artistic havens' that are emerging in select counties across the U.S.

[Figure 2 about here]

Given its proclivity for nice places, we asked whether the rural creative class is comprised largely of owners of bed-and-breakfasts and recreation boutiques, in contrast to an urban creative class of scientists, engineers, and musicians.

The answer is that the urban creative class is different from the rural creative class, but more in degree than in kind. According to the March 2003 Current Population Survey, the creative class comprises a much larger share of urban employment (30 percent) than rural employment (19 percent). The rural creative class is older and more likely to be married than the urban creative class, but the major difference is in the proportion that has completed at least a college degree, 37 percent in rural areas and 56 percent in urban areas, reinforcing the idea that creative class membership is somewhat

independent of education credentials (Table 4). In both rural and urban areas, the creative class has much higher education levels than the remainder of the workforce.

The low proportion in the rural creative class and the lower education levels of those in the rural creative class reflect lack of producer services in rural areas and the relatively low proportions of scientists and engineers. Other differences are small, however, and while there is some concentration of the rural creative class in wholesale, retail and personal services industries, it does not overwhelm the other industries in the measure. In all, there is face validity in both rural and urban areas that localities with relatively high proportions of creative class workers contain relatively high proportions of people who create new opportunities.

[Table 4 about here]

Empirical Model of Rural County Growth

To model the creative class relationships diagramed above for rural counties, we adopted a 3SLS model of change in creative class, employment change and net migration as these changes are simultaneous. With an exception noted below, we assumed that the creative class was drawn by the same rural characteristics as the general population.

$$\_CC = f(\_E, \_P_M, \quad CC, S, L, C, I, LM, U, D, \_AE)$$

$$\_E = f(\quad \_P_M, \_CC, CC, S, \quad I, LM, U, D)$$

$$\_P_M = f(\_E, \quad \_CC, CC, S, L, C, I, LM, U, D, \_AE)$$

where $\_E$ = the log of employment change between 1990 and 2000;

$\_P_M$ = the log of net migration between 1990 and 2000;

$\_CC$ = the log of change in creative class occupations between 1990 and 2000;

CC = employment share in creative class occupations in 1990;

S = settlement variables, including density, metro adjacency and out-commuting;

L = landscape measures, including forest, cropland, surface water area, and mountains;

C = climate measures;

I = 1990 industry employment (farming, mining, manufacturing, …)

LM = labor market characteristics, including education, employment rate, and median income;

U = presence of universities and colleges;

D = age, race, and ethnicity measures; and

_AE = aggregate 1990-2000 change in employment in abutting counties.

It should be noted that while we included the creative class measures as predictors of net migration, our expectation was that the coefficients would not be substantial relative to the corresponding coefficients in the jobs equation (see diagram, p.5). The thesis is that the creative class affects local growth through generating jobs, not attracting new residents. We also included employment change and net migration as predictors of change in creative class as a check, with the expectation that these relationships would be small relative to the effect of change in creative capital on employment change. (These and other expected relationships discussed below are outlined in an appendix table.)

Settlement (S) includes 4 measures. The first two measures are the natural logs of 1990 population density and its square. (Unless otherwise noted, measures are from 1990 Census of Population STF3 and STF4 data files.) The expectation was that migration would be low in the least dense counties because of poor access to services but, since people move to rural areas to have access to the outdoors, the highest density rural areas would also have lower net migration, making the second density term negative. This is less true for employers, who need access to labor markets and the square of density was not included in the jobs equation. The other two settlement measures reflect urban access: county adjacency to a metropolitan area (1990) and the proportion commuting out of the county (1990), both of which are expected to be related to all three growth measures.

Landscape (L) measures are meant to reflect the visual and recreational appeal of the countryside. Landscape preferences research has consistently found that the most

appealing landscapes contain clumps of trees, open vistas, and some water source—lake or stream (ULRICH, 1986). Landscapes with little variety or evidence of extensive manipulation (clear cutting, cropland) are among the least preferred. The $\log_e$ of the proportion of county area that is water (lake, pond, and/or ocean) was taken from MCGRANAHAN (1999). The presence of mountains was taken from the same source. Also included are the percent of land in forest (Forest Service web-site) and the square of that term. Since people prefer a mixture of trees and open space, an inverted U relationship of forest with both net migration and creative class growth was expected. Cropland (CENSUS OF AGRICULTURE, 1992) as a percent of county land was added to reflect the low appeal of extensive agriculture (e.g., KAPLAN et al., 1989). Finally, the percent of land in the public domain was included under the presumption that this land is usually undeveloped (Forest Service web-site).

Climate (C) has consistently been related to migration and population growth as people have moved from cold, wet areas to warm, often dry ones—from the "rust belt" of the Northeast to the "sun belt" of the South and Southwest. We included average January temperature, average number of January sun days, temperate Julys, and low humidity Julys (MCGRANAHAN, 1999).

Landscape and climate measures were included in the creative class and net migration equations, but not in the employment equation. While landscape and climate are likely to facilitate tourism, our model assumes that tourism-related jobs are generated primarily through the presence and growth of the creative class.

In addition to the above quality of life measures, we added two measures that we expected might be attractive especially for the creative class, given FLORIDA'S (2002) attention to interests in an active lifestyle and the authenticity of place. The first is the number of bicycle and sporting goods employees per capita, a reflection of outdoor active sports in the county. The second was the natural log of the number of nationally registered historical sites in the county. These measures were included only in the creative class equation.

Industry (I) structure has been included as a set of control measures as employment and creative class change stemming from industrial structure might otherwise be attributed to creative class. Industry structure is measured as share of

employment in each of six categories: agriculture, mining, manufacturing, producer services, recreation, and other. Agriculture, mining, and manufacturing, declining rural industries, were associated with lower creative class shares in 1990. At the same time, producer services and recreation, expanding industries in rural areas, were positively correlated with creative class share in 1990. Overall, the multiple R of 1990 industry structure with 1990 creative class share was .80. All industry proportions except "other" were included in both the creative class and employment change equations, with the expectation that specializing in faster or slower growing industries would have a corresponding influence on county growth.

We included shares of agriculture, producer services, and recreation employment in the net migration equation as well. Negative relationships found between cropland and growth could reflect declines in agricultural populations rather than low scenic value. Agricultural employment controls in part for this alternative explanation. Recreational development may attract new migrants quite apart from the jobs generated and the recreation measure provides an alternative explanation to landscape and climate as an explanation for in-migration (and growth in the creative class). Finally, early analyses suggested that omitting business services from the net migration equation could result in over identification.

Labor market (L) measures include education (the proportions of young adults—age 25-44—with a high school diploma and with a college degree, the civilian employment rate (age 16-64) and the $\log_e$ of median household income. One motivation for including these measures is to capture effects of labor market disequilibria. Thus, it was expected that higher levels of education would be associated with lower net migration (but higher jobs growth,) while income and employment rates would be associated with high net migration (but lower jobs growth). A second motivation for including the proportion of young adults with a college degree was to take into account GLAESER'S (2005) argument for the importance of human capital in local growth. For the creative class equation, only the shares with a college degree and median income were included, largely as quality of life measures. The creative class may have an affinity for areas with higher socioeconomic status, in part because schools are likely to be better.

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Post secondary schools (U) are included here because many counties particularly high in creative class in 1990 were college counties, and because colleges and activities associated with colleges may be attractive to the creative class, employers, and migrants. Their presence in a county is measured by 3 dichotomous measures reflecting the presence of 2- and 4-year public institutions and 4-year private colleges.

Demographic (D) measures include age structure and race/ethnicity. Age structure is represented by the shares of population that were age 8-17 and age over 62 in 1990. The former group turned 18 over the course of 1990-2000. Since this group is likely to migrate out of rural counties to colleges or the armed forces, its relative size should have a negative association with net migration. At the same time, since some of this age group enters the local labor market, a high proportion of population age 8-17 may be associated with a local growth in jobs. This age group was omitted from the creative class equation.

In the past, a large share of retirement-age population tended to signify an area with a long history of out-migration. However, a number of rural counties are gaining retirees, so the proportion of the population age over 62 may now be positively related to rural net migration.

Other demographic variables are the shares of the population that were Native American, Black, and Hispanic in 1990. In general, rural minority populations have been associated with loss of population and employment. However, Native Americans communities saw a tremendous growth in casinos during the 1990s, often in areas that were otherwise unattractive to employers. Although the Hispanic population expanded rapidly in nonmetropolitan areas in the 1990s, it did not expand in its traditional communities (KANDEL and CROMARTIE, 2004). As shown later, Blacks and Hispanics have relatively low shares of employment in creative class occupations. Our expectations were that, with the exception of employment growth in areas with Native American populations, minority representation in the population would be associated with lower growth of all kinds.

The aggregate 1990-2000 gain in employment in abutting counties (_AE) was included in an earlier analysis of net migration and employment growth to reduce spatial autocorrelation among the net migration residuals (MCGRANAHAN, 2005). A mapping of

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the residuals had suggested tendencies to over estimate migration in regions such as upstate New York and Northern California that were stagnant in the 1990s, and to underestimate nonmetropolitan growth around dynamic centers such as Atlanta and Minneapolis. The measure was also included in the creative class equation here as its omission suggested that the equation was overidentified (BASEMAN, 1960).

The analysis includes counties in the contiguous 48 states that were defined as nonmetropolitan in 1993, based on the 1990 Census of Population. We have excluded Virginia independent cities, 3 counties that were outliers in employment growth due to extensive casino construction (Tunica County, MS, and Gilpin County, CO) and a nuclear power plant construction (Somervell County, TX). Also excluded were three very small counties that were outliers in their loss of creative capital. Counties with missing data were excluded. The total N for the analysis is 2145.

Results

Rural analyses were carried out twice, first with the creative class measure that we developed and, second, with the measure used in FLORIDA (2002). The full results are presented for our measure below, followed by a comparison with the results for the Florida measure.

The creative class measure we propose behaves according to expectations (Table 5). First, both the 1990 share of employment in the creative class and the change in the size of the creative class are positively related to 1990-2000 employment growth. However, neither the share nor the change in creative class is directly related to net migration. The 1990-2000 growth in the creative class does not appear to have been affected by county employment growth or net migration. However, there is a strong connection between area employment growth and growth in the creative class, suggesting that we are picking up some intra-regional residential choices among the creative class.

<div align="center">**[Table 5 about here]**</div>

The only unexpected result is the large negative coefficient for the 1990 creative class percentage that appears in the creative class growth equation. In bivariate analysis, this coefficient is fairly small. To explore further, we divided the sample by quartiles and, in each quarter, regressed change in the creative class on the 1990 share. In the bottom quarter, there was strong evidence of regression to the mean, suggesting error or

random fluctuation was at play. In the middle two quarters, there was no relationship between 1990 creative capital share and change in creative capital. However, in the top quarter there was a strong positive effect of share on change in creative capital. The negative coefficient in Table 5 appears to picking up the noise at the bottom end of the distribution.

The other coefficients in the creative class equation suggest that the creative class is drawn to high amenity areas. Growth has been greatest in counties with modest density that have commuting. However, there is no particular movement to counties adjacent to a metropolitan area.

The creative class is growing most rapidly in areas that are mountainous, with a mix of forest and open area (but with relatively little cropland), and where winters are sunny. All of the landscape coefficients are stronger in the creative class equation than in the net migration equation, suggesting that this class is drawn more than others to high amenity areas. The omission of the landscape and climate measures from the employment equations did not create problems of overidentification, as the BASMANN (1960) tests for overidentification for the employment equation (or either of the other two equations) does not approach significance.

Counties with a relatively large number of bicycle and sports stores jobs per capita have gained more than their share of the creative class. Having a large number of registered historical sites does not seem to be a draw, however.

The creative class had greater growth to the extent that a county specialized in business services and recreation. Note that business services has a negative effect in the employment equation, which it did not before the creative class measures were incorporated into the employment and net migration model. This suggests that counties where business services were comprised of "back office" operations such as call centers faired relatively poorly in the 1990s.

The proportion of young adults with at least a college degree is strongly related to growth in the creative class. This may represent affinity, but it is also likely to reflect the attractiveness of local schools. In the employment equation, the college measure has, if anything, a negative effect. The creative class measure used here is not simply another way of measuring human capital.

Finally, the creative class had substantially less growth, the higher the proportions of Blacks or Hispanics in the population. There is considerable variation across counties with minorities, however. For instance, some counties that are at least 25 percent Black in 1990 were in the top quarter in the creative class share. Nevertheless, in both 1990 and 2000, over 40 percent of the high Black population counties fell in the bottom quarter in creative class share.

Table 6 shows the creative class coefficients obtained when we repeated the above analysis with FLORIDA'S (2002) measure of creative class in place of ours. While the employment equation coefficients for the Florida measure are in the same direction as the ones for our measure, they are considerably smaller. Although not shown, the coefficients in the creative class growth equation are all smaller as well. The only exception is the proportion employed in agriculture, which is .0036 (p<.0001) for the Florida measure, up from .0006 (p<.57) in the recast measure. We suspect that this is due to an expansion of health services in the 1990's which shows up particularly in agricultural areas, where other creative class members are few. Our exclusion of many of the occupations involved in reproduction appears to have resulted in a much sharper measure of creative class.

[Table 6 about here]

Rural-urban comparisons

Are our results for creative class peculiar to rural areas? Although our focus is rural, we also carried out analyses for urban areas, primarily for purposes of comparison. This analysis shows the recast creative class measure to be a strong predictor of urban employment growth, but that low population density rather than the level of outdoor amenities was the major driver of growth in the creative class.

We note again that our data were organized to analyze nonmetropolitan counties rather than metropolitan areas as such and our independent measures were selected with rural development in mind. Thus, our analysis does not include some measures typically considered in urban analyses of amenities, such as low crime rates, high teacher-pupil ratios, and low taxes. However, metropolitan counties are frequently used as units of

analysis and many of our measures are relevant to urban as well as rural development (e.g., employment rate, education, climate, industry).

Reduced form (OLS) regression equations actually produced substantially higher R^2 for metropolitan than nonmetropolitan counties for both creative class and employment change (Table 7). The net migration R^2's are essentially the same. While there are consistencies across the equations, Chow tests of the analyses for all three dependent measures indicate (at the $p<.0001$ level) that the rural and urban county analyses generally have different regression coefficients. Here we focus on three differences most relevant to the present analysis and one strong similarity.

First, coefficients for the share of creative class in the workforce are considerably stronger in the metropolitan employment and net migration equations than in the corresponding nonmetropolitan equations. Some question may be raised about the stability of these results, as the proportion of young adults (ages 25-44) with a college degree is highly correlated with our creative class measure across urban counties (r =.92), much more so than across rural counties (r = .66). However, the strong relationship of creative class with employment growth is very consistent across metropolitan counties. When we regressed 1990 creative class on college completion in metropolitan counties, 66 percent of the counties with a positive residual had employment growth above the metropolitan median rate while only 36 percent of those with a negative residual had growth above the median. When we dropped college completion from the regressions, the coefficients were still strong for creative class (b =1.236, β = .41 for employment change and b = .936, β = .39 for net migration).[iii]

Second, the metropolitan coefficients for the population density measures are the reverse sign of the corresponding nonmetropolitan coefficients, suggesting that the urban creative class is shifting from high- to low-density areas. Plots of employment change and net migration by density from the metropolitan equations show negative slopes that flatten as density increases (Figure 3). In addition, the settlement measures (density and commuting) are more important in the metropolitan equations than in the nonmetropolitan equations, especially for the change in creative class. Alone, the settlement measures explain 27 percent of the variation in creative class change in metropolitan counties, but only 4 percent in nonmetropolitan counties.[iv]

The third difference between the metropolitan and nonmetropolitan equations is the weaker influence of landscape and climate in the metropolitan analyses (with the exception of January temperature), although only cropland and January temperature have significantly different coefficients across urban and rural analyses. Cropland even has a slightly positive although insignificant effect in the metropolitan analyses, perhaps because it is easy to develop tract housing and industrial buildings on this type of land. It is possible that if the landscape measures from surrounding counties had been included in the analysis, stronger relationships of creative class growth and net migration with landscape/climate might have been found. Another contributing factor could be that zoning restrictions and high housing costs inhibit growth in some of the more attractive metropolitan counties. But, the basic explanation is probably that the growth in creative class in a metropolitan county is largely part of the evolution of its metropolitan area. Growth in peripheral metropolitan counties has been associated with a number of factors, including the (poor) quality of life offered by the central counties, transportation infrastructure, and relations among local government units (see FILION, BUNTING, and WARRINER, 1999). Metropolitan county growth is also likely to depend on the general growth of the region. In the expanding Atlanta and Minneapolis metropolitan areas, for instance, the central counties are ringed by counties with rapidly growing creative classes (see Map 2). The coefficients for employment growth in adjacent counties are consistently although not significantly larger in the metropolitan analyses compared with the nonmetropolitan analyses.

In all, the results for metropolitan counties suggest a process of growth similar to that identified for nonmetropolitan counties. However, in metropolitan counties, instead of the quality of natural amenities being a key driver, rurality itself is appears to be the driver, as the creative class seeks a lower density environment in which to live. The resulting pattern of metropolitan county growth is consistent with GARREAU'S (1991) concept of "edge cities." The creative class moves into less dense metropolitan counties in search of a higher (more rural) quality of life; the building of a creative class creates an environment for job growth; and this leads to further in-migration. The process may then lead to further outward expansion of the creative class, perhaps into adjacent nonmetropolitan counties.[v]

[Table 7 about here]

The one striking consistency between the metropolitan and nonmetropolitan analyses is the strong negative association between the proportion of the population that is Black and any of the three types of growth. Relatively few Blacks are in the creative class (Table 3) and this analysis suggests that areas with a high proportion of Blacks are gaining relatively few creative class members. In all, the analyses suggest a growing disparity between areas with significant Black populations and the rest of the country during the 1990s.

Policy Implications and Directions for Further Research

The current research was motivated by the following questions:

1. Does a large and growing share of workers in creative occupations lead to faster rates of employment growth?

2. If so, does this result apply to regions generally or is it specific to major urban environments?

3. Does increasing the construct validity of the creative class measure yield stronger results than found using Florida's measure?

4. Can we identify rural amenity characteristics that tend to attract workers in highly creative occupations?

The analysis has demonstrated that employment in creative occupations is positively associated with employment growth in both metropolitan and nonmetropolitan (rural) counties. The econometric test of the creative class thesis provides strong support for the notion that creativity has an effect on growth independent of the endowment of human capital.[vi] The results are substantially stronger using what we think is a more valid measure of creative class than that used in Florida.

The analysis also identified rural characteristics that tend to attract workers in creative occupations (as well as others), suggesting that the quality of life afforded by rural areas has become key to their growth. The role of outdoor amenities in attracting creative workers corroborates the findings of BEYERS and LINDAHL (1996) and GOE (2002), strengthening an alternative dimension to amenities-based rural development

strategies. The traditional emphasis on amenities has been on their valorization in terms of increased tourism, or in attracting retirees or vacation home residents. MCGRANAHAN (2005) demonstrates the allure of natural amenities for population more generally but does not identify a means by which amenity-based migration leads to employment growth. The present analysis establishes such a connection by demonstrating that outdoor amenities are also an important quality-of-life attribute for the creative class, which is, in turn, instrumental in job creation.

The strong association of the number of employees in sporting goods stores per capita in particular with the growth of the Creative Class were consistent with Florida's qualitative analysis: opportunities for an active lifestyle are also very important to the creative class. If the variable is an effective proxy of local opportunities for biking, hiking, skiing, watersports, hunting or fishing, then the policy implications are clear.[vii] Initiatives that increase outdoor recreational opportunities, which have traditionally been pursued to increase tourism, should increase the attractiveness of the local area to creative workers.

The quality of local schools is another attribute that may be critical to a strategy to attract creative workers. College graduates between the ages of 25 and 40 as a share of all workers is strongly associated with the growth of the Creative Class (Table 5). Affinity likely plays some role, but parental educational attainment is also a strong community indicator of school quality. The family life of the Creative Class is not a topic that Florida dwells on, but the rural Creative Class is older and more likely to be married than their urban peers (Table 4). Two areas of research that could flesh out these possibilities are the residential life-cycle choices of the Creative Class and incorporating explicit measures of school quality in examining location choices of creative workers.

The number of county entries on the Registry of Historic Places does not appear to have an effect on the growth of the creative class, despite Florida's arguments that the authenticity of an area is an important factor in local attractiveness (2002 p. 228). However, our proxy only addresses potential positive contributions to authenticity while abstracting from negative contributions such as the development of strip malls or big box retail stores. . A compelling rural anecdote suggests the value of further qualitative and quantitative analysis:

[Fillmore County, MN] provides an instructive example of how a modest endowment of natural and cultural amenities can be organized into a compelling attraction…The amenities that did exist were clearly hidden resources in the form of State Historic Sites and some buildings on the National Register of Historic Places, the scenic bluffs along the river running through the county, and the absence of any strip mall development owing to the stagnation of the local economy…It is likely that the state bike path built on retired rail beds running along the river would have had little effect on the development prospects of this economically depressed county. But in recognizing the bike path as an opportunity to interest weekend refugees from Rochester or the Twin Cities, the value of the formerly hidden resources became clearer. Communities along the bike path soon realized that the potential for high value-added tourism based on a combination of preservation and recreation was possible if they could come to some agreement on maintaining their authentic character. (PEZZINI AND WOJAN, 2002, p. 132).

Regarding the Creative Class, Fillmore County experienced robust growth in the 1990s, ranking in the top quartile of all metro and nonmetro counties.[viii]

The opportunity for social and cultural interaction is a dominant theme in Florida's analysis, establishing the urban center as an important enticement for creative workers. The rural analysis here reinforces this argument by demonstrating that creative workers are drawn to more densely populated counties. While the square of density is negative suggesting that rural creative workers are not seeking the most highly urbanized settlement areas, growth in the creative class tends to be higher in the more densely populated rural counties, all else equal (Figure 3). However, this result also supports the alternative interpretation that the minimum scale needed to support critical economic activities or desired consumer services is an important draw. While social or cultural interaction may be important in rural areas, it is likely to take different forms than the interaction described by Florida. In terms of informing policy, a useful analysis will have to address the nature of these interactions in differentiating successful rural places from creative backwaters, much as Florida compares, say, Austin to Pittsburgh.

Phenomena that may be important to rich social and cultural interaction in rural areas include the presence of an active arts or artisanal community, the existence and display of a rich cultural heritage, the extent to which rural town plans promote places for

public gathering and interaction, and the presence and activity of civic associations. Given the rural creative classes' older age and a greater likelihood of being married relative to their urban peers, family life may condition the importance of interaction or tend to emphasize venues different from the clubs and cafes appealing to urban creative workers. The relative strength of local norms that impose conformity on community members, tending to stifle creative behavior, may also be important. Gaining insight into this issue would clearly benefit from qualitative analysis. However, we know of at least one instance of a rural community that is confronting this issue directly. Walla Walla County in Washington has set up a Young Professionals Network where members of the Creative Class discuss the best ways to retain and attract talent to the community. To the extent that rural magnets for the Creative Class are emergent phenomena, such experimentation is likely to be the most effective way of moving a rural creative class strategy forward.

Finally, while Florida stressed the importance of urban vitality as a draw for the creative class, our analysis of urban (metropolitan) counties suggests that the creative class is diffusing outward from central cities, growing most rapidly in sparsely settled suburbs. This pattern is not necessarily incompatible with Florida's depiction, with its stress on urban vitality. There is a correlation between life-cycle and urban-rural residence, with young, single people more disposed to live in central cities than married couples, especially married couples with children.[ix] While Florida did not elaborate on how his focus groups were selected, it seems likely that young, single members of the creative class were overrepresented and it is for this group that urban vitality—the presence of a music scene, for instance—would seem most relevant. Moreover, as young, singles are the most mobile group both with respect to jobs and residence, it follows that this is a most important group to attract. In our metropolitan analysis, the movement of this group favoring some urban centers over others may have been dwarfed by the movement of the creative class from central cities to suburbs as they marry and have children.

Alternatively, our results may reflect an attraction of all members of the creative class to certain settlements outside central downtown areas, an attraction possibly

independent of the character of the downtown areas. Our analysis, in short, suggests the possibility of urban and rural forms not considered in *The Rise of the Creative Class.*

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Endnotes

[i] While the EEOC Special Tabulation of the 2000 Census provides data on employment in 472 detailed occupations, it is only available for groups of nonmetropolitan counties pooled together to meet a 50,000 population disclosure threshold.

[ii] Supervisory sales creates a problem as many small business owners fall in this category, yet in the 2000 Census of Population, the category is mixed with other sales occupations (although not retail sales and cashiers). We have kept this larger category in the recast creative class as we are uncomfortable with excluding small business owners.

[iii] When we ran the urban analyses using the Florida measure of creative class, the beta coefficients for employment change and net migration were smaller than found using the recast measure, but still statistically significant.

[iv] As figure 3 shows, however, everything else being equal, there is a tendency for the creative class to avoid low-density rural counties. Some of the other qualities associated with growth in the creative class are a more prevalent in low density counties.

[v] Twenty of the 30 metropolitan counties with the highest 1990 shares of creative class include "edge cities" identified by Garreau (1991) at the back of his book. Garreau provides only sketchy information on the location of the edge cities and notes that his list was not exhaustive.

[vi] Lee *et al*. find an association between firm birth per capita and the location of "bohemians" (artists, designers, musicians, etc.) in a study of U.S. metropolitan and labor market areas that is independent of human capital.

[vii] The number of bike rental shops in the county had a similar positive effect on the growth of the creative class. The measure provides a more direct proxy for bike trails in a county, but abstracts from other valid outdoor activities. Opportunities for outdoor activity are also highlighted in an article in the popular literature identifying 14 of the best small towns in America to live in or visit (Grudowski 2004).

[viii] Lanesboro, MN in Fillmore County was also included in Grudowski's (2004) list of 14 of the best small towns in America.

[ix] We explored this for the creative class, using the 2003 Current Population Survey. Over 48 percent of single members of the class under the age of 35 lived in central city parts of metropolitan areas. In contrast, whether under 35 or not, only about 20 percent of the creative class who were married with children lived in central cities. Gautier, *et al*. (2005) suggest that central cities function as marriage markets, especially for those with highly valued attributes.