

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

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MCGRANAHAN D. and WOJAN T. (2007) Recasting the creative class to examine growth processes in rural and urban counties, *Regional Studies* **41**, 1–20. Richard Florida's *Rise of the Creative Class* (2002) 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. The present analysis of recent rural development in rural US 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, the 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. The 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.

Amenities Construct validity Occupations Rural development strategy

MCGRANAHAN D. et WOJAN T. (2007) Reformuler la classe créatrice pour examiner les processus de croissance dans les comtés ruraux et urbains, *Regional Studies* **41**, 1–20. Dans son livre *Rise of the Creative Class (L'Essor de la classe créatrice)* (2002), Richard Florida affirme de façon convaincante que, de nos jours, l'aménagement du territoire dépend des combinaisons originales de la connaissance et des idées, que certaines catégories socioprofessionnelles se spécialisent dans cette tâche, que ceux qui travaillent dans de telles catégories sont poussés vers des professions qui offrent une qualité de la vie élevée, et donc la stratégie clé est de créer un milieu qui attire et retient ces travailleurs. L'analyse du développement rural récent dans les comtés ruraux aux E-U qui porte sur l'équipement naturel comme indicateur de la qualité de la vie, confirme la thèse qui prône la classe créatrice. Répéter l'analyse pour les comtés urbains montre aussi une corrélation étroite entre la présence de la classe créatrice et la croissance, alors que l'équipement naturel joue un moindre rôle. Cependant, les résultats dépendent d'une mesure de la classe créatrice reformulée qui exclut de la mesure originale de Florida beaucoup des professions dont les critères de créativité sont peu importants et dont les employés travaillent principalement dans la production économique. La mesure se conforme plus étroitement à la notion de la classe créatrice et s'avère en corrélation plus étroite avec l'aménagement du territoire que ne le fait la mesure originale de Florida.

Equipement Validité du concept Professions Aménagement du territoire

MCGRANAHAN D. und WOJAN T. (2007) Neues Modell der kreativen Klasse zur Untersuchung von Wachstumsprozessen in ländlichen und städtischen Bezirken, *Regional Studies* **41**, 1–20. In *Rise of the Creative Class* (2002) legt Richard Florida überzeugend dar, dass eine Regionalentwicklung heute auf neuartige Kombinationen aus Wissen und Ideen angewiesen ist, dass bestimmte Berufe auf diese Aufgabe spezialisiert sind, dass die Ausübenden dieser Berufe von Gebieten mit hoher Lebensqualität angezogen werden und dass die wichtigste Entwicklungsstrategie daher darin bestehen muss, eine Umgebung zu schaffen, die diese Arbeiter anzieht und zum Bleiben bewegt. Unsere Analyse der aktuellen Entwicklung in ländlichen Bezirken der USA stützt sich auf natürliche Erholungsgebiete als Indikatoren der Lebensqualität und bekräftigt die These der kreativen Klasse. Auch bei einer Wiederholung der Studie für städtische Bezirke zeigt sich ein enger Zusammenhang zwischen der Präsenz einer kreativen Klasse und dem Wachstum, obwohl hierbei natürliche Erholungsgebiete eine geringere Rolle spielen. Allerdings hängen unsere Ergebnisse von einem umgestalteten Maßstab für die kreative Klasse ab, bei dem zahlreiche Berufe mit geringen kreativen Anforderungen sowie Berufe, die in erster Linie mit wirtschaftlicher Reproduktion befasst sind, aus dem ursprünglich von Florida herangezogenen Maßstab ausgenommen werden. Unser Maßstab wird dem Konzept einer kreativen Klasse besser gerecht und erweist sich als stärker mit der Regionalentwicklung verknüpft als Floridas ursprünglicher Maßstab.

Erholungsgebiete Gültigkeit von Konstrukt Berufe Strategie zur ländlichen Entwicklung

MCGRANAHAN D. y WOJAN T. (2007) Reformulación de la clase creativa para examinar los procesos de crecimiento en comarcas rurales y urbanas, *Regional Studies* 41, 1–20. La teoría de la clase creativa, propuesta por Richard Florida en su libro *The Rise of the Creative Class* (2002), sostiene de forma convincente que el desarrollo regional depende ahora de nuevas combinaciones de conocimiento e ideas, que ciertas ocupaciones se especializan en esta labor, que las personas en estas ocupaciones se interesan por áreas que ofrecen un alto nivel de calidad de vida, y que por tanto la estrategia básica de desarrollo es crear un ambiente que atraiga y conserve a este grupo de trabajadores. En nuestro análisis de reciente desarrollo rural en comarcas rurales de los Estados Unidos, centrado en las prestaciones naturales como indicadores sobre la calidad de vida, defendemos la tesis de la clase creativa. Un caso similar en comarcas urbanas también demuestra un sólido vínculo entre la presencia de la clase creativa y el crecimiento, si bien los indicadores naturales desempeñan un papel más pequeño. Sin embargo, nuestros resultados dependen de una reformula de medición de la clase creativa que excluye de la medición original de Florida muchas ocupaciones con baja creatividad y en las que es más importante la reproducción económica. Nuestra medición se rige más por el concepto de clase creativa y demuestra estar más relacionado con el desarrollo regional que la medición original de Florida.

Servicios Validez de constructo Ocupaciones Estrategia de desarrollo rural

JEL classifications: J2, J24, Q2, Q26, R1, R11, R5, R58

INTRODUCTION

RICHARD FLORIDA's *Rise of the Creative Class* (2002) 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, California, Austin, Texas, and Seattle, Washington, demonstrate the statistical similarities of these places that seemingly capture an essential dimension in differentiating creative centre exemplars from creative backwaters.

The present paper addresses three major limitations in Florida's analysis. First, while Florida focuses attention on metropolitan areas, particularly the largest areas, this paper asks whether the creative class explanation applies to regional development more generally. In particular, it is asked 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 (non-metropolitan) US counties, this paper also identifies outdoor amenities that tend to attract such workers to rural counties. To learn by contrast, the same model developed for rural counties is applied to urban (metropolitan) counties. These results also show a link between the presence of creative class and subsequent growth and they suggest a process in line with GARREAU's (1992) 'edge city' model of urban development. Because the present unit of urban analysis is the county rather than the metropolitan area, the 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. The 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, he relies on the 22 summary occupations in the 1999 Occupational Employment Survey to define employment that *generally* requires a high level of creativity. Using the Occupational Information Network (O*NET; US 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 US Censuses of Population, several detailed occupations that apparently require relatively little creativity are screened from Florida's summary categories. Including these occupations would tend to blur the creative class measure particularly in rural areas, where empirical evidence of a spatial division of labour 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, these two broad occupational categories are dropped. Comparing results using the recast creative class measure with Florida's original measure provides strong assurance that the present measure is a more valid construct.

The third limitation addressed 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, growth (including the growth of the creative class) is modelled 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). The present 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 a 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, the paper concludes 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 the country; and (2) the creative class tends to locate in (metropolitan) areas with particular amenities. For the first part, Florida draws on the work of 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 (e.g. 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 ...' (FLORIDA, 2002, 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 (FLORIDA, 2002, p. 70). In sum, Florida leaves the distinction between human capital theory and the creative class thesis vague both theoretically and empirically. This issue will be returned to 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, the contention here 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.

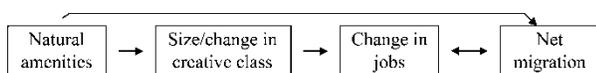
There is prior evidence of the movement of creative class into rural areas. BEYERS and LINDAHL (1996) document the option of rural location arising from more effective and cheaper telecommunications, small parcel delivery, and commuter air services. They identify 'quality-of-life' as a prime reason for 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 non-metropolitan 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 centres 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.

The present study explores 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? Focus on natural amenities stems in part from a 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 tested for in non-metropolitan counties (and later metropolitan counties) in 1990–2000 are as follows:



Before specifying the model in detail, however, the paper turns to the measurement issues relating to the creative class.

RECASTING THE CREATIVE CLASS

The 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 health-care professions, and business management. These people engage in creative problem solving, drawing on complex bodies of knowledge to solve specific problems.

(FLORIDA, 2002, pp. 68–69)

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 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 O*NET content model, described as 'developing, designing or creating new applications, ideas, relationships, systems or products, including artistic contributions'. The O*NET 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 1000 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 (for critiques of the *Dictionary of Occupational Titles*, see MILLER *et al.*, 1980; and SPENNER, 1987).

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 a 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

Table 1. How creative is the Florida creative class? 'Thinking creatively' occupation characteristic from O*NET for 22 occupation groups used to construct creative class categories

Standard Occupational Classification (SOC) group	Occupational group title	Detail occupations	Mean score*	Standard deviation	Minimum	Maximum
Creative class						
<i>Creative Core</i>						
15	Computer and mathematics occupations	13	4.00	1.27	2.0	5.8
17	Architecture and engineering occupations	37	3.86	1.34	1.0	6.5
19	Life, physical and social science occupations	47	3.22	1.11	0.6	5.0
25	Education, training and library occupations	43	3.39	0.67	2.0	5.0
27	Arts, design, sports and entertainment occupations	49	3.65	1.26	0.3	5.6
<i>Creative professionals</i>						
11	Management occupations	34	3.51	0.88	1.3	5.3
13	Business and financial operations occupations	34	1.83	0.86	0.4	3.8
23	Legal occupations	8	1.89	0.96	1.0	3.8
29	Healthcare practitioners and technical occupations	44	2.33	1.10	0.7	4.2
Part 41	High-end sales	15	2.38	0.74	1.0	4.0
Service class						
21	Community and social service occupations	11	2.45	0.35	2.0	3.2
31	Healthcare support occupations	11	1.62	0.76	0.7	3.0
33	Protective service occupations	26	1.75	0.86	0.3	3.4
35	Food preparation and food service occupations	15	1.48	0.82	0.5	3.7
37	Building and grounds cleaning occupations	10	1.27	0.65	0.7	2.2
39	Personal care and service occupations	27	2.03	0.92	0.3	4.0
Part 41	Sales and related occupations	9	1.83	0.51	1.0	2.2
43	Office and administrative support occupations	65	1.25	0.69	0.2	3.7
Working class						
47	Construction and extraction occupations	64	0.97	0.56	0.2	3.0
49	Installation, maintenance and repair occupations	69	1.20	0.51	0.4	2.3
51	Production occupations	192	1.29	0.75	0.0	3.4
53	Transportation and material moving occupations	58	0.99	0.73	0.2	3.3
Agriculture						
45	Farming, fishing and forestry occupations	19	1.09	0.44	0.5	1.8

Notes: *Scored from zero to 6.5, 'Developing, designing or creating new applications, ideas, relationships, systems or products, including artistic contributions' O*NET Content Model.

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. This hypothesis is tested empirically by examining the size of the metropolitan and non-metropolitan classes at different creativity thresholds. If a sharply articulated spatial division of

creative labour does exist, one would expect to see much of the rural creative class disappear as the threshold increases. This exercise is demonstrated in Table 2. For those occupations with the highest requirements for creative thinking, one sees a more dramatic decline in the rural creative class. While 13.2% of the creative class in metropolitan areas is found hyper-creative occupations scoring 5 or higher on the scale, only 7.3% of the rural creative class are in such occupations.

However, if rural employment was concentrated in nominally creative class occupations engaged primarily in tasks of execution, one 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 non-metropolitan areas is surprisingly similar. Between 11 and 12% of the creative class is employed in occupations that rate less than 2 on the 'Thinking Creatively' scale (i.e. roughly the average of 'Personal care and service occupations') and more than 41% of the creative class is in occupations that

Table 2. Size of the creative class using different 'creativity thresholds' and as a share of no threshold

Thinking creatively threshold	US total	Metropolitan	As a share of no threshold	Non-metro and countries with <100 000	As a share of no threshold
None	47 268 020	39 237 498	1.000	8 030 522	1.000
Two or greater	41 984 860	34 905 996	0.890	7 078 864	0.881
Three or greater	27 595 305	23 003 684	0.586	4 591 621	0.572
Four or greater	14 486 910	12 218 933	0.311	2 267 977	0.282
Five or greater	5 762 550	5 173 513	0.132	589 037	0.073.

Notes: *Scored from zero to 6.5, 'Developing, designing or creating new applications, ideas, relationships, systems or products, including artistic contributions' O*NET Content Model.

Source: Equal Employment Opportunity Commission (EEOC) Special Tabulation of the 2000 Census of Population, Worksite Geography, table 23.

rate less than 3. The mean 'Thinking Creatively' score for all creative class occupations was 3.32 in metropolitan 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 VERSUS 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 as follows:

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 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 based on 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 the present alternative creative class measure.

RECASTING THE CREATIVE CLASS AND COMPARISON WITH 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. The 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.¹ 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.

The recast measure excludes the summary 'healthcare practitioners and technical occupations' group and schoolteachers and aides in the 'Education, training, and library' occupational group. It is argued that the economic reproduction characterization does not apply to college professors and 'librarians, curators and archivists' 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 O*NET 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.²

The recast creative class would be expected to score higher on the O*NET ‘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.

Fig. 1b plots the share of employment in the original creative class against the share of employment in the recast classification for metropolitan counties. The 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.

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 in Fig. 1a. For non-metropolitan counties, the Spearman rank correlation coefficient drops to 0.806. The significant number of counties south-east 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 south-east 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 the argument that counties lacking meaningful opportunities for creative workers may nevertheless possess a considerable share of creative class employment as defined by Florida.

Fig. 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

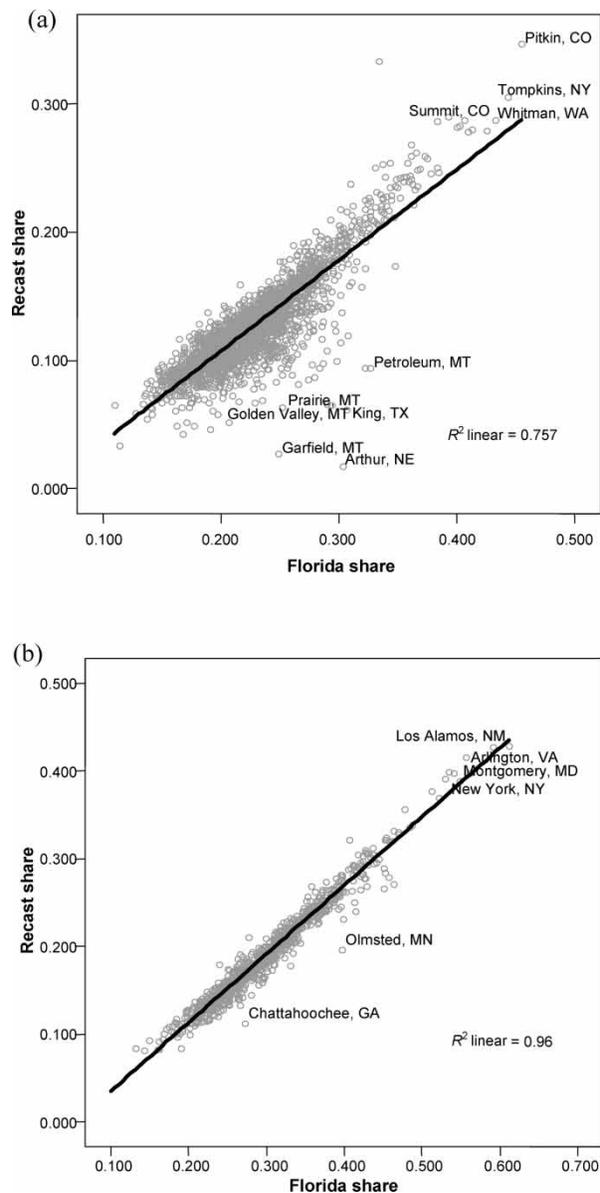


Fig. 1. Scatterplots of creative class measures: (a) non-metropolitan counties and (b) metropolitan counties

measure. This finding supports the stylized description of the rural creative class being most concentrated in the Mountain West and Northeast. However, the map of creative class shares in 2000 (Fig. 2) 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 5% 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

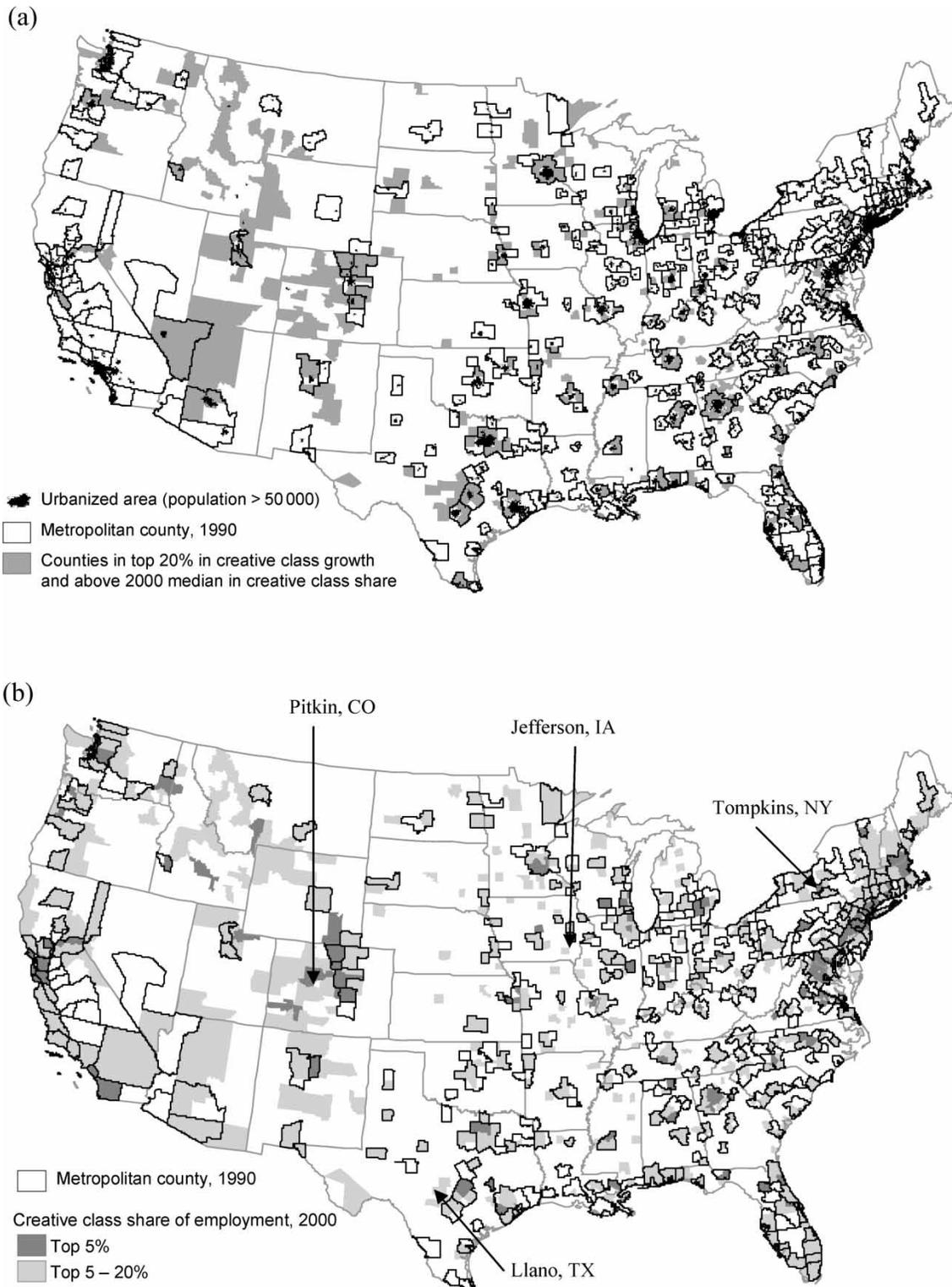


Fig. 2. (a) Counties with high growth in creative class, 1990–2000, and (b) counties with high shares creative class employment, 2000

contain a large college or university but is an amenity-rich location in Austin's ex-urban 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 USA.

Given its proclivity for nice places, it was 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%) than rural employment (19%). 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% in rural areas and 56% in urban areas), reinforcing the idea that creative class membership is somewhat

Table 3. Florida's original creative class occupations and a recast creative class excluding economic reproduction occupations and occupations requiring little creativity

STF4 occupation title	Florida	Recast	Excluded from recast
<i>Management occupations</i>	Summary		
Top executives	×	×	
Advertising, marketing, promotions, public relations, and sales managers	×	×	
Financial managers	×	×	
Operations specialties managers, except financial managers	×	×	
Farmers and farm managers	× ^a		×
Other management occupations, except farmers and farm managers	×	×	
<i>Business and financial operations occupations</i>	Summary		
Business operations specialists	×		×
Accountants and auditors	×	×	
Other financial specialists	×		×
<i>Computer and mathematical occupations</i>	Summary	Summary	
<i>Architecture and engineering occupations</i>	Summary	Summary	
Architects, surveyors, and cartographers	×	×	
Engineers	×	×	
Drafters, engineering, and mapping technicians	×	×	
<i>Life, physical, and social science occupations</i>	Summary		
Life and physical scientists	×	×	
Social scientists and related workers	×	×	
Life, physical, and social science technicians	×		×
<i>Legal occupations</i>	Summary		
Lawyers	×	×	
Judges, magistrates, and other judicial workers	×		×
Legal support workers	×		×
<i>Education, training, and library occupations</i>	Summary		
Post-secondary teachers	×	×	
Teachers, primary, secondary, and special education:	×		×
Teachers, pre-school, kindergarten, elementary, and middle school	×		×
Teachers, secondary school	×		×
Teachers, special education	×		×
Librarians, curators, and archivists	×	×	
Other teachers, instructors, education, training, and library occupations	×		×
<i>Arts, design, entertainment, sports, and media occupations</i>	Summary	Summary	
<i>Healthcare practitioners and technical occupations</i>	Summary		
Physicians and surgeons	×		×
Registered nurses	×		×
Therapists	×		×
Other health diagnosing and treating practitioners and technical occupations	×		×
Health technologists and technicians	×		×
<i>High-end sales: part of sales occupation summary category</i>			
Sales representatives, services, wholesale and manufacturing	×	×	
Other sales and related occupations, including supervisors	×	×	

Note: ^aThe category is excluded from the recast measure of the creative class in the analysis that follows based on relatively low creativity requirements for farmers in O*NET. Inclusion of this occupation in the creative class measure has profound effects on regression estimates, essentially reversing the positive association between the creative class and growth. The inclusion of this occupation inflates the number of creative class workers in heavily farm-dependent counties that generally performed poorly over the 1990s. For this reason, this occupation was also excluded from the Florida measures in the estimations that follow.

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. Characteristics of the creative class in metropolitan and non-metropolitan areas

Characteristic	Creative class		Other occupations	
	Non-metro-politan	Metro-politan	Non-metro-politan	Metro-politan
Creative class share of total	19.4	30.9	–	–
<i>Demographic</i>				
Age < 40	39.0	43.2	47.7	51.5
Female	40.2	38.2	48.1	50.6
Married	76.6	68.8	63.7	56.3
College degree	36.8	56.2	14.3	20.9
Self-employed	22.4	17.1	11.1	7.1
Black	3.3	8.2	8.9	15.8
Hispanic	2.5	6.6	5.7	16.7
<i>Industry</i>				
Agriculture and mining	1.3	0.4	7.0	1.2
Manufacturing	13.0	13.3	17.6	11.3
Information	4.1	5.6	1.0	1.7
Financial, professional and business services	21.1	32.7	7.2	12.6
Wholesale, retail and other services	28.1	20.1	16.9	19.3
Leisure and hospitality	6.6	5.0	7.0	9.5
Education, health, public sector	17.9	16.0	29.4	30.1
Transportation, utilities and construction	7.9	6.8	13.9	14.3
Total	100.0	100.0	100.0	100.0
<i>Occupation</i>				
Managers	38.0	34.2		
Management related	10.9	13.5		
Scientists and engineers	12.7	18.7		
Art and design	5.8	6.5		
Sales representatives and supervisors	29.1	24.4		
College teachers	3.4	2.8		
Total	100.0	100.0		

Note: Values are percentages.

Source: Current Population Survey, March 2003 data files.

EMPIRICAL MODEL OF RURAL COUNTY GROWTH

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

$$\Delta CC = f(\Delta E, \Delta P_M, CC, S, L, C, I, LM, U, D, \Delta AE)$$

$$\Delta E = f(\Delta P_M, \Delta CC, CC, S, I, LM, U, D)$$

$$\Delta P_M = f(\Delta E, \Delta CC, CC, S, L, C, I, LM, U, D, \Delta AE)$$

where

- ΔE log of employment change between 1990 and 2000,
 ΔP_M log of net migration between 1990 and 2000,
 ΔCC 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, metropolitan 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, etc.),
 LM labor market characteristics, including education, employment rate, and median income,
 U presence of universities and colleges,
 D age, race, and ethnicity measures,
 ΔAE aggregate 1990–2000 change in employment in abutting counties.

It should be noted that while the creative class measures were included as predictors of net migration, the expectation was that the coefficients would not be substantial relative to the corresponding coefficients in the jobs equation (see above). The thesis is that the creative class affects local growth through generating jobs, not attracting new residents. Employment change and net migration were also included 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 the Appendix.)

Settlement (S) includes four 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 labour 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 per cent of land in forest (Forest Service, US Department of Agriculture website: <http://fia.fs.fed.us>) 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 per cent of county land was added to reflect the low appeal of extensive agriculture (e.g. KAPLAN *et al.*, 1989). Finally, the per cent of land in the public domain was included under the presumption that this land is usually undeveloped (Forest Service website).

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. Average January temperature, the average number of January sun days, temperate Julys, and low humidity Julys were included (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, the 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, two measures were added that one might expect 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, which is 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, which are 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 0.80. 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.

Shares of agriculture, producer services, and recreation employment were included 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.

Labour market (L) measures include education (the proportions of young adults – aged 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 labour 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 socio-economic status, in part because schools are likely to be better.

Post-secondary schools (U) are included 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 three 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 who were aged 8–17 and 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 labour 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 aged 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 non-metropolitan areas in the 1990s, it did not expand in its traditional communities (KANDEL and CROMARTIE, 2004). As shown below, Blacks and Hispanics have relatively low shares of employment in creative class occupations. The 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 (ΔAE) 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 the residuals had suggested tendencies to overestimate migration in regions such as upstate New York and Northern California that were stagnant in the 1990s, and to underestimate non-metropolitan growth around dynamic centres such as Atlanta and Minneapolis. The measure was also included in the creative class equation here as its omission suggested that the equation was over-identified (BASMANN, 1960).

The analysis includes counties in the contiguous 48 states that were defined as non-metropolitan in

1993, based on the 1990 Census of Population. Virginia independent cities, three counties that were outliers in employment growth due to extensive casino construction (Tunica County, Mississippi, and Gilpin County, Colorado), and a nuclear power plant construction (Somervell County, Texas) have been excluded. Also excluded were three very small counties that were outliers in their loss of creative capital. Counties with missing data were excluded. The total number for the analysis is 2145.

RESULTS

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

The creative class measure proposed 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 some intra-regional residential choices are being picked up among the creative class.

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, the sample was divided by quartiles and, in each quarter, change in the creative class was regressed 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 pick 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

Table 5. Results of three-stage least-squares (3SLS) regressions for non-metropolitan counties using recast creative class

Independent variables	Creative class, 1990–2000			Employment, 1990–2000			Net migration, 1990–2000		
	Estimate	t-value	Pr > t	Estimate	t-value	Pr > t	Estimate	t-value	Pr > t
<i>Change</i>									
Employment	-0.2031	-0.62	0.5327	-	-	-	0.3960	2.30	0.0217
Migration	0.0136	0.06	0.9495	0.4133	2.66	0.0079	-	-	-
Creative class	-	-	-	0.2791	2.68	0.0075	-0.0076	-0.13	0.8983
<i>Creative class, 1990 (%)</i>	-3.8507	-8.93	<0.0001	1.8735	3.50	0.0005	0.2335	0.77	0.4395
<i>Quality of life</i>									
<i>Settlement</i>									
Population density, 1990 (ln)	0.2147	3.65	0.0003	0.0074	1.34	0.1793	0.0551	2.17	0.0301
Square of density	-0.0119	-3.22	0.0013	-	-	-	-0.0042	-2.73	0.0064
Commute from county, 1990 (%)	0.0031	3.62	0.0003	0.0006	2.49	0.0128	0.0011	2.75	0.0060
Adjacent to metropolitan area, 1990	0.0058	0.67	0.5043	-0.0057	-1.13	0.2605	0.0091	2.69	0.0071
<i>Landscape</i>									
Water area (ln %)	0.0050	1.05	0.2956	-	-	-	0.0023	1.36	0.1740
Mountains (0–1)	0.0666	2.74	0.0063	-	-	-	0.0309	3.26	0.0011
Land in forest, 1995 (%)	0.0021	2.37	0.0179	-	-	-	0.0012	3.46	0.0005
Square of forest	-0.00003	-2.71	0.0068	-	-	-	-0.00001	-2.93	0.0034
Cropland, 1992 (%)	-0.0012	-2.79	0.0053	-	-	-	-0.0005	-3.31	0.0009
Public lands (%)	0.0009	2.33	0.0197	0.0001	0.68	0.4978	-0.0002	-1.46	0.1443
<i>Climate (z-scores)</i>									
January sun	0.0185	2.89	0.0038	-	-	-	0.0048	2.01	0.0447
January temperature	0.0027	0.32	0.7517	-	-	-	0.0140	4.71	<0.0001
July humidity (low)	0.0117	1.47	0.1413	-	-	-	0.0087	3.13	0.0018
Temperate summer	0.0056	0.95	0.3432	-	-	-	0.0044	2.18	0.0293
<i>Other</i>									
Bicycle and sports store jobs/capita	0.0081	2.83	0.0047	-	-	-	-	-	-
Historic registration sites (ln)	0.0045	1.21	0.2269	-	-	-	-	-	-
<i>Industry employment, 1990 (%)</i>									
Agriculture	0.0006	0.6	0.5486	0.0004	0.67	0.5025	-0.0006	-1.53	0.1273
Mining	-0.0062	-2.09	0.0368	-0.0037	-4.59	<0.0001	-	-	-
Manufacturing	-0.0006	-0.86	0.3894	-0.0011	-2.96	0.0031	-	-	-
Business services	0.0167	4.75	<0.0001	-0.0078	-2.76	0.0058	-0.0025	-2.24	0.0254
Recreation	0.0119	4.45	<0.0001	0.0008	0.65	0.5140	0.0019	1.28	0.1993
<i>Labour market, 1990 (%)</i>									
HS completion rate, age 25–44	-	-	-	-0.0003	-0.35	0.7290	-0.0019	-5.66	<0.0001
College graduates, age 25–44	0.0119	8.61	<0.0001	-0.0036	-2.17	0.0297	-0.0012	-1.31	0.1902
Civilian employment rate, age 16–64	-	-	-	0.0004	0.62	0.5322	0.0019	4.82	<0.0001
Median household income (\$)	0.0682	1.87	0.0620	-0.0991	-4.41	<0.0001	0.0168	0.76	0.4478
<i>Post-secondary schools (0–1)</i>									
Public, 4-year	0.0106	0.6	0.5477	0.0044	0.42	0.6775	-0.0154	-2.26	0.0238
Private, 4-year	-0.0008	-0.06	0.9541	0.0055	0.70	0.4830	-0.0015	-0.27	0.7884
Public, 2-year	-0.0085	-0.78	0.4378	-0.0025	-0.39	0.6938	0.0004	0.09	0.9275
<i>Demographic, 1990 (%)</i>									
Population age 8–17	-	-	-	0.0104	6.03	<0.0001	-0.0091	-5.80	<0.0001
Population age over 62	-0.0018	-1.05	0.2920	-0.0019	-1.94	0.0523	0.0031	5.26	<0.0001
Native American	-0.0005	-0.67	0.5000	0.0010	2.77	0.0056	-0.0005	-1.56	0.1180
Black	-0.0035	-4.00	<0.0001	-0.0008	-3.59	0.0003	-0.0008	-1.64	0.1020
Hispanic	-0.0027	-4.50	<0.0001	0.0004	1.75	0.0809	-0.0012	-4.56	<0.0001
Employment change, 1990–2000 in adjacent counties combined (ln)	0.5872	4.66	<0.0001	-	-	-	0.1955	3.59	0.0003
Intercept	-2.6518	-2.13	0.0329	2.7350	3.57	0.0004	1.7052	2.92	0.0035
R ²	0.34			0.44			0.66		
Over ID (Basmann) Pr <	0.25			0.62			0.79		

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 over identification, as the BASMANN (1960) tests for over identification 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 have 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 centres fared 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% Black in 1990 were in the top quarter in the creative class share. Nevertheless, in both 1990 and 2000, over 40% of the high Black population counties fell in the bottom quarter in creative class share.

Table 6 shows the creative class coefficients obtained when the above analysis was repeated with FLORIDA's (2002) measure of creative class in place of the authors'. While the employment equation coefficients for the Florida measure are in the same direction as

the ones for the present 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 0.0036 ($p < 0.0001$) for the Florida measure, up from 0.0006 ($p < 0.57$) in the recast measure. The authors suspect this is due to an expansion of health services in the 1990s, which shows up particularly in agricultural areas, where other creative class members are few. The exclusion of many of the occupations involved in reproduction appears to have resulted in a much sharper measure of creative class.

RURAL-URBAN COMPARISONS

Are the results for creative class peculiar to rural areas? Although the focus here is rural, analyses were also carried out 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.

Note again that the data were organized to analyse non-metropolitan counties rather than metropolitan areas as such, and the independent measures were selected with rural development in mind. Thus, 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 the measures are relevant to urban as well as to rural development (e.g. employment rate, education, climate, industry).

Reduced-form (ordinary least-squares, OLS) regression equations actually produced substantially higher R^2 's for metropolitan than non-metropolitan 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 $p < 0.0001$ level) that the rural and urban county analyses generally

Table 6. Non-metropolitan creative class regression coefficients, recast versus Florida measures*

Creative class	Employment, 1990-2000			Net migration, 1990-2000		
	Estimate	<i>t</i> -value	Pr > <i>t</i>	Estimate	<i>t</i> -value	Pr > <i>t</i>
<i>Recast</i>						
Share, 1990	1.873	3.50	0.0005	0.233	0.77	0.4395
Change, 1990-2000	0.279	2.68	0.0075	-0.008	-0.13	0.8983
<i>Original (Florida)</i>						
Share, 1990	0.716	1.48	0.1380	0.317	1.35	0.1779
Change, 1990-2000	0.188	1.21	0.2275	0.039	0.66	0.5074

Note: *See table 5 for the model.

Table 7. Results of reduced-form (OLS) regressions for metropolitan and non-metropolitan counties with recast creative class*

Independent variables	Creative class, 1990–2000				Employment, 1990–2000				Net migration, 1990–2000			
	Non-metropolitan		Metropolitan		Non-metropolitan		Metropolitan		Non-metropolitan		Metropolitan	
	<i>B</i>	<i>t</i>	<i>B</i>	<i>t</i>	<i>B</i>	<i>t</i>	<i>B</i>	<i>t</i>	<i>B</i>	<i>t</i>	<i>B</i>	<i>t</i>
<i>Creative class, 1990 (%)</i>	-4.0136	-17.5	-0.2422	-0.72	1.0344	6.30	1.7523	6.48	0.6854	6.27	1.2171	5.65
<i>Quality of life</i>												
Settlement												
Population density, 1990 (ln)	0.1278	6.15	-0.1210	-3.05	0.0755	5.05	-0.0169	-0.53	0.0520	5.24	-0.1493	-5.90
Square of density	-0.0103	-4.88	0.0054	2.15	-0.0071	-4.71	-0.0006	-0.29	-0.0062	-6.16	0.0075	4.71
Commute from county, 1990 (%)	0.0026	8.42	0.0035	8.83	0.0020	8.81	0.0028	9.03	0.0018	12.26	0.0019	7.67
Adjacent county (0–1)	0.0093	1.15			0.0018	0.32			0.0107	2.77		
Landscape												
Water area (% ln)	0.0051	1.16	0.0099	1.46	0.0032	1.01	-0.0004	-0.08	0.0042	1.98	-0.0011	-0.25
Mountains (0–1)	0.0646	3.22	0.0375	1.18	0.0243	1.69	0.0562	2.22	0.0391	4.07	0.0170	0.84
Land in forest, 1995 (%)	0.0022	3.47	0.0009	1.06	0.0018	3.93	0.0013	1.84	0.0019	6.30	0.0014	2.50
Square of forest (<i>B</i> /100)	-0.0025	-4.17	-0.0011	-1.19	-0.0020	-4.75	-0.0013	-1.71	-0.0018	-6.39	-0.0014	-2.29
Cropland, 1992 (% of land)	-0.0009	-3.32	0.0005	1.13	-0.0005	-2.34	0.0003	0.88	-0.0006	-4.61	0.0001	0.36
Public lands (%)	0.0007	2.19	-0.0002	-0.28	0.0005	2.02	-0.0015	-3.12	-0.0001	-0.82	-0.0003	-0.79
National Park (any land)	-0.0303	-1.53	-0.0330	-1.19	-0.0397	-2.80	0.0128	0.58	-0.0327	-3.46	-0.0084	-0.47
Sports and bicycle store jobs/capita	0.0075	2.85	0.0247	2.96	0.0025	1.32	0.0274	4.11	0.0011	0.91	0.0147	2.78
Climate (<i>z</i> -score)												
January sun	0.0154	2.98	-0.0012	-0.17	0.0059	1.58	-0.0060	-1.04	0.0073	2.96	-0.0023	-0.50
January temperature	0.0046	0.76	0.0421	4.65	0.0125	2.85	0.0353	4.87	0.0194	6.66	0.0421	7.30
July humidity (low)	0.0100	1.45	-0.0043	-0.47	0.0053	1.07	-0.0043	-0.59	0.0106	3.19	0.0103	1.76
Temperate summer	0.0071	1.27	-0.0044	-0.64	-0.0001	-0.01	-0.0118	-2.15	0.0065	2.45	-0.0134	-3.08
<i>Industry employment, 1990 (%)</i>												
Agriculture	-0.0002	-0.24	-0.0064	-2.01	-0.0001	-0.13	-0.0064	-2.50	-0.0009	-1.99	-0.0048	-2.34
Mining	-0.0049	-4.34	-0.0096	-2.56	-0.0074	-9.12	-0.0118	-3.92	-0.0054	-10.03	-0.0071	-2.96
Manufacturing	-0.0003	-0.50	0.0010	1.01	-0.0013	-2.74	-0.0018	-2.25	-0.0004	-1.41	0.0004	0.67
Business services	0.0188	5.88	-0.0002	-0.08	-0.0025	-1.08	-0.0056	-2.50	-0.0006	-0.38	-0.0065	-3.64
Recreation	0.0108	6.55	0.0054	2.23	0.0058	4.87	0.0076	3.90	0.0041	5.17	0.0074	4.81
<i>Labour market, 1990 (%)</i>												
HS completion rate, age 25–44	0.0007	0.97	-0.0014	-0.95	-0.0010	-1.79	-0.0028	-2.37	-0.0023	-6.18	-0.0041	-4.39
College graduates, age 25–44	0.0116	9.68	0.0038	2.09	-0.0011	-1.31	-0.0031	-2.13	-0.0019	-3.29	-0.0017	-1.43
Civilian employment, age 16–64	0.0006	0.60	0.0073	4.66	0.0012	1.69	0.0057	4.57	0.0024	5.21	0.0053	5.29
Median household income (US\$)	0.0562	1.50	-0.0174	-0.33	-0.0833	-3.09	-0.0893	-2.14	-0.0206	-1.15	0.0591	1.78
<i>Post-secondary schools (0–1)</i>												
Public, 4-year	0.0140	0.84	0.0031	0.23	0.0035	0.29	0.0023	0.21	-0.0133	-1.68	0.0057	0.67
Private, 4-year	0.0021	0.17	0.0174	1.46	0.0088	0.96	0.0038	0.40	0.0024	0.40	0.0039	0.51
Public, 2-year	-0.0046	-0.45	-0.0417	-3.51	-0.0004	-0.06	-0.0256	-2.69	0.0012	0.24	-0.0182	-2.40
<i>Demographic, 1990 (%)</i>												
Population age 8–17	-0.0014	-0.58	0.0118	2.83	0.0067	3.91	0.0168	4.99	-0.0063	-5.51	0.0041	1.53
Population age over 64	-0.0024	-1.66	-0.0056	-2.77	-0.0026	-2.51	-0.0037	-2.32	0.0024	3.53	0.0029	2.27
Native American	-0.0004	-0.71	-0.0034	-1.00	0.0007	1.73	0.0017	0.62	-0.0001	-0.47	-0.0047	-2.20
Black	-0.0032	-8.75	-0.0029	-4.65	-0.0026	-9.89	-0.0025	-4.90	-0.0018	-10.39	-0.0022	-5.34
Hispanic	-0.0024	-5.54	-0.0008	-1.00	-0.0010	-3.19	-0.0003	-0.41	-0.0015	-7.27	-0.0009	-1.69
<i>Job change in adjacent counties</i>	0.5386	12.64	0.6319	11.95	0.2617	8.55	0.3496	8.26	0.2971	14.59	0.3575	10.59
Intercept	-2.7691	-11.88	-2.8188	-7.78	3.3645	20.10	2.8953	9.97	3.1994	28.72	3.0727	13.28
<i>R</i> ²	0.365		0.542		0.372		0.584		0.590		0.604	

have different regression coefficients. Here the focus is 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 non-metropolitan equations. Some question may be raised about the stability of these results, as the proportion of young adults (aged 25–44) with a college degree is highly correlated with the present creative class measure across urban counties ($r = 0.92$), much more so than across rural counties ($r = 0.66$). However, the strong relationship of creative class with employment growth is consistent across metropolitan counties. When the 1990 creative class was regressed on college completion in metropolitan counties, 66% of the counties with a positive residual had employment growth above the metropolitan median rate, while only 36% of those with a negative residual had growth above the median. When college completion was dropped from the regressions, the coefficients were still strong for creative class ($b = 1.236$, $\beta = 0.41$ for employment change; and $b = 0.936$, $\beta = 0.39$ for net migration).³

Second, the metropolitan coefficients for the population density measures are the reverse sign of the corresponding non-metropolitan 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 (Fig. 3). In addition, the settlement measures (density and commuting) are more important in the metropolitan than in the non-metropolitan equations, especially for the change in creative class. Alone, the settlement measures explain 27% of the variation in creative class change in metropolitan counties, but only 4% in non-metropolitan counties.⁴

The third difference between the metropolitan and non-metropolitan equations is the weaker influence of

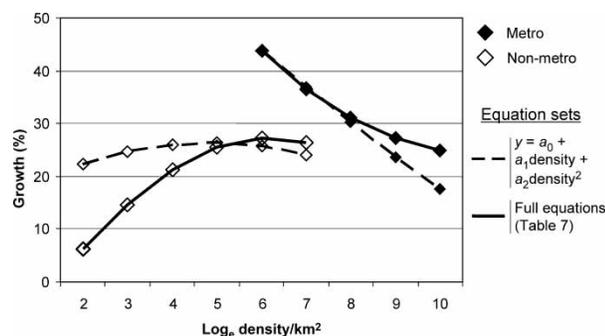


Fig. 3. Population density and predicted growth of the creative class, 1990–2000. Plots run approximately from bottom to top density vingtiles for metropolitan and non-metropolitan counties

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 (FILION *et al.*, 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 (Fig. 2a). The coefficients for employment growth in adjacent counties are consistently although not significantly larger in the metropolitan analyses compared with the non-metropolitan analyses.

In all, the results for metropolitan counties suggest a process of growth similar to that identified for non-metropolitan counties. However, in metropolitan counties, instead of the quality of natural amenities being a key driver, rurality itself 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 non-metropolitan counties.⁵

The one striking consistency between the metropolitan and non-metropolitan 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 4) 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:

- Does a large and growing share of workers in creative occupations lead to faster rates of employment growth?
- If so, does this result apply to regions generally or is it specific to major urban environments?
- Does increasing the construct validity of the creative class measure yield stronger results than found using Florida's measure?
- Can one 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 non-metropolitan (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.⁶ The results are substantially stronger using what the authors 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 the 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.⁷ 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 are 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 (FLORIDA, 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, Minnesota] 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 metropolitan and non-metropolitan counties.⁸

The opportunity for social and cultural interaction is a dominant theme in Florida's analysis, establishing the urban centre 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 being equal (Fig. 3). However, this result also supports the alternative interpretation that the minimum scale needed to support critical economic activities or that 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, Texas, with Pittsburgh, Pennsylvania.

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 behaviour, may also be important. Gaining insight into this issue would clearly benefit from qualitative analysis. However, the authors 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, the present 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.⁹ While Florida did not elaborate on how his focus groups were selected, it seems likely that young, single members of the creative class were over represented 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 the present metropolitan analysis, the movement of this group favouring some urban centres 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, the 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. The present analysis, in short, suggests the possibility of urban and rural forms not considered in *The Rise of the Creative Class*.

APPENDIX: SUMMARY OF EXPECTED AND ACTUAL RELATIONSHIPS IN THREE-STAGE LEAST-SQUARES (3SLS) ANALYSIS (NON-METROPOLITAN)

Measures	Creative class		Employment		Net migration	
	(a)	(b)	(a)	(b)	(a)	(b)
<i>Change</i>						
Employment	0	✓			+	✓
Migration	0	✓	+	✓		
Creative class			+	✓	0	✓
<i>Creative class, 1990 (%)</i>	±		+	✓	0	✓
<i>Quality of life</i>						
<i>Settlement</i>						
Population density, 1990 (ln)	+	✓	+		+	✓
Square of density	–	✓			–	
Commute from county, 1990 (%)	+	✓	+	✓	+	✓
Adjacent to metropolitan area, 1990	+		+		+	✓
<i>Landscape</i>						
Water area	+				+	

(continued)

APPENDIX Continued

Measures	Creative class		Employment		Net migration	
	(a)	(b)	(a)	(b)	(a)	(b)
Mountains	+	✓			+	✓
Percent of land in forest	+	✓			+	✓
Square of forest	-	✓			-	✓
Cropland, 1992 (% of land)	-	✓			-	✓
Public lands	+	✓			+	
Climate						
January sun	+	✓			+	✓
January temperature	+				+	✓
July humidity (low)	+				+	✓
Temperate summer	+				+	✓
Other						
Bicycle and sporting jobs/cap	+	✓				
Historic registration sites (ln)	+					
<i>Industry employment, 1990 (%)</i>						
Agriculture	-		-		0	✓
Mining	-			✓		
Manufacturing	-			✓		
Business services	+	✓	+	×	+	×
Recreation	+	✓	+		+	
<i>Labour market, 1990</i>						
HS completion rate, ages 25–44			+		-	✓
College graduates, ages 25–44	+	✓	+	×	-	
Civilian employment rate, ages 16–64			-		+	✓
Median household income	+		-	✓	+	
<i>Post-secondary schools (0–1)</i>						
Public, 4-year	+		+		+	
Private, 4-year	+		+		+	
Public, 2-year	+		+		+	
<i>Demographic, 1990</i>						
Population aged 8–17 (%)			+	✓	-	✓
Population aged over 62 (%)	+		-	✓	+	✓
Native American (%)	±		+	✓	±	
Black (%)	-	✓	-	✓	-	✓
Hispanic (%)	-	✓	±		-	✓
Employment change, 1990–2000 in adjacent counties combined	+	✓			+	✓

Note: In column (a), expected signs are indicated, and blanks are where not included. In column (b), checks (✓) are results confirm expectations, blanks are not significant; ×'s are the significant opposite of expectations.

NOTES

- While the Equal Employment Opportunity Commission (EEOC) Special Tabulation of the 2000 Census provides data on employment in 472 detailed occupations, it is only available for groups of non-metropolitan counties pooled together to meet a 50 000 population disclosure threshold.
- 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). This larger category has been kept in the recast creative class as the authors are uncomfortable with excluding small business owners.
- When the urban analyses were run 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 they were still statistically significant.
- As Fig. 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 more prevalent in low-density counties.
- Twenty of the 30 metropolitan counties with the highest 1990 shares of creative class include 'edge cities' identified by GARREAU (1992) 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.

6. LEE *et al.* (2004) find an association between firm birth per capita and the location of 'bohemians' (artists, designers, musicians, etc.) in a study of US metropolitan and labour market areas that is independent of human capital.
7. 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 a paper in the popular literature identifying 14 of the best small towns in America to live in or visit (GRUDOWSKI, 2004).
8. Lanesboro, Minnesota, in Fillmore County was also included in GRUDOWSKI's (2004) list of 14 of the best small towns in America.
9. This was explored for the creative class using the 2003 Current Population Survey. Over 48% of single members of the class under the age of 35 lived in central city parts of metropolitan areas. In contrast, whether or not under 35, only about 20% 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.

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