Creative Class and Regional Growth—Empirical Evidence from Seven European Countries

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Abstract

We analyze the regional distribution and the economic effect of the "Creative Class" based on a unique data set covering more than 500 regions in seven European countries. The Creative Class is unevenly geographically distributed across Europe; our analyses show that a regional climate of tolerance and openness has a strong and positive effect on a region's share of these people. Regional job opportunities also have a quite large effect on the size of a region's population of the Creative Class. We find some evidence for a positive relationship between Creative Class occupation, employment growth, and entrepreneurship at the regional level in a number of European countries. Based on our analysis, however, it is not clear whether human capital, measured by creative occupation, outperforms indicators based on formal education, or if formal education has the stronger effect.

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1. Introduction

In his book, *The Rise of the Creative Class*, Richard Florida (2003, 2004) argues that creative people are key drivers of urban and regional growth. His ideas on the Creative Class have attracted international attention from scholars, as well as from policymakers and civic leaders (Lang and Danielsen 2005). What makes these ideas particularly interesting from a geographical perspective is that the Creative Class is not evenly distributed across cities and regions. According to Florida, the Creative Class is especially attracted to places characterized by an urban climate of tolerance that is open to new ideas and new people. Florida states that this type of "people's climate" rather than a "business climate" (such as low taxes or a rich supply of physical infrastructure *per se*) is crucial for regional development. Creative people not only generate novelties,[1] but also attract new economic activities, resulting in innovative businesses in the region. In other words, jobs follow people, instead of people following jobs.

The objective of our article is to test some of Florida's ideas across different European countries at a very detailed regional scale (see also Andersen et al. 2008, this special issue). We present information on the scale and the distribution of Creative Class occupations in these countries. Our analyses are based on a large research project[2] on the Creative Class

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[1] Florida (2004, 33) identifies three forms of creativity—*technological* (invention), *economic* (entrepreneurship), and *artistic and cultural*—that "are in fact deeply interrelated. Not only do they share a common thought process, but they reinforce each other through cross-fertilization and mutual stimulation."

[2] The European research project was entitled "Technology, Talent and Tolerance in European Cities: A Comparative Analysis." The project was supervised by Bjorn Asheim and Meric Gertler and financed by the European Science Foundation, among other national financial sources. Data were collected by seven European teams in the 2004–2006 period based on national data sources that were made comparable between the seven participating countries. The members of the national teams were Kristina Vaarst Andersen and Mark Lorenzen (Denmark); Irina van Aalst, Oedzge Atzema, Ron Boschma, and Frank van Oort (the Netherlands); Mika Raunio and Markku Sotarauta (Finland); Michael Fritsch (Germany); Arne Isaksen and Markus Bugge (Norway); Bjorn Asheim and Hogni Kalso Hansen (Sweden); and Phil Cooke and Nick Clifton (England and Wales).

and regional growth in seven European countries (Denmark, England/Wales, Finland, Germany, the Netherlands, Norway, and Sweden). For most of these seven countries, the data are at the level of NUTS 3 regions, which more or less correspond to city-regions or labor market areas.[3] At this spatial scale, place of residence and place of work usually coincide within the same region, which makes it a relevant scale for analyzing the relationship between the Creative Class and regional economic development. Data at the regional level were collected for each country from national sources and made as comparable as possible by using similar definitions.[4] The data set comprises information on 503 European regions.

Based on this unique European database, we investigate the answers to three research questions.

1. How big are the differences in the share of Creative Class across European regions, and how concentrated is the regional distribution?

2. What determines a region's share of the creative population?

3. How does the Creative Class affect entrepreneurship, innovation, and regional growth?

Due to data limitations, the analyses of the effects of the Creative Class on regional development is restricted to only a few European countries. In Section 2, we briefly describe the main ideas of Florida's work, which will be tested with the European data set. Details on this data set are provided

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[3] NUTS (*Nomenclature des Unites Territoriales Statistiques*) is a hierarchical regional classification system used for the Member States of the European Union. NUTS 1 regions are the national states, but the NUTS 3 regions are much smaller. Because the NUTS 3 regions for Germany are not always functional units, the analysis for this country is at the level of planning regions, which are functional regions in the sense of travel-to-work areas that comprise at least one city and its surroundings. For a more detailed description of the German data, see Fritsch (2007).

[4] All information is based on national registers. Employment figures refer to full-time employment. Employees are assigned to the region of their workplace.

in Section 3; Section 4 deals with the geographical distribution of the Creative Class in the seven European countries. We then attempt to explain this spatial pattern by means of regression analyses in Section 5. Section 6 assesses the effects of the Creative Class on entrepreneurship, employment growth, and innovation in several European countries at the regional level. Section 7 concludes.

2. Creative Class, urban climate, and regional growth

Florida's main hypothesis is that the Creative Class is a key driver of urban and regional growth (Florida 2004). Hence, it is the nature of the population in a place (i.e., creative or not) that makes the difference. According to Florida, regions with a high share of creative people will perform better economically because they generate more innovations, have a higher level of entrepreneurship, and attract creative businesses.

With its focus on creative individuals and their occupations, Florida's theory is a departure from several branches of literature in economic geography. According to Florida, the Creative Class consists of people who are engaged in creative and innovative jobs. Hence, it is what people actually *do*, rather than their industry affiliations or educational attainment that makes them economically productive (Markusen et al. 2006). This means that regional development is not primarily based on particular industries (like high-tech or creative industries), but on creative occupations that are not particularly industry-specific. This abandonment of a sector perspective also makes Florida's theory different from the agglomeration externalities literature (Glaeser et al. 1992), which basically investigates whether regional specialization (localization economies) or regional diversity (Jacobs' externalities) enhance innovation and regional growth. Instead of emphasizing knowledge spillovers between firms and industries, Florida focuses on creative individuals who generate spillovers and innovation within a city or region (Stolarick and Florida 2006). This is in line with Zucker et al. (1998) and Ameida and Kogut (1999), who show

that the transfer of knowledge and skills embodied in individuals is a crucial mechanism through which spillovers occur at the regional level.

Florida's theory is also regarded as a refinement of the relationship between human capital and regional development because of its focus on the creativity of individuals instead of their educational attainment. According to Florida, the accumulation of creative capital does not necessarily depend on formal education, examples being poets and artists who may be highly creative but without formal training. More importantly, human capital does not contribute to regional development *per se* as long as what people *know* is not related to what people actually *do* or, in other words, it does not matter how much human capital a person might have if it is not employed in a creative and economically viable manner (Marlet and Van Woerkens 2004).

A basic element of Florida's approach is that geography matters. In fact, he makes the rather extreme claim that "places have replaced companies as the key organizing units in our economy" (Florida 2004, 30). According to Florida, the Creative Class is not evenly distributed across space: not every city or region is equally well-supplied with members of the Creative Class. Florida asserts that the Creative Class is attracted to places characterized by, among other things, an urban climate of tolerance that is open to new ideas and to newcomers. According to Florida, Creative Class members have a nonconformist lifestyle that combines disciplined work ethics with hedonistic values. He assumes that creative people are attracted to tolerant and open-minded regional societies that offer a diverse population comprised of different cultural and ethnical backgrounds because creative people view a tolerant environment as being especially positive and because diversity inspires innovation (Andersen and Lorenzen 2005). The Creative Class also attaches high value to urban facilities and small-scale cultural services such as cinemas, bars, museums, art galleries, restaurants, and trendy shops.

In other words, Florida emphasizes the sociocultural underpinnings of regional development. A tolerant, diverse, and open-minded urban culture is a major economic asset because it attracts the Creative Class. As a consequence, urban cultural artifacts are valued for their economic utility (Peck 2005). Interestingly, according to Florida, these are not places with high levels of social capital, and he is quite critical of Putnam (2000), who stresses the positive effect of social capital on regional development. Florida believes that homogeneous communities that have strong ties between their members can have an adverse effect on growth, claiming that such environments often tend to suppress new ideas and creativity. Therefore, the future is moving toward “places with looser networks and weaker ties” that “are more open to newcomers and thus promote novel combinations of resources and ideas” (Florida 2004, 273).

According to Florida, it is this type of “people’s climate” that is crucial for regional growth, a view in stark contrast with conventional explanations for growth that emphasize the importance of the “business climate,” such as low taxes or a rich supply of physical infrastructure. The essence of Florida’s proposition is that places with a good “people’s climate” retain and attract creative people, who, in turn, induce new economic activities such as start-ups and innovation. Thus, the Creative Class is not attracted to places with high growth *per se*. On the contrary, regional growth is expected to be a result of the presence of creative people. Or, in Florida’s terminology, jobs will follow people, instead of people following jobs (Florida 2004).

Florida’s latest research stresses the importance of knowledge spillovers for regional growth. Knudsen, Florida, Gates, and Stolarick (2007) combined the argument concerning the effect of the Creative Class with endogenous growth theory. Endogenous growth theory is based on the idea that human capital and knowledge accumulate in cities because a great number of highly educated and skilled people have intimate interactions, thereby increasing their own knowledge as well as each other’s (Lucas 1988). A key hypothesis of this approach is that a certain

level of human capital concentrated in one place generates more spillover benefits than the same level of human capital spread across several locations (Martin and Sunley 1998). Accordingly, Knudsen, Florida, Gates, and Stolarick (2007) assume that the effect of the Creative Class on innovation should be relatively pronounced in high-density areas. In regressions using the number of patents per 100,000 inhabitants as the dependent variable, they find a highly significant positive impact for an interaction variable of the share of the Creative Class and urban density.

Florida's ideas have provoked considerable controversy, much of which centers around the question of whether, and if so, to what extent, the Creative Class is different from other educated and skilled people. According to Glaeser (2004), creative capital closely corresponds to human capital, as conventionally measured by educational attainment, because most members of the Creative Class are skilled and highly educated. Glaeser thus claims that there is no benefit to be gained in including Creative Class indicators in a growth model that already accounts for the effect of human capital in terms of education. Running regressions with Florida's data, Glaeser shows that the Creative Class variables become negative and statistically insignificant when an indicator for the qualification level (i.e., education) of the regional population is included. In contrast, other empirical studies (e.g., Marlet and Van Woerkens 2004; McGranahan and Wojan 2007; Florida, Mellander, and Stolarick 2008) demonstrate that indicators for Creative Class and education are both good predictors of urban and regional growth and that the Creative Class indicators perform better than indicators for education. These latter results tend to suggest that creative capital converts human potential (as measured by educational attainment) into something that is economically useful. It could be argued that Florida's Creative Class indicators and conventional measures for educational attainment are both proxies for the same thing: human capital. Therefore, the real question is what kind of human capital is more important for regional development. We provide some empirical answers to this question in Section 6.

3. How to measure the Creative Class?

Florida bases his classification of the Creative Class on professions, not on qualification levels or industry affiliations, because professions provide a better description of what people actually do (Markusen et al. 2006). According to Florida, the Creative Class is comprised of people who are engaged in creative and innovative jobs. Hence, members of the Creative Class may be found in every industry, and thus empirical research needs to identify and separate these people from workers who are engaged in noncreative tasks. Even though creative and cultural industries may have certain definite characteristics (Power and Scott 2004), the Creative Class is not found only in those industries (see also Stam et al. 2008).

The concept underlying how to measure the Creative Class sounds plausible and appealing, but it is not without its difficulties. One problem is that professions in the data sets are categorized by the skill content and characteristics of the work process (Markusen et al. 2006). As a consequence, professions assigned to the Creative Class tend to be biased toward those needing a fairly high level of education, thus excluding creative workers with lower levels of education. Another problem is how to distinguish between creative and noncreative occupations, a difficulty for which Florida has been strongly criticized (Markusen 2006). Florida (2004) defines creative people as workers who are engaged in identifying problems, figuring out new solutions, and combining pieces of knowledge in new and innovative ways. This is, however, a rather vague definition that does not give much practical help in deciding either what is creative or how to measure creativity.

In our analyses, we take three steps to define and measure the Creative Class.

- As a starting point, we adopt Florida's (2004) definitions of creative occupations, distinguishing between the Creative Core, Creative Professionals, and Bohemians. *Creative Core* members are those "whose economic function is to create new ideas, new technology

and/or new creative content" (Florida 2004, 8). These individuals are chiefly found occupying positions "in science and engineering, architecture and design, education, arts, music and entertainment" (ibid.). *Creative Professionals* are those who work in "business and finance, law, health care and related fields" (ibid.). They "engage in complex problem solving that involves a great deal of independent judgment and requires high levels of education" (ibid.).[5] *Bohemians* are engaged in cultural and artistic occupations. Bohemians have two roles: they are part of the Creative Class and they are a sign of an urban culture of tolerance; thus, they play a key role in attracting the two other categories of the Creative Class.

- To achieve an international comparison, we used the International Standard Classification of Occupations (ISCO 88) to select professions that belong to the Creative Class at the three-digit level. This classification scheme was developed by the International Labour Office (ILO) and is based on the types of skills necessary to a specific profession. The selected ISCO categories are presented in Table 1.[6]

- Each country team assigned these classifications to its national data sources in an effort to the data as comparable as possible. However, due to data availability and different ways of measurement, country-specific effects in the data that result in limited comparability between countries are unavoidable. In our analyses, we account for this

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[5] "[A]ll members of the Creative Class … share a common creative ethos that values creativity, individuality, difference and merit. For the members of the Creative Class, every aspect and every manifestation of creativity—technological, cultural and economic—is interlinked and inseparable" (Florida 2004, 8).

[6] Detailed information on the structure of occupations within the different creative class categories is available for Germany, where engineers make up more than 26 percent of the creative core, followed by data-processing professionals, who accounted for about 18 percent of creative core employment in 2002. Teachers accounted for 3.3 percent of the creative core; physicians made up about 9 percent. The largest groups of creative professionals were business professionals and live science and health associate professionals. Exclusion of certain professions with a relatively small share for which the creative character may appear doubtful (e.g., teachers and physicians) does not lead to changes of the basic results.

problem by running multivariate estimation models for each country separately.

(Table 1 about here!)

Because of the special character of Bohemian occupations, we depart from Florida's approach (2004) of including Bohemians in the Creative Core and instead create a separate category specifically for them. Accordingly, we use two different definitions of the Creative Class: Creative Class A is the sum of the Creative Core and the Creative Professionals; Creative Class B contains the Creative Core, the Creative Professionals, and the Bohemians.

4. Regional distribution of the Creative Class in Europe[7]

As mentioned, Florida does not expect the Creative Class to be evenly distributed among cities and regions. In this section, we describe the spatial pattern of the Creative Class in the regions of seven European countries.[8] First, we look at the spatial distribution in each of the countries. The descriptive statistics of the regional share of the Creative Class in total population (Table 2) clearly indicate that the Creative Class is, indeed, very unevenly distributed in the European countries in our

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[7] We are indebted to Florian Noseleit for his support in preparing the data and figures, and to Jarno Hoekman for drawing the maps.

[8] The total number of regions included in our analysis is 503. For the Netherlands (40 regions) and England/Wales (106 regions), data at the NUTS 3 level were used. Because the NUTS-3 regions for Germany are not always functional units, the analysis for this country is at the level of 93 planning regions, which are functional regions in the sense of travel-to-work areas and comprise at least one city and its surroundings (for details, see Fritsch 2007). In Sweden, 70 city-regions were included in our analyses, which are defined as labor-market regions (A-Regioner) based on travel-to-work patterns. The data for Finland are at the level of 82 labor-market regions that are combinations of NUTS 3 regions. This regional level is provided for the purposes of regional planning and policy. The 77 Norwegian regions are so-called city-regions, which are NUTS 3 regions or combinations of several NUTS 4 designations for the larger cities. The 35 Danish regions are functional city-regions.

sample.[9] In each of the countries, we find the highest share for Creative Professionals, followed by the Creative Core. The median values for the share of Bohemians are much lower and constitute considerably less than 1 percent of the population. There is, however, rather pronounced variation of these figures across regions within the countries.

After identifying the professional categories of the Creative Class, we calculated their numbers in each country and region, making use of national employment data that are provided by profession and by region in or around the year 2002.[10] Our results show that the Creative Class (including the Bohemians) consists of about 26,065,907 persons in 2002, which comprises about 37.7 percent of the total workforce in the seven European countries, and about 15 percent of their total population. The total workforce was calculated for each country as the total number of workers who work at least half the regular full-time employment hours per week. The Creative Professionals form the largest category (18,179,184 persons), followed by the Creative Core (6,782,995 persons). The number of Bohemians is comparatively small, amounting to 1,103,728 employees.

(Table 2 about here!)

Figures 1 to 4 show the spread of creative occupations for the entire Creative Class (i.e., including the Bohemians, what we call Creative Class B) and the subcategories within each of the seven European countries. The line in the middle of the shaded box indicates the median value. The shaded box comprises the values of the second and the third quartile (i.e.,

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[9] We use the share of creative occupations in total population as an indicator for regional creativity, not the share in overall employment, as Florida (2004) did. We prefer the share in total population because this measure also accounts for the nonemployed living in the region. Both denominators (employment and population) lead to about the same pattern of results.

[10] The creative class data for Denmark are from 1999, for Finland from 2000, for England/Wales from 2001, and for Norway from 2004. The workforce data are for 2002.

between the 25th and 75th percentile of the distribution). The lines extending from the boxes (whiskers) show the adjacent values. The adjacent values are calculated by utilizing the interquartile range (IQR), which is the difference between the first and third quartile values (Q3 – Q1). The upper adjacent value is the highest data value that is less than or equal to the third quartile plus 1.5 * IQR; the lower adjacent value is the smallest data value that is greater than or equal to the first quartile minus 1.5 * IQR. Values exceeding the upper and lower adjacent values are termed outside values and are displayed as markers. Differences in the level of the shares between countries may be caused by different definitions and procedures of data collection and thus should be interpreted with caution. Nevertheless, the figures suggest that, broadly speaking, the Netherlands is well-supplied with all categories of the Creative Class, whereas Norway is less so.[11]

(Figure 1 about here!)

(Figure 2 about here!)

(Figure 3 about here!)

(Figure 4 about here!)

Each of Figures 1–4 displays outlier regions with relatively high shares of creative population. All these outlier regions comprise main cities of the respective country. In Germany, the Munich region has the highest values in all categories of creative occupation, followed by

[11] The low figures for the creative class in Norway are due to causes. First, the Norwegian figures do not include employees in the public health sector, which has relatively many creative class workers. Second, the Norwegian regions are comparatively small, and the most peripheral regions do not contain a city or town, which particularly lowers the share of creative class members in these small, peripheral regions of the country.

Frankfurt, Hamburg, Stuttgart, and Berlin. In Denmark, the outliers are Arhus and Copenhagen. In Finland, it is Helsinki. In the Netherlands, the leading regions are part of the northern wing of the Randstad area, with high scores for Amsterdam, Haarlem, and Utrecht. In Norway, the by far highest share of creative occupations is found in Oslo, followed by Kongsberg, and Trondheim. The leading Swedish region is Stockholm, with Uppsala, Linköping, and Gotenburg next in line. Unsurprisingly, in England, the London region is the clear winner as to highest share.

(Map 1 about here!)

(Map 2 about here!)

(Map 3 about here!)

(Map 4 about here!)

In Map 1, we project the regional share of the Creative Class in the total population for six European countries. Large parts of the Netherlands and England show relatively high scores, especially compared to Norway and Finland. Map 4 shows a similar spatial pattern for Creative Professionals. More pronounced differences are found in Map 2, which projects the regional shares of Bohemians. The English regions score particularly high on Bohemians; there are profound intra-country differences for the remaining five European countries. Map 3 reveals that parts of the Netherlands, Sweden, England, and Finland score high on shares of the Creative Core.

(Table 3 about here!)

Table 3 sets forth Gini coefficients for the spatial concentration of population and different categories of employment. The Gini-coefficient is a common measure for describing the degree of spatial concentration. It can take values between 0 (even distribution across regions) and 1 (extreme concentration in one region). With respect to all indicators, we note two broad groups of countries. One group consists of Germany, the Netherlands, and England/Wales; the other is comprised of the Scandinavian countries, which show much lower Gini coefficients than those of the first group. One plausible explanation for this is the urban pattern of the countries—the first group of countries are more decentralized than the second. We also observe that in each of the countries, all Creative Class categories are more unevenly distributed than the population as a whole: with the exception of the Netherlands, the Creative Class categories are more spatially concentrated than overall employment. In all the countries, employment in high-tech industries[12] shows a higher degree of spatial concentration than the Creative Core and Creative Professional occupations. Also, the spatial distribution of employees with tertiary education tends to be more concentrated than the Creative Core and the Creative Professionals. According to the Gini coefficients, regional concentration of Bohemians is always higher than that of Creative Core, Creative Professionals, and employees with a tertiary degree. Spatial concentration of employees in high-tech industries and of Bohemians is about equal. Correlation analysis suggests a high level of spatial coincidence of the shares of high-tech employment, Creative Core, Creative Professionals, and employees with a tertiary degree. However, the relationship between the regional share of Bohemians and of high-tech employees is considerably lower, suggesting

[12] Following the definition of the Milken Institute (also used by Florida), the NACE categories 244, 300, 321–323, 331–335, 341–343, and 353 have been classified as high-tech industries. However, in contrast to the Milken Institute definition (Vol and Koepp 2004), we also included knowledge-intensive service industries (NACE categories 642, 721–726, 731, 732, 742, and 743). NACE (*Nomenclature générale des ACtivités Economique*) is an international industry classification system.

less spatial coincidence of high-tech employment and artistic occupations.[13]

5. What explains the uneven distribution of the Creative Class across European regions?

The previous section demonstrated that some regions in Europe have considerably higher shares of the Creative Class than others. To discover why, we conduct multiple regressions that allow us to assess the relative importance of the different factors.[14] The dependent variable in these regressions is the regional population share of employees in creative occupations in the year 2002. Again, we divide the Creative Class into three categories—the Creative Core, Creative Professionals, and Bohemians—because different explanations may be significant for each type. We run the various regressions separately for the five countries for which we have a sufficient number of cases (regions) in our data set: England/Wales, Finland, Germany, the Netherlands, Norway, and Sweden.

Following Florida's (2004) hypothesis regarding where creative people will choose to locate (Section 2), we tested the impact of three types of influences on the share of creative occupations in each region. The first type of influence is *regional culture*, which is closely associated with particular cultural qualities of a region, such as a climate of tolerance and

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[13] For the whole sample the Spearman rank correlation coefficients between the regional share of high-tech employment and the share of creative core employment and of creative professionals are 0.65 and 0.48, respectively. For the relationship between the share of high-tech employees and the share of bohemians it is 0.30. All correlation coefficients are statistically significant at the 1 percent level.

[14] Some authors criticize Florida because his argument rests on suggestive correlations rather than causality (e.g., Peck 2005; Markusen and Schrock 2006). There are a number of publications in which Florida conducts multivariate analyses to test a number of his theses, e.g., Florida (2002a, 2002b), Lee , Florida, and Acs (2004), Knudsen, Florida, and Stolarick (2007) and Florida, Mellander, and Stolarick (2008).

openness. We calculated two indicators to account for this effect.[15] The first is the *share of the regional population in Bohemian occupations*. We use this measure to explain the employment share of people in Creative Core and Creative Professional occupations. According to Florida (2004), this Bohemian index should have a positive effect on the presence of other creative occupations because a high proportion of Bohemians indicates a kind of local culture, lifestyle, and set of values different from the mainstream. Being artistically creative, according to Florida (2004), Bohemians add a sense of liveliness to a location ("the place to be") as well as tolerance (openness to different lifestyles and values), and this makes the region attractive to the other two types of the Creative Class. The second measure of regional culture is the share of foreign-born people, which is expected to have a positive effect on the presence of creative occupations.[16] Following Florida (2004), this *openness index* is used as a proxy for the degree of open-mindedness, tolerance, and cultural diversity in a region.

The second type of explanatory factors can be called *regional facilities.* We employ two indicators that measure the regional provision of types of facilities that can be expected to have a positive impact on the share of creative people in a region. First, the *public provision index* measures the share of the labor force working in public health care and public education (NACE codes 80 and 85). Second, the *cultural opportunity index* is the share of the workforce active in cultural and

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[15] Another indicator of a tolerant and open urban climate applied by Florida in his analysis for the United States is the so-called Gay index, which measures "the over- or under-representation of coupled gay people in a region relative to the United States as a whole" (Florida 2004, 333). This type of index could not be calculated for the European countries due to a lack of data at the NUTS-III level.

[16] This indicator is not without controversy. Especially in the current cultural and political climate of many European countries, a large number of foreign-born people in cities may be accompanied by a lack of tolerance. A better indicator might be the rate of labor-market participation by immigrants (e.g., Hansen 2007) because, among other things, it reflects how open the region is to absorbing and integrating people of different descent and culture into the regional labor market. However, such an indicator was not available for our European countries at the regional level.

recreational activities. These types of activities are defined by NACE codes 553 (restaurants), 554 (bars), 921 (activities in the field of film and video), 922 (radio and television), 923 (entertainment), 925 (libraries, public archives, museums, and other cultural activities), and 926 (sports). Following Florida, we expect that both kinds of facilities are highly valued by the Creative Class. However, both indexes have the potential problem that the respective industries may include employees in occupations that have been classified as "creative" (Table 1). To avoid the possibility that the same person enters both sides of the regression equation, we also run the models excluding the *public provision index* and the *cultural opportunity index*.

The third factor that might explain the share of creative occupations in a region is its economic condition, particularly employment opportunities. We measure a region's job opportunities by its *annual employment growth rate* in the preceding 10 years (1993–2002). We expect to find a positive sign for this variable because job growth may attract creative people to a region ("people follow jobs"). However, if the location decisions of the Creative Class are mainly governed by other regional characteristics, such as a climate of tolerance, the effect of prior employment growth should be relatively small.

Population density is included as a "catch-all" variable for several regional factors, including land prices, wage levels, and so forth, that tend to be associated with this indicator. In particular, the results for this variable will show the effect of an urban atmosphere *per se*, as compared to a cultural climate, on the presence of creative people in a region.[17] We accounted for spatial autocorrelation by including a spatial error term

[17] Because the relation between the size of the core(s) and the respective hinterland(s) is not identical in the functional regions in our sample, the figures for the population density of a region as a whole may not be perfectly comparable. However, regressions using more fine-grained regions, which were available for Germany, did lead to rather similar results (Fritsch 2007).

(spatial error model).[18] Table A1 in the Appendix provides some descriptive statistics for the variables included in the analysis. In the regressions for Germany, a dummy variable with the value 1 for a location in former socialist East Germany (otherwise the value of this variable is 0) is included to account for the fact that this part of the country was governed by a quite specific growth regime in the period under study (Fritsch 2004). Most variables are entered as logarithmic values (logarithmus naturalis) because the distribution of the logarithmic values tends to correspond much better to the assumption of a normal distribution than the original values. In particular, taking the logarithms reduces the effect of extreme values ("outliers") on the results. Another reason is that if the dependent and the independent variable are logarithmic values, the estimated coefficient for the relationship can be interpreted as an elasticity that gives the percent change of the dependent variable resulting from a 1 percent change of the independent variable. Comparison of elasticities gives the relative importance of the different influences. The percent employment change during previous years is not entered in logarithmic form because of a number of negative values for this variable for which the logarithm is not defined.

For some of the relationships between the variables included in the empirical models the direction of causality is not entirely clear. It may, for instance, be argued that it is not that the Creative Class is attracted by the presence of Bohemians, but that Bohemians follow the Creative Class because it represents their clientele. Also, it could be that the Creative Class are not lured by a region's employment growth, but are, instead, the cause of it. A more detailed analysis of the direction of causality would require a two-stage least square procedure or a simultaneous equation system. However, a two-stage least square model will not result in any

[18] The spatial lag model assumes that the error terms for adjacent regions are not independent, which may be because certain influences affect spatial entities larger than the regions of our analysis. To account for this spatial autocorrelation, we include the weighted average of the disturbance terms of adjacent regions in our models. For details, see Anselin (1988).

improvement in the results here because practically the same variables would have to be included at both stages given that the available data set does not provide adequate alternative variables. Nevertheless, we are able to shed some light on the question of causality with regard to the role of Bohemians by running all models explaining the share of Creative Core and Creative Professional occupations without the share of Bohemians. Because some persons included in the public provision index and the cultural opportunity index may also be members of the Creative Class according to our definition (e.g., teachers, life science and health associate professionals) we also estimate a version without these two indices.

Tables 4 and 5 show the results of the regression analyses for the employment share of Creative Core and Creative Professional occupations, respectively. Table 6 sets out the estimates for the share of Bohemians. A key finding, and one that we expected, is that there is a strong positive statistical relationship between the share of Bohemians in a region and the same region's share of Creative Core and Creative Professional occupations in all six European countries. However, if the Bohemians are omitted from the models that explain the share of Creative Core and Creative Professional occupations, the explained variance declines very little. Broadly speaking, we find support for a strong and positive impact of the openness index on Bohemians in all European countries in our sample, except for Sweden. This is also true for most of the countries with respect to the Creative Core (except the Netherlands) and the Creative Professionals (except the Netherlands and Sweden). The effect of the openness index on the presence of creative people tends to be more pronounced if the share of Bohemians and the public provision index, as well as the cultural opportunity index, are omitted (Models II and III of Tables 4 and 5), pointing to the importance of a tolerant atmosphere for Bohemians. The results for the openness index may be somewhat affected by the positive correlation with population density. In fact, in models where the openness index has a negative sign, we tend to find a

pronounced positive impact of population density and *vice versa*. In sum, we find some support for Florida's thesis that a regional climate of tolerance and openness has a positive impact on the presence of the Creative Class.

The coefficients for the public provision index show a positive sign for Creative Core employment in five of the six countries (Table 4), but the same is nonsignificant or even significantly negative in the models for the Creative Professionals (Table 5). Apparently, Creative Core members are very sensitive to regional supply of public services in health care and education, whereas this is not true of Creative Professionals or, except in German, of Bohemians.

Remarkably, the cultural opportunity index is only statistically significant in explaining the share of Creative Core and Creative Professional occupations when the share of Bohemians is omitted (with the exception of England/Wales in the estimations for Creative Professionals). This is further evidence of the pronounced positive relationship between this index and the presence of Bohemians, which is also indicated by the high values of the cultural opportunity index in explaining the share of Bohemians (Table 6). This finding could be interpreted as an indication that a high level of cultural amenities in a region attracts Bohemians. However, we cannot rule out that the correlation between the employment share of cultural industries and Bohemian occupations is partly caused by some overlap between the two categories, i.e., some Bohemians may be employed in cultural industries.

Because the presence of creative occupations could be a result of rich employment opportunities in cultural industries, as well as in those sectors included in the public provision index, all regressions were run without the public provision and cultural opportunity indexes (Model III in Tables 4 and 5). The differences between the coefficients in Models II and III indicate that the effect of the openness index and of population density becomes even stronger, but the decrease in explained variance is not very large.

An urban climate *per se*, as proxied by population density, has a positive effect on presence of the Creative Class in five of the six European countries. England/Wales, alone, shows a persistent negative impact of population density on the regional share of the Creative Class. As far as employment growth in preceding years is concerned, we find a positive effect on the employment shares of Creative Core occupations in all countries except Norway (Table 4). With regard to the share of Creative Professionals (Table 5), we find a strong impact of past employment change in England/Wales, Finland, Norway, and Sweden. Past employment growth has a statistically significant impact on Bohemians in three of the six countries: England/Wales, Finland, and Sweden. The different statistical tests for lambda being unequal to 0 show that spatial autocorrelation occurs only rarely and does not appear to be very pronounced. This is probably because most of the regions in our sample are functional units. The variance inflation factor (vif) indicates possible multicollinearity problems only for the openness index and the dummy for location in East Germany, but the values of this measure are below 8, which is acceptable.[19] The obvious reason for the close statistical relationship between the two variables is the much lower presence of foreign-born population in East Germany due its 40-year history of being a rather secluded society under a socialist regime.[20]

(Table 4 about here!)

(Table 5 about here!)

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[19] According to a widely accepted rule of thumb, multicollineary should be regarded as a serious problem if the vif exceeds a value of 6 or even 10 (see Hill and Adkins 2001). In the large majority of cases, the value of the vif was well below 3, indicating no multicollinearity problem. Cases in which the vif was greater than 6 are marked with a "v" in the tables.

[20] While there was very little migration into East Germany during its socialistic period**,** West Germany experienced a massive inflow of workers and their families**,** particularly from Mediterranean countrie**s**, resulting in a much higher level of foreign-born population than found in East Germany.

(Table 6 about here!)

The results of the regression analyses confirm most of our expectations. First, the outcomes clearly show that there is a close relationship between the presence of Bohemians and the other categories of the Creative Class at the regional level in all six European countries. The openness index has the expected positive impact on the presence of Bohemians and the Creative Core, but the effect is weaker than that of Bohemians. We can, therefore, conclude that a regional climate of tolerance and openness tends to attract members of the Creative Class. The cultural opportunity index, which indicates the level of cultural and recreational activities, is in many cases statistically significant for explaining Creative Core and Creative Professional employment only if the share of Bohemians is omitted. The close statistical relationship between the cultural opportunity index and employment in Bohemian occupations is particularly obvious in models explaining the share of Bohemians. Public provision of health care and education are important for Creative Core employment in four of the five countries. However, this result should be regarded with some caution because these sectors comprise occupations that, according to our definition (Table 1), belong to the Creative Core.[21] The public provision index is nonsignificant or statistically negatively significant in the models for the share of Creative Professionals; however, it has a positive impact on Bohemian employment in one European country—Germany.

Annual regional employment growth in preceding years has a statistically significant impact on the share of Creative Core employment in four of the five countries, Norway being the exception. While employment opportunities play a significant role in explaining the share of Creative Professionals in three of the five countries, they appear less important to

[21] However, excluding such occupations (e.g., physicians and teachers) from the creative core does not lead to substantially different results.

employment in Bohemian occupations. These results suggest that creative people do follow jobs but, given the effect of the other variables in the regressions, the influence of employment growth is far from dominate. Our results indicate that a location characterized by an atmosphere of openness, cultural opportunity, and the presence of Bohemians is of at least equal importance as employment opportunities. Population density seems to have a positive effect on all types of Creative Class employment, although the identification of this impact suffers from the pronounced positive correlation of population density with other indicators, particularly the openness index.

6. The effect of education and Creative Class on regional growth in Europe

Our analyses show that the Creative Class tends to concentrate in certain regions in Europe, but comprises only a rather small share in many other regions. How important is this, economically? To answer this question, we assess the effect of the Creative Class on regional growth by means of regression analysis. Such an analysis requires data for past periods that need to be related to indicators of regional development in subsequent years. Unfortunately, such information is not available for most of the European countries in our project and we thus have to restrict our analysis to Germany and the Netherlands. These two countries provide indicators for the qualification of the regional workforce, the Creative Class in 1996, and egional employment change over the 1996–2002 period. We also test the effect of the qualification of the workforce on regional development to investigate Glaeser's (2004) criticism that Florida's creative occupation indicators are actually measures of qualification rather than of creativity (see Section 2). The education indicator is constructed on the basis of the International Standard Classification of Education (ISCED 1997). Group 5A and 6 of this classification can be associated with the level of bachelor's degree or higher, and we assigned these categories to the national statistics in Germany and the Netherlands. The education indicator measures the share of people in a region with a bachelor's

degree (tertiary degree) or higher. In the regressions for Germany, we again include a dummy variable for East Germany in order to account for the obviously different growth regimes in the two parts of the country (Fritsch 2004). Population density is included as a control variable for all kinds of regional effects. We account for spatial autocorrelation by including the weighted average error term of adjacent regions (spatial error model).

We are unable to present a fully-fledged regional growth model due to missing data on a number of key factors, such as the regional capital stock. Therefore, we restrict ourselves to simple regressions of the effect of qualified workforce and employees in Creative Class occupations on regional employment change, which should be regarded as a first rough test. The results of the regressions are shown in Tables 7 (Germany) and 8 (the Netherlands).[22] The effect of higher education on subsequent employment growth is positive in both countries (Model I). In the Netherlands, all Creative Class indicators show a highly significant positive effect on regional development. For Germany, the share of Bohemians is the only Creative Class indicator that is statistically positively significant at the 1 percent level; the effect of Creative Class and Creative Core occupations fail to be statistically significant at the 5 percent level (but are statistically significant at the 10 percent level). Remarkably, we find a significantly negative coefficient for the effect of Creative Professionals on regional growth in Germany. The economic effect of population density tends to be negative in both countries, suggesting that employment growth in the more urbanized regions has been rather poor during the period of analysis. The high coefficients of the dummy variable for East German regions clearly indicate the different employment pattern in this part of the country. According to the values for lambda, spatial autocorrelation played a role in Germany but not in the Netherlands.

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[22] Multicollinearity is not an issue in these regressions since the values of the variance inflation factors (vif) for all variables are well below 3.

(Table 7 about here!)

(Table 8 about here!)

Due to the pronounced correlation between some of the Creative Class indicators and the measure for higher education (see Table A2 in the Appendix for details), including these indicators in the same model is of doubtful utility, particularly in the case of Germany. If we do include both types of indicator in one model, the Creative Class measures tend to dominate the education measure in the Netherlands,[23] whereas in Germany the qualification indicator remains statistically significant and the Creative Class indicators have no effect.

We demonstrate a positive effect of Creative Class on regional growth in the Netherlands but the cause of same is not clear. Florida (2003, 40, 2004, 8) argues that artistic/cultural creativity, technological creativity (innovation), and economic creativity (entrepreneurship) are interlinked and reinforce each other, suggesting that there should be a positive relationship between creativity, new business formation, and innovation (Lee et al. 2004; Hackler and Mayer 2008).

To test this conjecture, we first examine three European countries at the regional level to find out whether there is an effect of higher education (share of employees with tertiary degree) and Creative Class (share of

[23] These results are quite similar to those found in a study of 50 Dutch cities (Marlet and Van Woerkens 2004). Employment growth in those cities for the 1993–2004 period could be attributed to both the level of education and the share of the creative class, but especially to the latter. Partly based on these results, Marlet and Van Woerkens (2004) conclude that Florida had just proposed a better indicator for human capital because creative capital accounts for what people do (i.e., using their skills and knowledge in a creative manner), rather than what people just know (as proxied by educational attainment). When human capital is coupled with creativity in such a way, both become more closely connected to regional growth. This line of reasoning has been embraced recently by Florida himself (Florida et al. 2008).

employees in creative occupations) on new business formation (Lee, Florida and Acs 2004). Data for this type of analysis were available for Germany, Norway, and Sweden. We made a distinction between new business formation in general and new business formation in high-tech industries. Start-up rates are measured as the number of start-ups per 1,000 inhabitants in 2002. A spatial error regression model was applied with the start-up rate as dependent variable and the share of employees with tertiary degree or in creative occupations as the independent variable. Compared to simple correlations, such a regression model has the advantage of being able to control for the effect of spatial autocorrelation. One should, however, be well aware of the exploratory character of these analyses since a detailed investigation of regional new business formation would require accounting for all other potential influences (for such an analysis, see Fritsch and Falck 2007), which is far beyond the scope of this paper. Due to the exploratory character of this analysis, we report the regression coefficients for the respective education or occupation variable, but not for the full models. As expected, we find significantly positive effects of a workforce that is highly educated and/or in creative occupations on regional start-up rates in the three European countries (Table 9). In Sweden, however, the effect of the employment share in Creative Core and Creative Professional occupations is not statistically significant for the overall start-up rate. The coefficients for the different indicators show no clear trend toward a higher impact of workforce with higher education compared to that of people in creative occupations. However, we find a relatively weak effect for the share of Bohemians, hinting at a lesser role of artistic occupations for new business formation. In most cases, the level of significance of an education or Creative Class indicator is particularly high for start-ups in high-tech industries.

(Table 9 about here!)

(Table 10 about here!)

Finally, in order to test the effect of higher education and Creative Class on innovation, we used patent data, which were available at a regional level only for the German regions in the 1996–2002 period. Similar to our investigation of regional start-up rates, we estimated regressions with the number of patents per 10,000 inhabitants in the period 1996–2002 as the dependent variable.[24] In these regressions, we again controlled for spatial autocorrelation by applying a spatial error model. Independent variables were the share of employees with a tertiary degree and the share of employees in Creative Class occupations. Table 10 shows a positive effect of the regional level of qualification and of the employment share of Creative Core and Creative Professional occupations at the beginning of the observation period, in 1996. That such an effect cannot be found for the share of Bohemian employment indicates that the link between artistic occupations and patenting is very weak or even nonexistent, which is not too surprising as patenting art or culture is not even possible. Obviously, the presence of art and culture in a region is not sufficient for achieving high levels of patenting. Patenting requires considerable Research and Development activity of highly skilled people, be it in creative or in non-creative occupations. However, patents may not be the best indicator of innovation in regard to the Creative Class because many members of this Class are active in sectors (such as services and low-tech sectors) that do not have a high patent intensity.

7. Conclusion

Our analyses, based on a unique data set of more than 500 regions in seven European countries, provides strong empirical evidence that the Creative Class is unevenly distributed across Europe. The regression analyses clearly shows that a regional climate of tolerance and openness has a positive effect on regional share of the Creative Class. Our results

[24] The data on patents have been taken from Greif and Schmiedl (2002) and Schmiedl (2006). Patents have been assigned to the residence of the inventor.

suggest that this cultural effect is more important than an urban climate *per se*. The provision of public facilities in health care and education has only a minor, if any, impact on the presence of the Creative Class, which is also true regarding the regional supply of cultural and recreational amenities. The effect of regional job opportunities on the Creative Class, however, is quite large.

Our results are mixed respecting the relationship between the Creative Class and regional development in a number of European countries. For example, in the Netherlands, the Creative Class measures have a positive effect on employment growth in subsequent periods, but the estimations for Germany show such a positive effect only for the share of Bohemian occupations. A regional analysis of three European countries points to a positive relationship between both employment with high education level and in creative industries and regional start-up rates. For German regions, we also find a positive relationship between Creative Core and Creative Professional occupations and the level of patenting in subsequent years. However, the effect of employees with high education on patenting activity is stronger than that of Creative Core and Creative Professional occupations.

Although we are able to shed some light on the role of the Creative Class, further research is necessary to obtain a better understanding of the relevant relationships. There is no question that better indicators for measuring creativity are a prerequisite for this task (Rantisi and Leslie 2006). In particular, studies are needed that account for all three types of creativity mentioned by Florida (2004): creativity in the artistic, technological (innovation), and economic (entrepreneurship) spheres. We need to define more precisely, for instance, which workers really are creative in order to link them more directly to the other variables in the analysis.

Such studies should also attempt to come to a better understanding of the relationship between creativity and education, as well as the role of

knowledge spillovers. As mentioned, human capital (including the role of knowledge spillovers) and creative capital are two different explanations for regional growth and they need to be disentangled in empirical analyses. The question of whether the local presence of highly educated and creative people contributes to regional growth or whether their presence generates localized knowledge spillovers, with a consequent effect on regional growth needs to be clarified in empirical analyses. After conducting a patent analysis, Bettencourt et al. (2007) conclude that big cities in the United States are more innovative than smaller cities because they happen to house a disproportionately large number of inventors, not because inventors in big cities are more productive due to local knowledge spillovers. The same question can be asked about the Creative Class: Are cities or regions performing better because they have a relatively high number of Creative Class members, or is it because their Creative Class members are more productive due to local buzz, or is it some combination of both?

Another possible extension of the analytical framework is to include the effect of diversity of creative occupations in regions in addition to population characteristics such as levels of education and creativity. This would allow controlling for the effects of Jacobs' externalities. Florida sings high praise for diversity in cities and regions, but it remains to be discovered if certain types of diversity, or for that matter, creativity, are more conducive to innovation and growth. Since the Creative Class consists of many diverse occupations, there is a need for disaggregating the Creative Class when assessing its spatial and economic consequences (Markusen 2006). Some creative jobs are more likely to induce knowledge spillovers or support each other's presence in a region. Stolarick and Florida (2006) suggest this might be the case for technicians and art designers. The importance of relatedness or related variety for regional growth has been demonstrated recently in empirical studies taking a sector perspective (Frenken et al. 2007; Boschma and Iammarino, 2009). Assessing the impact of labor mobility on plant

performance, Boschma et al. (2009) find empirical evidence that establishments perform better when they employ individuals with related skills and when they hire new employees who bring in new knowledge that is related (but not similar or unrelated) to the existing knowledge base of the plant. This concept of relatedness could be extended to creative individuals: Is a high degree of diversity in creative people merely a good thing for regional and urban development, or do certain combinations of creative occupations in a region reinforce each other's presence and induce knowledge spillovers due to complementary skills and, therefore, have an additional economic effect?

Another important project for further research is to provide more evidence for the relationship between a climate of tolerance, the presence of the Creative Class, and regional growth. First, we need more direct indicators to measure a climate of tolerance or a culture of openness: it is simply not enough to assume that a more diverse population is more tolerant. For instance, regional unemployment rates among foreign-born or non-Western people could provide an indication of the extent to which the regional community is open to newcomers and how well they are integrated in the local labor market. Another more direct indicator is racial tolerance, as measured, for instance, by attitudes toward interracial marriage (Sharp and Joslyn 2008). Using these indicators would shed more light on whether a strong presence of the Creative Class in a region goes hand in hand with higher levels of tolerance. Second, we need to clearly specify the mechanisms by which a regional climate of tolerance may affect regional growth and in what ways such a climate could be created by public policy (Peck 2005). Third, a more dynamic approach to this topic should be taken, instead of simply assuming that creativity is inherent to members of the Creative Class (Scott 2006). We need to explore how creativity and cultural openness develop and are enhanced in particular places via the interactions of creative people both at their places of employment and during social events. There is also a need to determine whether the Creative Class grows or declines *in situ* because

production activities that employ creative people expand or shrink over time, or whether these swings are merely due to this Class's penchant for migration, as suggested by Florida and others. Such a dynamic perspective would also throw more light on the direction of causality: Do successful regions create, retain, and attract creative capital, is it the other way around, or, again, is it some combination of both (Markusen 2006)?

Last, but not least, our empirical outcomes call for a comparative theory of the Creative Class that accounts for differences between countries. For example, urbanization patterns and tolerance levels differ considerably between countries, and so do labor mobility and institutions. The question is how these factors affect the spatial concentration of the Creative Class, and whether the impact of the Creative Class on urban and regional growth depends on these national characteristics. For instance, we found that the Creative Class was more unevenly distributed in the Scandinavian countries, which are much more centralized than Germany, the Netherlands, and England/Wales. Might this Creative Class distribution reflect the particular national urban patterns? Moreover, we found that the effect of the public provision index on the Creative Class was systematically different in England/Wales, as compared to the other countries in our analyses. Note that England/Wales is the only country in our sample that has a liberal market economy, according to Hall and Soskice (2001), and the effect of public provision was either nonsignificant or negative there, whereas it was positive or nonsignificant in the other countries. Does this indicate a lower appreciation of public facilities in liberal market economies? And, if so, what are the implications for the Creative Class and, by extension, regional growth?

Completely understanding the complex relationship between creativity and regional growth poses many challenges; challenges that will require a certain amount of, shall we say, *creativity* to address.

Tables and Figures

Table 1: The creative occupations

Groups of creative people	*Occupations (ISCO-Code)*
Creative Core	Physicists, chemists, and related professionals (211) Mathematicians, statisticians, and related professionals (212) Computing professionals (213) Architects, engineers, and related professionals (214) Life science professionals (221) Health professionals (except nursing) (222) College, university, and higher education teaching professionals (231) Secondary education teaching professionals (232) Primary and pre-primary education teaching professionals (233) Special education teaching professionals (234) Other teaching professionals (235) Archivists, librarians, and related information professionals (243) Social sciences and related professionals (244) Public service administrative professionals (247)
Creative Professionals	Legislators, senior officials, and managers (1) Nursing and midwifery professionals (223) Business professionals (241) Legal professionals (242) Physical and engineering science associate professionals (31) Life science and health associate professionals (32) Finance and sales associate professionals (341) Business services agents and trade brokers (342) Administrative associate professionals (343) Police inspectors and detectives (345) Social work associate professionals (346)
Bohemians	Writers and creative or performing artists (245) Photographers and image and sound recording equipment operators (3131) Artistic, entertainment, and sports associate professionals (347) Fashion and other models (521)

Table 2: Descriptive statistics for the distribution of the Creative Class occupations across European regions in 2002, as percentage of total population

	Mean	Median	Minimum	Maximum	Standard deviation
Creative Core					
Denmark	4.303	4.239	2.998	6.422	0.817
England/Wales	4.140	3.999	2.074	8.692	1.060
Finland	3.643	3.231	1.871	7.793	1.160
Germany	2.674	2.502	1.461	5.971	0.839
The Netherlands	4.981	4.826	2.569	7.722	1.324
Norway	1.200	0.984	0.217	5.279	0.968
Sweden	3.845	3.447	2.624	8.682	1.156
Creative Professionals					
Denmark	8.462	8.406	5.952	13.479	1.699
England/Wales	11.305	10.916	6.850	20.581	2.525
Finland	6.764	6.551	4.248	13.966	1.891
Germany	7.869	7.657	5.753	13.073	1.283
The Netherlands	15.494	15.568	12.316	19.088	1.632
Norway	4.575	4.125	2.59	12.616	1.647
Sweden	8.687	8.541	5.853	14.354	1.534
Creative Class A					
Denmark	12.765	12.567	8.951	19.001	2.261
England/Wales	15.445	15.000	9.155	29.273	3.465
Finland	10.407	9.774	6.401	21.759	2.962
Germany	10.543	10.189	7.214	19.044	2.010
The Netherlands	20.475	20.302	15.107	25.575	2.605
Norway	5.775	5.112	2.843	17.895	2.516
Sweden	12.532	11.968	8.573	21.270	2.525
Bohemians					
Denmark	0.438	0.343	0.221	2.235	0.532
England/Wales	0.771	0.705	0.298	4.090	0.493
Finland	0.313	0.268	0.125	1.139	0.164
Germany	0.337	0.290	0.121	1.240	0.196
The Netherlands	0.689	0.588	0.188	2.078	0.385
Norway	0.103	0.082	0.0	0.556	0.085
Sweden	0.296	0.264	0.117	1.059	0.138
Creative Class B					
Denmark	13.203	13.015	9.347	19.895	2.332
England/Wales	16.216	15.570	9.589	33.364	3.827
Finland	10.720	9.992	6.586	22.898	3.108
Germany	10.880	10.479	7.356	20.284	2.178
The Netherlands	21.164	21.089	15.456	26.852	2.857
Norway	5.878	5.151	2.851	18.452	2.589
Sweden	12.828	12.208	8.788	22.329	2.670

*Table 3: Gini coefficients for regional concentration of various employment categories in 2002**

	DK	EN	FI	DE	NL	NO	SE
Creative Core	0.748	0.438	0.712	0.471	0.447	0.837	0.645
Creative Professionals	0.747	0.444	0.695	0.421	0.385	0.769	0.610
Creative Class A	0.747	0.442	0.701	0.432	0.399	0.785	0.620
Bohemians	0.806	0.563	0.780	0.580	0.527	0.853	0.738
Creative Class B	0.749	0.448	0.704	0.437	0.403	0.787	0.624
Population	0.689	0.384	0.560	0.352	0.381	0.624	0.518
Employment	0.704	0.415	0.624	0.394	0.437	0.663	0.554
Employees with bachelor's or master's degree	0.762	0.518	0.738	0.534	0.417	0.734	0.674
Employees in high-tech industries	0.837	0.495	0.815	0.537	0.563	0.851	0.744

* DK: Denmark, EN: England/Wales, FI: Finland, DE: Germany, NL: The Netherlands, SE: Sweden.

Table 4: Regressions explaining the share of Creative Core employment (spatial error models)

	England/Wales			*Finland*			*Germany*			*The Netherlands*		
	I	II	III	I	II	III	I	II	III	I	II	III
Share of Bohemians (ln)	0.237** (3.84)	–	–	0.263** (5.07)	–	–	0.311** (6.96)	–	–	0.135* (2.28)	–	–
Openness index (ln)	0.113* (2.80)	0.215** (6.70)	0.248** (7.66)	0.023 (0.92)	0.083** (3.72)	0.147** (5.06)	0.133 (1.70)^{V}	0.248** (3.56)^{V}	0.296** (3.64)^{V}	0.039 (0.50)	0.095 (1.21)	0.078 (0.89)
Public provision index (ln)	0.078 (0.86)	0.018 (0.19)	–	0.352** (4.28)	0.504** (4.76)	–	0.232** (2.54)	0.486** (3.72)	–	0.245** (3.34)	0.260** (2.95)	–
Cultural opportunity index (ln)	0.066 (0.82)	0.221** (2.97)	–	0.044 (0.99)	0.155** (4.28)	–	-0.020 (0.27)	0.166* (2.55)	–	0.011 (0.13)	0.052 (0.61)	–
Population density (ln)	-0.067** (4.16)	-0.091** (5.81)	-0.089** (5.69)	0.017 (1.25)	0.026* (2.17	0.062** (3.28)	0.100* (2.47)	0.140** (3.47)	0.167** (3.57)	0.172** (4.76)	0.181** (4.41	0.225** (5.53)
Employment growth 1993–2002	0.055** (3.38)	0.007** (3.94)	0.009** (4.96)	0.007** (5.00)	0.008** (5.91	0.012** (5.58)	0.063* (2.05)	0.010** (2.70)	0.010* (2.41)	0.073** (4.36)	0.012** (3.96)	0.015** (4.42)
Dummy East Germany	–	–	–	–	–	–	0.500** (4.48)^{V}	0.655** (6.53)^{V}	0.823** (7.29)^{V}	–	–	–
Constant	1.340** (7.41)	1.199** (6.34)	1.356** (14.45)	0.770** (4.00)	0.061 (0.68)	0.914** (13.39)	0.042 (0.67)	- 1.138** (4.29)	- 0.651** (3.65)	-0.140 (0.60)	-0.464* (1.96)	-0.271 (1.23)
Lambda	0.003 (0.80)	0.003 (0.58)	0.002 (0.43)	-0.009 (0.87)	-0.152* (2.44)	-0.007 (0.53)	0.102* (2.21)	-0.119 (1.04)	-0.005 (0.25)	-0.048 (0.63)	-0.045 (1.01)	-0.064 (1.08)
Wald test of lambda = 0	0.639	0.341	0.184	0.754	5.960*	0.284	4.882*	1.088	0.063	0.403	1.021	1.177
LM test of lambda = 0	0.673	0.147	0.020	0.772	1.705	0.160	1.545	2.610	1.093	0.007	0.052	0.034
Variance ratio	0.641	0.585	0.529	0.862	0.862	0.705	0.818	0.660	0.564	0.764	0.696	0.730
Log likelihood	50.093	43.191	36.864	70.806	61.487	40.371	48.340	34.940	21.645	24.384	21.816	15.622
No. of observations	105	105	105	82	82	82	93	93	93	40	40	40

Notes: Robust estimates (z-values in parentheses); * statistically significant at the 5%-level; ** statistically significant at the 1%-level. ^{V}: variance inflation factor (vif) for variable > 6 < 8.

Table 4 continued

	Norway			*Sweden*		
	I	II	III	I	II	III
Share of Bohemians (ln)	0.320** (3.26)	–	–	0.378** (5.44)	–	–
Openness index (ln)	0.129 (0.83)	0.235 (1.45)	0.594** (3.23)	0.137* (2.11)	0.047 (0.63)	0.002 (0.03)
Public provision index (ln)	2.064** (5.04)	2.065** (4.72	–	0.613** (9.02)	0.406** (5.91)	–
Cultural opportunity index (ln)	0.076 (0.39)	0.442** (2.67)	–	-0.037 (0.53)	0.204** (3.03)	–
Population density (ln)	0.198** (3.25)	0.266** (4.34)	0.194** (2.60)	0.001 (0.02)	0.054 (1.50)	0.008 (0.22)
Employment growth 1993–2002	-0.042 (0.58)	0.000 (0.02)	0.001 (0.12)	0.090* (2.39)	0.018** (3.94)	0.017** (3.34)
Constant	-5.031** (4.45)	-6.139** (5.34)	-1.13** (4.70)	-0.012 (0.33)	-0.016 (0.30)	1.259** (8.16)
Lambda	0.000 (0.07)	-0.003 (0.54)	0.027 (1.12)	0.159** (4.84)	0.151** (3.80)	-0.012 (0.82)
Wald test of lambda = 0	0.005	0.296	1.258	23.468**	14.460**	0.671
LM test of lambda = 0	0.003	0.000	0.015	12.896**	14.475**	5.575*
Variance ratio	0.614	0.552	0.325	0.748	0.654	0.240
Log likelihood	-45.969	-50.950	-67.109	42.744	30.307	8.613
No. of observations	77	77	77	70	70	70

Notes: Robust estimates (z-values in parentheses); * statistically significant at the 5%-level; ** statistically significant at the 1%-level. ^{V}: variance inflation factor (vif) for variable > 6 < 8.

Table 5: Regressions explaining the share of Creative Professionals (spatial error models)

	England/Wales			*Finland*			*Germany*			*The Netherlands*		
	I	II	III	I	II	III	I	II	III	I	II	III
Share of Bohemians (ln)	0.219** (5.44)	–	–	0.204** (4.24)	–	–	0.170** (5.00)	–	–	.079* (2.26)	–	–
Openness index (ln)	0.057* (2.17)	0.152** (6.87)	0.190** (7.61)	0.094** (4.04	0.136** (5.90)	0.165** (7.53)	0.057 (0.157)^{V}	0.097* (2.43)^{V}	0.152** (3.29)^{V}	-0.116* (2.57)	-0.086 (1.87)	-0.075 (1.61)
Public provision index (ln)	-0.327** (5.53)	-0.382** (5.78)	–	-0.041 (0.56)	-0.005 (0.07)	–	-0.006 (0.09)	0.087 (1.18)	–	0.017 (0.33)	0.040 (0.75)	–
Cultural opportunity index (ln)	0.155** (2.93)	0.299** (5.81)	–	0.022 (0.53)	0.113** (2.84)	–	0.079 (1.93)	0.199** (5.32)	–	0.047 (0.98)	0.067 (1.36)	–
Population density (ln)	-0.027* (2.59)	-0.050** (4.61)	-0.068** (5.53)	0.080** (6.05)	0.094** (6.74)	0.099** (6.99)	0.013 (0.57)	0.057* (2.41)	0.71* (2.52)	0.077** (3.61)	0.085** (3.82	0.089** (3.92)
Employment growth 1993–2002	0.064** (6.13)	0.008** (6.47)	0.011** (7.93)	0.053** (3.69)	0.059** (3.72)	0.070** (4.38)	0.014 (0.88)	0.003 (1.31)	0.003 (1.46)	0.013 (1.38)	0.003 (1.54	0.003 (1.83)
Dummy East Germany	–	–	–	–	–	–	0.041 (0.78)	0.131* (2.33)	0.243** (3.78)^{V}	–	–	–
Constant	2.978** (25.23)	2.846** (21.76)	2.268** (31.01)	1.947** (10.87)	1.553** (9.16)	1,477** (32.82)	2.076** (11.02)	1.404** (9.17)	1.305** (11.69)	2.451** (16.01)	2.234** (17.63)	2.28** (19.36)
Lambda	0.001 (0.70)	0.001 (0.44)	0.002 (0.73)	-0.006 (1.59)	-0.007 (1.42)	-0.007 (1.15)	0.005 (1.71)	0.013** (2.78)	0.009 (1.54)	-.002 (0.48)	-0.000 (0.11)	0.000 (0.07)
Wald test of lambda = 0	0.489	0.196	0.526	2.521	2.004	1.331	2.916	7.749**	2.386	0.226	0.011	0.005
LM test of lambda = 0	0.325	0.293	0.059	0.371	1.956	1.324	4.864*	5.351*	3.371	0.065	0.016	0.136
Variance ratio	0.796	0.736	0.629	0.872	0.845	0.824	0.671	0.588	0.431	0.446	0.381	0.327
Log likelihood	94.727	81.692	63.493	75.677	67.527	63.319	102.185	91.127	73.752	45.668	43.257	41.460
No. of observations	105	105	105	82	82	82	93	93	93	40	40	40

Notes: Robust estimates (z-values in parentheses); * statistically significant at the 5%-level; ** statistically significant at the 1%-level. ^{V}: variance inflation factor (vif) for variable > 6 < 8.

Table 5 continued

	Norway			*Sweden*		
	I	II	III	I	II	III
Share of Bohemians (ln)	0.097** (2.65)	–	–	0.257** (5.08)	–	–
Openness index (ln)	0.136* (2.28)	0.168** (2.75)	0.265** (4.50)	0.028 (0.81)	-0.003 (0.07)	-0.039 (0.087)
Public provision index (ln)	0.257 (1.68)	0.207 (1.49)	–	0.082 (0.749	0.143 (1.11)	–
Cultural opportunity index (ln)	0.061 (0.83)	0.180** (2.95)	–	-0.006 (0.13)	0.148** (3.54)	–
Population density (ln)	0.088** (3.86)	0.105** (4.71)	0.096** (4.00)	0.016 (1.00)	0.048** (2.75)	0.040 (2.12)
Employment growth 1993–2002	0.069* (2.47)	0.009** (2.98)	0.010** (2.86)	0.056* (2.49)	0.012** (4.54)	0.016** (5.87)
Constant	0.661 (1.57)	0.442 (2.26)	0.908** (11.20)	2.116** 86.54)	1.556** (4.35)	2.033** (26.54)
Lambda	-0.013 (0.75)	-0.034 (0.91)	-0.025 (1.64)	0.003** (6.54)	0.038 (0.0.73)	-0.000 (0.06)
Wald test of lambda = 0	0.563	0.819	2.682	0.727	0.539	(0.004)
LM test of lambda = 0	0.076	0.235	0.132	0.152	0.064	1.405
Variance ratio	0.672	0.638	0.578	0.751	0.662	0.585
Log likelihood	28.168	24.722	18.861	74.767	63.773	55.677
No. of observations	77	77	77	70	70	70

Notes: Robust estimates (z-values in parentheses); * statistically significant at the 5%-level; ** statistically significant at the 1%-level. ^{V}: variance inflation factor (vif) for variable > 6 < 8.

Table 6: Regressions explaining the share of Bohemian employment (spatial error models)

	England/Wales		*Finland*		*Germany*		*The Netherlands*		*Norway*		*Sweden*	
	I	II	I	II	I	II	I	II	I	II	I	II
Openness index (ln)	0.434** (9.20)	0.525** (10.07)	0.203** (4.15)	0.317** (5.79)	0.227* (2.15)^{V}	0.429** (2.99)^{V}	0.405* (2.08)	0.442* (2.18)	0.330 (1.86)	0.814** (4.04)	-0.118 (1.45)	-0.246* (2.21)
Public provision index (ln)	-0.245 (1.75)	–	0.190 (1.12)	–	0.551** (2.76)	–	0.273 (1.20)	–	0.005 (0.01)	–	0.233 (0.89)	–
Cultural opportunity index (ln)	0.651** (5.93)	–	0.435** (5.26)	–	0.715** (7.12)	–	0.267 (1.26)	–	1.141** (6.39)	–	0.601** (7.00)	–
Population density (ln)	-0.105** (4.54)	-0.113** (4.39)	0.072* (2.44)	0.107** (3.08)	0.248** (4.14)	0.304** (3.61)	0.098 (1.03)	0.121 (1.20)	0.211** (3.17)	0.182* (2.23)	0.122** (3.51)	0.112* (2.36)
Employment growth 1993–2002	0.061* (2.03)	0.094** (3.41)	0.087 (0.84)	0.085* (2.22)	-0.052 (1.08)	0.087 (1.20)	0.028 (0.62)	0.042 (0.91)	0.126 (1.50)	0.165 (1.58)	0.197** (4.19)	0.341** (5.62)
Dummy East Germany	–	–	–	–	0.500** (3.34)^{V}	0.953** (4.77)^{V}	–	–	–	–	–	–
Constant	-0.611* (2.23)	-0.721** (4.67)	-1.937** (5.59)	-1.793** (16.78)	-3.868** (9.65)	-3.868** (11.99)	-2.744** (5.06)	-2.417** (4.72)	-3.470** (2.80)	-3.950** (14.27)	-2.156** (2.99)	-1.192** (6.36)
Lambda	0.004 (0.26)	0.006 (0.42)	0.008 (0.23)	0.006 (0.53)	-0.013* (2.31)	-0.005 (0.73)	-0.019 (1.27)	-0.027 (1.58)	0.013 (1.23)	0.014 (1.43)	0.00 (0.12)	0.023 (1.67)
Wald test of lambda = 0	0.065	0.180	0.054	0.278	5.319*	0.527	1.603	2.486	1.514	2.059	0.014	2.782
LM test of lambda = 0	0.044	0.106	0.804	2.671	0.003	0.012	0.913	0.426	0.032	0.067	0.004	0.864
Variance ratio	0.698	0.586	0.735	0.620	0.706	0.473	0.406	0.332	0.604	0.395	0.750	0.576
Log likelihood	1.866	-14.417	-7.785	-7.306	-2.158	-32.763	-14.676	-16.983	-57.447	-74.850	14.611	-7.047
No. of observations	105	105	82	82	93	93	40	40	77	77	70	70

Notes: Robust estimates (z-values in parentheses); * statistically significant at the 5%-level; ** statistically significant at the 1%-level. ^{V}: variance inflation factor (vif) for variable > 6 < 8.

Table 7: The effect of the Creative Class and higher education on regional employment growth 1996–2002 in Germany (spatial error models)

	I	II	III	IV	V	VI
Higher education 1996 (ln)	4.019** (2.99)	–	–	–	–	–
Creative Class A 1996 (ln)	–	8.696 (1.81)	–	–	–	–
Creative Core 1996 (ln)	–	–	3.325 (1.75)	–	–	–
Creative Professionals 1996 (ln)	–	–	–	-2.894* (2.22)	–	–
Bohemians 1996 (ln)	–	–	–	–	2.215** (2.94)	–
Creative Class B 1996 (ln)	–	–	–	–	–	8.765 (1.92)
Population density 1996 (ln)	-1.120* (2,40)	-0.677 (0.90)	-1.000 (1.53)	1.562* (2.13)	0.038 (0.15)	-0.754 (1.00)
Dummy East Germany	-14.987** (6.42)	-17.115** (17.16)	-13.734** (5.88)	-10.646** (5.08)	-11.333** (5.62)	-17.176** (17.16)
Constant	0.046 (0.09)	-24.168 (1.63)	-0.0426 (0.08)	0.021 (0.04)	0.026 (0.05	-24.189 (1.72)
Lambda	0.169** (5.94)	-0.005 (0.39)	0.168** (5.80)	0.183** (7.74)	0.180** (7.80)	-0.004 (0.37)
Wald test of lambda = 0	35.247**	0.149	33.662**	59.946**	60.800**	0.136
LM test of lambda = 0	4.082*	6.667*	6.938**	5.861*	6.209*	6.749**
Variance ratio	0.428	0.792	0.431	0.372	0.360	0.793
Log likelihood	-242.672	-253.430	-245.441	-244.597	-242.881	-253.224
No. of observations	93	93	93	93	93	93

Notes: * statistically significant at the 5%-level; ** statistically significant at the 1%-level. *Z*-values in parentheses.

Table 8: The effect of the Creative Class and higher education on regional employment growth 1996–2002 in the Netherlands (spatial error models)

	I	II	III	IV	V	VI
Higher education 1996 (ln)	28.511** (3.35)	–	–	–	–	–
Creative Class A 1996 (ln)	–	28.768** (3.98)	–	–	–	–
Creative Core 1996 (ln)	–	–	19.996** (9.66)	–	–	–
Creative Professionals 1996 (ln)	–	–	–	21.554** (2.94)	–	–
Bohemians 1996 (ln)	–	–	–	–	7.424** (4.28)	–
Creative Class B 1996 (ln)	–	–	–	–	–	29.977** (4.27)
Population density 1996 (ln)	-1.533 (1.20)	-1.314 (1.07)	-5.299** (6.15)	-0.629 80.46)	-4.372** (3.29)	-1.601 (1.33)
Constant	-73.527* (2.30)	-82.620** (2.81)	6.046* (2.05)	-53.637 (1.82)	45.124** (5.38)	-86.561** (3.04)
Lambda	0.006 (0.70)	0.005 (0.71)	-0.341** (4.05)	0.005 (0.37)	-0.010 (0.70)	0.005
Wald test of lambda = 0	0.496	0.503	16.408**	0.139	0.486	0.551
LM test of lambda = 0	1.040	0.875	2.150	0.859	0.017	0.779
Variance ratio	0.249	0.312	0.399	0.204	0.345	0.340
Log likelihood	-134.602	-132.811	-124.455	-135.599	-131.411	-131.957
No. of observations	40	40	40	40	40	40

Notes: * statistically significant at the 5%-level; ** statistically significant at the 1%-level. *Z*-values in parentheses.

T*able 9: Regression coefficients for the effect of employees with tertiary degree and in creative occupations on regional start-up rates in 2002 in three European countries (spatial error models)*

	Share of employees with tertiary degree (ln)	Share of Creative Core (ln)	Share of Creative Professionals (ln)	Share of Creative Class A (ln)	Share of Bohemians (ln)
Germany (93 regions)					
Start-up rate, overall	0.4001** (4.60)	0.3611** (5.60)	1.2607** (18.37)	1.1079** (18.54)	0.3611** (5.60)
Start-up rate, high-tech	0.0738** (10.40)	0.0987** (8.32)	0.1860** (7.91)	0.1680** (8.79)	0.0541** (7.54)
Norway (77 regions)					
Start-up rate, overall	4.7800** (3.68)	0.9791** (2.86)	3.2471** (4.01)	2.5291** (3.80)	1.0292** (3.70)
Start-up rate, high-tech	1.0930** (4.73)	0.2744** (4.85)	0.7441** (5.25)	0.5958** (5.01)	0.2135** (4.35)
Sweden (70 regions)					
Start-up rate, overall	2.0371** (11.06)	0.6808 (1.45)	0.3806 (0.59)	0.4953 (0.80)	0.6732* (2.35)
Start-up rate, high-tech	0.3288** (6.67)	0.3978** (7.42)	0.6103** (8.99)	0.5848** (10.10)	0.2857** (10.97)

Notes: Robust estimates (z-values in parentheses). * statistically significant at the 5%-level; ** statistically significant at the 1%-level.

Table 10: Regression coefficients for the impact of employees with higher education and in creative occupation in 1996 on the number of patents per 10,000 inhabitants in German regions during the 1996–2002 period (spatial error models)

	Share of employees with higher education (ln)	Share of Creative Core (ln)	Share of Creative Professionals (ln)	Share of Creative Class A (ln)	Share of Bohemians (ln)
Number of patents per 10,000 inhabitants	0.1644** (6.38)	0.1575** (5.88)	0.1001** (2.66)	0.0717** (4.07)	0.0632 (1.66)

Notes: Robust estimates (z-values in parentheses). * statistically significant at the 5%-level; ** statistically significant at the 1%-level.

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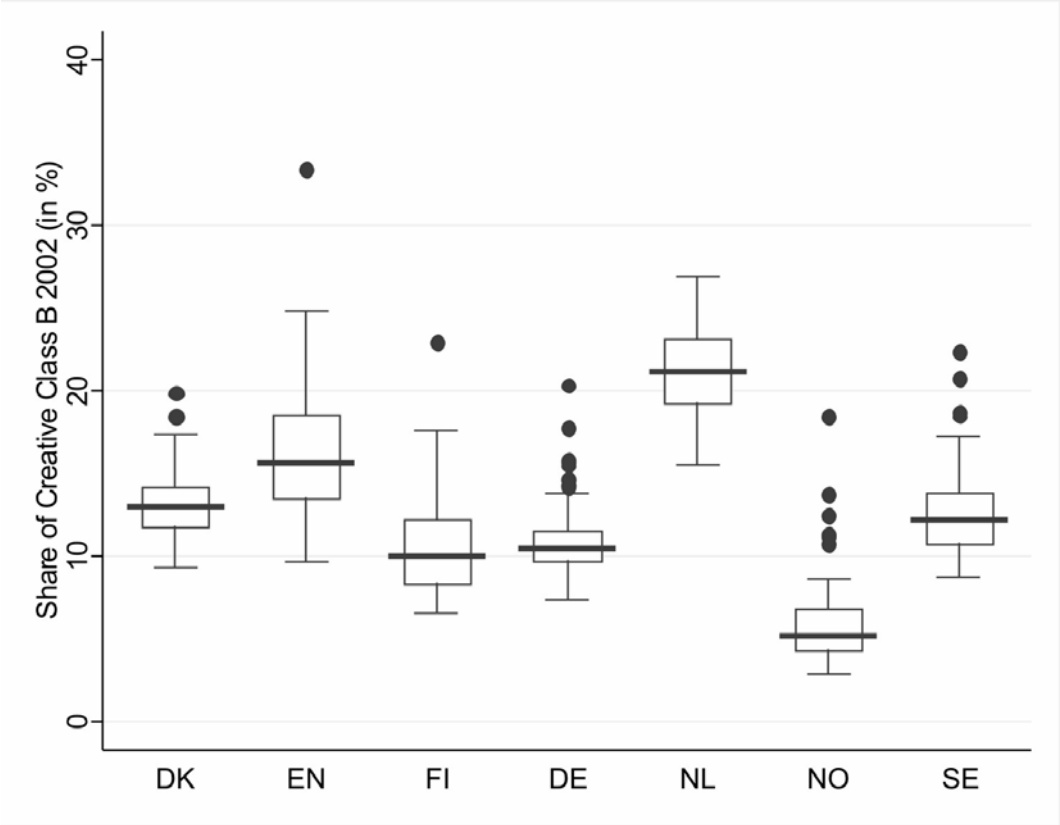
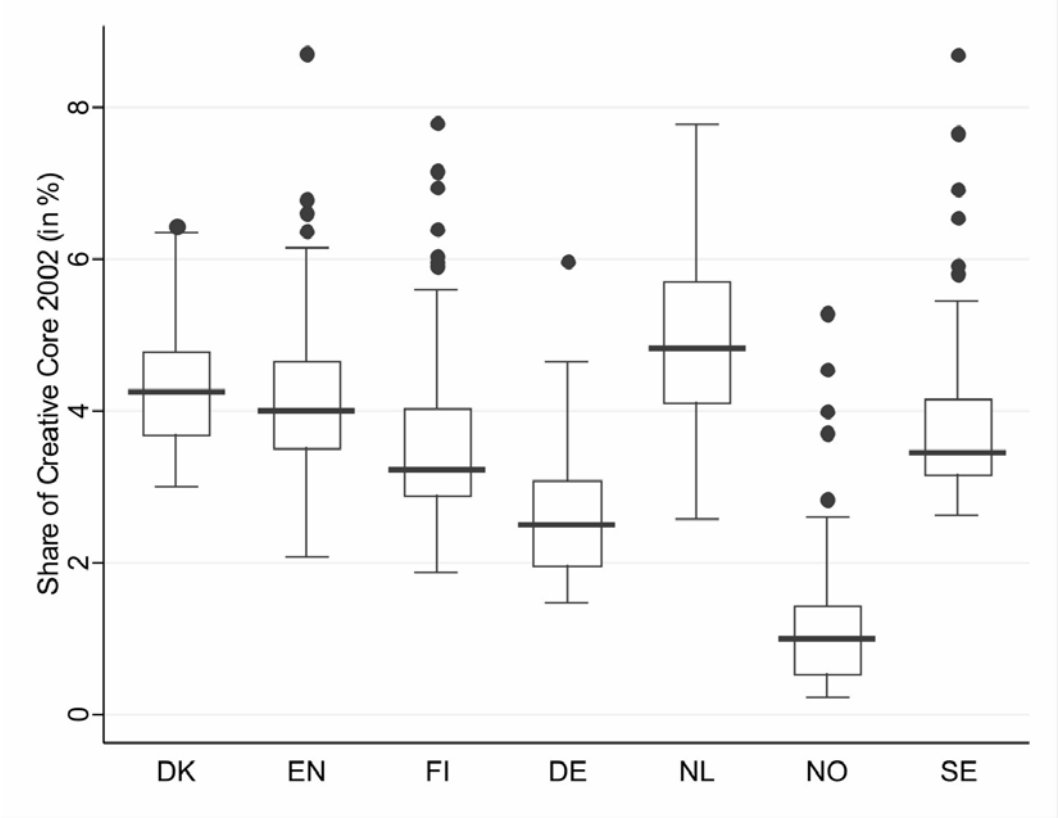
*Figure 1: Spatial distribution of the share of the Creative Class (Creative Class B) occupations in total population in the European countries in 2002**



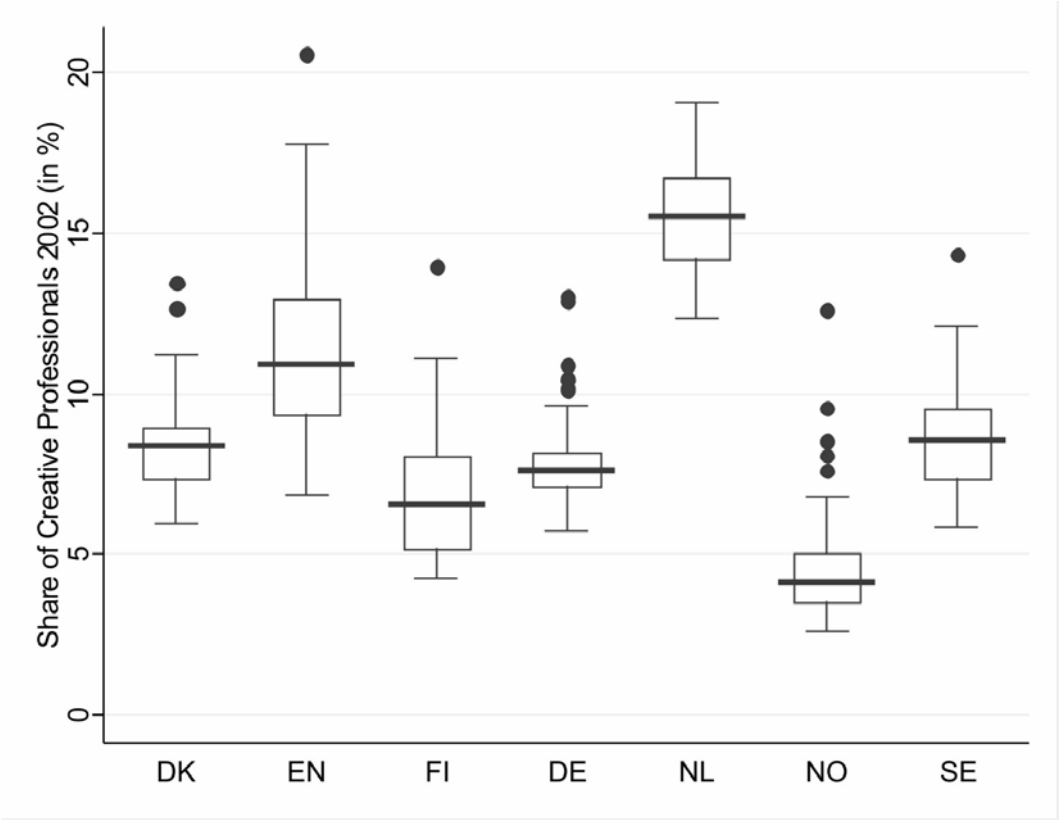
* DK: Denmark, EN: England/Wales, FI: Finland, DE: Germany, NL: The Netherlands, NO: Norway, SE: Sweden.

*Figure 2: Spatial distribution of the share of Creative Core occupations in population in the European countries in 2002**



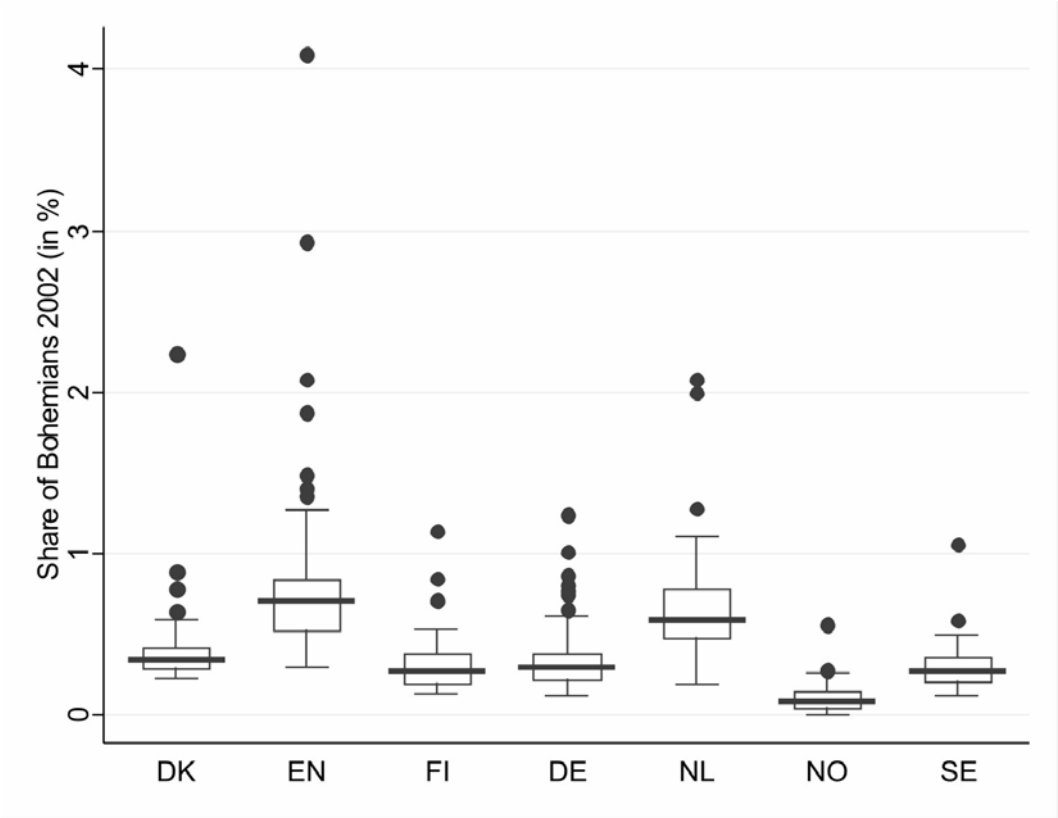
* DK: Denmark, EN: England/Wales, FI: Finland, DE: Germany, NL: The Netherlands, NO: Norway, SE: Sweden.

*Figure 3: Spatial distribution of the share of Creative Professional occupations in population in the European countries in 2002**



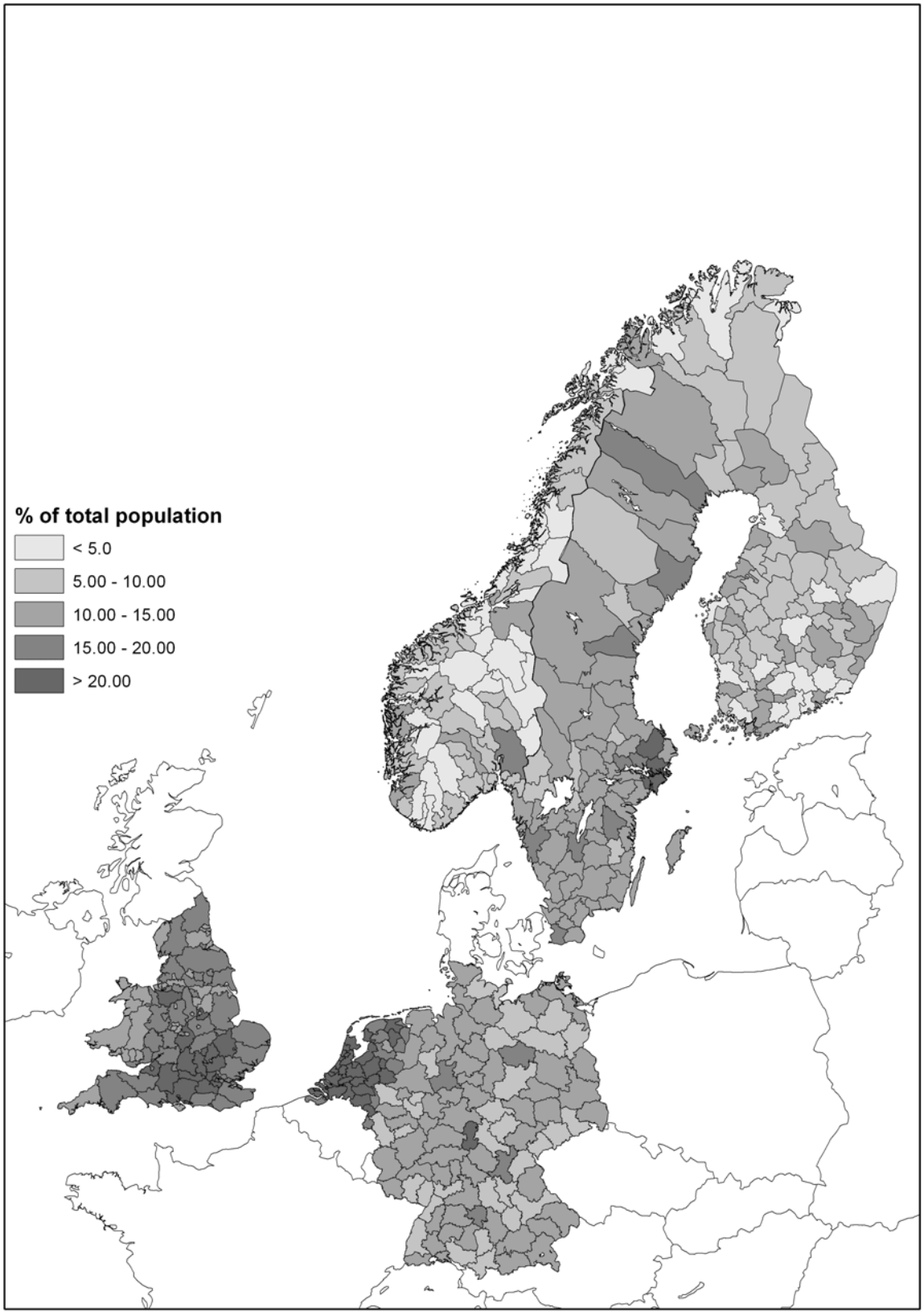
* DK: Denmark, EN: England/Wales, FI: Finland, DE: Germany, NL: The Netherlands, NO: Norway, SE: Sweden.

*Figure 4: Spatial distribution of the share of Bohemian occupations in population in the European countries in 2002**

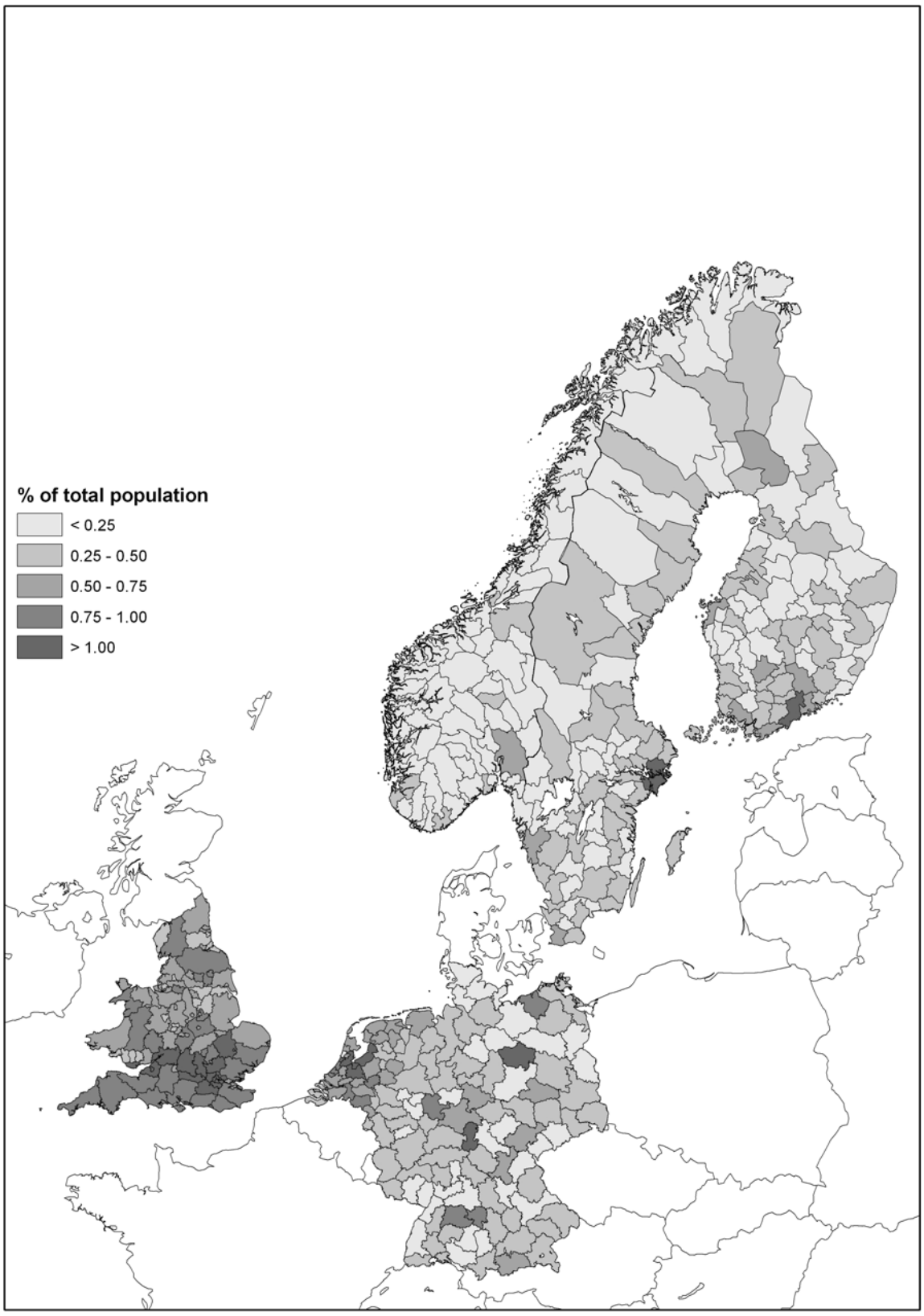


* DK: Denmark, EN: England/Wales, FI: Finland, DE: Germany, NL: The Netherlands, NO: Norway, SE: Sweden.

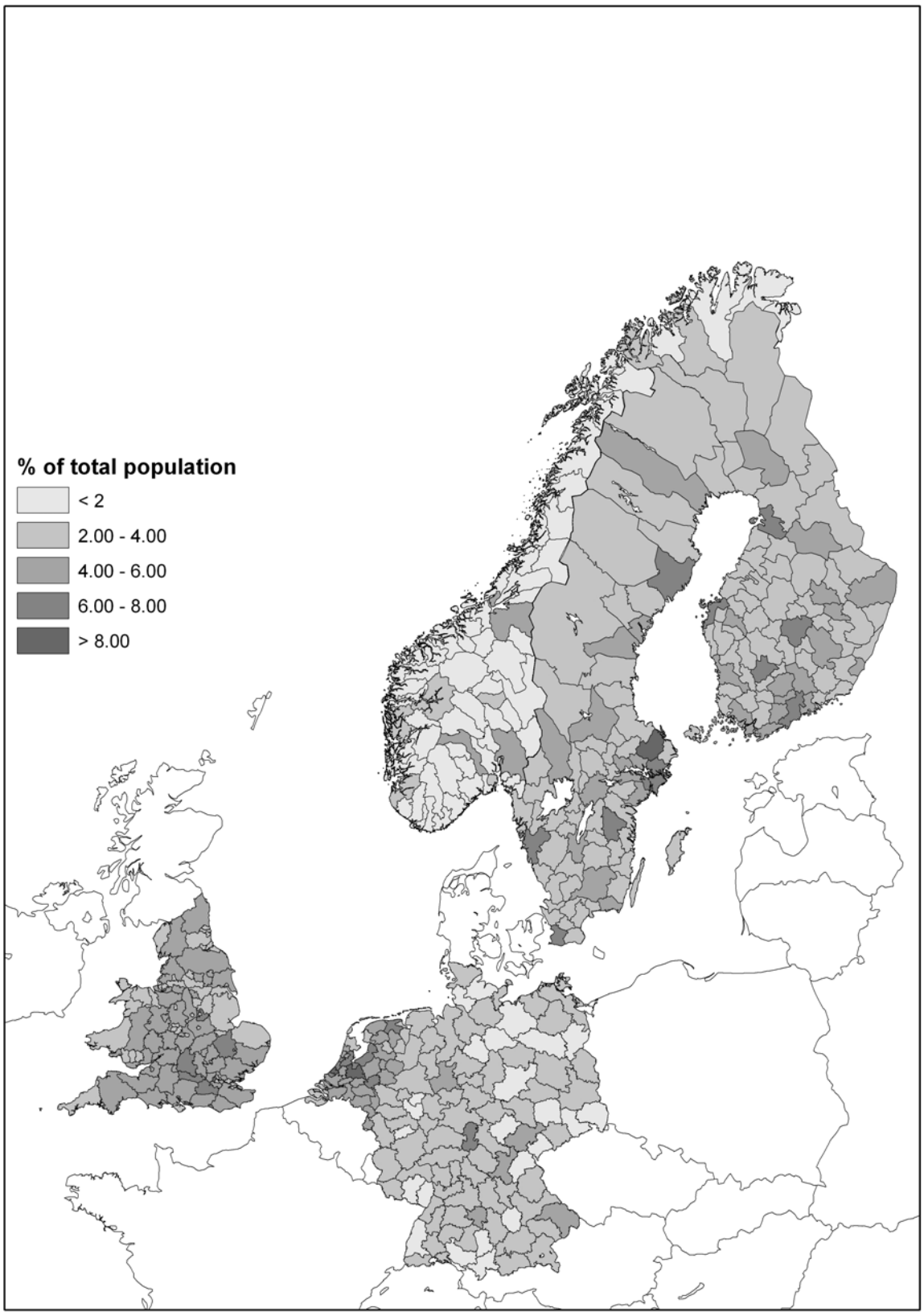
Map 1: Spatial distribution of the share of the Creative Class in population in six European countries in 2002



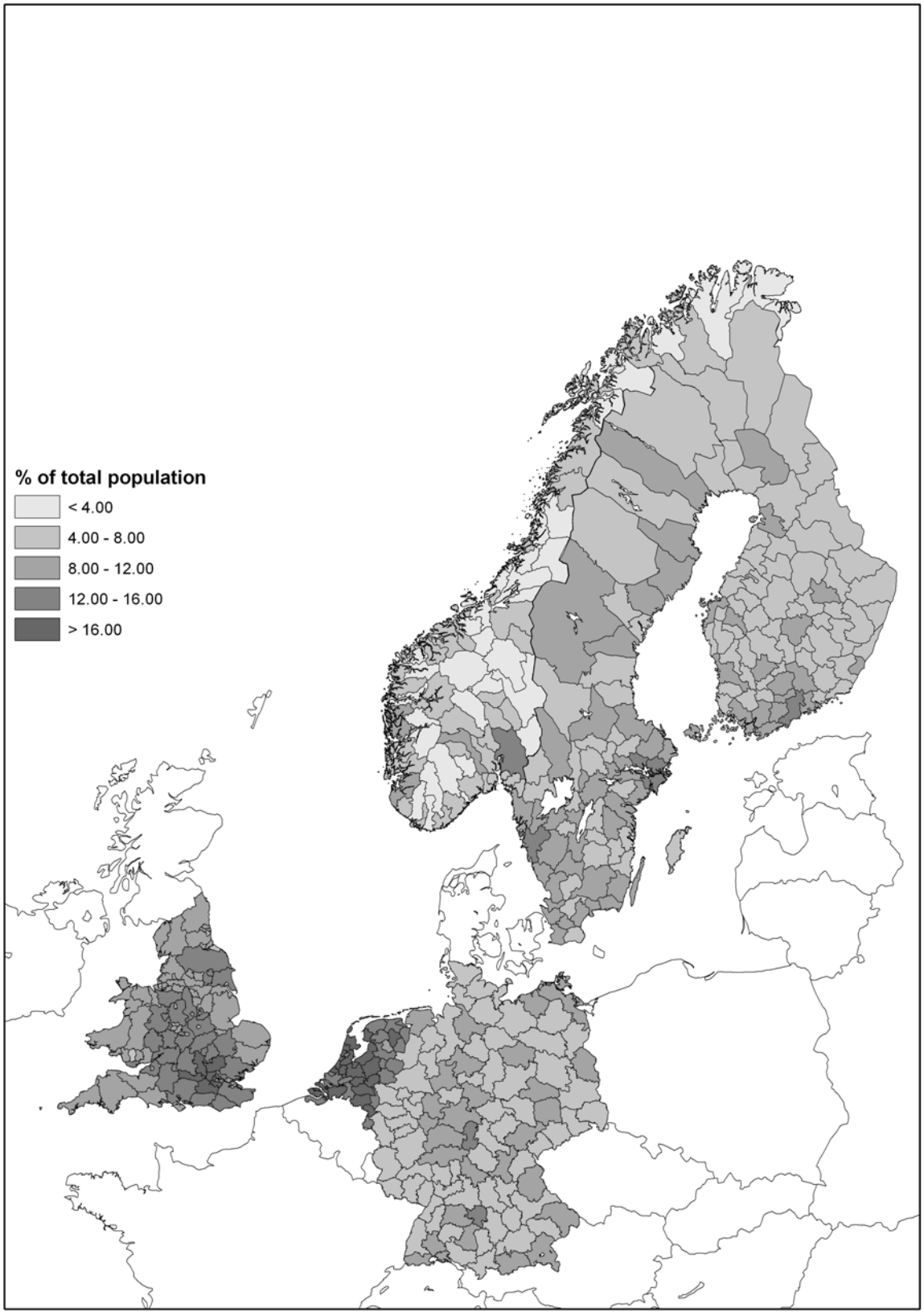
Map 2: Spatial distribution of the share of Bohemians in population in six European countries in 2002



Map 3: Spatial distribution of the share of the Creative Core in population in six European countries in 2002



Map 4: Spatial distribution of the share of Creative Professionals in population in six European countries in 2002



Appendix:

Table A1: Descriptive statistics for variables

Variable	*Mean*	*Median*	*Minimum*	*Maximum*	*Standard deviation*
Bohemian index (ln)					
England/Wales	-0.374	-0.349	-1.210	1.409	0.438
Finland	-1.263	-1.315	-2.078	0.130	0.432
Germany	-1.216	-1.238	-2.110	0.215	0.487
The Netherlands	-0.488	-0.531	-1.672	0.732	0.417
Norway	-2.574	-2.496	-5.048	-0.586	0.847
Sweden	-1.299	-1.333	-2.145	0.057	0.396
Openness index (ln)					
England/Wales	1.641	1.600	0.465	4.018	0.664
Finland	0.687	0.460	-0.566	2.251	0.641
Germany	1.785	1.886	0.434	2.853	0.667
The Netherlands	1.974	1.999	1.280	3.042	0.417
Norway	1.207	1.196	0.164	2.372	1.211
Sweden	2.068	2.069	1.268	2.912	0.409
Public provision index (ln)					
England/Wales	2.212	2.185	0.263	2.637	0.284
Finland	2.069	2.016	1.745	2.842	0.196
Germany	1.580	1.597	1.155	1.958	0.160
The Netherlands	1.631	1.576	1.211	2.540	0.276
Norway	2.527	2.528	2.267	3.000	0.137
Sweden	2.528	2.532	2.250	2.857	0.108
Cultural opportunity index (ln)					
England/Wales	0.955	0.953	0.263	2.637	0.284
Finland	-0.136	-0.127	-1.110	0.950	0.411
Germany	-0.320	-0.388	-0.853	0.587	0.309
The Netherlands	0.669	0.685	0.091	1.681	0.305
Norway	0.027	0.037	-1.061	0.933	0.376
Sweden	0.057	0.093	-0.604	1.154	0.331
Employment change 1993–2002					
England/Wales	2.350	2.260	0.094	6.464	1.042
Finland	0.080	0.067	-0.161	0.357	0.103
Germany	-0.376	-0.266	-2.780	1.604	0.886
The Netherlands	3.346	3.342	-0.100	8.232	1.353
Norway	1.008	1.005	-2.174	3.862	0.881
Sweden	0.492	0.449	-1.393	2.287	0.742

Table A2: Correlation coefficients of Creative Class indicators and the share of employees with a tertiary degree 1996, Germany and the Netherlands

	Germany	The Netherlands
Creative Class A 1996 (ln)	0.699	0.788
Creative Core 1996 (ln)	0.905	0.692
Creative Professionals 1996 (ln)	0.249	0.642
Bohemians 1996 (ln)	0.719	0.393
Creative Class B 1996 (ln)	0.712	0.808

References

Almeida, P., and Kogut, B. 1999. Localization of knowledge and the mobility of engineers in regional networks. *Management Science* 45: 905–917Andersen, K. V., and Lorenzen, M. 2005. The Geography of the Danish Creative Class: A Mapping and Analysis. Copenhagen Business School. http://www.kreativeklasse.dk/index.php?id=75.

Andersen, K. V., Hansen, H. K., Isaksen, A., and Raunio, M. 2008. Nordic city regions in the creative class debate. Putting the creative class thesis to a test. *Economic Geography*, [special issue] forthcoming.

Anselin, L. 1988. *Spatial Econometrics: Methods and Models.* Dordrecht: Kluwer Academic Publishers.

Bettencourt, L. M. A., Lobo, J., and Strumsky, D. 2007. Invention in the city. Increasing returns to patenting as a scale function of metropolitan size. *Research Policy* 36 (1):107–120.

Boschma, R., Eriksson, R., and Lindgren, U. 2009. How does labour mobility affect the performance of plants? The importance of relatedness and geographical proximity. *Journal of Economic Geography* 9 (2): 169–190.

Boschma, R., and Iammarino, S. 2009. Related variety, trade linkages and regional growth in Italy. *Economic Geography*, 85 (3), forthcoming.

Florida, R. L. 2002a. The economic geography of talent. *Annals of the Association of American Geographers* 92:743−755.

Florida, R. L. 2002b. Bohemia and economic geography. *Journal of Economic Geography* 2:55−71.

Florida, R. L. 2003. Entrepreneurship, creativity and regional economic growth. In *The Emergence of Entrepreneurship Policy: Governance, Start-Ups, and Growth in the US Knowledge Economy*, ed. D. M. Hart, 39–58. Cambridge, UK: Cambridge University Press.

Florida, R. L. 2004. *The Rise of the Creative Class*. Revised paperback edition. New York: Basic Books.

Florida, R., Mellander, C., and Stolarick, K. 2008. Inside the black box of regional development. Human capital, the creative class and tolerance. *Journal of Economic Geography* 8:615–649.

Frenken, K., Oort, F. G. van, and Verburg, T. 2007. Related variety, unrelated variety and regional economic growth. *Regional Studies* 41 (5):685–697.

Fritsch, M. 2004. Entrepreneurship, entry and performance of new businesses compared in two growth regimes: East and West Germany. *Journal of Evolutionary Economics* 14:525−542.

Fritsch, M. 2007. The Geography and the Effect of Creative People in Germany. Jena Economic Research Papers 001 – 2007 [http://www.jenecon.de]. Friedrich-Schiller-University and Max Planck Institute of Economics, Jena, Germany.

Fritsch, M., and Falck, O. 2007. New business formation by industry over space and time: A multi-dimensional analysis. *Regional Studies* 41:157–172.

Glaeser, E. L. 2004. Review of Richard Florida's *The Rise of the Creative Class*. http://www.economics.harvard.edu/faculty/glaeser/papers/Review_Florida.pdf, (16.03.2006).

Glaeser, E. L., Kallal, H. D., Schinkmann, J. A., and Shleifer, A. 1992. Growth in cities. *Journal of Political Economy* 100:1126–1152.

Greif, S., and Schmiedl, D. 2002. *Patentatlas Deutschland – Dynamik und Strukturen der Erfindungstätigkeit*. Munich: Deutsches Patent- und Markenamt.

Hackler, D., and Mayer H. 2008. Diversity, entrepreneurship, and the urban environment, *Journal of Urban Affairs* 30 (3):273–307.

Hall, P. A., and Soskice D., eds. 2001. *Varieties of Capitalism. The Institutional Foundation of Comparative Advantage*, Oxford: Oxford University Press.

Hansen, H. K. 2007. Technology, Talent and Tolerance – The Geography of the Creative Class in Sweden. Rapporter och Notitser 169, Lund: Lund Universitet, Department of Social and Economic Geography.

Hill, C., and Adkins, L. 2001. Collinearity. In *A Companion to Theoretical Econometrics*, ed. B. Baltagi, 257–278. Oxford: Blackwell.

Knudsen, B., Florida, R. L., Gates, G., and Stolarick K. 2007. Urban Density, Creativity, and Innovation, http://creativeclass.com/rfcgdb/articles/Urban_Density_Creativity_and_Innovation.pdf.

Lang, R., and Danielsen, K. 2005. Review roundtable: Cities and the creative class. *Journal of the American Planning Association* 71:203−220.

Lee, S. Y., Florida, R., and Acs, Z. 2004. Creativity and entrepreneurship: A regional analysis of new firm formation. *Regional Studies* 38:879−891.

Lucas, R. E. 1988. On the mechanism of economic development. *Journal of Monetary Economics* 22:3−42.

Markusen, A. 2006. Urban development and the politics of a creative class: Evidence from the study of artists. *Environment and Planning A* 38:1921−1940.

Markusen, A., and Schrock G. 2006. The artistic dividend: Urban specialization and economic development implications. *Urban Studies* 43:1661−1686.

Markusen, A., Wassall, G. H., DeNatale, D., and Cohen, R. 2006. Defining the cultural economy. Industry and occupational approaches. Paper presented at the North American Regional Science Council Meetings, Toronto.

Marlet, G., and Woerkens, C. van 2004. Skills and Creativity in a Cross-Section of Dutch Cities. Discussion Paper Series 04-29. Koopmans Research Institute, Utrecht.

Martin, R., and Sunley, P. 1998. Slow convergence? The new endogenous growth theory and regional development. *Economic Geography* 74:201−227.

McGranahan, D., and Wojan T. 2007. Recasting the creative class to examine growth. Processes in rural and urban counties. *Regional Studies* 41 (2):197–216.

Peck, J. 2005. Struggling with the creative class. *International Journal of Urban and Regional Research* 29:740−770.

Power, D., and Scott, A. 2004. *Cultural Industries and the Production of Culture.* London: Routledge.

Putnam, R. D. 2000. *Bowling Alone: The Collapse and Revival of American community*. New York: Simon & Schuster.

Rantisi, N. M., and Leslie, D. 2006. Guest editorial. Placing the creative economy: Scale, politics, and the material. *Environment and Planning A* 38:1789−1797.

Schmiedl, D. 2006. *Patentatlas Deutschland – Ausgabe 2006*. Munich: Deutsches Patent- und Markenamt.

Scott, A. J. 2006. Creative cities. Conceptual issues and policy questions. *Journal of Urban Affairs* 28:1−17.

Sharp, E. B., and Joslyn M. R. 2008. Culture, segregation and tolerance in urban America. *Social Science Quarterly* 89 (3):573–591.

Stam, E., de Jong, J. P. J., and Marlet, G. 2008. Creative industries in the Netherlands. Structure, development, innovativeness and effects on urban growth. *Geografiska Annaler Series B, Human Geography* 90 (2):119–132.

Stolarick, K., and Florida, R. 2006. Creativity, connections and innovations. A study of linkages in the Montreal region. *Environment and Planning A* 38:1799–1817.

Vol, R. de, and Koepp, R. 2004. *State Technology and Science Index*. The Milken Institute. http://www.milkeninstitute.org/publications/download.taf?pubtype=pdf&pubid=304&file=/pdf/state_tech_sci_index04.pdf.

Zucker, L., Darby, M., and Brewer, M. 1998. Intellectual human capital and the birth of biotechnology enterprises. *American Economic Review* 88:290–306.