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Entrepreneurship and Creative Professions – A Micro-Level Analysis

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January 2013

Abstract

It has widely been recognized that creativity plays an immense role not only for arts, sciences, and technology, but also for entrepreneurship, innovation, and thus, economic growth. We analyze the level and the determinants of self-employment in creative professions at the level of individuals. The analysis is based on the representative micro data of the German Socio-Economic Panel (SOEP). The findings suggest that people in creative professions appear more likely to be self-employed and that a high regional share of people in the creative class increases an individual's likelihood of being an entrepreneur. Investigating the determinants of entrepreneurship within the creative class as compared to non-creative professions reveals only some few differences.

JEL classification: L26, Z1, D03

Keywords: Entrepreneurship, new business formation, creativity, creative class

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1. Introduction

Creativity plays a key role in the process of economic development. The importance of creativity for economic development has been recognized in at least two respects. First, creativity is a key input into Research and Development (R&D) and innovation which is a main driver of economic growth (Solow, 1988; Gittleman and Wolff, 1995). Second, there has been increasing demand for goods and services produced by creative industries (Caves, 2000; Howkins, 2001) as well as employment growth in such industries (Florida, 2004) over the last decades. As far as creativity can be nurtured and stimulated (Simonton, 1984), it may be regarded as a target for a policy devoted to foster economic growth (Florida, 2004).

Several dimensions or types of creativity may be distinguished such as artistic or cultural creativity[1], technological creativity or innovation, as well as economic creativity or entrepreneurship. Richard Florida (2004) in his book *"The Rise of the Creative Class"* argues that these three types of creativity are mutually dependent. Lee, Florida and Acs (2004) attempt to investigate such relationships for the USA by asking if regions with a high level of cultural activity are also characterized by a correspondingly high level of start-ups. They, indeed, find some coincidence of these two types of creativity at a regional level and conclude that there may be a close relationship.[2] However, the geographic coincidence of cultural creativity and entrepreneurship does not necessarily suggest a coincidence at the level of individuals. The reason for geographic coincidence may simply be that the regional levels of new business formation and of cultural activity depend on the same factors while the entrepreneurs and the creative people are different persons. Florida (2004, 33), however, claims that "the varied forms of creativity–technological creativity (or invention), economic creativity (entrepreneurship), and artistic and

[1] The term "culture" here refers to the fine arts such as painting, sculpture, music, dance, theatre, architecture, etc.

[2] Florida (2003) shows that there is some correspondence between his creativity indicators and the share of high-tech industries in large cities of the USA.

cultural creativity are in fact deeply interrelated. Not only do they share a common thought process, they reinforce each other through cross-fertilization and mutual stimulation." He also argues (2003, 2004) that people with high ambitions of becoming self-employed prefer locations which are characterized by high levels of cultural creativity. This implies that (potential) entrepreneurs have a special interest in cultural activity. The main reason for such a positive association between entrepreneurship and cultural activities is that culture may stimulate creativity of an individual and can serve as a rich source of new ideas.[3] In this contribution, we aim at investigating the question whether creativity and entrepreneurship coincide not only within regions but within individuals.

In what follows, we first provide an overview on the state of research on entrepreneurial creativity (section 2). Section 3 introduces the theory of the creative class and its relationship to entrepreneurship. Section 4 describes the data, and section 5 reports the result of the empirical analysis. The final section summarizes the evidence and concludes.

2. Approaches to the study of entrepreneurial creativity

2.1 Overview

For a long time, research on creativity has been a domain of psychologists mainly due to the fact that creativity is an attribute of the personality, which is the main topic of this academic discipline (Sternberg and Lubart, 1996; Hennessey and Amabile, 2009). Only recently, scholars from other research fields, such as educational research, organizational and business research, and entrepreneurship, have made significant contributions to this topic (Runco, 2004). Particularly, it has been recognized that creativity is a major driver of innovation, and thus, it is of crucial importance for economic growth.

[3] See, for instance, KEA (2009) as well as Sacchetti, Sacchetti and Sudgeon (2009) for an extensive discussion of this issue.

The heterogeneity of approaches in the study of creativity may be one of several reasons why a generally accepted definition of this phenomenon does not yet exist. However, most researchers agree that creativity involves the development of an idea (a product, a problem solution) that is both novel (i.e., original, unexpected) and useful (i.e., is of value for the individual and/or the larger social group).[4] Usefulness, however, should not be understood in a merely pragmatic sense: while it is of central significance for technological creativity (innovation), artistic creativity is usually not of instrumental, but of intrinsic value (Deutsch, 2001, 227).

Entrepreneurship essentially involves the creation of new businesses. According to Schumpeter (1934), entrepreneurs contribute to economic growth through the process of creative destruction, i.e., their innovative businesses destroy the value of established firms. Early discussions of possible connections between creativity and entrepreneurship (e.g., Lessem, 1980; Gilad, 1984; Whiting, 1988) were based on a rather intuitive understanding of both issues. The obvious reason is that a few decades ago, research in both fields was at a rather early stage, still seeking suitable definitions and research methods. Amabile (1997, 20) proposed a definition of entrepreneurial creativity as “the generation and implementation of novel, appropriate ideas to establish a new venture.” She claims that entrepreneurial creativity does not only occur in start-up firms, but that it also can be exhibited in established organizations, which implies that creativity is related to a more integrated concept of entrepreneurship that includes established firms. Zhou and Shalley (2008, 360) argue that entrepreneurship research and research on creativity are connected in a natural way, since “all entrepreneurs need some level of creativity, whether it is in identifying an opportunity, coming up with new ideas, being creative in how they seek venture capital funding, or pitching their ideas to potential investors.” Block and Koellinger (2009) conclude that entrepreneurship is a particularly attractive career option for people who

[4] Hennessey and Amabile (2009), Sternberg and Lubart (1999), Feist (1998), Amabile et al. (1996).

strongly value creativity. They argue that such people may experience high levels of satisfaction in entrepreneurship because the creativity that is required for starting and running an own business matches their preferences. The three main approaches to the study of entrepreneurial creativity that prevail in the literature are reviewed below.

2.2 Cognitive approach

The studies of cognitive processes, i.e., intellectual skills and knowledge among others, consider the cognitive skills as an important factor influencing creativity. Based on a cognitive approach, Ward (2004) shows that conceptual combination, i.e. the fundamental capacity to interpret concepts and to produce new combinations of already existing ideas, is an important attribute of creativity, and is particularly relevant for entrepreneurs in search of new ideas for their business ventures. Another process described by Ward (2004) with a special link to creativity and entrepreneurship is analogical reasoning, i.e. the transfer of ideas from a familiar domain to a new field. Hence, the cognitive approach suggests that knowledge plays an important role for discovering or creating entrepreneurial opportunities (Shane, 2000; Shane and Venkataraman, 2000). For instance, Shane (2000) shows that many entrepreneurs create ideas for their new business ventures based on their previous knowledge and their familiarity with the field where they start their venture. The observation that the majority of transitions into self-employment occur after a longer spell of dependent employment (Fritsch, Kritikos and Rusakova , 2012) points to the crucial role of work experience for the accumulation of knowledge and other entrepreneurship-related resources. Accordingly, Fritsch and Falck (2007) find that people often set up their businesses in the industry where they have been previously employed.

Another popular concept in the study of (entrepreneurial) creativity is divergent thinking, i.e., the ability of individuals to generate many creative ideas in approaching a problem rather than provide a workable solution (Batey and Furnham, 2006; Carson et al., 2005). Divergent

thinking or flexibility appears to be crucial for entrepreneurs who are searching for new opportunities and try them out (Nyström, 1993) so that it can be regarded an important determinant of innovation (Heunks, 1998) as well as serial entrepreneurship (Ames and Runco, 2005).

Although cognitive skills and, in particular, high levels of human capital have been found to be related to entrepreneurship in several studies (Block, Hoogerheide and Thurik, 2011), a person's intelligence seems to be only modestly related to creativity (Batey and Furnham, 2008). Hence, while cognitive skills and human capital seem to be a necessary precondition for entrepreneurial creativity, other factors such as personality and favorable framework condition may also influence an individual's creative ability.

2.3 Personality approach

Apart from the cognitive approach, empirical studies have focused on the personality of creative people and the characteristics that distinguish them from the remaining population. This type of research often applies the Five Factor Model (called the "Big Five") that reduces the personality traits into five broad factors: openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism (Costa and McCrae, 1992). The most intriguing result of these studies is that the distinguishing characteristics of creative persons have also been found to be relevant to entrepreneurs. One of these characteristics is openness to experience, which conveys someone's intellectual and experiential curiosity, originality, coming up with new ideas[5], but is also related to entrepreneurial behavior[6]. A recent study by Shane et al. (2010) investigates whether openness to experience and an individual's ability to recognize entrepreneurial opportunities are influenced by the same genetic factors. They indeed find that the

[5] Kaufman (2009), King et al. (1996), McCrae (1987), Feist (1998), Glueck et al. (2002), Perrine and Brodersen (2005).

[6] Schmitt-Rodermund (2004), Zhao and Seibert (2006), Rauch and Frese (2007), Zhao et al. (2010), Obschonka et al. (2010), Sorgner (2012).

influence of genetic factors on an individual's ability to recognize opportunities is mediated by their openness to experience.

While openness to experience was found to be closely related to the creative and entrepreneurial performance of people, the findings about the impact of the remaining four factors of the Big Five are rather unstable and differ according to the respective group of professions. For instance, Feist (1998) in his meta-analytical study shows that scientists tend to be much more introverted than non-scientists whereas artists are more extraverted than non-artists. Extraversion was found to be relevant for both entrepreneurial activities (see Shane, 2003; Brandstätter, 1997; Schmitt-Rodermund, 2004; 2007) and creative performance (Ivencevich et al., 1994). In contrast, other studies did not observe any such relationship (Zhao and Seibert, 2006; Sorgner, 2012). Furthermore, empirical analyses arrived at the conclusion that creativity and entrepreneurship are both associated with high levels of risk taking (Heunks, 1998; Caliendo et al., 2009), richness of ideas and imagination, hard work (Glück et al., 2002), intrinsic motivation (Amabile et al., 1994; Prabhu et al., 2008; Rauch und Frese, 2007), as well as self-confidence (Feist, 1998), among others.

2.4 Developmental approach

Research on creativity has traditionally relied on the individual differences in cognitive abilities and personality traits, as described above. In recent years, however, it has been increasingly recognized that the context may play a crucial role. Hence, creativity is also regarded a function of an individual's personality, of the environmental characteristics, and of the interaction of these factors (see, e.g., Amabile, 1996; Shalley, Zhou and Oldham, 2009). Similarly, the developmental approach to the study of entrepreneurial behavior emphasizes the importance of individual characteristics and of the environment for all stages of the entrepreneurial process (Obschonka and Silbereisen, 2012).

A few studies have investigated how creative role models (for instance, being engaged in creative activities or observing creative people) affect individual's own creative abilities. The results strongly suggest that the existence of creative peers can considerably contribute to a person's level of creativity (Shalley and Perry-Smith, 2001; Zhou, 2003; Sacchetti, Sachetti and Sudgen, 2009). The idea that creativity can be stimulated or even learned (Amabile, 1996; Funke, 2009) has attracted increasing interest among business organizations in the so called 'artistic interventions'. The idea behind the artistic interventions is that introducing artistic methods in business organizations, and in particular that interaction with artists can stimulate creativity, innovation, and learning processes among employees (Berthoin Antal, forthcoming; Barry and Meisiek, 2010; Darsø, 2004). Similarly, entrepreneurial creativity may be learned from observing entrepreneurial role models in a person's close context, such as family, workplace, peers, friends, etc. (Bosma et al., 2012). Moreover, entrepreneurial creativity can be stimulated at a more aggregated level of regions with high levels of cultural activities and presence of people in creative professions (Florida, 2004; Lee, Florida and Acs, 2004).

3. Entrepreneurship in the creative class

The significant role of the creative class for regional economic growth and, particularly, its relationship with the regional level of entrepreneurial activity has been put forward by Florida (2004) in his provoking book "The Rise of the Creative Class". Florida (2004) proposes to measure the creativity in a region by means of the share of people in creative professions. Accordingly, he distinguishes between several types of professions based on different degrees of creativity that may be assumed necessary for performing the respective tasks. In this approach, the creative class consists of professions in which the major task is "complex problem solving that involves a great deal of independent judgment and requires high levels of education or human capital" (Florida**,** 2004, 8). Florida's creative class consists of two larger subgroups: the creative core and the creative professionals (Table 1).

The *creative core* includes “people in science and engineering, architecture and design, education, arts, music and entertainment, whose economic function is to create new ideas, new technology and/or new creative content” (ibid.). Surrounding the creative core is “a broader group of *creative professionals* in business and finance, law, health care and related fields” (ibid.). Although the job duties of these professionals are more routinized than those of the creative core, they regularly face problems that require creative solutions (e.g., managers). People in the two subgroups of the creative class, creative core and creative professionals, tend to possess a high level of human capital, but they differ with regard to the extent to which they have to use their skills creatively. An important subgroup of the *creative core* is the *bohemians*, which includes culturally and artistically creative people such as authors, designers, musicians, composers, actors, directors, painters, sculptors, printmakers, photographers and dancers (Table 1).

Table 1: Overview of professions in the creative class and noncreative professions

Creative core	Bohemians (Writers and creative or performing artists, photographers and image and sound recording equipment operators, artistic, entertainment and sports associate professionals, Fashion and other models), natural scientists and engineers, teaching professionals, designers, engineers, computer programmers, psychologists, etc.
Creative professionals	Department managers, lawyers, judges, science technicians, engineering technicians, finance and sales associate professionals, health professionals, finance dealers and brokers, insurance representatives, etc.
Noncreative professions	Social work professionals, school inspectors, computer assistants, aircraft pilots, fire inspectors, sanitarians, travel consultants, clearing agents, bookkeepers, police inspectors, secretaries, office clerks, construction workers, bakers, etc.

According to Florida (2004), the creative class represents a certain environment that may be assumed to be particularly favorable for people to unfold their creative abilities. A key hypothesis of Florida’s approach is that creativity has a positive effect on regional economic growth (Figure 1). In particular, he argues that entrepreneurs, scientists, engineers, artists and other creatively active people may have strong

preferences for locations that offer a rich spectrum of cultural activities. Hence, he concludes that a growth-oriented policy should not neglect the cultural sector of the regional economy but try to create a regional environment that is attractive to creative people.

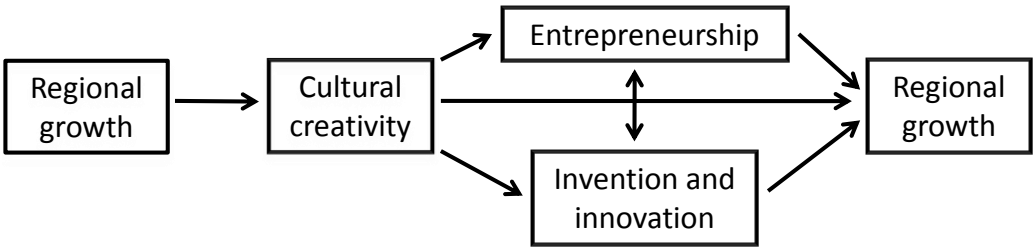


Figure 1: Cultural creativity, invention, innovation, entrepreneurship, and regional growth

The identification of such a growth-enhancing effect of artistic culture in a region is, however, faced with a possible hen-egg problem. Because prosperous locations are able to spend relatively large amounts of resources for culture as a kind of luxury, high levels of cultural and artistic activity in a region could be primarily the result of previous growth, not necessarily a determinant of growth. Hence, the finding of a positive statistical relationship between a relatively high level of cultural activity in a region and subsequent growth cannot be regarded a convincing proof that cultural creativity is conducive to regional development.[7]

Based on these considerations, we will test three hypotheses at the micro-level of individuals. Previous research has shown that the presence of creative class in a region is related with relatively high levels of entrepreneurship (Lee, Florida, and Acs, 2004). It is, however, unclear whether artistic, economic and technological creativity coincide at the individual level. Although artistic creativity appears to be a good

[7] Falck, Fritsch and Heblich (2011) could solve this hen-egg problem by using the presence of a stand-alone opera house in the baroque era as an instrument for a regions' cultural tradition. They show that, during the baroque era, opera houses in German regions have not been set up due to economic prosperity but resulted from a competition of local rulers for prestige. Those regions that had an opera house in the year 1800 were characterized by higher shares of highly qualified workforce today that makes a significant contribution to growth.

precondition for entrepreneurship, since artists often produce new and original ideas that are a necessary input for the creation of new businesses (Sundbo, 2011), it is less clear whether artistically creative people are more likely to be entrepreneurs than persons who are in professions not classified as belonging to the creative class. Accordingly, our Hypothesis 1 states:

H1: People in the creative class are more likely to be self-employed than people in non-creative professions.

Empirical research has shown that entrepreneurial role models can have a significantly positive effect on an individual's decision to set up an own business (Bosma et al., 2012). Hence, if Hypothesis 1 does apply, than there should be relatively high numbers of such entrepreneurial role models present in regions with high shares of people in creative class occupations. This may then turn out to be simulative for entrepreneurship of people in other occupations. A number of authors (Berthoin Antal, forthcoming; Barry and Meisiek, 2010; Darsø, 2004) have argued that quite much may be learned from artists in terms of innovation and business capabilities such as leadership development, problem solving, and team-building, among others; abilities that can be regarded conducive to starting and running a business. Accordingly, our Hypothesis 2 states:

H2: The presence of creative class in a region is positively related to the individual probability of self-employment.

Another related question regards the determinants of entrepreneurship in the creative class. Since entry conditions, entrepreneurial opportunities as well as motivations for entrepreneurship can largely vary across professions and industries, the requirements for entrepreneurship as well as the characteristics of self-employed persons may considerably differ between the creative class and non-creative fields. Hence, we expect

H3: The determinants of self-employment in the creative class differ from those in non-creative professions.

These three hypotheses will be tested in Section 5.

4. Data and indicators

Our empirical analysis is based on the German Socio-Economic Panel (SOEP), a representative longitudinal study of private households in Germany (see Wagner, Frick and Schupp, 2007, for details). For the purposes of present analysis, we use the wave of the year 2009, which includes detailed information on individual's personality and their socio-economic characteristics. We restrict the sample to individuals between 18 and 65 years old and exclude persons who were retired, unemployed or in full-time education, retirees and unemployed. We also do not use information about civil servants or respondents in military service since we consider the occupational choice for these groups of persons to be rather different from employees in the private sector. Self-employed farmers are excluded for the same reason.[8] Next, all persons who have declared their primary activity to be helping in a family business are also left out of our sample because they are neither entrepreneurs nor dependent employees. After excluding respondents with missing values for relevant information, there are 7,918 individuals left in our sample. The remaining sample contains 850 self-employed persons accounting for 10.7 percent of the total sample. This corresponds quite well to the share of self-employed persons in the overall population (Fritsch, Kritikos and Rusakova, 2012).

Previous empirical analyses of the determinants of self-employment at different stages of an entrepreneurial process have found a significant impact of diverse factors such as human capital, social capital, socio-demographic characteristics as well as characteristics of the macro environment on the probability of being engaged in entrepreneurial activities (see Parker, 2009, for an overview). We account for these influences found in earlier studies as far as the respective information is available in our data.

Since we know the planning region (*Raumordnungsregion*) where a person resides, we are able to account for characteristics of the

[8] Most farms in Germany are family businesses. Self-employment of farmers may particularly be a result of a family tradition or of the tradition in the particular region.

individual environment. Planning regions consist of at least one core city and the surrounding area, and can be regarded as functional units in the sense of travel to work areas.[9] Data about the regional environment used in the empirical analysis include the regional unemployment rate as provided by the Federal Employment Agency (*Bundesagentur für Arbeit*), the regional start-up rate derived from the German Social Insurance Statistics (for details see Fritsch and Brixy, 2004), and population density. Moreover, we are able to account for the regional share of people working in professions of the creative class, as proposed by Florida (2004).[10] In order to allow some time lags for the regional characteristics to unfold their effect on new business formation, the respective indicators correspond to the year 2007.

We follow Florida's (2004) approach and classify persons into three groups based on their current occupation: creative core, creative professionals, and noncreative professions. Additionally, we distinguish bohemians who constitute a subgroup of the creative core. The definition of the different classes of professions is based on the International Classification of Occupations (ISCO-88), which is available in the SOEP data at the four-digit level (see Table A1 in the Appendix). In our sample, 37.3 percent (2,956 individuals) belong to the creative class. Among them 1,083 individuals (13.7 percent of the full sample) belong to the creative core and 1,873 individuals (23.6 percent of the full sample) are classified as creative professionals. Bohemians constitute about 0.93 percent of the sample (about 6.8 percent of the creative core). The remaining 62.7 percent (4,962 individuals) are in non-creative professions.

The set of control variables that we are able to use includes socio-demographic variables, such as age and its squared value, gender, nationality, and marital status. We further control for the level of human

[9] Planning regions are slightly larger than what is usually defined as a labor market area. The advantage of planning regions in comparison to districts (*Kreise*) as spatial units of analysis is that they account for economic interactions between districts. See Federal Office for Building and Regional Planning (2003) for the definition of planning regions and districts.

[10] This data is also taken from the German Insurance statistics..

capital by including the information about the number of years a person has spent in formal education, as well as the number of years of experienced unemployment. Moreover, the dataset contains a psychological scale that measures the Big Five dimensions of personality (Costa and McCrae, 1992) based on three questions for each of the broad dimensions. The Big Five dimensions are 'openness to experience', 'conscientiousness', 'extraversion', 'agreeableness', and 'neuroticism'.[11] Empirical entrepreneurship research provides evidence that entrepreneurs tend to have a higher propensity to take risks than dependently employed persons (Kihlstrom and Laffont, 1979; Stewart et al., 1998; Ekelund et al. 2005). Thus, we employ a measure of a person's willingness to take risks, which is an experimentally validated 11-point-scale based on the question "Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?" (see Dohmen et al., 2011).

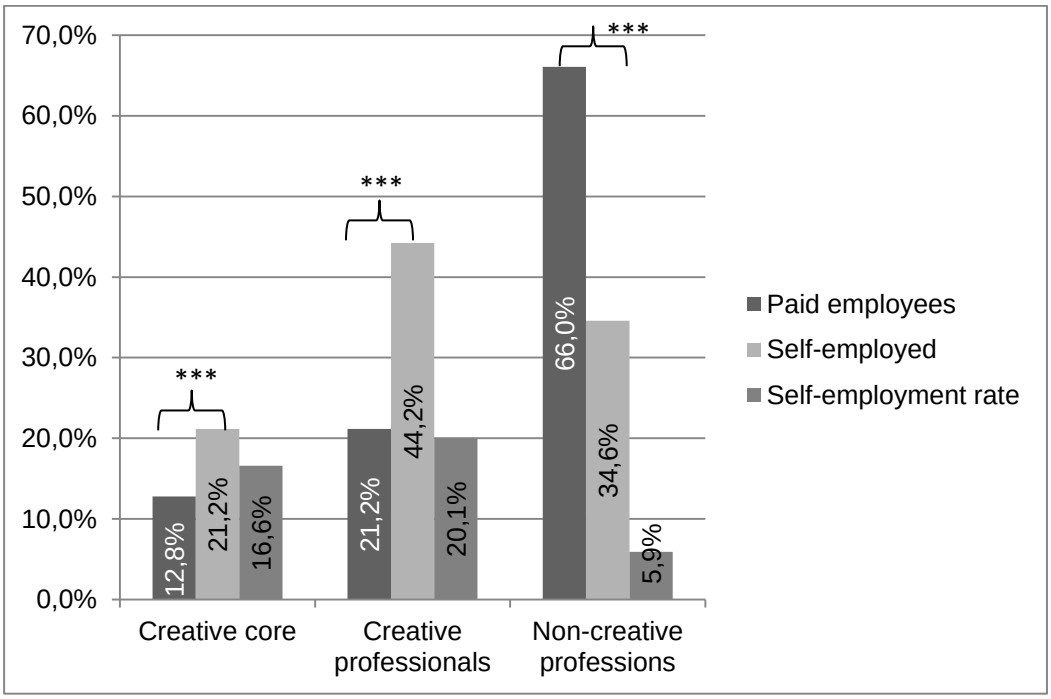
5. Results

5.1 Descriptive evidence

There are substantial differences in the distribution of self-employed people and paid employees in the creative class (see Figure 1). While most self-employed people (44.2 percent) are in the category of creative professionals, the majority of paid employees (66 percent) are working in non-creative professions. The share of self-employed in the creative core (21.2 percent) is significantly larger than the share of paid employees (12.8 percent) in this group of professions. Remarkably, the self-employment rates in the creative core (16.6 percent) and among creative professionals (20.1 percent) are both considerably above the sample average self-employment rate (10.7 percent). In contrast, the self-employment rate in non-creative professions is only 5.9 percent.

[11] The SOEP respondents were asked to rate themselves on a seven-point scale, with 1 indicating that a given personality characteristic does not apply to them at all and 7 meaning that the characteristic applies perfectly. Gerlitz and Schupp (2005) show that the self-reported personal attitudes based on the Big Five related questions in the SOEP are valid and reliable. We calculate the value for each of the Big Five dimensions as arithmetical means of the responses to the three questions.

These figures that are in accordance with our Hypothesis 1 make it clear that some professional groups are much more economically creative in terms of entrepreneurship than others.



Note: t-test of equal means between the groups of employees and self-employed; ***: statistically significant at the 1% level.

Figure 1: Distribution of paid employees and self-employed in the creative class.

The findings concerning the characteristics of self-employed people and employees suggest further differences between these two groups (Table 2). Self-employed people are more likely to be located in regions with a significantly higher share of people employed in the creative class, and particularly, in its subgroups: the bohemians, the creative core, and the creative professionals. Moreover, the regions where self-employed people reside are characterized by on average higher unemployment rates and higher population density, as compared to regions of an average paid employee. There is no statistically significant difference, however, between the two groups with regard to the regional start-up rate.

Table 2: Mean differences between self-employed and paid employees.

	Self-employed	Paid employees	p-value
Regional share of bohemians	0.008	0.007	0.000
Regional share of the creative core	0.076	0.073	0.001
Regional share of creative professionals	0.495	0.485	0.000
Regional share of the creative class	0.571	0.558	0.000
Regional unemployment rate	0.241	0.234	0.079
Regional start-up rate	11.787	11.694	0.362
Population density in a region	535.568	451.257	0.000
Bohemian profession	0.029	0.007	0.000
Profession of the creative core	0.212	0.128	0.000
Creative professional	0.442	0.212	0.000
Profession of the creative class	0.654	0.340	0.000
Years of formal education	13.931	12.517	0.000
Experienced years of unemployment	0.654	0.676	0.712
Age	46.748	42.113	0.000
Male (yes = 1, no = 0)	0.621	0.494	0.000
Either parents self-employed (yes = 1, no = 0)	0.164	0.083	0.000
Married (yes = 1, no = 0)	0.652	0.583	0.000
German (yes = 1, no = 0)	0.961	0.955	0.389
Conscientiousness	5.940	5.861	0.014
Extraversion	5.000	4.804	0.000
Agreeableness	5.239	5.281	0.229
Openness to experience	4.843	4.396	0.000
Neuroticism	3.573	3.758	0.000
Willingness to take risks	4.578	4.036	0.000
Number of observations	850	7,068	

Notes: t-test of equal means of the group of self-employed and employees. ***: statistically significant at the 1% level, **: statistically significant at the 5% level, *: statistically significant at the 10% level.

With regard to individual characteristics, self-employed people have on average spent almost 1.5 years more in formal education, and tend to be older than persons that are dependently employed. About 62 percent of the self-employed people are male as compared to 49.4 percent among the paid employees. Self-employed people are more likely to have had self-employed parents when they were around 15 years old (about 16.4 percent), and they are more likely to be married.

With regard to personality characteristics, self-employed people score on average higher than dependently employed on the dimensions conscientiousness, extraversion, openness to experience, and they score significantly lower on neuroticism. Finally, self-employed people are significantly more willing to take risks than employees. Overall, this evidence is in line with the previous findings on the characteristics of self-employed people (see, e.g., Parker, 2009).

5.2 Multivariate analysis

While the descriptive evidence in the previous section has already provided indications in favor of Hypothesis 1, which states that people in the creative class are more likely to be self-employed as compared to people in non-creative professions, the multivariate analysis offers additional support for this proposition. When including a variable that indicates a respondent's affiliation with the creative class, we find a positive and statistically significant association of this variable with the respondent's self-employment status (column I of Table 3). Having a bohemian profession has a strong and positive association with the status of being self-employed (column II), but also being a creative professional is statistically significant and positively related to on the probability of self-employment (column IV). However, the effect is not statistically significant for people in the creative core (column III).

In order to test our Hypothesis 2 which states that the presence of the creative class in the region is positively associated with an individual probability of self-employment, we conduct a logistic regression analysis with the binary dependent variable that equals one if a respondent is self-employed and is zero otherwise (Table 3). As expected, the regional share of people employed with creative class professions is significantly and positively associated with the individual

Table 3: The role of the regional share of creative class and respondent's affiliation with the creative class for individual self-employment

	I	II	III	IV	V	VI	VII	VIII
Respondent in the creative class	0.078***							
	(0.008)							
Respondent in a bohemian profession		0.120**						
		(0.049)						
Respondent in the creative core			0.008					
			(0.008)					
Respondent is a creative professional				0.074***				
				(0.009)				
Regional share of the creative class (t-2)					0.110**			
					(0.056)			
Regional share of bohemians (t-2)						1.893**		
						(0.903)		
Regional share of the creative core (t-2)							0.047	
							(0.147)	
Regional share of the creative professionals (t-2)								0.151**
								(0.067)
Regional unemployment rate (t-2)	0.039	0.036	0.036	0.047*	0.050*	0.038	0.036	0.056**
	(0.026)	(0.027)	(0.027)	(0.026)	(0.028)	(0.027)	(0.027)	(0.028)
Regional start-up rate (t-2)	-0.0002	-0.0003	-0.0002	-0.00003	-0.001	-0.0004	-0.0002	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Regional population density (t-2)	0.00001**	0.00001**	0.00001**	0.00001**	0.00001	0.00001	0.00001**	0.00001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age	0.012***	0.0121***	0.012***	0.0117***	0.012***	0.0120***	0.012***	0.0120***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Age, squared	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male (yes = 1, no = 0)	0.037***	0.040***	0.040***	0.037***	0.040***	0.040***	0.040***	0.0400***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)

Table 3 (continued)

Either parents self-employed (yes = 1, no = 0)	0.055***	0.059***	0.058***	0.054***	0.058***	0.057***	0.058***	0.058***
	(0.012)	(0.013)	(0.013)	(0.012)	(0.013)	(0.0126)	(0.013)	(0.013)
Married (yes = 1, no = 0)	-0.004	-0.003	-0.003	-0.005	-0.002	-0.002	-0.003	-0.002
	(0.006)	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)
German (yes = 1, no = 0)	-0.022	-0.015	-0.015	-0.024	-0.014	-0.016	-0.015	-0.0141
	(0.017)	(0.017)	(0.017)	(0.0182)	(0.017)	(0.017)	(0.017)	(0.017)
Years of formal education	0.006***	0.011***	0.011***	0.009***	0.011***	0.011***	0.011***	0.0110***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Experienced years of unemployment	0.004***	0.002	0.002	0.003**	0.002	0.002	0.002	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Conscientiousness	0.006*	0.006	0.006	0.005	0.006*	0.006	0.006	0.00620*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Extraversion	0.008***	0.008***	0.008***	0.007**	0.008***	0.008***	0.008***	0.008***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Agreeableness	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	-0.005
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Openness to experience	0.014***	0.017***	0.018***	0.018***	0.018***	0.018***	0.018***	0.018***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Neuroticism	-0.0002	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Willingness to take risks	0.003***	0.007***	0.006***	0.006***	0.006***	0.007***	0.006***	0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Number of observations	7,918	7918	7,918	7918	7,918	7,918	7,918	7918
Log Likelihood	-2,360	-2417	-2,424	-2372	-2,422	-2,419	-2,424	-2422
Chi2	635.2***	535.2***	534.9***	607.4***	533***	532.7***	530***	533.4***
Pseudo R2	0.126	0.105	0.102	0.121	0.103	0.103	0.102	0.103

Notes: Marginal effects as results of logit regressions. Dependent variable =1 if self-employed and =0 if dependently employed. Robust standard errors are in parentheses. ***: statistically significant at the 1% level, **: statistically significant at the 5% level, *: statistically significant at the 10% level.

probability of self-employment (column V). More specifically, a rather strong effect on the probability of self-employment is observed for the regional share of bohemian professions (column VI), as well as for the regional share of creative professionals (column VIII). For the subgroup of people in the creative core the respective coefficient is not statistically significant (column VIII).Overall, Hypothesis 2 cannot be rejected.

In a final step we investigate the determinants of self-employment within the creative class in order to test our Hypothesis 3. Table 4 presents the results (marginal effects) for the full sample, for people in the creative core, for the creative professionals, as well as for persons with non-creative professions. Unfortunately, a more detailed analysis for the subgroup of the bohemians was not possible due to a rather low number of cases. Interestingly, the regional unemployment rate is only significantly associated with the probability of self-employment in non-creative occupations. High population density is only significantly and positively related with self-employment in the creative core. Particularly, large cities might be more attractive for highly creative self-employed people, for instance, because of the rich cultural life and closeness to other creative people.

Interestingly, there are only few statistically significant determinants of self-employment in the creative core, as compared to other professional groups. For instance, there is no statistically significant effect of age, gender, parental role models of self-employment, and education. On the one hand, this result may be regarded as an indication that highly creative people are likely to become self-employed more or less independently of their socio-economic background. Thus, certain barriers for self-employment entry appear not to be particularly strong in the creative core. On the other hand, this finding may indicate that entrepreneurial individuals are more likely to self-select into professions of the creative core. If this should be the case, people in the creative core will be rather homogeneous with

regard to their individual characteristics, which then explains the few observed significant effects.

Table 4: Determinants of self-employment in the creative class

Variables	Full sample	Creative core	Creative profes-sionals	Non-creative professions
Regional unemployment rate (t-2)	0.036	-0.051	0.077	0.046**
	(0.027)	(0.099)	(0.088)	(0.022)
Regional start-up rate (t-2)	-0.0002	0.004	0.0005	-0.001
	(0.001)	(0.004)	(0.004)	(0.001)
Regional population density (t-2)	0.00001**	0.0001***	-0.000003	0.000002
	(0.000)	(0.000)	(0.000)	(0.000)
Age	0.012***	0.005	0.034***	0.007***
	(0.002)	(0.008)	(0.007)	(0.002)
Age, squared	-0.0001***	-0.00002	-0.0003***	-0.0001***
	(0.000)	(0.000)	(0.000)	(0.000)
Male (yes = 1, no = 0)	0.040***	0.024	0.071***	0.029***
	(0.006)	(0.024)	(0.018)	(0.006)
Either parents self-employed (yes = 1, no = 0)	0.058***	0.034	0.128***	0.038***
	(0.013)	(0.038)	(0.034)	(0.013)
Married (yes = 1, no = 0)	-0.003	-0.002	-0.019	0.001
	(0.007)	(0.024)	(0.021)	(0.006)
German (yes = 1, no = 0)	-0.015	-0.137	-0.003	-0.011
	(0.017)	(0.085)	(0.066)	(0.014)
Years of formal education	0.011***	0.006	0.012***	0.006***
	(0.001)	(0.004)	(0.003)	(0.001)
Experienced years of unemployment	0.002	0.023***	0.023***	0.0001
	(0.001)	(0.008)	(0.008)	(0.001)
Conscientiousness	0.006	-0.013	0.006	0.009***
	(0.004)	(0.013)	(0.012)	(0.003)
Extraversion	0.008***	0.001	0.026***	0.003
	(0.003)	(0.011)	(0.009)	(0.002)
Agreeableness	-0.004	0.002	-0.008	-0.003
	(0.003)	(0.013)	(0.009)	(0.003)
Openness to experience	0.018***	0.047***	0.005	0.012***
	(0.003)	(0.011)	(0.009)	(0.002)
Neuroticism	-0.001	0.009	-0.003	-0.001
	(0.003)	(0.011)	(0.008)	(0.002)
Willingness to take risks	0.007***	0.009	0.011**	0.004***
	(0.001)	(0.006)	(0.004)	(0.001)
Number of observations	7,918	1,083	1,873	4,962
Log Likelihood	-2424	-453.6	-851.3	-1006
Chi2	528.8***	67.96***	155.5***	216.8***
Pseudo R2	0.102	0.0688	0.0936	0.0987

Notes: Marginal effects as results of logit regressions. Dependent variable =1 if self-employed and =0 if dependently employed. Robust standard errors are in parentheses. ***: statistically significant at the 1% level, **: statistically significant at the 5% level, *: statistically significant at the 10% level.

The time that a person has experienced unemployment has a positive effect on the decision to be self-employed among the creative core and the creative professionals. This may be regarded an

indication that entrepreneurship in these groups is more likely to be necessity-driven than in other types of professions. With regard to the Big Five dimensions of personality, we find that openness to experience appears to have the strongest effect on the probability of being self-employed in the full sample, for people in creative core professions, and among non-creative professions. However, it is not associated with the probability of self-employment among the creative professionals. Instead, extraversion was a personality trait most strongly associated with the self-employment status among creative professionals. This finding indicates that the personality profile of self-employed people may vary across the occupational context (Sorgner, 2012). Summarizing, we can say that the analyses show some significant differences of the determinants of self-employment between groups of professions according to Hypothesis 3.

6. Discussion and conclusions

There can be little doubt that creativity is of crucial importance for entrepreneurship. In this contribution we have analyzed the propensity and the determinants of self-employment among different groups of professions based on Richard Florida's (2004) concept of the creative class. We have found that people in creative professions are more likely to be self-employed than people in professions that are classified as not particularly creative. The empirical evidence shows that a high share of creative class in a region, and particularly, the share of bohemians and creative professionals, is strongly associated with a higher individual probability of self-employment. This effect was statistically significant when controlling for a wide set of regional, socio-economic, and psychological factors. The reasons behind such a creativity-spillover are, however, not clear. A possible explanation could be that creative people, particularly if self-employed, serve as role models for other people in a region thereby increasing their willingness to become entrepreneurs. Another explanation would be that places that are especially attractive for creative people are also attractive for entrepreneurs. Analyzing the determinants of self-employment among

the creative core, the creative professionals and the non-creative professions showed a number of differences between these groups of professions. This may indicate self-selection of entrepreneurial people in certain professions as well as an effect of the respective professional environment on the decision to be self-employed.

All in all, our analyses provide some support for the hypotheses about the effect of the creative class on entrepreneurship that have been put forward by Richard Florida (2004). Bohemians and creative professionals represent the subgroups of the creative class that appear to be closely related with individual entrepreneurship. It is both the regional share of people in the creative class as well as the own affiliation with the creative class that are positively associated with individual self-employment. What we can say with a considerable degree of certainty is that the propensity for self-employment as well as the determinants of entrepreneurial choice may considerably vary across professions, be it due to self-selection of certain types of people in certain professions, or be it because different professions provide different environments that offer specific possibilities and incentives for self-employment (Sorgner, 2012; Sorgner and Fritsch, 2013). More research is needed to analyze such differences and to identify the relevant relationships.

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Appendix: Tables

Table A1: Definition of the subgroups of the creative class

Subgroups of the creative class	4-digit-codes of International Standard Classification of Occupations (ISCO-88)
Bohemians	2451-2455, 3131, 347, 521.
Creative core	1236–1237, 2111–2213, 2310–2351, 2359, 2431–2443, 2445, 2451–2455, 3131, 3310–3340, 3434, 3471–3474, 7313, 7324, 7433.
Creative professionals	1110–1120, 1140–1143, 1200, 1210, 1221-1229, 1231, 1232, 1234, 1235, 1239, 1300, 1311-1319, 2221-2224, 2229, 2230, 2400, 2411, 2412, 2419, 2421, 2422, 2429, 2470, 3111-3119, 3132, 3211, 3223-3229, 3231, 3232, 3241, 3411-3413, 3416, 3417, 3419, 3432, 3475, 7312, 7331, 7332.

Table A2: Descriptive statistics.

Variables	Mean	Median	Minimum	Maximum	Standard deviation
Self-employed	0.11	0	0	1	0.31
Regional share of bohemian professions	0.008	0.007	0.002	0.017	0.004
Regional share of the creative core	0.07	0.07	0.03	0.12	0.02
Regional share of creative professionals	0.486	0.482	0.360	0.613	0.055
Regional share of the creative class	0.56	0.55	0.42	0.68	0.07
Regional unemployment rate	0.23	0.20	0.08	0.54	0.11
Regional start-up rate	11.70	11.32	6.05	21.09	2.81
Population density	460.31	256.63	46.83	2,345.20	476.87
Bohemian profession	0.009	0	0	1	0.096
Profession of the creative core	0.14	0	0	1	0.34
Creative professional	0.237	0	0	1	0.425
Profession of the creative class	0.37	0	0	1	0.48
Years of formal education	12.67	11.5	7	18	2.64
Experienced years of unemployment	0.67	0	0	24	1.66
Age	42.61	44	18	65	11.31
Age, squared	1,943.59	1,936	324	4,225	943.78
Male	0.51	1	0	1	0.50
Either parents self-employed	0.09	0	0	1	0.29
Married	0.59	1	0	1	0.49
German	0.96	1	0	1	0.21
Conscientiousness	5.87	6	1.67	7	0.89
Extraversion	4.83	5	1	7	1.14
Agreeableness	5.28	5.33	1	7	0.97
Openness to experience	4.44	4.33	1	7	1.16
Neuroticism	3.74	3.67	1	7	1.20
Willingness to take risks	4.09	4	0	10	2.10

Table A3: Correlation matrix

		1	2	3	4	5	6	7	8	9	10	11	12	
1	Regional share of bohemians	1												
2	Regional share of creative professionals	0.58	1											
3	Regional share of the creative core	0.65	0.34	1										
4	Regional share of the creative class	0.7	0.95	0.62	1									
5	Regional unemployment rate	0.01	-0.19	0.03	-0.15	1								
6	Regional start-up rate	0.16	0.29	-0.14	0.2	0.14	1							
7	Population density	0.56	0.57	0.31	0.58	0.02	0.23	1						
8	Bohemian profession	0.07	0.04	0.05	0.05	0.01	0.03	0.06	1					
9	Profession of the creative core	0.08	0.05	0.08	0.07	0.03	0.02	0.05	0.24	1				
10	Creative professional	0.05	0.06	0.04	0.07	-0.03	0	0.05	-0.05	-0.22	1			
11	Profession of the creative class	0.1	0.09	0.09	0.11	-0.01	0.01	0.08	0.13	0.52	0.72	1		
12	Years of formal education	0.15	0.13	0.14	0.16	0.05	0	0.11	0.1	0.36	0.23	0.46	1	

	Table A3 (continued)	13	14	15	16	17	18	19	20	21	22	23	24
13	Experienced years of unemployment	1											
14	Age	0.07	1										
15	Age, squared	0.06	0.99	1									
16	Male	-0.05	0.01	0.02	1								
17	Either parents self-employed	-0.05	-0.01	0	-0.01	1							
18	Married	-0.04	0.42	0.39	0.02	-0.01	1						
19	German	-0.05	0.07	0.07	-0.01	0.01	-0.05	1					
20	Conscientiousness	0.01	0.15	0.14	-0.09	-0.02	0.1	-0.02	1				
21	Extraversion	-0.02	-0.07	-0.07	-0.13	0.02	-0.03	-0.02	0.17	1			
22	Agreeableness	0.03	0.01	0.02	-0.16	-0.01	0	-0.02	0.26	0.08	1		
23	Openness to experience	-0.04	0.01	0.01	-0.08	0.05	-0.07	0	0.11	0.34	0.12	1	
24	Neuroticism	0.05	-0.02	-0.02	-0.2	0	0.02	0	-0.09	-0.15	-0.12	-0.04	1
25	Willingness to take risks	-0.02	-0.14	-0.13	0.19	0.04	-0.1	-0.01	-0.09	0.17	-0.14	0.16	-0.15