Entrepreneurship and Cultural Creativity

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Abstract

We investigate the relationship between cultural creativity and entrepreneurship in two respects: first, cultural and personal creativity as a characteristic of self-employed individuals; second, self-employment in professions that can be classified as belonging to the 'Creative Class' as compared to the non-creative class. The analysis is based on micro-data for individuals of the German Socio Economic Panel (SOEP). We find, indeed, some significant links between entrepreneurship and cultural creativity that deserve further investigation.

JEL classification: L26, Z1, D03

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1. Introduction[1]

Human capital has diverse facets (see Rosen, 1987, for an overview). The term may denote certain characteristics of a person, which can be rather stable over time or result from education and experiences. One important dimension of human capital is creativity, which 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, 1997). 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) in 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[2], 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.[3] However, the geographic coincidence of cultural creativity and entrepreneurship does not necessarily mean that potential entrepreneurs have a special interest in culture or that they

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

[3] 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.

are artistically creative. 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 with the entrepreneurs and the culturally creative people being different persons. But are entrepreneurs more culturally creative than dependent employees? Florida (2004) indeed claims that this is the case.[4] 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.[5]

This paper investigates if artistic-cultural and economic creativity or entrepreneurship coincide not only within regions but within individuals. We approach this relationship in two ways. First, we investigate if self-employed people are more interested in cultural creativity than their dependently employed counterparts (section 4)? Based on the "Big Five" approach of personality measurement, we particularly ask if creativity is an inherent characteristic of a person that distinguishes between self-employed and dependent employed individuals. In a second attempt to shed light on the relationship between cultural and economic creativity, we analyze if persons in creative professions, the ´Creative Class´ and its subgroups, have in general a higher propensity of being self-employed and which factors are essential for entrepreneurial choice in these groups of professions (section 5)? Section 6 summarizes the evidence and concludes. In the next sections, we give an overview on the state of research on the two creativities in some detail (section 2) and introduce the data (section 3).

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[4] "Thus, the varied forms of creativity that we typically see as different from one another – technological creativity (or invention), economic creativity (entrepreneurship), and artistic and cultural creativity – among others – are in fact deeply interrelated. Not only do they share a common thought process, they reinforce each other through cross-fertilization and mutual stimulation." Florida (2004,33).

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

2. Entrepreneurial creativity

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 in this academic discipline (Sternberg and Lubart, 1996; Hennessey and Amabile, 2009). In their recent study, Hennessey and Amabile (2009) stress the importance and the need for a systems view of creativity and call for interdisciplinary research on creativity. Only recently, scholars of other research fields such as psychology, sociology, education science, biology, economics, geography, and organizational science have made significant contributions to this topic (Runco, 2004). The heterogeneity of approaches in the study of creativity may be one reason why a generally accepted definition of this phenomenon does not yet exist. Despite continuous debates surrounding definitions, most researchers agree that creativity involves the development of an idea, a product, or a problem solution that is both novel (i.e., original, unexpected) and useful (i.e., is of value to the individual and/or the larger social group) (Hennessey and Amabile, 2009; Sternberg and Lubart, 1999; Feist, 1998; Amabile, Conti, Coon, Lazenby, and Herron, 1996). Usefulness, however, should not be understood in a merely pragmatic sense: while it is of central significance for technological creativity, artistic creativity is usually not of instrumental, but of intrinsic value (Deutsch, 2002, 227). Recognizing its complex nature, Rosen (1987) defines creativity as part of a person's human capital, i.e. her or his strengths and intangible assets such as knowledge, skills, general intelligence, educational attainments, or personality characteristics.

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 the fields of creativity and entrepreneurship was at a rather early stage, still seeking appropriable definitions and research methods. Only recently, as the definition of creativity have been established among different disciplines, has it become possible to translate it into a more specific field of entrepreneurship. 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 self-employment in terms of established business ownership.

Entrepreneurship in its relation to creativity has been primarily discussed in the framework of a cognitive approach as well as a social-personality approach to the study of creativity. For example, based on a cognitive approach, Ward (2004) shows that conceptual combination, i.e. the fundamental capacity to interpret concepts and produce new combinations of already existing ideas, is not only important for creativity, but can also be directly relevant to entrepreneurs in search of new ideas for their business ventures. Just to give one example from the market of digital products, a combination of established products such as mobile phone and personal digital assistant (PDA) which have spawned a new product category called the smartphone. Another process described in 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. A nice example of entrepreneurial creativity, which required analogical thinking, is that the design of the first automobiles resembled the shape of a carriage, and also the driver's place was designed as a coach box. Hence, the creators of the first automobiles transferred elements from a familiar means of transport to a completely novel domain by analogy.

Apart from the cognitive processes that underlay creative and entrepreneurial thought, there are a lot of empirical studies that focus on the personality of creative people and the characteristics that distinguish them from the remaining population. The most intriguing result of studies that have separately investigated creativity and entrepreneurship from the personality approach perspective is that certain personality characteristics have been found to be directly relevant for the both groups, i.e. creative persons and entrepreneurs. This type of research often applied the Five Factor Theory of personality (often called the "Big Five"), which reduces the personality variables

into five broad factors: neuroticism, extraversion, openness to experience, conscientiousness, and agreeableness (Costa and McCrae, 1992). A large body of empirical studies has found that a personality factor that is most often associated with creativity is openness to experience, which conveys someone's intellectual and experiential curiosity, originality, and coming up with new ideas (Kaufman, 2009; King et al., 1996; McCrae, 1987; Feist, 1998; Perrine and Brodersen, 2005). Glueck et al. (2002), for instance, compared definitions of creativity given by a group of free artists (e.g., painters, sculptors) with those named by a group of architects, a profession in which creativity is more constrained. They found for both groups that richness of ideas is consideres to be the most important factor that contributes to creativity. Architects additionally agreed on the importance of the usefulness of an idea, which seemed not to be relevant for the more unconstrained artists. However, free artists were more likely than others to mention that creative achievements require hard work. Furthermore, studies that focus on the characteristics of entrepreneurs conclude that openness to experience is an important attribute of entrepreneurship (Rauch und Frese, 2007; Zhao und Seibert, 2006).

While openness to experience was found to be closely related to the creative and entrepreneurial performance of persons, 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 are much more introverted than non-scientists whereas artists are more extraverted than non-artists. Extraversion was found to be relevant for entrepreneurs in Shane (2003) and Brandstätter (1997) while other studies did not observe any such relationship (Zhao and Seibert, 2006). Other 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 (Glück et al., 2002), intrinsic motivation (Amabile et al., 1994; Prabhu et al., 2008; Rauch und Frese, 2007), self-confidence (Feist, 1998), etc. Though entrepreneurship today is associated with creativity, a comprehensive approach that integrates the different approaches to the definition and to

research of creativity, particularly to entrepreneurial creativity, is still missing (see e.g. Sternberg and Lubart, 1999; Ward, 2004; Hennessey and Amabile, 2009).

The study at hand is an empirical investigation which aims to shed light on the relationship between entrepreneurship and creativity by accounting for both personality characteristics and a the person's involvement in a special social environment, which is characterized by certain cultural values. Hence, the contribution of the present study can be seen as an attempt to look at entrepreneurial creativity from a comprehensive perspective that includes characteristics of an individual's human capital, social capital, socio-demographic characteristics, experience with unemployment, psychological factors as well as information on the involvement in cultural activities and on the regional environment.

The conjecture that there is a significant relationship between entrepreneurship and cultural creativity has particularly been put forward by Richard Florida (2004), who distinguishes between artistic or cultural creativity, technological creativity (invention), and economic creativity (entrepreneurship) argues in his book "*The Rise of the Creative Class*" that these three forms of creativity are interrelated: "not only do they share a common thought process, they reinforce each other through cross-fertilization and mutual stimulation." A person's creativity involved in realizing an entrepreneurial concept and setting up a new business may be stimulated or encouraged by her or his interests or achievements in the fields of art and technology. In the same vein, Sacchetti, Sachetti, and Sudgen (2009) emphasize the importance of a creative space and artistic activities, which they highlight as a viaticum for people's creativity and for economic development in sectors or regions.

In the current study, we test the hypothesis that entrepreneurship is related to creativity at the level of individuals. In particular, we distinguish between personal creativity and cultural creativity, and approach this relationship in two ways. Firstly, we investigate individual propensity of entrepreneurs to have a special interest in culture as compared to non-

entrepreneurs. Secondly, we look at the determinants of entrepreneurship in the 'Creative Class.' We use self-employment status as a proxy for the concept of entrepreneurship.[6] Unfortunately, we have to largely neglect technological creativity due to lack of available data.

3. Data and indicators

3.1 Data

Our empirical analysis is based on the German Socio-Economic Panel (SOEP), a representative longitudinal study of private households in Germany. The SOEP was started in the year 1984 and since then the private households, persons, and families have been surveyed annually (see Haisken De-New and Frick, 2005, for details). For the purposes of present analysis, we use the 2005 wave because it includes information on some personality characteristics that has only been gathered in that particular year.

The 2005 wave of the SOEP provides data on 21,105 individuals living in Germany. We restrict the analyses to individuals between 18 and 65 years old and exclude persons who were retired, unemployed or working on their 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. We also exclude self-employed farmers for the same reason.[7] Next, all persons who have declared their primary activity as helping in family

[6] In some studies (e.g., the Global Entrepreneurship Monitor, see Bosma, et al. 2009), the definition of entrepreneurship is largely restricted to the early phases of a firm, particularly the preparation of a start-up (nascent entrepreneurship) and the first years of its existence (young business). The main motive for such a narrow definition of entrepreneurship is probably that these studies are primarily interested in the gestation and the early development of new businesses, not in old incumbent firms. Assuming that the personality characteristics of entrepreneurs are rather stable over time, they should not differ much between young entrepreneurs and persons who have already been self-employed for a longer period of time. The data set does not have enough cases to perform the analyses in the different occupational groups for young entrepreneurs who recently started a business.

[7] Most farms in Germany are family business with their owners being more or less self-employed due to their profession. Self-employment of farmers may particularly be a result of a family tradition or of the tradition in the particular region in which they are living.

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 8,215 individuals left in our sample. Our remaining sample contains 928 self-employed persons accounting for 11.3 percent of the total sample. This corresponds quite well to the share of self-employed persons in the overall population (Hansch, 2006).

Since we know planning region ("Raumordnungsregion") each individual in the sample is residing, we are able to account for location factors such as an entrepreneurial environment. Planning regions consist of at least one core city and the surrounding area. Planning regions can be regarded as functional units in the sense of travel to work areas.[8] Information on population is from the Federal Statistic Office ("Statistisches Bundesamt"). Data on the unemployment rate was obtained from the Federal Employment Agency ("Bundesagentur für Arbeit"). Information on regional start-up rates is taken from the German Social Insurance Statistics (for details see Fritsch and Brixy, 2004).

3.2 Indicators

Previous empirical analyses of the determinants of self-employment have found a significant impact of diverse forms of capital such as human capital, social capital, socio-demographic characteristics as well as characteristics of macro environment on the probability of being self-employed.[9] Our own model accounts for these influences found in earlier studies as far as the respective indicators are available in our data (see section 3.2.1). Section 3.2.2 introduces indicators for a person's creativity and her of his interest in cultural activities that we include in our analysis.

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[8] 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. In contrast to this, a district may be a single core city or a part of the surrounding suburban area. See German Federal Office for Building and Regional Planning (2003) for the definition of planning regions and districts.

[9] For empirical evidence see, for instance, Evans and Leighton (1989), Benz and Frey (2008), Borjas (1986), Brüderl and Preisendörfer (1998), Blanchflower and Oswald (1998), Lentz and Laband (1990), Mueller (2006).

3.2.1 General determinants of self-employment

Table 1 provides mean values of these variables for dependent employees and self-employed persons in our sample as well as t-tests of equal means. Concerning the entrepreneurial macro environment, we find that the start-up rate measured as the number of start-ups per 1,000 population at an age between 15 and 64 years is significantly higher in regions where self-employed persons live. Self-employed persons are also more likely to live in regions with high population density. They have on average experienced 13.6 years of education, which is significantly more than the average 12.4 years of education that we find for the dependently employed persons. Additionally, self-employed persons experienced longer years of full-time, but shorter periods of part-time employment during their careers.

Since there is considerable empirical evidence that social networks may be important for the decision to become an entrepreneur (e.g., Davidsson and Honig, 2003; Brüderl and Preisendörfer, 1998; Aldrich et al., 1998), we include measures of social capital into our analysis. Such social networks can, for instance, be provided by self-employed family members who act as a role-model for entrepreneurship and informally transfer business experience and networks to a potential entrepreneur (Parker, 2004, 85). We create a variable “either parents have been self-employed,” which assumes the value 1 if at least one parent was an entrepreneur when the respondent was at the age of 15. About 16.8 percent of the self-employed had, indeed, self-employed parents and can be regarded as “occupational followers.” This figure is almost twice as much of what we find for the dependent employees. Furthermore, there are significantly more married persons among the self-employed as compared to dependent employees in our data which may be due to the on average higher age of the self-employed persons.

Table 1: Determinants of self-employment: mean characteristics and t-test of equal means (SOEP 2005)

Variable	Dependently employed	Self-employed
Entrepreneurial environment		
Start-up rate	4.18	4.23**
Unemployment rate	.088	.088
Population density	512.91	569.12**
Human capital		
Years of education	12.43	13.74***
Experience full-time employment	14.64	19.35***
Experience part-time employment	2.73	1.86***
Experience unemployment	.45	.47
Social capital		
Either parent has been self-employed	.083	.167***
Married	.603	.677***
Political interests	.333	.525***
Attends social gatherings	.428	.402
Socio-demographic variables		
Male	.513	.665***
German citizenship	.947	.953
Age	40.6	45.6***
Hard working	6.001	6.254***
Personal creativity		
Imaginative	4.835	5.091***
Original, new ideas	4.717	5.143***
Communicative, talkative	5.551	5.803***
Cultural creativity		
Values artistic experience	3.986	4.592***
Attends cultural events	.146	.248***
Artistic activities	.165	.181
Profession-specific probabilities for self-employment	.076	.394***
Number of observations	7,287	928

Our data also provide an indicator of a person's general interest in politics that may be regarded as an indication for engagement in social life.[10] We suggest that persons who are well-informed about developments in the political arena have a better understanding of political regulations, which could be helpful in organizing her or his own business, than those who are not interested in politics. Furthermore, being interested in a political life may indicate involvement in a network of like-minded people that gives access to information which is of crucial importance for self-employed persons. We find considerable differences between self-employed persons and their counterparts in this respect: about 52.5 percent of self-employed are interested in local politics whereas only about 33 percent of dependent employees claim to do so. We also use some socio-demographic variables in our analysis that show that self-employed people are more likely to be males and tend to be of older age than their dependent employed counterparts. In accordance with Glueck (2002), self-employed persons regard working hard to be more important for success than dependent employees,[11] which may result from the fact that self-employed persons are much more reliant on their own work for earning a living.

3.2.2 Indicators for creativity and interest in cultural activity

As we have already mentioned above (section 2), entrepreneurial creativity may be related to personal creativity as well as cultural creativity. Personal creativity means that individuals possess certain personality characteristics that are conducive for introducing novel ideas such as openness to experience or extraversion. Cultural creativity, in turn, implies involvement in a special cultural environment, which could be seen as a potential source of new ideas for entrepreneur's business venture. Those ideas could be combined, resulting in new entrepreneurial ideas, or directly absorbed and implemented in a new or an

[10] The SOEP 2005 survey included the following question regarding engagement in political life: "Generally speaking, how much are you interested in politics?" We recoded the answers into a variable, which assumes the value of one if the given answer was "very much" or "much." The other possible answers ("not so much" and "not at all") were recoded to zero.

[11] The corresponding question in the SOEP, 2005: "Do you agree with a following statement: one has to work hard in order to succeed."

existing firm. We approximate the concept of the personal creativity with personality characteristics provided in our dataset. In particular, we use some indicators based on the Big Five[12] approach of personality measurement, which was first implemented in the SOEP questionnaires in 2005. The SOEP respondents were asked to grade themselves on a 7-point scale with the value 1 indicating that a given personality characteristic does not apply at all and the value 7 meaning that the respective characteristic applies perfectly. We measure the personal creativity using the openness-to-experience dimension of personality, which assumes the scales "imagination"[13] and "originality."[14] In addition, we employ the scale "communicativeness"[15] that corresponds to the extraversion dimension of personality, which is associated with exploratory behavior (e.g., Peterson et al., 2002) [16] and has been shown to be valuable for entrepreneurs (Shane, 2003; Brandstätter, 1997).

We approach the concept of the cultural creativity with indicators for a person's interest in cultural activities. One of these indicators is based on respondent's self-assessment of her of his appreciation of artistic, aesthetic experiences on a 7-point scale.[17] Furthermore, two binary variables (1 = yes, 0 = no) measure whether a person is "visiting cultural events (such as concerts, theater, lectures, etc.) during her or his free time at least once a month" or if she

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[12] For more information about the Big Five in the SOEP, see Gerlitz and Jürgen (2005).

[13] The corresponding question in the SOEP, 2005: "I see myself as someone who has an active imagination."

[14] The corresponding question in the SOEP, 2005: "I see myself as someone who is original, comes up with new ideas."

[15] The corresponding question in the SOEP, 2005: "I see myself as someone who is communicative, talkative."

[16] We also ran a regression analysis including all Big Five variables as explanatory variables with the dependent variable being in self-employment. We found that measures of extraversion and openness to experience have a strong positive effect on the probability of being self-employed. Furthermore, neuroticism and conscientiousness have significantly negative impact on the likelihood to be self-employed. We did not find an effect of agreeableness on self-employment.

[17] The corresponding question in the SOEP, 2005: "I see myself as someone who values artistic experiences."

or he is engaged in “artistic or musical activities (playing music/singing, dancing, acting, painting, photography) during free time at least once a month.”

Descriptive statistics (Table 1) reveal that self-employed persons score significantly higher on personal creativity, estimating themselves as being more imaginative, original, and communicative than the dependently employed persons. Concerning the measures of cultural creativity, self-employed persons value artistic experiences more than dependent employees. We also find a higher share of persons that visit cultural events in their free time among the self-employed (about 24.8 percent) in comparison to the dependently employed persons (14.6 percent). We do, however, not find any considerable differences between self-employed and dependently employed persons with regard to performing artistic activities.

4. Are entrepreneurs more (culturally) creative?

The aim of our empirical analysis is to identify the impact of cultural creativity on self-employment. We estimate a model of occupational choice by logistic regression with robust standard errors using the whole set of variables discussed in the previous section. The dependent variable assumes the value 1 if the individual was self-employed in the year 2005 and has a value of 0 otherwise.[18] Our model of potential determinants of self-employment can, therefore, be specified as:

$$\Pr(y_j \neq 0 \mid E_j, H_j, S_j, F_j, SD_j, C_j) = F(\beta_0 + \beta_e * E_j + \beta_h * H_j + \beta_s * S_j + \beta_{sd} * SD_j + \beta_c * C_j),$$

where $F(z) = e^z/(1+e^z)$ is the cumulative logistic distribution. y_j is the dichotomous indicator of self-employment status in 2005; E_j, H_j, S_j, F_j, SD_j, C_j are characteristics of entrepreneurial environment, human capital, social

[18] A number of studies like the Global Entrepreneurship Monitor (see Bosma et al., 2008) distinguish between self-employed in new firms, which is regarded as entrepreneurship in narrow sense and self-employed in older firms as a form of entrepreneurship in the broader sense. Since the SOEP contains only rather few numbers of self-employed in young firms, we are unable to make such a distinction here.

Table 2: Determinants of self-employment in the entire sample

	Model I		Model II	
	Coefficient	Marginal effect	Coefficient	Marginal effect
Entrepreneurial environment				
Start-up rate	0.0460	0.00356	-0.0415	-0.00214
	(0.0929)	(0.00718)	(0.111)	(0.00573)
Unemployment rate	-0.0121	-0.000939	-0.00992	-0.000511
	(0.0148)	(0.00115)	(0.0175)	(0.000901)
Population density	-1.30e-05	-1.00e-06	6.68e-05	3.44e-06
	(5.85e-05)	(4.53e-06)	(6.95e-05)	(3.58e-06)
Human capital				
Years of education	0.123***	0.00952***	0.00638	0.000329
	(0.0153)	(0.00120)	(0.0191)	(0.000983)
Experience full-time employment	-0.00382	-0.000296	-0.00841	-0.000434
	(0.00937)	(0.000724)	(0.0110)	(0.000568)
Experience part-time employment	-0.0351**	-0.00272**	-0.0320*	-0.00165*
	(0.0145)	(0.00112)	(0.0166)	(0.000856)
Experience unemployment	0.0660**	0.00510**	0.0882***	0.00455***
	(0.0284)	(0.00220)	(0.0293)	(0.00151)
Social capital				
Either parent has been self-employed°	0.616***	0.0587***	0.418***	0.0252**
	(0.106)	(0.0121)	(0.141)	(0.00983)
Married°	-0.0917	-0.00716	-0.0345	-0.00178
	(0.0884)	(0.00694)	(0.108)	(0.00558)
Political interests°	0.178**	0.0140**	0.164	0.00865
	(0.0817)	(0.00661)	(0.101)	(0.00544)
Attends social gatherings	0.0735	0.00571	0.0547	0.00283
	(0.0785)	(0.00613)	(0.0968)	(0.00503)
Socio-demographic variables				
Male°	0.513***	0.0394***	0.420***	0.0215***
	(0.0929)	(0.00710)	(0.112)	(0.00572)
German citizenship°	-0.176	-0.0145	-0.300	-0.0175
	(0.177)	(0.0156)	(0.210)	(0.0138)
Age	0.168***	0.0130***	0.198***	0.0102***
	(0.0290)	(0.00219)	(0.0351)	(0.00177)
Age^2	-0.00145***	0.000112***	0.00175***	-9.04e-05***
	(0.000316)	(2.40e-05)	(0.000380)	(1.93e-05)
Hard working	0.234***	0.0181***	0.219***	0.0113***
	(0.0430)	(0.00328)	(0.0500)	(0.00254)
Personal creativity				
Imaginative	-8.50e-05	-6.58e-06	-0.0182	-0.000936
	(0.0288)	(0.00223)	(0.0361)	(0.00186)
Original, new ideas	0.114***	0.00882***	0.118***	0.00609***
	(0.0338)	(0.00262)	(0.0418)	(0.00215)
Communicative, talkative	0.0937***	0.00724***	0.0332	0.00171
	(0.0352)	(0.00271)	(0.0422)	(0.00218)
Cultural creativity				
Values artistic experience	0.124***	0.00960***	0.132***	0.00682***
	(0.0242)	(0.00187)	(0.0299)	(0.00153)

Table 2 (continued)

Attends cultural events	0.244**	0.0202**	0.290**	0.0163**
	(0.0955)	(0.00850)	(0.118)	(0.00724)
Artistic activities	-0.149	-0.0111	-0.256**	-0.0122**
	(0.100)	(0.00716)	(0.128)	(0.00567)
Profession-specific probabilities of being self-employed			7.114***	0.367***
			(0.251)	(0.0184)
Constant	-11.38***		-10.86***	
	(0.832)		(1.011)	
Pseudo R^2	0.11		0.3598	
Chi-squared	616.76***		1151.95***	
Log-likelihood	-2578.47		-1854.90	
Number of observations	8,215	8,215	8,215	8,215

Notes: Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. (°) Marginal effects for discrete change of dummy variable from 0 to 1.

capital, socio-demographic characteristics as well as creativity variables, respectively.[19] Parameters β_0, β_e, β_h, β_s, β_{sd} and β_c are coefficients corresponding to the determinants of entrepreneurship as mentioned above. Table 2 provides coefficients and marginal effects[20] for this model as well as its modification that includes profession-specific probabilities of being self-employed[21].

According to model I, human capital in terms of years of education has a strong and statistically significant positive influence on entrepreneurship in the entire sample. According to the marginal effect for this variable, each additional

[19] See Appendix A4 for the correlation matrix of regressors.

[20] We report both coefficients and marginal effects after logit evaluated at the sample means for continuous variables or as discrete change from 0 to 1 for the dummy variable (see Greene, 2008, for more information about the marginal effects).

[21] The occupation specific probability of being self-employed was constructed on the base of international classification of occupations at the 4-digit level (ISCO'88). For each occupational group, the probability of being self-employed in this particular group has been calculated.

year of education increases the probability of being self-employed by 0.9 percent points. Overall, experienced years of part-time employment have a significantly negative effect on the propensity to be in self-employment while experienced years of unemployment increase this probability by 0.4 percentage points per year of unemployment. Having self-employed parents has a significant positive influence and increase the likelihood to be self-employed by 5.8 percent points. This confirms the results of several other studies that have analyzed the characteristics of self-employed persons (Mueller, 2006; Aldrich and Cliff, 2003; Davidsson and Honig, 2003*).* We also find a significant effect of being interested in politics. Self-employed persons are more likely to be male and tend to be older than dependent employees. The personal creativity measured as being original and coming up with new ideas has a strongly significant positive effect on the probability of being self-employed. As expected, the value of the variable indicating a person's belief that hard work is necessary for success is significantly higher for the self-employed than for dependently employed persons. The measure of communicative abilities also has a significant positive impact of 0.6 percent points. Next, the model confirms the hypothesis that there is a positive relationship between entrepreneurship and cultural creativity. A person's valuation of artistic experiences as well as by her of his propensity to visit cultural events has a strong, significantly positive effect on the probability of being self-employed. However, model I does not reveal any significant impact of performing artistic activities on the propensity of being self-employed.

Calculating self-employment rates for persons with different professions reveals a large variety of the propensity to be self-employed between professions. Differences of self-employment rates between professional groups may have a number of reasons. First, it may be easier to set up one's own business in some professions than in others. Hence, the propensity of self-employment within a certain profession may result from a smaller minimum efficient size of a profession-specific business with relatively low capital requirements, etc. Second, certain professions such as an architect, psychologist or physician offer established role models for self-employment

which may make it appear rather natural for individuals in these professions to have their own firm. It may also be easier to acquire money and other resources for setting up a new business when a conventional role-model of self-employment can be adopted. Third, if the education level has an effect on the propensity to start one's own business, self-employment rates may differ due to the profession-specific educational requirements. In our model II, we account for such factors by including the self-employment rate for each profession which we calculate from the data. Compared to model I, we find that the effect of the education level is no longer statistically significant. The indicators for being interested in politics and for the degree of extraversion also turn out to be no longer statistically significant. Another difference as compared to model I is that there is a significantly negative relationship between being self-employed and performing artistic activities. This may indicate that self-employed persons simply do not have enough free time for such kind of activities.

It should be noted that the effect of cultural creativity on entrepreneurial creativity should be independent of the education level since our multivariate analysis controls for the years of education. Although education may be an important precondition and stimulus for cultural and for entrepreneurial creativity[22], education and culture can be regarded as two distinct factors that shape an individual's entrepreneurial creativity.

[22] There is a positive statistical relationship between a person's years of education and the valuation of cultural experiences, the propensity to visit cultural events, performing artistic activities and – to a considerably smaller degree – the self-assessment of one's own originality (see the correlation coefficients given in table A4 in the Appendix***).*** A large body of literature on creativity suggests that creative performance takes place if a number of dimensions coincide. According to Sternberg and Lubert (1996) and Feldman (1999), education (formal and informal) is only one of those dimensions that is critical to the creativity. Simonton (1984), exploring the relationship between formal education and creativity, found that the relationship was an inverted U with the peak of eminence in his sample of eminent individuals occurring at about midway through undergraduate training.

5. Self-employment in Creative Class professions

5.1 Definition of creative professions

Our second attempt to investigate the relationship between entrepreneurship and cultural creativity is based on the 'Creative Class' approach, as proposed by Florida (2004). Florida (2004) distinguishes between several types of professions that are assumed to be related with different degrees of creativity. According to this approach, the Creative Class consists of professions where the major task is "complex problem solving that involves a great deal of independent judgment and requires high levels of education of human capital" (Florida, 2004, 8). Florida distinguishes between two sub-groups of the Creative Class: the creative core and the creative professionals. 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.) (see table 3 and table A3 in the Appendix). An important sub-group of the *creative core* is the *bohemians*, which includes the artistically creative people such as "authors, designers, musicians, composers, actors, directors, painters, sculptors, artists, printmakers, photographers, dancers, and performers" (Florida, 2004, 333). Another large sub-group of the creative core is *engineers*. Surrounding the *creative core* is "a broader group of *creative professionals* in business and finance, law, health care and related fields" (ibid.). Along with a routine job, they are regularly faced with problems that require creative solution (e.g., managers). The two sub-groups of the Creative Class, creative core and creative professionals, possess a high level of human capital, but they differ with regard to the extent to which they have to apply their skills creatively.[23]

[23] See table A5 in the Appendix for mean comparison of measures of creativity in occupational classes.

Table 3: Overview of professions in the Creative Class and non-creative professions

Creative core	Painters, artists, photographers, musicians, singers, actors, authors, scientists, 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.
Non-creative 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.

Focusing on professions, not on qualifications or industries, the concept of the Creative Class can be regarded as an attempt to measure the contribution of a certain aspect of human capital, creativity, to economic growth. If this approach is correct, the measure should outperform other standard measures of human capital such as formal education or job experience.[24] Moreover, being in one of the creative class professions does not merely mean that someone is creative due to the requirements of her of his profession, but also that he or she is involved in a professional network which may be a source of creative ideas.

We follow Florida's (2004) approach and classify persons according to their professions into three groups: creative core, creative professionals, and non-creative professions. Furthermore, we run separate analyses for two important sub-groups of the creative core which may have rather different characteristics,

[24] McGranahan and Wojan (2007) have modified Florida's definition of the creative class by applying the "Thinking Creatively" element of the O*NET content model that provides information on creativity levels typically required in particular professions. They find that this modified definition leads to the identification of more pronounced relationships between creative professions and economic development. Wise (2003) tried to indentify the creative sector of the economy by means of a firm-level approach, categorizing firms according to the creativity that is necessary to be competitive in the respected industry or market. He then distinguished between firms that compete in creativity-centered industries in which organizations must constantly develop new products to survive and creativity-enhanced industries in which firms adapt or utilize the creative products of others.

engineers and bohemians (artists). Analyses for the artists are, however, rather restricted by a relatively small number of cases in the dataset for this specific group. The definition of the different classes of professions according their creativity is based on the International Classification of Occupations (ISCO-88; for details see International Labour Office, 1990), which is available in the SOEP data at the four-digit level. This classification (see table A3 in the Appendix) is a slightly revised version of the original definition proposed by Florida (2004).[25] 13.77 percent (1,131 individuals) of our sample belong to the creative core, 22.25 percent (1,828 individuals) are classified as creative professionals, and the remaining 63.98 percent (5,168 individuals) are in professions which are regarded as relatively non-creative. The sample contains 565 engineers (6.88 percent of the sample and 49.96 percent of the creative core) and 69 artists (0.84 percent of the sample and 6.1 percent of the creative core). Given that our sample is rather representative, these numbers clearly indicate that the artists make only a rather small share of the creative core.

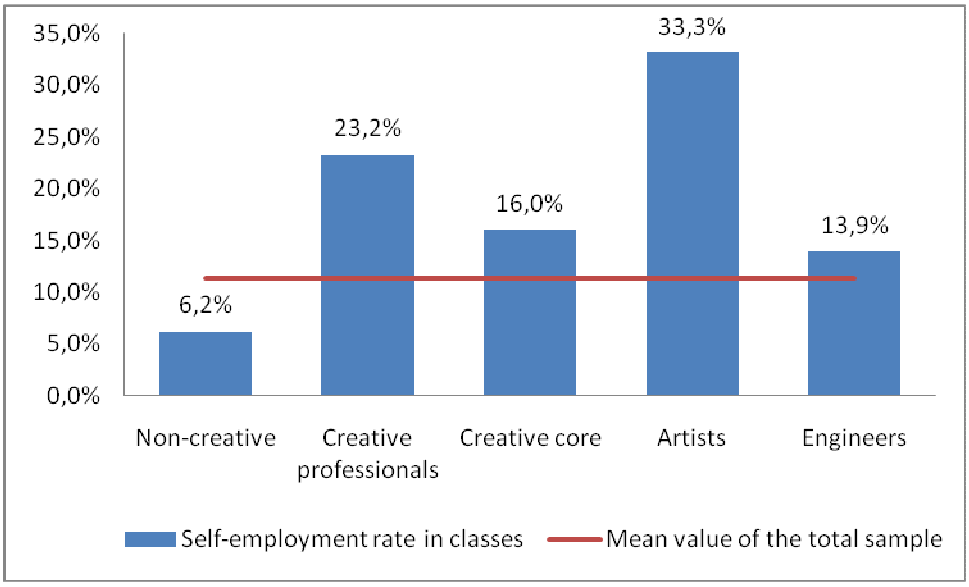
5.2 Self-employment in creative professions

Looking at the self-employment rates in the professional classes as defined above, we notice striking differences (see figure 1). The highest share of self-employed persons, 23.2 percent, is found in the group of creative professionals, followed by the creative core with 16.0 percent of self-employed. Self-employment in the group of non-creative professions is considerably lower and amounts to only 6.2 percent. The two subgroups of the creative core that we distinguish here, artists and engineers, have self-employment rates of 33.3 and 13.9 percent, respectively. These figures make rather clear that some professional groups can be regarded as being much more economically creative in terms of entrepreneurship than others. The relatively high self-employment rates that we find for the Creative Class may, indeed, be regarded

[25] This definition has been developed in cooperation with members of Richard Florida's research team, particularly Dieter Kogler, Scott Pennington, Kevin Stolarick, Ian Swain, and Irene Tinagli.

as an indication of a positive relationship between entrepreneurship and creativity, which characterizes certain professions.

Figure 1: Self-employment rates in classes of professions



We, therefore, investigate if self-employed persons *within the professional groups* can be regarded as more original and more interested in culture than their dependently employed counterparts. This is done by performing the multivariate analyses that we have run for the overall sample (section 4) for each class of professions separately. We keep the control variable of profession specific probabilities for self-employment since the groups of professions as defined above are still rather heterogeneous in this respect. Table 3 presents the results (coefficients and marginal effects) for the creative core, the creative professionals as well as for non-creative professions. Results for the engineers, which form an important subgroup of the creative core, are provided in table 4. We are unable to find a statistically significant multivariate model for the subgroup of artists probably due to the rather low number of cases in our sample. For comparisons of indicator values between self-employed and dependently employed persons in the different groups of professions, see tables A6 and A7 in the Appendix.

Table 3: Determinants of self-employment in classes of professions

	Creative Core		Creative professionals		Non-creatives	
	Coefficient	Marginal effect	Coefficient	Marginal effect	Coefficient	Marginal effect
Entrepreneurial environment						
Start-up rate	-0.268	-0.0246	0.133	0.0150	-0.0159	-0.000436
	(0.232)	(0.0214)	(0.193)	(0.0217)	(0.175)	(0.00480)
Unemployment rate	-0.0684*	-0.00628*	-0.0452	-0.00509	0.0328	0.000900
	(0.0391)	(0.00356)	(0.0331)	(0.00372)	(0.0252)	(0.000686)
Population density	0.000323***	2.97e-05***	-3.50e-05	-3.94e-06	-1.94e-05	-5.32e-07
	(0.000125)	(1.14e-05)	(0.000133)	(1.50e-05)	(0.000106)	(2.91e-06)
Human capital						
Years of education	0.00601	0.000552	-0.00600	-0.000676	0.0204	0.000560
	(0.0401)	(0.00369)	(0.0334)	(0.00377)	(0.0353)	(0.000974)
Experience full-time employment	0.0164	0.00151	-0.0198	-0.00223	-0.0154	-0.000423
	(0.0262)	(0.00240)	(0.0220)	(0.00248)	(0.0148)	(0.000403)
Experience part-time employment	0.0532	0.00489	-0.0718**	-0.00809**	-0.0552**	-0.00151**
	(0.0348)	(0.00317)	(0.0305)	(0.00346)	(0.0247)	(0.000670)
Experience unemployment	0.252***	0.0231***	0.0600	0.00676	0.0697*	0.00191*
	(0.0883)	(0.00808)	(0.0959)	(0.0108)	(0.0373)	(0.00102)
Social capital						
Either parent has been self-employed°	-0.357	-0.0295	0.507**	0.0658*	0.848***	0.0332***
	(0.320)	(0.0235)	(0.237)	(0.0351)	(0.205)	(0.0107)
Married°	-0.206	-0.0194	0.0366	0.00411	0.00330	9.05e-05
	(0.222)	(0.0215)	(0.194)	(0.0217)	(0.164)	(0.00450)
Political interests°	0.313	0.0287	-0.325*	-0.0363*	0.404***	0.0121**
	(0.218)	(0.0199)	(0.176)	(0.0194)	(0.152)	(0.00492)
Attends social gatherings	0.293	0.0275	-0.0923	-0.0103	0.0598	0.00165
	(0.201)	(0.0191)	(0.172)	(0.0192)	(0.149)	(0.00413)
Socio-demographic variables						
Male°	0.678***	0.0600***	0.296	0.0331	0.262	0.00716
	(0.233)	(0.0200)	(0.204)	(0.0227)	(0.170)	(0.00463)
German citizenship°	-0.369	-0.0389	-0.0612	-0.00704	-0.407	-0.0132
	(0.478)	(0.0571)	(0.510)	(0.0599)	(0.293)	(0.0113)
Age	0.0746	0.00686	0.210***	0.0237***	0.280***	0.00769***
	(0.0761)	(0.00699)	(0.0664)	(0.00728)	(0.0561)	(0.00145)
Age²	-0.000542	-4.98e-05	-0.00161**	-0.000182**	-0.00275***	-7.53e-05***
	(0.000803)	(7.37e-05)	(0.000716)	(7.91e-05)	(0.000622)	(1.63e-05)
Hard working	0.183*	0.0168*	0.166*	0.0187*	0.319***	0.00876***
	(0.0959)	(0.00869)	(0.0883)	(0.00990)	(0.0820)	(0.00215)
Personal creativity						
Imaginative	0.0542	0.00499	0.0284	0.00320	-0.0838*	-0.00230*
	(0.0842)	(0.00772)	(0.0678)	(0.00764)	(0.0493)	(0.00135)
Original, new ideas	0.0156	0.00144	0.113	0.0128	0.152**	0.00417**
	(0.0937)	(0.00860)	(0.0823)	(0.00930)	(0.0612)	(0.00170)
Communicative, talkative	-0.0677	-0.00622	0.181**	0.0204**	0.00241	6.59e-05
	(0.0785)	(0.00722)	(0.0866)	(0.00964)	(0.0611)	(0.00168)
Cultural creativity						
Values artistic experience	0.138**	0.0127*	0.0521	0.00587	0.150***	0.00410***
	(0.0693)	(0.00648)	(0.0527)	(0.00595)	(0.0437)	(0.00118)

Table 3 (continued)

Attends cultural events	0.220	0.0210	0.484**	0.0604**	0.282	0.00858
	(0.223)	(0.0222)	(0.196)	(0.0270)	(0.200)	(0.00665)
Artistic activities	-0.497**	-0.0420**	-0.370	-0.0381*	0.0538	0.00150
	(0.237)	(0.0183)	(0.233)	(0.0219)	(0.194)	(0.00554)
Profession-specific probabilities of self-employment	6.817***	0.627***	6.491***	0.731***	8.758***	0.240***
	(0.628)	(0.0618)	(0.326)	(0.0555)	(0.445)	(0.0197)
Constant	-6.197***		-11.84***		-13.52***	
	(2.221)		(1.885)		(1.579)	
Pseudo R^2	0.2352		0.4505		0.2768	
Chi-squared	180.05***		472.65***		511.50***	
Log-likelihood	-380.35		-544.05		-877.89	
Number of observations	1,131	1,131	1,828	1,828	5,256	5,256

Notes: Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. (°) Marginal effects for discrete change of dummy variable from 0 to 1.

As compared to the results for the overall sample (table 2), the number of explanatory variables that prove to be statistically significant in the analyses for the sub-samples is much smaller. The reason for this phenomenon is probably that the different groups of professions are considerably more homogeneous with regards to a number of these characteristics. For example, certain professions require more or less the same level of education which results in similar numbers of years spent in education so that this variable does not contribute to distinguish self-employed and dependently employed persons in professional groups. However, we find a slightly positive effect of years of formal education for the engineers. It is also quite remarkable that some of the variables have statistically significant opposite signs in the different groups, indicating differences in the factors that shape the decision to be self-employed. An example for this is the number of years that someone has experienced part-time employment. This indicator is statistically significant with a positive sign among the engineers but assumes a significantly negative sign in the models for the creative professionals and the non-creative professions. Contradicting signs of coefficients can also be found for the political interest measure in the models for creative professionals and for the non-creatives. Being male has a

Table 4: Determinants of self-employment among engineers

	Coefficient	Marginal effect
Entrepreneurial environment		
Start-up rate	-0.135	-0.0108
	(0.376)	(0.0304)
Unemployment rate	-0.0238	-0.00190
	(0.0619)	(0.00498)
Population density	0.000303	2.43e-05
	(0.000191)	(1.56e-05)
Human capital		
Years of education	0.119*	0.00952*
	(0.0703)	(0.00555)
Experience full-time employment	0.0947*	0.00759*
	(0.0509)	(0.00389)
Experience part-time employment	0.120*	0.00959*
	(0.0628)	(0.00495)
Experience unemployment	0.183	0.0146
	(0.174)	(0.0139)
Social capital		
Either parent has been self-employed°	-0.0655	-0.00514
	(0.537)	(0.0414)
Married°	-0.136	-0.0112
	(0.340)	(0.0284)
Political interests°	0.355	0.0281
	(0.323)	(0.0252)
Attends social gatherings	0.0848	0.00684
	(0.312)	(0.0254)
Socio-demographic variables		
Male°	1.425**	0.0789***
	(0.629)	(0.0233)
German citizenship°	0.696	0.0428
	(1.017)	(0.0466)
Age	-0.0198	-0.00159
	(0.147)	(0.0118)
Age²	-0.000216	-1.73e-05
	(0.00144)	(0.000115)
Hard working	0.0432	0.00346
	(0.156)	(0.0125)
Personal creativity		
Imaginative	-0.0538	-0.00431
	(0.128)	(0.0102)
Original, new ideas	-0.0462	-0.00370
	(0.133)	(0.0106)
Communicative, talkative	-0.0730	-0.00585
	(0.118)	(0.00941)
Cultural creativity		
Values artistic experience	0.225**	0.0181**
	(0.109)	(0.00869)
Attends cultural events	-0.0299	-0.00238
	(0.346)	(0.0274)

Table 4 (continued)

Artistic activities	-1.172***	-0.0731***
	(0.443)	(0.0227)
Occupational specific probabilities of self-employment	7.223***	0.579***
	(1.098)	(0.0973)
Constant	-7.185*	
	(4.275)	
Pseudo R^2	0.2135	
Chi-squared	86.74***	
Log-likelihood	-179.82	
Number of observations	565	565

Notes: Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. (°) Marginal effects for discrete change of dummy variable from 0 to 1.

statistically significant effect on the decision of being self-employed only for the creative core, in particular for engineers. The age variables are statistically significant for the creative professionals and the non-creative professions but not for the creative core and for the engineers.

Concerning the variables of our particular interest, the measures of creativity, we find a strong positive effect of being original in the group of non-creative professions. Our indicators of cultural creativity, in particular valuing artistic activities, remain statistically significant for the creative core (increase of probability by 1.3 percent points), for the non-creative professions (0.4 percent points) as well as for the engineers (1.7 percent points). The only sub-group for which we find no significant effect of this variable is the creative professionals. However, self-employed members of this group indicate an interest in cultural creativity by being significantly more likely to attend cultural events (6.04 percent points). These results suggest that there is a positive relationship between the valuation of cultural events and entrepreneurship even within narrowly defined groups of professions. This higher interest in culture does, however, not coincide with one's artistic activities. Our results show that self-employed members of the creative core, creative professionals as well as self-

employed engineers are less likely to be artistically active than their dependently employed counterparts.

The evaluation of the necessity of hard work for being successful proved to have a positive significant impact on the probability of being self-employed in all three classes of professions. Moreover, communicative abilities are important for self-employment of creative professionals, increasing the propensity of being self-employed by 2.04 percent points, which could be explained by the requirements of their profession (e.g., health services, insurance representatives, salespersons).

6. Conclusions

In this paper, we investigated the relationship between cultural creativity and entrepreneurship. First, we applied a concept of two creativities – personal and cultural creativity, based on the Big Five approach in order to test the relationship between entrepreneurship and creativity. The results show that our measures of creativity have a rather strong effect on the propensity of being self-employed, even if we control for education. Self-employed regard themselves as being more original and more likely to generate new ideas than the dependently employed, and they are also aware that success requires hard work. Furthermore, we found that there is some relationship between self-employment and cultural creativity since self-employed people value artistic experiences more and tend to be more likely to visit cultural events such as concerts and theater performances than their dependently employed counterparts.

Applying Florida's (2004) concept of the creative class, we then distinguished between broadly defined types of professions (creative core, creative professionals, and non-creative professions) as well as between two important subgroups of the creative core, artists, and engineers. We found that the share of self-employed persons is lowest in the non-creative professions and relatively high among the artists and the creative professionals. There were only relatively few variables that could help to distinguish the self-employed from dependently employed persons within the different groups of professions,

presumably because of a considerably higher degree of homogeneity within these groups as compared to the entire sample. But even when performing the multivariate analysis within these groups of professions, we found that self-employed persons are characterized by a significantly higher valuation of artistic experience and cultural events than the dependent employees.

Some limitations of the analysis result from data constraints. Firstly, we used a relatively wide definition of entrepreneurship that comprises all self-employed respondents irrespective of when they set up their business, i.e. if they just founded a firm or if they can be regarded as established business owners. If the characteristics of the entrepreneurial mindset are stable over time, this definition may be appropriate. According to this wide definition of entrepreneurship, we cannot exclude that the self-assessment of those respondents who have been running their own business for a long period of time are influenced by their experience of self-employment and can, therefore, not be regarded as determinants of the decision to set up one's own firm. Unfortunately, the dataset does not provide enough cases of young entrepreneurs to restrict the empirical analysis to this group of persons. Secondly, we run cross-section analysis for the wave 2005 because of information on the Big Five has been raised for the first time in this particular wave. This does not allow us to draw any reliable conclusions about causality effects. We only detect some relationship between entrepreneurship and our measures of creativity on a personality level, but we can only speculate about the nature of the respective relationship. To investigate such causal relationships is the issue of future research. Another shortcoming is our rather one-sided measures of personal creativity that is only based on the openness to experience and extraversion. Other dimensions of personality, based on the Big Five approach, proved to be insignificant, and, therefore, have been omitted from our analysis. We were also not able to approximate a person's technological creativity due to missing data.

All in all, our results clearly suggest that there is, indeed, some positive link between economic creativity in terms of entrepreneurship and cultural creativity at the level of individuals. Hence, it is not just geographic coincidence between

culturally and economically creative people living in the same regions that can make culturally active places also economically successful. This draws the attention to ‘soft’ factors such as ‘people’s climate’ of a place that can play an important role for economic development and has been put forward by Florida (2004) among others.

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Appendix: Tables

Table A1: Definition of Variables

Variable	Description
Dependent variable	
Self-employment	Dummy = 1 if respondent was self-employed in 2005
Explanatory variables	
Entrepreneurial environment	
Start-up rate	Number of start-ups pro 1,000 inhabitants in a German planning region (`Raumordnungsregion`)
Unemployment rate	Share of unemployed population in a German planning region
Population density	Number of inhabitants pro 1km² in a German planning region
Human capital	
Years of education	Number of years the respondent has been in full-time education
Experienced full-time employment	Number of years the respondent has been in full-time employment
Experienced part-time employment	Number of years the respondent has been in part-time employment
Experienced unemployment	Number of years the respondent has been in unemployment
Social capital	
Either parent has been self-employed	Dummy = 1 if either parents has been self-employed when the respondent was 15 years old
Married	Dummy = 1 if respondent was married in 2005
Political interests	Dummy = 1 if (very) strong interest in local politics
Attends social gatherings	Dummy = 1 if respondent meets his/her friends, relatives or neighbors at least once a week in the free time
Socio-demographic characteristics	
Male	Dummy = 1 if respondent is male
German citizenship	Dummy = 1 if respondent is German citizen
Age	Years of age
Hardworking	Self-assessment according to the 7-point scale "One has to work hard in order to succeed"
Personal creativity	
Imaginative	Self-assessment according to the Big Five 7-point scale "I see myself as someone who has an active imagination"
Original	Self-assessment according to the Big Five 7-point scale "I see myself as someone who is original and comes up with new ideas"
Communicative	Self-assessment according to the Big Five 7-point scale "I see myself as someone who is communicative, talkative"
Cultural creativity	
Values artistic activities	Self-assessment according to the Big Five 7-point scale "I see myself as someone who values artistic experiences"
Attends cultural events	Dummy = 1 if respondent attends cultural events (such as concerts, theater, lectures) at least once a month in his free time
Artistic activities	Dummy = 1 if respondent performs artistic activities (such as playing music, singing, dancing) at least once a month in his free time
Profession-specific probabilities of self-employment	Average probability of being self-employed in the respective profession based on ISCO'88 at a 4-digit level

Table A2: Descriptive statistics for variables

Variable	Min	Max	Median	Mean	Standard deviation
Self-employment	0	1	0	.113	.316
Start-up rate	3.232	5.523	4.159	4.192	.530
Unemployment rate	4.177	1.655	8.493	8.794	3.156
Population density	48.208	3,814.819	244.885	519.259	726.042
Years of education	7	18	11.5	12.571	2.631
Experienced full-time employment	0	47.8	13.8	15.173	11.283
Experienced part-time employment	0	45	0	2.632	5.227
Experienced unemployment	0	24	0	.464	1.224
Either parent has been self-employed	0	1	0	.093	.2898
Married	0	1	1	.611	.4874
Political interests	0	1	0	.355	.4784
Attends social gatherings	0	1	0	.425	.4945
Male	0	1	1	.529	.4991
German citizenship	0	1	1	.947	.2213
Age	18	65	42	41.265	1.105
Hardworking	1	7	6	6.029	1.088
Imaginative	1	7	5	4.864	1.488
Original	1	7	5	4.765	1.333
Communicative	1	7	6	5.578	1.274
Values artistic activities	1	7	4	4.054	1.789
Attends cultural events	0	1	0	.158	.3655
Artistic activities	0	1	0	.167	.3738
Profession-specific probabilities of self-employment	0	1	.033	.113	.1783

Table A3: Definition of creative professions

ISCO-88	Creative Professionals	Creative Core	Engineers	Artists
1110 Legislators	x			
1120 Senior government officials	x			
1141 Senior officials of political-party organizations	x			
1142 Senior officials of employers', workers' and other economic-interest organizations	x			
1143 Senior officials of humanitarian and other special-interest organizations	x			
1210 Directors and chief executives	x			
1221 Production and operation department managers in agriculture, hunting, forestry and fishing	x			
1222 Production and operation department managers in manufacturing	x			
1223 Production and operation department managers in construction	x			
1224 Production and operation department managers in wholesale and retail trade	x			
1225 Production and operation department managers in restaurants and hotels	x			
1226 Production and operation department managers in transport, storage and communications	x			
1227 Production and operation department managers in business services	x			
1228 Production and operation department managers in personal care, cleaning and related services	x			
1229 Production and operation department managers not elsewhere classified	x			
1231 Finance and administration department managers	x			
1232 Personnel and industrial relations department managers	x			
1234 Advertising and public relations department managers	x			
1235 Supply and distribution department managers	x			
1236 Computing services department managers		x		
1237 Research and development department managers		x		
1239 Other department managers not elsewhere classified	x			
1311 General managers in agriculture, hunting, forestry/ and fishing	x			
1312 General managers in manufacturing	x			
1313 General managers in construction	x			
1314 General managers in wholesale and retail trade	x			
1315 General managers of restaurants and hotels	x			
1316 General managers in transport, storage and communications	x			
1317 General managers of business services	x			
1318 General managers in personal care, cleaning and related services	x			
1319 General managers not elsewhere classified	x			
2111 Physicists and astronomers		x	x	
2112 Meteorologists		x	x	
2113 Chemists		x	x	
2114 Geologists and geophysicists		x	x	
2121 Mathematicians and related professionals		x	x	
2122 Statisticians		x	x	
2131 Computer systems designers and analysts		x	x	
2132 Computer programmers		x	x	
2139 Computing professionals not elsewhere classified		x	x	

Table 3 (continued)

2141 Architects, town and traffic planners		x	x	
2142 Civil engineers		x	x	
2143 Electrical engineers		x	x	
2144 Electronics and telecommunications engineers		x	x	
2145 Mechanical engineers		x	x	
2146 Chemical engineers		x	x	
2147 Mining engineers, metallurgists and related professionals		x	x	
2148 Cartographers and surveyors		x	x	
2149 Architects, engineers and related professionals not elsewhere classified		x	x	
2211 Biologists, botanists, zoologists and related professionals		x	x	
2212 Pharmacologists, pathologists and related professionals		x	x	
2213 Agronomists and related professionals		x	x	
2221 Medical doctors	x			
2222 Dentists	x			
2223 Veterinarians	x			
2224 Pharmacists	x			
2229 Health professionals (except nursing) not elsewhere classified	x			
2230 Nursing and midwifery professionals	x			
2310 College, university and higher education teaching professionals		x		
2320 Secondary education teaching professionals		x		
2331 Primary education teaching professionals		x		
2332 Pre-primary education teaching professionals		x		
2340 Special education teaching professionals		x		
2351 Education methods specialists		x		
2359 Other teaching professionals not elsewhere classified		x		
2411 Accountants	x			
2412 Personnel and careers professionals	x			
2419 Business professionals not elsewhere classified	x			
2421 Lawyers	x			
2422 Judges	x			
2429 Legal professionals not elsewhere classified	x			
2431 Archivists and curators		x		
2432 Librarians and related information professionals		x		
2441 Economists		x		
2442 Sociologists, anthropologists and related professionals		x		
2443 Philosophers, historians and political scientists		x		
2445 Psychologists		x		
2451 Authors, journalists and other writers		x		x
2452 Sculptors, painters and related artists		x		x
2453 Composers, musicians and singers		x		x
2454 Choreographers and dancers		x		x
2455 Film, stage and related actors and directors		x		x
2470 Public service administrative professionals	x			
3111 Chemical and physical science technicians	x			
3112 Civil engineering technicians	x			
3113 Electrical engineering technicians	x			
3114 Electronics and telecommunications engineering technicians	x			
3115 Mechanical engineering technicians	x			

Table 3 (continued)

3116 Chemical engineering technicians	x			
3117 Mining and metallurgical technicians	x			
3118 Draft persons	x			
3119 Physical and engineering science technicians not elsewhere classified				
3131 Photographers and image and sound recording equipment operators		x		
3132 Broadcasting and telecommunications equipment operators	x			
3211 Life science technicians	x			
3212 Agronomy and forestry technicians	x			
3221 Medical assistants	x			
3223 Dieticians and nutritionists	x			
3224 Optometrists and opticians	x			
3225 Dental assistants	x			
3226 Physiotherapists and related associate professionals	x			
3227 Veterinary assistants	x			
3228 Pharmaceutical assistants	x			
3229 Modern health associate professionals (except nursing) not elsewhere classified	x			
3231 Nursing associate professionals	x			
3232 Midwifery associate professionals	x			
3241 Traditional medicine practitioners	x			
3310 Primary education teaching associate professionals		x		
3320 Pre-primary education teaching associate professionals		x		
3330 Special education teaching associate professionals		x		
3340 Other teaching associate professionals		x		
3411 Securities and finance dealers and brokers	x			
3412 Insurance representatives	x			
3413 Estate agents	x			
3416 Buyers	x			
3417 Appraisers, valuers and auctioneers	x			
3419 Finance and sales associate professionals not elsewhere classified	x			
3432 Legal and related business associate professionals	x			
3434 Statistical, mathematical and related associate professionals		x		
3471 Decorators and commercial designers		x		
3472 Radio, television and other announcers		x		
3473 Street, night-club and related musicians, singers and dancers		x		
3474 Clowns, magicians, acrobats and related associate professionals		x		
3475 Athletes, sportspersons and related associate professionals	x			
7312 Musical instrument makers and tuners	x			
7313 Jewelry and precious-metal workers		x		
7324 Glass, ceramics and related decorative painters		x		
7331 Handicraft workers in wood and related materials	x			
7332 Handicraft workers in textile, leather and related materials	x			
7433 Tailors, dressmakers and hatters		x		

Table A4: Correlation matrix

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	Self-employment	1.000																					
2	Start-up rate	0.024	1.000																				
3	Unemployment rate	0.001	-0.418	1.000																			
4	Population density	0.025	0.402	0.156	1.000																		
5	Years of education	0.158	0.026	0.085	0.094	1.000																	
6	Experienced full-time employment	0.133	-0.038	0.078	0.012	-0.019	1.000																
7	Experienced part-time employment	-0.052	0.056	-0.077	-0.000	-0.061	-0.297	1.000															
8	Experienced unemployment	0.003	-0.079	0.114	-0.006	-0.113	-0.061	0.026	1.000														
9	Either parent has been self-employed	0.093	0.068	-0.066	0.052	0.102	0.002	0.008	-0.051	1.000													
10	Married	0.049	-0.012	-0.036	-0.039	0.035	0.324	0.149	-0.037	-0.002	1.000												
11	Political interests	0.127	0.065	-0.002	0.075	0.288	0.186	-0.059	-0.081	0.070	0.077	1.000											
12	Attends social gatherings	-0.017	0.112	-0.153	0.042	-0.013	-0.253	-0.027	-0.060	0.038	-0.198	-0.017	1.000										
13	Male	0.097	-0.005	-0.021	0.006	0.038	0.306	-0.431	-0.048	0.007	0.029	0.222	-0.018	1.000									
14	German citizenship	0.007	-0.059	0.112	-0.018	0.110	0.072	0.047	-0.049	0.025	-0.030	0.065	-0.073	-0.026	1.000								
15	Age	0.142	0.017	0.024	0.026	0.096	0.771	0.240	0.038	0.030	0.448	0.200	-0.295	0.030	0.091	1.000							
16	Hardworking	0.074	-0.041	0.060	-0.016	-0.081	0.061	-0.015	0.026	-0.013	0.024	0.008	-0.023	0.018	-0.019	0.038	1.000						
17	Imaginative	0.054	0.036	0.009	0.047	0.058	-0.055	0.001	-0.003	0.029	-0.072	0.076	0.074	-0.042	0.012	-0.051	0.066	1.000					
18	Original	0.101	0.009	0.027	0.031	0.087	0.023	-0.062	-0.045	0.029	-0.003	0.122	0.049	0.071	0.009	-0.012	0.096	0.407	1.000				
19	Communicative	0.063	0.019	0.027	0.029	0.005	-0.019	0.065	-0.016	0.022	-0.015	0.055	0.085	-0.153	-0.009	0.011	0.152	0.274	0.342	1.000			
20	Values artistic activities	0.107	0.042	0.037	0.054	0.151	0.007	0.084	-0.003	0.042	-0.009	0.114	0.040	-0.156	0.005	0.100	0.025	0.331	0.310	0.212	1.000		
21	Attends cultural events	0.088	0.075	-0.018	0.071	0.237	-0.000	0.065	-0.075	0.052	-0.047	0.168	0.123	-0.040	0.013	0.077	-0.053	0.086	0.105	0.079	0.228	1.000	
22	Artistic activities	0.013	0.008	-0.017	0.014	0.124	-0.083	0.042	-0.017	0.025	-0.045	0.056	0.103	-0.075	0.027	-0.036	-0.078	0.116	0.107	0.032	0.271	0.223	1.000
23	Occupation specific probabilities	0.563	0.022	0.002	0.012	0.261	0.092	-0.082	-0.033	0.096	0.022	0.144	0.001	0.128	0.033	0.087	0.034	0.057	0.096	0.050	0.090	0.089	0.041

Table A5: Group comparison of measures of creativity: mean characteristics and t-test of equal means

	Creative core	Creative professionals	Creative core	Non-creative	Creative professionals	Non-creative
Personal creativity						
Imaginative	5.096	4.933***	5.096	4.792***	4.933	4.792***
Original, new ideas	5.087	4.895***	5.087	4.651***	4.895	4.651***
Communicative, talkative	5.492	5.725***	5.492	5.547	5.725	5.547***
Cultural creativity						
Artistic experience	4.613	4.193***	4.613	4.613***	4.193	4.613***
Attends cultural events	.271	.213***	.271	.115***	.213	.115***
Artistic activities	.277	.174***	.277	.142***	.174	.142***
Number of observations	1,131	1,828	1,131	5,256	1,828	5,256

Table A6: Determinants of self-employment in classes of professions: mean characteristics and t-test of equal means (SOEP 2005)

	(1) Creative core		(2) Creative professionals		(3) Non-creatives	
Variable	Employed	Self-employed	Employed	Self-employed	Employed	Self-employed
Entrepreneurial environment						
Start-up rate	.042	.043**	.042	.043	.042	.041
Unemployment rate	.091	.087	.086	.084	.087	.092**
Population density	564.952	771.747***	556.052	537.461	490.608	497.133
Human capital						
Years of education	15.05	15.386	13.432	14.165***	11.627	12.252***
Experience full-time employment	15.472	18.128***	15.012	19.85***	14.373	19.413***
Experience part-time employment	2.243	2.867*	2.227	1.654**	2.964	1.606***
Experience unemployment	.257	.505***	.259	.304	.561	.685
Social capital						
Either parent has been self-employed	.117	.115	.094	.200***	.073	.155***
Married	.655	.652	.610	.682***	.590	.686***
Political interests	.500	.652***	.437	.527***	.271	.448***
Attends social gatherings	.42	.464	.425	.392	.431	.381*
Socio-demographic variables						
Male	.572	.663**	.505	.653***	.503	.681***
German citizenship	.972	.945*	.970	.972	.936	.932
Age	42.928	46.844***	40.894	46.184***	40.222	44.344***
Hardworking	5.84	6.065***	5.988	6.274***	6.034	6.334***
Personal creativity						
Imaginative	5.035	5.419***	4.895	5.054**	4.781	4.954**
Original, new ideas	5.043	5.32***	4.832	5.104***	4.622	5.095***
Communicative, talkative	5.474	5.585	5.662	5.932***	5.534	5.754***
Cultural creativity						
Values artistic experience	4.497	5.215***	4.127	4.405***	3.848	4.485***
Attends cultural events	.255	.347**	.192	.283***	.114	.148*
Own artistic activities	.274	.297	.182	.148	.141	.157
Profession-specific probabilities of self-employment	.1343	.2952***	.130	.568***	.051	.220***
Number of observations	950	181	1,404	424	4,933	323

Table A7: Determinants of self-employment in classes of professions: mean characteristics and t-test of equal means (SOEP 2005)

	Artists		Engineers	
Variable	Employed	Self-employed	Employed	Self-employed
Entrepreneurial environment				
Start-up rate	.044	.044	.042	.043
Unemployment rate	.086	.089	.084	.088
Population density	854.108	879.307	587.256	744.089
Human capital				
Years of education	15.814	15.283	15.440	15.796
Experience full-time employment	17.636	14.386	16.807	21.943***
Experience part-time employment	1.924	4.695**	.953	1.189
Experience unemployment	.130	.530*	.245	.281
Social capital				
Either parent has been self-employed	.130	.174	.129	.114
Married	.630	.522	.686	.746
Political interests	.695	.695	.536	.695***
Attends social gatherings	.586	.652	.391	.417
Socio-demographic variables				
Male	.630	.477	.833	.936**
German citizenship	.956	.913	.966	.975
Age	45.022	45.435	43.212	48.241***
Hardworking	5.738	6.304**	5.876	6.063
Profession-specific probabilities of self-employment	.286	.425***	.125	.231***
Personal creativity				
Imaginative	5.369	6.216***	4.883	5.037
Original, new ideas	5.152	5.956**	4.992	5.227
Communicative, talkative	5.674	6.130	5.227	5.404
Cultural creativity				
Values artistic experience	5.130	6.304***	4.096	4.684***
Attends cultural events	.304	.608**	.224	.265
Own artistic activities	.456	.564	.224	.138*
Profession-specific probabilities of self-employment	.286	.425***	.125	.231***
Number of observations	46	23	486	79