**Location Patterns of Creative Capital and**

**Regional Disparities in Spain**

**Ebru KERIMOGLU¹, B. Can KARAHASAN²**

¹Assist. Prof. Dr., Istanbul Technical University, Department of Urban and Regional Planning, [ebrukerimoglu@gmail.com](mailto:ebrukerimoglu@gmail.com), [kerimoglu@itu.edu.tr](mailto:kerimoglu@itu.edu.tr), phone: +90 212 2931300-2842, fax: +90 212 2514895

²Asisst. Prof. Dr., Okan University, Department of International Trade, [can.karahasan@okan.edu.tr](mailto:can.karahasan@okan.edu.tr), phone: +90 216 677 16 30-2884, fax: +90 216 677 16 67

**Abstract**

‘Creative class’ as a source of growth has gained increasing awareness in recent years. However, creative people are not spread equally; instead tend to concentrate within particular locations across space. According to Florida, a main factor in explaining differences in growth and development is about this diverse location choice of creative people (Florida, 2002; Fritsch and Stuetzer, 2009). Inspired by these contemporary discussions of the creative class theory; this study investigates the spatial distribution of creative capital and its connection with regional disparities by considering the geographical divergence of provincial income in Spain. Our findings indicate that although provinces with low creative capital around 1996 realize an acceleration of creative employment during the 1996-2004 period they still lag behind the northern (especially north eastern) provinces of Spain. More interestingly there are strong spillover effects between the leading and lagging provinces. This spatially diverse location pattern of the creative capital also explains the north-south duality in Spain; our empirical evidence validates that provinces with high creative capital level in northern Spain are still more developed in terms of provincial income even other determinants of the process are controlled for, such as industrial development, regional spillover effects and human capital development.

**Keywords:** Creative Capital, Spain, Regional Divergence, Regional Spillover

**JEL codes:** R 11, R 12, O 10, E 24

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1. **INTRODUCTION**

A debate has recently emerged about the role of creative people on economic growth (Lang and Danielsen, 2005; Boschma and Fritsch, 2007). According to Florida (2005), creative people are a key driver of urban and regional development (Florida, 2005; Boschma and Fritsch, 2007). He mentioned that cities and regions whose populations show high levels of creativity grow faster. In addition to that his creative capital theory is significantly different from the human capital theory; for instance the key to understanding of regional economic growth is not necessarily high levels of education, but instead creativity (Florida, 2002; 2002a). In more recent publications, Florida has argued that the creative class theory outperforms the human capital theory in predicting urban economic development (Florida, 2005).

On the other hand, Glaeser found that human capital variables when pitted against the creative class theory, in a test of economic growth, outperformed the creative class variables (Glaeser, 2005; Hoyman and Faricy, 2008). Following this debate, a number of empirical evidence points out that cities and regions with more educated residents grow faster than cities with smaller stocks of highly educated labor (Glaeser and Saiz, 2003; Marlet and Woerkens, 2007).

Yet still investigating the impact of creativity on regional differences is valuable. The idea is that creative class is particularly linked to territorial considerations because; regions and cities have to attract high skilled or creative human capital in order to reach high levels of economic growth (Florida, 2005; Lucas, 1988; Chantelot et. al., 2010). Creative capital has been raised as crucial resource for innovation and economic competitiveness (Chantelot et. al., 2010) hereby it is important to identify geographic patterns of creative people for understanding regional differences. To shed light on these discussions, this research presents empirical findings from Southern Europe case study, namely the country of Spain. It investigates the spatial distribution of creative capital and its effects on regional disparities. Based on the major objective of the study, two-step analysis is implemented. First we analyze the dispersion of creative capital and explain the geographical rigidity of this geographical pattern. Second, this dispersion is used as a possible factor behind the differences in Spain.

Within the scope, the following section provides summary of the literature on focusing the creative class theory along with its relation to regional development and previous critics of the creative class theory. In section 3, the geography of employment and creative capital in Spain is described. Information about the evolution of the creative capital for post 1996 period as well as their performances is visualized. Section 4 outlines the methodology and the data set. Section 5 contains empirical findings about the geographical patterns of creative capital and regional divergences. Both the spatial patterns as well as their interdependencies are discussed as to test the impact of the creative class on regional differences. Finally the last section concludes.

1. **THE REVIEW OF THE CREATIVE CLASS THEORY**

A high number of studies demonstrated that the quality of a region’s workforce is a key determinant of that region’s economic success (Glaeser, 2000; Florida, 2002; Simon and Nardinelli, 2002). Nowadays, the role of high skilled workers as represents an emerging paradigm, being at the center of a scientific debate in economic development and has been the subject of growing interest among not only economists, economic geographers, regional scientists (Mallender and Florida, 2007), but also sociologists, and urban planners (Power and Scott, 2004; Hartley, 2005; Cooke and Lazzeretti, 2008, Lazzeretti et. al., 2008). Regional development studies now commonly stress the need for regions; both urban and rural, to be open and attractive to human capital (Bollman, 1999; Petrov, 2008). Florida (2002a) asserts that high skilled workers’ idea and creativity are the most important element in the economic success of regions. In this new approach, today knowledge based economic growth and local development is found associated with “clustering of creative people and human capital” as pointed out also by Lucas (1988). Also other studies highlighted how local development is highly related with highly skilled human capital (Simon, 1998; Glaeser, et al., 1992; Glaeser and Saiz, 2003; Henderson, et al., 1995; Capone, 2006).

More specifically the creative class theory stresses the importance of place in attracting talented workers—specifically, that areas blessed with technology, talent, and tolerance (referred to by creative class scholars as the three Ts) will experience population and economic growth (Hoyman and Faricy, 2008). The creative class theory as presented by Richard Florida in ‘The Rise of the Creative Class’ (2002a) is a multifaceted concept that represents a new class, an emerging sector of the economy, and an urban plan for economic growth and development. The presence of technology clusters, talented populations, and tolerance attracts a significant number of creative workers, and the presence of this ‘creative class’ drives innovation and economic growth in cities is asserted in this theory (Florida, 2002a; Hoyman and Faricy, 2008).

The creative class is often identified as the group of individuals who are either highly educated or engaged in creative (scientific, artistic, or technological) types of activities (Florida, 2002a; 2005; Petrov, 2008). According to Florida (2005), the core of the creative class 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” (Florida, 2005). Surrounding this creative core is “a broader group of creative professionals in business and finance, law, health care and related fields” (Florida, 2002a). 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, artists, and performers’ (Florida, 2002a; Fritsch and Stuetzer, 2009). Florida mentioned that creative class is creative and innovative, and as a result of this, remarkable for its high productivity (Florida, 2002a; Marlet and Woerkens, 2007).

The main factor participating in creativity is human capital. Creativity is, therefore, considered to be a form of capital (Florida, 2005), the so called ‘creative capital’. From this perspective, one major driving force of economic development is creative people, or the creative class (Florida, 2005; Petrov, 2008). The notion of the creative class goes beyond traditional representations of a highly skilled workers, knowledge workers, and so forth (Petrov, 2008). The human capital and the creative class approach both differ from regular economic geographical literature because they assume that it is people, not ﬁrms, who lead the way (see Marlet and Woerkens, 2007). Creative, well educated, people do choose desirable places to live while companies are attracted towards such places by the creative, educated working force (Boarnet, 1994; Marlet and Woerkens, 2007). Thus human capital theory is essentially about the creation and use of knowledge by the skilled and highly educated in those cities and regions (Marlet and Woerkens, 2007). According to contemporary discussions of the modern growth theories; technology is the key driver of the economic growth and it is the human capital accumulation that is vital as to understand the differences in the level of technology and for sure economic growth. Even though the most conventional measure of human capital was the educational level, it would be necessary, but difficult, to take into account everyone’s intrinsic creative potential to generate new ideas, technologies, business models, cultural forms and whole new industries. It is how the “creative class” came to being as a concept in the studies of Richard Florida (Dinescu and Grigorovici, 2008). It is argued that not only the level of skills, but also the creative ability of the labor force (or of the creative class) is a key ingredient of endogenous development of urban areas (Anderson, 1985; Florida, 2002; 2002a). The creative class argument, although debated by many (Glaeser, 2005; Markusen, 2006), has found support in a number of critical empirical studies that measured creativity and its effect on regional economic competitiveness (Florida and Gates, 2001; Florida, 2002; 2002a; Mc Granahan and Wojan, 2007). These studies also demonstrated that quality of place (interpreted as a function of diversity and openness) represents one of the most important factors in attracting creative capital (Florida, 2002a; 2005), and hence acts as a powerful force of urban and regional economic growth and development (Petrow, 2008).

A main criticism about Florida’s approach is that creativity and human capital are interconnected (Glaeser, 2005; Fritsch and Stuetzer, 2009). This criticism is mainly directed towards the definition of creative people for the empirical analysis on the basis of occupations. Many of the occupations that Florida regards as creative require a relatively high level of qualification. Glaeser’s critique (2005) is correct to the extent that there tends to be a highly positive correlation between the share of people in creative occupations and the share of people with a higher level of education. Thus, opponents of Florida’s view state that creativity is measuring the impact of qualification and human capital on economic development (Fritsch and Stuetzer, 2009). Similarly Marlet and Woerkens (2007) agree with Glaeser (2005) that creativity is basically the same as human capital. Nevertheless, designing categories for people who are not necessarily highly educated yet highly important for economic production is useful to achieve a better understanding of regional economic growth (Marlet and Woerkens, 2007). According to them, Florida does not support this creative class theory with much empirical analysis; some of the individuals in Florida’s creative class are indeed not highly educated; but most of them are (Marlet and Woerkens, 2007). Moreover there is lack of evidence for the direction of the causality between the creative class and economic growth in thriving urban areas; basically endogenity makes it unclear whether the creative class fosters growth or the growth attracts the creative labor force (Glaeser, 2005; Shearmur, 2007; Petrov, 2008). A further point of criticism is directed towards the impact of people in artistic occupations, the bohemians, on economic development (Lang and Danielsen, 2005; Markusen, 2006). These critics doubt that there is a causal relationship between a high share of bohemians in a region and economic development (Fritsch and Stuetzer, 2009). Hoyman and Faricy (2008), found the wide adoption of creative class–based policies to be surprising given that in the academic literature, there is little evidence supporting the relationship between creative clusters and actual economic indicators. Goonewardena (2004) has indicated that cities have always been creative and diverse, so this cannot be responsible for the new economy and growth in the 1990s (cited in Hoyman and Faricy, 2008).

Keeping in mind the various discissions listed above, still majority of the evidence is in favor of the positive impact of creative people on economic development. Moreover evidence supports the fact that they are spread unevenly, thus it is important to understand the factors that account for this varied geography (Mallender and Florida, 2007). The concentration of creative people in a few locations can be regarded as a reason for the clustering of economic activity. This is particularly true for activities with a high demand for high qualified labor such as research and development, design and marketing and high-tech industries (Arora et al., 2000; Florida, 2005; Fritsch and Stuetzer, 2009). Florida’s argument is congruent to Jacobs’ (1970, 1985) ideas about the important role of cities as well as the basic hypotheses of the new economic growth theory (Romer, 1986, 1993; Lucas, 1988, cited in Fritsch and Stuetzer, 2009). For instance Lucas (1988) recognized the role of great cities, which localize human capital and information, create knowledge spillovers, and become engines of economic growth (Lucas, 1988; Mallender and Florida, 2009). According to the role of highly skilled workers in explaining the relation between inequality and economic growth, various studies investigated that growth is heterogeneous (Paci and Usai, 2001; Castella and Domanech, 2002; Ahmed, 2009). Karlsson, et al. (2009) observe that the critical input in the knowledge economy – the human capital – is strongly concentrated in geographical space, much more so than most other types of economic resources and activities. With other words, they conclude that human capital exhibits strong tendencies to agglomerate in certain locations (Karlsson, et al. 2009; Berry and Glaeser 2005) argued that human capital levels are diverging and its concentration is likely to continue to occur in certain regions only (Florida, 2002; Berry and Glaeser, 2005).

Overall as can be followed both from the modern growth theories as well as the recent developments in the creative class theory; the way that people is dispersed across space seems to be a vital element to understand the location specific differences. On one hand there is the agglomeration of human capital that is parallel with the regional level of development (Jacobs 1961, 1969; Lucas 1988; Glaeser 1994; Qian, 2008; Fujita, 1988; Krugman, 1991; Romer, 1990). On the other hand there is the clustering and spreading out of individuals with a specific level of creativity (that is to say the spillover of creative capital) which coincides with again location specific differences (Glaeser, 2005; Mallender and Florida, 2007; Marlet and Woerkens, 2007; Hoyman and Faricy, 2008). We believe these two facts make investigation of location patterns of creative capital, which is basically some sort of human capital, and its possible association with regional divergences in Spain valuable.

1. **THE GEOGRAPHY OF CREATIVE CAPITAL IN SPAIN**

Spain comprises of 52 provinces and 19 Autonomous Communities. Historically speaking the geography of Spain, despite improvements, shows ongoing regional imbalances (Tortosa-Ausina et.al., 2005; Pastor, et al. 2010; Cuadrado, et al. 1998; Villaverde, 2001; de la Fuente, 2002; Goerlich, et al. 2002; Raymond, 2002; Lladós, 2002). For the 1961-1981 period, Leonida and Montolio (2001) highlighted the fact that the rich provinces had lost positions in the distribution of income, but that they still created a separate mode (showing persistence), indicating that there were few high prosperity regions in Spain in that period. In the sub-period of 1991-1997 there began a process of polarization of. The provinces above the Spain average were found to be located, primarily, in the north of Spain, as north-south division became apparent during the nineties (Leonida and Montolio, 2001). As underlined by Maza and Villaverde’s (2009), Spanish provinces form clusters with similar levels of income per inhabitant with the north eastern part of Spain being the most developed area and the south and north-west of the country being least developed. Overall the studies examining the path of inequalities in Spain all agree that despite limited signs of convergence, the dual north-south structure is an ongoing inequality phenomenon of the country (Cuadrado et al., 1998; Villaverde, 2001; de la Fuente, 2002; Goerlich et. al., 2002; Raymond, 2002; Lladós, 2002, Kerimoglu and Karahasan, 2011, Pastor et. al., 2010).

According to Prados de la Escosura and Roses (2009), human capital provided a positive, albeit small, contribution to labor productivity growth thereby facilitating technological innovation, while broad capital accumulation and efficiency gains are complementary in Spain’s long-term growth. In the period 1850-2000, Spain experienced a major transformation in the general level of qualifications of its labor force, with the proportion of Spanish workers having completed at least their secondary education more than doubling (from 36.4% in 1985 to 78% in 2002) (Prados de la Escosura and Roses, 2009). The number of jobs for the professionally trained levels has also grown very rapidly in the years between 1850 and 2000 (Prados de la Escosura and Roses, 2009).

If we consider the creative employment, table 1 shows more or less but mostly increases in all provinces of the country. The figures regarding the creative capital show that, both for 1996 and 2004, the highest share of creative employment in the total employment by provinces is observed in Barcelona, Zaragoza, Madrid and Vizcaya (see Table 1). Girona, Alicante, Castellon, Valencia, Alava and Guipúzcoa attract the attention in terms of the sharing creative employment in total employment in 2004. In terms of the creative capital development of Spain’s provinces, Table 1 illustrates that between 1996 and 2004 Castellon and Valencia had the most highly increased rate of creative employment. The rise in the proportion of creative employment in total employment went from 0.01% in 1996 to 0.42 % in 2004 in Valencia, from 0.01% in 1996 to 0.43% in 2004 in Castellon, while from 0.27% in 1996 to 0.52% in 2004 for Madrid (see Table 1). And yet despite the changes in the rankings according to creative employment, the same provinces quite remained in the same clusters from 1996 to 2004 (see Table 1).

Both in 1996 and in 2004, taking the ratios for the whole of Spain, Barcelona stood out as a leader in terms of creative employment, while Madrid as a leader in terms of highly educated employment and also highly educated population, Vizcaya come second. The proportion of highly educated people in total employment rose in Madrid from 15.97% in 1996 to 21.07% in 2004, in Barcelona from 9.85% in 1996 to 14.04% in 2004, while from 15.68% in 1996 to 16.98% in 2004 for Vizcaya. The share of highly educated people in total population rose in Madrid from 7.89% in 1996 to 10.95% in 2004, in Barcelona from 4.76% in 1996 to 7.07% in 2004, while from 7.22% in 1996 to 8.88% in 2004 for Vizcaya (see table 1).

According to the creative capital, Barcelona, Zaragoza, Madrid and Vizcaya make up the first cluster in both 1996 and 2004. According to the highly educated employment, Madrid and Vizcaya make up the first cluster in 1996 and in 2004, while Sevilla comes third, Salamanca comes forth, Zaragoza and Barcelona follows in 1996. In 2004, Granada, Barcelona, Navarra and Zaragoza follow them respectively (see Table 1).

Some differences can be observed between the trends in the dispersion of creative employment and highly skilled employment. For example; Granada and Salamanca just only gained positions in terms of highly educated employment while Girona, Alicante and Castellon have better position only for creative employment in 2004. Girona, Alicante, Castellon and Valencia gained positions from 1996 to 2004 in terms of creative employment while, Alava and Guipúzcoa gained positions from 1996 to 2004 in terms of both creative and highly educated employment (see Table 1).

Table 1: The ranking of the Spanish provinces

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **provinces** | **increase rate of creative employment\* 1996-2004** | **increase rate**  **of total employment\*\* 1996-2004** | **share of creative employment in total employment 1996 %** | **share of creative employment in total employment 2004 %** | **Share of employment with un. degree or higher\*\*\***  **in total employment 1996 %** | **Share of people with un. degree or higher\*\* in total population 1996 %** | **Share of employment with un. degree or higher\*\*\***  **in total employment 2004 %** | **Share of people with un. degree or higher\*\* in total population 2004 %** |
| Almería | 0.19 | 0.50 | 0.03 | 0.17 | 6.30 | 2.66 | 9.49 | 4.98 |
| Cádiz | 0.13 | 0.37 | 0.06 | 0.21 | 6.27 | 1.97 | 8.25 | 3.90 |
| Córdoba | 0.12 | 0.26 | 0.09 | 0.27 | 5.40 | 1.99 | 10.33 | 4.24 |
| Granada | 0.14 | 0.35 | 0.07 | 0.23 | 8.60 | 3.60 | 15.36 | 7.05 |
| Huelva | 0.11 | 0.50 | 0.06 | 0.20 | 3.86 | 1.39 | 5.41 | 2.82 |
| Jaén | 0.14 | 0.77 | 0.06 | 0.18 | 4.89 | 1.75 | 10.44 | 4.64 |
| Málaga | 0.18 | 0.62 | 0.07 | 0.31 | 6.58 | 2.80 | 8.43 | 4.02 |
| Sevilla | 0.11 | 0.39 | 0.11 | 0.29 | 10.53 | 3.86 | 12.96 | 6.09 |
| Huesca | 0.13 | 0.08 | 0.11 | 0.31 | 6.45 | 3.50 | 8.36 | 4.01 |
| Teruel | 0.16 | 0.13 | 0.06 | 0.26 | 3.43 | 2.20 | 7.57 | 3.14 |
| Zaragoza | 0.10 | 0.50 | 0.28 | 0.55 | 9.88 | 4.95 | 13.75 | 6.89 |
| Asturias | 0.11 | 0.28 | 0.11 | 0.32 | 7.19 | 3.36 | 9.11 | 5.08 |
| Baleares | 0.12 | 0.82 | 0.11 | 0.34 | 5.28 | 2.68 | 6.24 | 3.25 |
| Las Palmas | 0.27 | 0.25 | 0.04 | 0.33 | 4.42 | 2.00 | 8.82 | 4.67 |
| Santa Cruz de Tenerife | 0.28 | 0.44 | 0.03 | 0.29 | 6.74 | 3.18 | 11.36 | 5.87 |
| Cantabria | 0.07 | 0.28 | 0.05 | 0.14 | 7.12 | 3.16 | 8.39 | 4.39 |
| Ávila | 0.14 | 0.05 | 0.06 | 0.20 | 6.10 | 2.54 | 7.57 | 3.63 |
| Burgos | 0.14 | 0.57 | 0.11 | 0.37 | 5.28 | 2.99 | 10.87 | 6.17 |
| León | 0.03 | 0.22 | 0.06 | 0.20 | 6.44 | 2.96 | 9.03 | 4.57 |
| Palencia | 0.10 | 0.51 | 0.07 | 0.18 | 6.17 | 3.0 | 9.00 | 4.21 |
| Salamanca | 0.19 | -0.12 | 0.04 | 0.25 | 10.14 | 5.24 | 12.55 | 6.61 |
| Segovia | 0.10 | -0.19 | 0.05 | 0.17 | 7.53 | 4.04 | 11.71 | 6.06 |
| Soria | 0.07 | 0.69 | 0.09 | 0.19 | 5.77 | 3.14 | 9.58 | 5.15 |
| Valladolid | 0.08 | 0.03 | 0.12 | 0.32 | 9.21 | 4.68 | 10.50 | 6.52 |
| Zamora | 0.13 | -0.29 | 0.04 | 0.15 | 6.22 | 2.64 | 9.20 | 4.19 |
| Albacete | 0.15 | 0.54 | 0.08 | 0.28 | 7.55 | 2.77 | 9.13 | 4.02 |
| Ciudad Real | 0.15 | 0.61 | 0.07 | 0.22 | 6.37 | 2.75 | 7.91 | 3.43 |
| Cuenca | 0.15 | 0.74 | 0.04 | 0.14 | 5.04 | 2.32 | 6.63 | 3.13 |
| Guadalajara | 0.13 | 0.82 | 0.08 | 0.23 | 6.58 | 3.14 | 12.25 | 5.90 |
| Toledo | 0.12 | -0.15 | 0.07 | 0.26 | 5.15 | 2.32 | 6.80 | 3.15 |
| Barcelona | 0.08 | 0.37 | 0.32 | 0.67 | 9.85 | 4.76 | 14.04 | 7.07 |
| Girona | 0.13 | 0.43 | 0.16 | 0.44 | 6.91 | 3.53 | 8.25 | 4.62 |
| Lleida | 0.11 | 0.09 | 0.10 | 0.32 | 6.42 | 3.40 | 10.69 | 5.03 |
| Tarragona | 0.12 | 0.12 | 0.10 | 0.31 | 6.10 | 3.05 | 8.87 | 4.49 |
| Alicante | 0.10 | 0.35 | 0.17 | 0.43 | 5.66 | 2.65 | 9.97 | 4.79 |
| Castellón | 0.52 | 0.26 | 0.01 | 0.43 | 6.60 | 3.29 | 8.34 | 3.93 |
| Valencia | 0.53 | 0.41 | 0.01 | 0.42 | 8.33 | 3.95 | 13.76 | 6.82 |
| Badajoz | 0.10 | 0.15 | 0.04 | 0.18 | 6.11 | 2.07 | 7.80 | 3.37 |
| Cáceres | 0.19 | -0.38 | 0.03 | 0.19 | 6.09 | 2.46 | 7.98 | 3.61 |
| A Coruña | 0.14 | -0.23 | 0.07 | 0.28 | 6.92 | 3.40 | 11.19 | 6.19 |
| Lugo | 0.16 | -0.49 | 0.04 | 0.24 | 3.42 | 2.00 | 9.35 | 4.94 |
| Ourense | 0.12 | -0.42 | 0.07 | 0.26 | 6.62 | 3.54 | 12.68 | 5.84 |
| Pontevedra | 0.16 | -0.02 | 0.07 | 0.32 | 5.83 | 2.89 | 7.71 | 4.29 |
| Madrid | 0.08 | 0.51 | 0.27 | 0.52 | 15.97 | 7.89 | 21.07 | 10.95 |
| Murcia | 0.13 | 0.64 | 0.08 | 0.24 | 7.88 | 3.41 | 9.68 | 4.68 |
| Navarra | 0.09 | 0.56 | 0.17 | 0.34 | 8.29 | 4.39 | 14.16 | 7.02 |
| Álava | 0.11 | 0.31 | 0.16 | 0.43 | 8.10 | 4.62 | 13.21 | 7.50 |
| Guipúzcoa | 0.09 | 0.32 | 0.15 | 0.40 | 8.67 | 4.19 | 13.63 | 7.76 |
| Vizcaya | 0.08 | 0.47 | 0.21 | 0.45 | 15.68 | 7.22 | 16.98 | 8.88 |
| La Rioja | 0.08 | 0.39 | 0.11 | 0.27 | 7.55 | 3.53 | 9.97 | 5.19 |

Source: authors’ own calculations, \* from SABI database, \*\* from INE, \*\*\* from IVIE

These preliminary yet important figures will be more valuable once they are combined with the geographical illustrations about creative capital in Spain. First of all Figure 1 illustrates the spatial distribution of creative capital. For both years geographical dispersion of the creative capital seems to be mostly concentrated among the north-eastern geography of the country. Note that this pattern is somehow identical with the overall regional differences in Spain (see section II for the literature; see section 5 for the findings of the paper validating this concern). More interestingly information in table 1 as well as the creative employment growth performances illustrated in figure 2 signals that, provinces with lower creative capital base try to grow faster during the 1996-2004 period. When this information is combined with the coefficient of variation in figure 3, we realize the convergence struggle of the lagging geographies.[[1]](#footnote-1) However returning to figure 1, still the north and south differences in creative capital is persistent. The north east geography seems to be highly concentrated in terms of creative employment. There is also Madrid at the center but it seems that it acts as an outlier. Indeed, even taking into consideration of developments in terms of creative capital, the north-south pattern inequalities seems to be persistent.[[2]](#footnote-2)

Figure 1: Spatial Distribution of Creative Capital in Spain (per 10.000 employers)

|  |  |
| --- | --- |
| 1996 | 2004 |
|  |  |
| |  |  | | --- | --- | |  | High Creative Class | |  | Medium High Creative Class | |  | Medium Low Creative Class | |  | Low Creative Class | | |

Source: SABI

Figure 2: Performance of Spanish Provinces in terms of Creative Capital

(Annualized growth of creative employment 1996-2004)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | |  |  | | --- | --- | |  | 53% -16% | |  | 13% - 15% | |  | 11% - 12% | |  | 3 % - 10% | |

Source: SABI, authors’ own calculations

Figure 3: Coefficient of Variation for Creative Capital in Spain

Source: SABI

1. **METHODOLOGY**
   1. **Spatial Data Analysis**

Based on the major objectives of the study first we analyze the spatial dispersion of creative capital by using some exploratory spatial data tools. We consider the creative capital consisting of high-tech, knowledge intensive services, real estate, architecture and engineering, research and development, advertising and market research, professional, scientific and technical activities, financial and insurance activities, other creative activities such as publishing, software publishing, telecommunications, and computer programming occupations.

The first set of analysis is about the spatial concentration and local patterns of creative capital in Spain. While there are different ways to see how creative capital is dispersed, we prefer to increase the attention on the spatial concentration. First the spatial autocorrelation is computed (see equation1, Moran’s *I*). While the measure explains the general tendency about the regional interconnections, it will fail to show us the local patterns. To deal with this issue both the decomposed Moran scatter maps (diagrams) will be used but also an investigation about the significant local realizations will be done to see the local spillovers. To do so, we also compute the local indicator of spatial association - LISA - (see equation 2 and see Anselin, 1993). By doing so, we have possibility to decompose and analyze the significance of the spatial concentration of creative capital in Spain.

(eq.1) 

(eq.2) 

* 1. **Econometric Specification**

The second analysis refers to the investigation of the creative capital dispersions’ impact on regional differences in Spain. We measure the regional differences by looking at the provincial GDP of the Spain for the year 2004. Our major hypothesis is that even controlling for the industrial development (Ind), human capital development (HK) and local spillover effects of close provinces (Spillover), creative capital (Crea) should be explaining the regional differences in per capita income (y) among the Spanish territory (see equation 3). Data for creative employment is collected from SABI data base and defined in the previous sub-section. Per capita GDP for 2004 is from INE. Industrial development is measured by the share of manufacturing employment in the total employment and human capital development is the share of people with university degree in total population. Both collected again from INE data base.

(eq. 3) 

Equation 4 and 5 are the generalized models that includes the X matrix consisting of the control for regional differences in industrial and human capital development. Equation 4 is a spatial lag model (spatial auto regressive model - SAR) which assumes that the regional spillovers and spatial dependency works over the regional differences in per capita income. Whereas equation 5 is the spatial error model (SEM) that remarks that provinces that are close to each other will be influenced from common shocks and the spatial association works over the omitted variables in the model.

(eq. 4) 

(eq. 5) 

**5. EMPRICAL FINDINGS**

As we have already addressed in figure 1 that there is an unequal structure for creative capital. To examine the roots of this dispersion we begin with the examination of spatial associations. Our expectation is to determine the geographical locations that exhibit regional spillovers, thus some location can act as locations forming high creative employment clusters, meanwhile some can suffer from low levels. First global spatial autocorrelation is computed for creative employment. The preferred weight matrix is an inverse distance weight matrix, which gives higher weight to close locations.[[3]](#footnote-3) Result of the spatial autocorrelation test is provided in table 2 and as we can see from the significant stats that creative employment is spatially dependent across the territory of Spain. This brings in mind the possible spillover effects of the creative capital. As to understand such spillover of the creative capital, we decompose the Moran statistic and focus on the local patterns in 2004.[[4]](#footnote-4)

Figure 4 gives us the first set of information about the regional spillover effects of the creative capital. Moreover as to have some preliminary information in mind about the relationship of local development and creative capital, figure 4 also gives the decomposition of the spatial autocorrelation for per capita GDP. The creative capital map of Spain, signals that north-eastern geography of the country forms a cluster of provinces that realize substantial level of creative capital. There are also locations that are outliers of their geography. However general pattern shows us that; there is some sort of an “L” shape for the isolated provinces in terms of creative employment across the territory of Spain starting from the north west towards the south east of Spain. This finding becomes more prominent when we also focus on the regional per capita income’s spillover, which exhibits a much or less similar pattern. In both cases the creative capital and regional income patterns are signaling us that there is some sort of interdependencies between these two variables.

Table 2: Global Spatial Autocorrelation of Creative Capital in Spain

|  |  |
| --- | --- |
|  | **Moran’s I** |
| **1996** | 0.0703 \*\*\* (0.022542) |
| **1997** | 0.0707 \*\*\* (0.022542) |
| **1998** | 0.0839 \*\*\* (0.022542) |
| **1999** | 0.0366 \*\*\* (0.022542) |
| **2000** | 0.0705 \*\*\* (0.022542) |
| **2001** | 0.0732 \*\*\* (0.022542) |
| **2002** | 0.0768 \*\*\* (0.022542) |
| **2003** | 0.0887 \*\*\* (0.022542) |
| **2004** | 0.0998 \*\*\* (0.022542) |

St. dev in ( ), \*\*\* represents significance at 1%

Figure 4: Regional Spillover of Creative Capital and Regional Differences

|  |  |
| --- | --- |
| **2004 – Creative Capital** | **2004 – Per capita GDP** |
|  |  |
| **Moran I stat: 0.0998 (p-value: 0.00001)** | **Moran I stat: 0.2450 (p-value: 0.00001)** |
| |  |  | | --- | --- | |  | **High – High Clusters** | |  | **Low – Low Clusters** | |  | **High Outliers** | |  | **Low Outliers** | | |

Source: SABI, INE, authors, calculations

After understanding the spatial relationship and observing how regional spillovers work in Spain, we find it valuable to focus on the local realizations. LISA values for the all provinces are computed and are reported for 2004. Here we believe the positive LISA scores should be regarded as the significant high clustering behavior of the general locations. But more importantly the scores can also signal the important externalities generated by the locations. These externalities seem to provide a general cluster composed of Barcelona, Girona, Zaragoza, Huesca, Castellon and Lleida on the easten and north eastern geography; whereas Cacares, Badajoz, Zamora and Huelva seem to suffer from common negative shocks of their locations. On the other hand, there is Madrid as the capital province of the country that acts as an outlier, with high levels of creative capital surrounded by lagging provinces of the country.

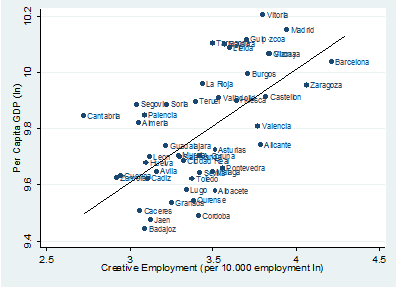
Table 3: Local Measures to Understand the Spillover of Creative Class (2004)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **LISA** | **Z-score** | **P -value** |  | **LISA** | **Z-score** | **P - value** |
| **Barcelona** | 1.0083\*\*\* | 5.988 | 0.0000 | **Madrid** | -0.439\*\*\* | -4.0301 | 0.0001 |
| **Girona** | 0.8818\*\*\* | 5.0599 | 0.0000 | **Guip·zcoa** | -0.113 | -0.8734 | 0.3824 |
| **Zaragoza** | 0.2842\*\*\* | 3.0647 | 0.0022 | **Cuenca** | -0.0599 | -0.4592 | 0.6461 |
| **Caceres** | 0.2183\*\*\* | 2.6446 | 0.0082 | **Teruel** | -0.0614 | -0.3751 | 0.7076 |
| **Badajoz** | 0.2087\*\* | 2.4509 | 0.0143 | **Soria** | -0.0522 | -0.3055 | 0.76 |
| **Zamora** | 0.2218\*\* | 2.4143 | 0.0158 | **Pontevedra** | -0.0549 | -0.2294 | 0.8186 |
| **Huelva** | 0.1979\*\* | 2.176 | 0.0296 | **Valladolid** | -0.0425 | -0.2106 | 0.8332 |
| **Huesca** | 0.1911\*\* | 2.0033 | 0.0451 | **Segovia** | -0.032 | -0.1004 | 0.92 |
| **Castellon** | 0.2005\* | 1.9419 | 0.0521 | **Burgos** | -0.0273 | -0.0534 | 0.9574 |
| **Lleida** | 0.1851\* | 1.7023 | 0.0887 | **Asturias** | -0.0269 | -0.0434 | 0.9654 |

Source: SABI, authors’ calculations

The pattern that we detect when we compare the spatial concentration becomes stronger once we have a quick look about the direct relation between creativity and regional difference measures. Combining figure 4 and table 3 gives some clues about the relationship between locations’ creative capital and per capita GDP. Similarly figure 5 gives another the direct association. All underlining that province with high creative capital are realizing relatively high per capita income in Spain. To increase the degree of certainty about this functional relationship, we continue by estimating a set of models that test the hypothesis about the role of creative capital as to understand regional differences in per capita income.

Figure 5: Relationship between Creative Capital and Regional Divergence (2004)



Source: INE, SABI

Results reported in table 4 are the estimation for 47 provinces of Spain.[[5]](#footnote-5) In all models creative capital’ impact is tested by controlling for possible different dimensions of regional divergence. Note that all models take into account the possible regional spillovers as they include the spatial lag or the error parameter, which are all statistically significant as in line with our expectations and previous spatial data findings. Moreover creative capital variable is influencing the regional per capita differences in models I, II, IV and V. This validates our concerns about the vital impact of the employment in creative work lines. Even when we control for industrial development and local spillovers, creative capital endowment is significantly affecting the regional differences (that is already visualized in section 3). However for the models III and VI; when we also take into account the impact of human capital endowment of the provinces, results indicate the decreasing impact of the creative capital. In our view this mostly has to do with the expected co-movement between human capital development and the deepening of creative capital, which has been an issue in section 2. And when the spatial dispersion of the human capital bases of provinces are investigated in details, both the endowment but also the growth patterns of creative capital and human capital development is found to be similar (see appendix). Note that this similarity is stronger for the endowments. Finally about the comparison of the models, we realize that based on the information criterions spatial lag models are superior to the spatial error models. Thus all these findings indicate once more the strong and significant impact of the creative capital endowments on the regional differences in Spain.

Table 4: Econometric Results

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Dependent Variable: Per Capita Gross Domestic Product 2004 (2004 GDP in €)** | | | | | | |
|  | **Spatial Lag Models** | | | **Spatial Error Models** | | |
|  | **Model I** | **Model II** | **Model III** | **Model IV** | **Model V** | **Model VI** |
| **Creative**  **Capital** | 0.292\*\*\*  (0.059) | 0.226\*\*\*  (0.069) | 0.134\*  (0.072) | 0.273\*\*\*  (0.068) | 0.227\*\*\*  (0.076) | 0.121  (0.085) |
| **Share of**  **Manufacturing Emp.** | - | 0.095\*  (0.054) | 0.092\*  (0.050) | - | 0.084  (0.063) | 0.096  (0.060) |
| **Share of Population**  **with BA Degree** | - | - | 0.186\*\*\*  (0.068) | - | - | 0.182\*\*  (0.078) |
|  | 0.916\*\*\*  (0.058) | 0.898\*\*\*  (0.071) | 0.905\*\*\*  (0.066) | - | - | - |
|  | - | - | - | 0.898\*\*\*  (0.071) | 0.868\*\*\*  (0.092) | 0.864\*\*\*  (0.095) |
|  | 0.41 | 0.47 | 0.53 | 0.18 | 0.23 | 0.27 |
| **BP-Test**  **(P-value)** | 0.001  (0.9960) | 0.843  (0.66) | 0.715  (0.86) | 0.0004  (0.98) | 0.113  (0.94) | 0.247  (0.97) |
| **AIC** | -48.775 | -49.731 | -54.631 | -48.631 | -47.905 | -50.963 |
| **SC** | -43.225 | -42.330 | -45.380 | -44.930 | -42.354 | -43.562 |

Standard errors in ( ), \*, \*\*, \*\*\* represents significance at 1%, 5% and 10% respectively

1. **CONCLUSION**

The creative class theory and the regional imbalances of Spain relationship is not something accidental. Keeping in mind the various discussions of the creative capital theory, we focus on basically what goes on in Spain from 1996s to beginning 2000s. As like the other empirical researches’ findings (Maza and Villaverde, 2009; Pastor et.al., 2010; Cuadrado et.al., 1998; Villaverde, 2001; de la Fuente, 2002; Goerlich et.al., 2002; Raymond, 2002; Lladós, 2002), our findings indicate that the so called on going differences in Spain, despite some improvements, is also valid for dispersion of creative capital. It should be highlighted the fact that there is a territorial imbalance in provincial income and educated employment or creative capital in Spain.

Our preliminary set of results indicates that north eastern geography of the country is composed of cluster that realizes substantial level of creative capital. In conjunction with this; these provinces with high creative capital are realizing relatively high per capita income. And more interestingly the findings of the study validates that regional income as well as the regional creative capital have spillover effects that forms persistent clusters much or less at the same geographies. This finding should be read carefully since it contains valuable information about the implementation of local policies; that implementations in a given single locations will have effects spilling over the geography. Overall the pattern of the clusters for regional income and creative capital is no coincidence. Moreover our second set of findings pin points that; creative capital endowment is significantly affecting the regional differences, even when we control for industrial development and local spillovers. Yet, when we also take into account the impact of human capital endowment; results are as if the impact of the creative capital is decreasing. We believe this is not coming from a lack of connection between creativity and regional differences; rather it is to do with the connection between the level of human capital and education of the individuals in the creative class.

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**APPENDIX**

**Table A1: Description of the independent and dependent variables**

|  |  |  |
| --- | --- | --- |
| ***Variable*** | ***Measure*** | ***Source*** |
| **Independent**  **Creative Employment**  ***Explanatory/Controls***  **Human capital**  **Manufacture based employment**  **Service based employment**  **Dependent**  **GDP per capita** | Percentage of creative employment in the selected sectors (according to CNAE \* classifications), in total employment by Provinces of Spain from 1996 to 2004 (the data are not available for Ceuta and Melilla)  Percentage of employment with a bachelor’s degree and higher in total employment by Provinces of Spain from 1996 to 2004  Percentage of the population with a bachelor’s degree and higher in total population by provinces of Spain from 1996 to 2004  Percentage of manufacture employment in total employment by Provinces of Spain from 1996 to 2004  Percentage of service sector employment in total employment by Provinces of Spain from 1996 to 2004  Per capita income (GDP) per year by Provinces of Spain from 1996 to 2004 | ‘Sistema Anual de Balances Ibéricos’ (SABI) database\*\*  Instituto Valenciano de Investigaciones Económicas **(IVIE)**  Instituto Nacional de Estadística **(INE)**  Instituto Nacional de Estadística **(INE)**  Instituto Nacional de Estadística **(INE)**  Instituto Nacional de Estadística **(INE)** |

\* Spanish National Classification of Economic Activities

\*\* Data classified at four-4 digit level for selected occupations. Given data availability for all variables selected, data can be collected from 1996 to (up to) 2004.

Figure A1: Human Capital and Creative Capital Potentials

|  |  |
| --- | --- |
| Change in the number of people with BA Degree (1996-2004) | Annualized Growth of Creative Capital (1996-2004) |
|  |  |
| Population with BA Degree (2004) | Creative Class (2004) |
|  |  |

|  |  |
| --- | --- |
|  | High |
|  | Medium High |
|  | Medium Low |
|  | Low |

Source: INE, SABI, own calculations

1. Coefficient of variation is simply  and regarded as a basic sigma convergence measure. A decrease in the measure is in favor of a more equal dispersion of the creative capital. [↑](#footnote-ref-1)
2. See section 4 for a detailed examination of the regional spillovers. [↑](#footnote-ref-2)
3. See Karahasan and Bazo (2011) for a discussion about different possible ways of calculation of weight matrix again for the case of Spain. [↑](#footnote-ref-3)
4. Note that both Moran Scatter Maps as well as the LISA calculations are done for the whole sample. However since the local patterns and the spillover illustration are persistent over time, here only results for the year 2004 is reported. Results for the other years are available from the authors upon request. [↑](#footnote-ref-4)
5. Balaric and Canary Islands as well as the two small provinces in North Africa (Ceuta and Melilla) are not included as they are not in the territorial borders of the country. [↑](#footnote-ref-5)