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CENTRE DE RECERCA EN ECONOMIA
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Where New Creative Industries Locate? Evidence from French Departments

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Document de treball n.12 - 2018

DEPARTAMENT D'ECONOMIA – CREIP
Facultat d'Economia i Empresa

UNIVERSITAT ROVIRA I VIRGILI

DEPARTAMENT D'ECONOMIA

Edita:

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Adreçar comentaris al Departament d'Economia / CREIP

ISSN edició en paper: 1576 - 3382
ISSN edició electrònica: 1988 - 0820

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Where New Creative Industries Locate? Evidence from French Departments

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Abstract:

This paper focuses on the creative industries and the role played by the existing spatial distribution and agglomeration economies of these activities in relation to their entry decisions. Our main statistical source is the *Répertoire des entreprises et des établissements* (REE) provided by INSEE, which has plant-level microdata on the location of new establishments between 2006 and 2013. We use Count Data Models to show that location determinants are quite similar in creative and non-creative industries and that specialisation in creative industries positively influences entry of all industries.

Keywords: creative industries, firm location, industrial organisation, France

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*This paper was partially funded by ECO2017-88888-P, the "Xarxa de Referència d'R+D+I en Economia i Polítiques Públiques", the SGR programme (2014 SGR 299) of the Catalan Government, the "Departament d'Universitats, Recerca i Societat de la Informació de la Generalitat de Catalunya" FI Fellowship (2017 FI_B 00223) and the "Fundación SGAE". Any errors are, of course, our own.

1. Introduction

Incidence of firm entries on employment and economic growth is quite relevant and has been largely analysed by economic literature from several points of view, typically trying to understand what explains entry decisions in terms of industry-specific or territory-specific determinants. In this sense, there is a wide tradition of analyses trying to identify and quantify entry determinants, sometimes focusing on whole manufacturing and services entries for different areas or, by the contrary, focusing on specific industries for aggregate spatial areas. Nevertheless, analyses for entries of specific industries into different geographical areas are more scarce and, at the same time, of big interest, as they allow to highlight the role played by spatial characteristics and, simultaneously, industry-specific characteristics.

In addition, in developed countries there are some activities that have noticeably increased their weight in overall economic activity very recently but unfortunately, without receiving enough attention from academic community in order to understand forces driving entry of firms and, especially, their location decisions when choosing among alternative territories. This is why this paper focuses on Creative Industries (CIs), a group of industries linked to culture, creative and high-tech activities[1] that have experienced high growth rates in recent years and that have relevant positive externalities (Sanchez-Serra, 2014), as they contribute to knowledge generation, and prestige of areas specialised in these activities (Myerscough, 1988) that may attract firms and economic activity (Bille and Schulze, 2006) and boost productivity of existent firms. This positive perception of CIs has been fuelled by contributions of Florida (2005, 2002) in which he has provided a measure of creative class and a first (qualitative) attempt to quantify its contribution over economic activity.

Unfortunately, current knowledge about entry determinants is quite scarce for CIs and, consequently, it is needed to shed light on processes driving entries in these industries. This paper aims to (partially) fill this gap by analysing the French case in terms of entry determinants at province (*départements*) level (i.e., NUTS 3 level). The French case is of special interest in view of relevance of CIs regarding *i)* the important figures in terms of number of firms and employees (IFM, 2013), *ii)* the important growth of workforce in CIs (Chantelot, 2010a), *iii*) the solid export profile of firms, and *iv)* the fact that despite an

[1] List of specific activities included into CIs is quite wide but, in general terms, the following ones are considered: Arts, Advertising, Cinema, Fashion, Publishing, R&D and Software. See section 4 (Data) for details and Table 3 for the complete list of industries.

important weight of Paris region, there is a relatively well-balanced territorial distribution, as all provinces are able to generate and attract new firms belonging to CIs at the same time that they present noticeable heterogeneities that influence their capacity to generate new entries. In addition, French CIs have a worldwide reputation as they include some of the most prominent actors in areas as fashion design, arts and entertainment, and publishing, among others (Scott, 2000 APUR, 2015). Moreover, as there are important inter-industry linkages arising from CIs as they contribute to prestige some specific areas and later to attract firms from very different industries unrelated to CIs (Coll-Martínez *et al.*, 2018), understanding what determines the location choice of CIs is key to design public policies aiming to attract innovative firms in French regions.

Our results suggest that on average, the probability of a creative firm to locate in a French department increases with human capital, disposable income per habitant, unemployment rate, number of museums, weather conditions (proxied by cumulate rain and sunny hours), and that this probability reduces with share in manufacturing activities, public investment per inhabitant and distance to Paris. Nevertheless, previous results blur some specificities for CIs subgroups.

The paper is organized as follows. In the second section we discuss theoretical and empirical contributions about firm entry and CIs, and we focus on these ones that specifically analyse entries in these industries and those that take into account spatial dimension of entries. In the third section we present the methodology and the econometric specification. In the fourth section we describe data set and the variables used. In the fifth section we discuss the main results. Finally, the sixth section concludes.

2. Literature: firm entry and CIs

Understanding firm entry decisions is becoming more and more relevant for policy makers as new firms are commonly hypothesized to be drivers of local and regional development (Acs *et al.*, 2009), regional diversity (Noseleit, 2015), technological change (Rigby and Essletzbichler, 2000), productivity growth (Brixy, 2014) and innovation (Audretsch, 1995), among a wide range of many positive effects. That is why it is relevant to analyse determinants of firm entry in order to better understand forces driving that phenomenon.

Initially, such analyses focused solely on industry-specific determinants without a territorial dimension (see Orr, 1974, for a seminal contribution), but in addition to industry dimension, contributions since mid-nineties (Reynolds *et al.*, 1994) have highlighted as well role of spatial dimension, mainly because spatial asymmetries generate important differences in terms of attractiveness of alternative territories.

Accordingly, empirical contributions focusing on aggregate firm entries (typically only for manufacturing industries and to a lesser extent for services) have identified several entry determinants that correspond to characteristics of geographical units that vary across space. Among them, the most well-known are related to agglomeration economies (Fotopoulos and Louri, 2000), entrepreneurial attitude (Bosma and Schutjens, 2011), firms' structure (Arauzo-Carod and Segarra-Blasco, 2005; Kangasharju, 2000), population size (Armington and Acs, 2002), institutional issues (Acs et *al.*, 2008), income (Elert, 2014), human capital (Armington and Acs, 2002), persistence of previous entries (Andersson and Koster, 2010), and labour market characteristics (Audretsch *et al.*, 2015; Santarelli *et al.*, 2009).

As "traditional" manufacturing or service activities have mainly attracted attention by most of researchers, entries in cultural or CIs have received much less attention, and sometimes that attention has solely focused on their role as magnets for other activities (Hall, 2000), as promoters of firm entries (De Jong *et al.*, 2007), or as tools for economic growth (De Propris, 2013), rather than analysing specific entries for these industries. Nevertheless, there are some empirical contributions about location determinants for CIs as those of Coll-Martínez and Arauzo-Carod (2017) for Catalan municipalities, Coll-Martínez *et al.* (2018) for Barcelona at a intra-urban level, Kiroff (2017) for the design subsector in Auckland, Sanchez-Serra (2016) for Spanish travel-to-work areas, Boix *et al.* (2015) for a selection of European metropolitan areas, Wenting *et al.* (2011) for fashion design firms in the Netherlands, Smit (2011) for three Dutch cities, and Cruz and Teixeira (2014) for Portuguese municipalities.

Although methodologies, geographical areas and research focus of these works differ considerably, there are some common key location determinants that have been identified by some of previous researchers. Concretely, apart from traditional agglomeration economies (Coll-Martínez and Arauzo-Carod, 2017; Sanchez-Serra, 2016) specialisation in CIs is a strong determinant for entries of both creative and non-creative firms (Coll-

Martínez and Arauzo-Carod, 2017). In a similar way, there is empirical evidence indicating that all types of firms benefit from the existence of an intangible *creative milieu* favouring entries (Coll-Martínez and Arauzo-Carod, 2017; Wojan *et al.*, 2007) as well as creative externalities (Sanchez-Serra, 2016). Previous results highlight the strong interindustry linkages between creative and non-creative industries that enhance positive effects of the formers over the laters and, in any case, empirical evidence indicates a strong preference for CIs co-located clusters where there are also other non-creative activities (Boix *et al.*, 2015). In terms of locational preferences of CIs, they tend to agglomerate at metropolitan areas (Boix *et al.*, 2015; Sanchez-Serra, 2014 and 2013) and, inside them, in a concentrated way close to core neighbourhoods (Coll-Martínez *et al.*, 2018) trying to benefit from agglomeration economies, although there are contributions giving a stronger role to urban amenities (Wenting *et al.*, 2011) as major locational determinants.

In spite of the interest of this topic and the importance of creative and cultural markets in France[2], unfortunately empirical evidence for the French case is still scarce. Among the few contributions we may highlight those by Sanchez-Serra (2014, 2013). Concretely, Sanchez-Serra (2013) focus on clusterisation of creative clusters at travel-to-work areas (*Zones d'Emploi*) and identifies 63 artistic creative local labour systems, showing that creative employment is clearly more concentrated that total employment, specially in and around big urban areas. In a similar approach, Sanchez-Serra (2014) identifies creative clusters in France and their determinants, finding that existence of information and communication technology jobs, education and the presence of foreign-born workers positively stimulate creative clustering. Finally, although Chantelot (2010a) focus on CIs workforce rather than on firm entries, he identifies urban amenities and market opportunities among main determinants of CIs workforce concentration at big French urban areas.

3. Methods

Although most of analyses about firm entry determinants rely on cross-section data, there is, as well, a large group of contributions using panel data approaches that cover a wide range of countries and entry typologies. Among them, for instance, we may highlight those of Hong *et al.* (2015) for Korea; Karahassan (2015) and Günalp and Cilasun (2006) for

[2] See Chantelot (2010b) for an analysis of French creative class in terms of workforce.

Turkey; Abdesselam *et al.* (2014) for France; Elert (2014) and Nyström (2007) for Sweden; Arauzo-Carod and Teruel-Carrizosa (2005) for Spain; Kangasharju (2000) and Ilmalkunnas and Topi (1999) for Finland, or Dunne *et al.* (1988) for the U.S. Using panel data offers some advantages over cross-section data (Hsiao, 2014) as, for instance, the possibility to introduce standard fixed effects on the regression that (potentially) reduce the correlation effects of the explanatory variables with unobservables, which are difficult to control with cross-section data. Accordingly, we have introduced time fixed effects in order to control for these factors.

3.1 Model specification

As there is some consensus about considering that entry determinants are industry-specific (Audretsch and Fritsch, 1999), using typical pool of covariates used mainly for manufacturing entries may imply some bias as CIs entries are affected by a set of specific factors that are found to foster creativity (see for instance, Coll-Martínez and Arauzo-Carod, 2017; Sánchez-Serra, 2016; Cruz and Teixeira, 2014; and Lazzeretti *et al.*, 2012). Among them, the median household income (*income*) (the income elasticity of demand for cultural assets tends to be high) and higher levels of public investment in cultural issues (*public_investment*) should favour location of CIs. Also the location decision of CIs is determined by residential amenities that in this paper are proxied by the following variables: the average number of days of sun (*sun*) and cumulated rain in mm (*rain*), that are expected to capture natural amenities, and the number of cinemas (*cinemas*) and museums (*museums*), that are expected to capture cultural amenities.[3] Finally, areas that are more specialised in CIs (*LQ_creative*) should favour the entry of all kinds of firms because of the existence of knowledge spillovers in terms of creativity and innovation, as shown in Coll-Martínez and Arauzo-Carod (2017), but also areas specialised in CIs should be more able to attract new firms because of the agglomeration advantages (localisation economies) created by the co-location of creative firms (Stam *et al.*, 2008; De Jong *et al.*, 2007; Lee *et al.*, 2004; Scott, 2000).

Nevertheless, CIs also take into account traditional location determinants (see Arauzo-Carod *et al.*, 2010, for an extensive review) like other economic activities do. Among them, education (*human_capital*) and agglomeration economies (in this paper proxied by

[3] In alternative specifications other variables related to proximity to the political power (regional capital), climate variables (such as temperature, humidity), landscape (coast, forest area, natural parks) and tourism proxies (lodging size), diversity (foreign population) were used but they were highly correlated with population density and the model's fit did not improve when they were included.

population density: *pop_density*) are important location factor whatever characteristics a firm may have. Share of manufacturing activities (*manufacturing*) is another well-known location determinant that fosters number of firm entries. Similarly, unemployment rates (*unemployment)* typically encourage firms to locate, as suggested by different theories. Concretely, some studies show that high unemployment rates favour the creation of firms in view of lack of employment alternatives (Wagner and Sternberg, 2004). Nevertheless, there are other authors arguing that high unemployment rates are linked to economic recession and, therefore, lower levels of consumption (Reynolds *et al.*, 1994) that deters entries. Finally, geography and institutional issues matter (Guimarães *et al.*, 2000), as firms need good accessibility to services provided in cores, so it is necessary to control for distance to main cities as Paris (*dist_paris)*. Moreover, proximity to the most important city of the country may capture on the one hand, a potential competition effect in view of agglomeration of firms in that area and, on the other hand, a competitive advantage in terms of the services and amenities located in and around Paris.

Thus, in order to analyse the determinants of the location decisions of firms from CIs and their relationship with CIs specialisation, we estimated the number of new establishments as a function of the specific local characteristics:

$$Firm\ entries_{it} = \beta_0 + \beta_1 human\_capital_{it} + \beta_2 pop\_density_{it} + \beta_3 income_{it} + \beta_4 manufacturing_{it} + \beta_5 unemployment_{it} + \beta_6 public\_investment_{it} + \beta_7 LQ\_creative_{it} + \beta_8 dist\_paris_{it} + \beta_9 rain_{it} + \beta_{10} sun_{it} + \beta_{11} cinema_{it} + \beta_{12} museums_{it} + u_{it} \quad (1)$$

where *Firm entries*$_i$ is the number of plants located in area *i*. Our empirical strategy consists of estimating eight different models that share the same set of explanatory variables with different dependent variables (Y_i): all firms (*entry_t*), non-creative firms (*entry_noncrea*), creative firms (*entry_crea*), cinema and audiovisuals firms (*entry_audio*), music and arts firms (*entry_arts*), publishing firms (*entry_pub*), advertising firms (*entry_arts*) and videogames firms (*entry_videogames*). This strategy allows us to compare the location determinants of the group of firms considered, with particular focus on the impact of a location quotient in CIs.[4]

3.2 Model selection

[4] The key variable LQ_creative is replaced in each model for a LQ in each subgroup of CIs, that is, LQ_audio, LQ_arts, LQ_pub, LQ_adv and LQ_videogames.

In this paper we use Count Data Models to analyse the determinants of the location choice of firms in CIs. The number of firm entries in a given area (i.e., French departments in this paper) is a nonnegative integer variable (i.e., count) that is preferred not to be estimated by ordinary least squares (OLS) since this technique may lead to biased, inefficient and inconsistent estimates (Long, 1997).

Count Data Models (CDM) have been commonly used when dealing with this location phenomenon from a spatial point of view: i.e., when trying to explain how the local characteristics of different sites (e.g., municipalities, counties, regions) can influence firms' decisions (Arauzo-Carod *et al.*, 2010). These CDM include, among others, the Poisson model (PM), the negative binomial model (NBM), the zero inflated Poisson model (ZIPM) and the zero inflated negative binomial model (ZINBM). Although PM is the most popular CDM, there are two econometrical problems that are not easy to manage using this estimation procedure, "overdispersion" and "excess of zeroes". As these problems may be solved using NBM, ZIPM and ZINBM, we follow Cameron and Trivedi (1998, 2005) in order to determine which one of them is the more appropriate by computing the following statistics: the Akaike information criterion (AIC), the Bayesian information criterion (BIC) and the Vuong test.

[INSERT TABLE 1 ABOUT HERE]

The descriptive statistics of the dependent variables in the firm entry model showed signs of overdispersion but there is not a zero inflation problem since at least one establishment located in each department except for publishing and videogames industries. Specifically, zeroes were 6.94% for publishing entries and 30% for videogames entries. For this reason, we estimated a baseline specification using CDM and selected the specification with the best fit using the aforementioned selection tests. Table 1 illustrates the results of these statistics and shows that the NBM performed best according to AIC and BIC. The only exception is found for publishing and videogames since AIC, BIC and the Vuong test also favoured the ZINBM over the NBM, but the percentage of zeroes was not big enough to justify using an inflated model. Thus, we decided to use the NBM for all the firm entry specifications, but for publishing and videogames.

4. Data

The data in this paper are from France. The data includes one dataset about the location of new establishments (dependent variable) and another dataset about territorial characteristics (independent variables). The dataset about the location of new establishments includes the *Répertoire des Entreprises et des Établissemetns* (REE) and the *Système Informatique pour le Répertoire des Entreprises et de leurs Établissements* (SIRENE), supplied by the *Institut National de la Statistique et des Études Économiques* (INSEE). This data provides comprehensive information on the location of establishments (both manufacturing and services) in France between 2006 and 2014, including geographical information (at regional and department levels), employment data, and other characteristics at the 4-digit NAF level. The dataset of the local characteristics of French Departments (96) is taken from different sources such as INSEE, French Government and Eurostat. Table 2 shows some descriptive statistics and Table 3 main correlation results for these variables.

[INSERT TABLE 2 ABOUT HERE]
[INSERT TABLE 3 ABOUT HERE]

Regarding CIs definition, we use the APUR-INSEE proposal (2014) as it is the official classification of CIs used in France and roughly relies on the UNCTAD's (2008) proposal, which is the most widely accepted by researchers (see, among others, Boix and Lazzeretti, 2012, and Coll-Martínez and Arauzo-Carod, 2017). According to this criterion, we include 29 sectors in CIs classified in 5 subgroups (Cinema and audio-visuals, music and life performance, publishing, advertising and videogames (see NAF-Rev. 2 industry classification in Table 4).[5] This selection reports 112,274 new creative establishments located in French Departments between 2008 and 2013.[6]

[INSERT TABLE 4 ABOUT HERE]

[5] Although Architecture and Engineering industries are typically included among CIs we have decided to exclude them as they have a very particular location patterns, are concentrated in some departments and include an important share of nuclear activities (noticeably in Territoire Belfort where there is a cross-border cluster at both sides of French-Swiss border) which are far away from CIs.
[6] Because of the lack of data for most explanatory variables for the full period, we finally work with a panel data from 2008 to 2013.

Table 5 illustrates 2008-2013 period showing a clear boom (between 2008 and 2009) followed by a short period of attrition that fits with the economic trend of these years, and Table 6 shows a weak decrease of the employment in CIs sectors during the same period.

[INSERT TABLE 5 ABOUT HERE]
[INSERT TABLE 6 ABOUT HERE]

4.1 Stylised facts about creative industries and firm location in French Departments

Figure 1 compares the location patterns of all firms, non-creative and creative firms. For both years (2008 and 2013) roughly 75% of all firms locate in and around Île-de-France and in the most populated departments such as Nord, Rhône, Bouches-sur-Rhône or Gironde, the same areas were most of cultural jobs are located (Cléron and Patureau, 2007). Thus, it seems clear that one of the most essential determinants of firms' location decision are agglomeration economies arising by dense populated areas that are expected to provide some advantages that increase attractiveness of these areas (e.g., specialised labour markets, availability of suppliers and knowledge spillovers).

[INSERT FIGURE 1 ABOUT HERE]

Spatial distribution for entries holds for both creative and non-creative firms. Moreover, even it has not significantly changed from 2008 to 2013; the number of new creative firms has increased over these years, although they have kept the same agglomeration pattern around larger capitals[7], as has been demonstrated by other researchers using spatial analysis tools (Chantelot *et al.*, 2010).

In order to identify location patterns for CIs in French departments we calculate a Location Quotient (LQ) in CIs, calculated using data of employment (*Effectif salarié déclaré par les établissements*) taken from INSEE. The same index has been used for other scholars before but under different specifications (for example, Lazzeretti *et al.*'s Location Quotient (2012)). This index compares the relative specialisation of a department in a sector in relation to the national (France) average and is defined as:

$$LQ\_creative_{ij} = (L_{ij}/L_j) \,/\, (L_i/\mathrm{L})$$

[7] See Julien (2002) for evidence for the French case.

where L_{ij} is the workforce in the creative industry j in department i, L_j is the total workforce in the creative industry j, L_i is the total workforce in department i, and L is total employment in the area (France). A LQ above 1 indicates that the clustering of a creative industry j in department i is larger than the national average, so the department is specialised in CIs.

[INSERT TABLE 7 ABOUT HERE]

Table 7 and Figure 2 show LQ results for the ten most specialised French departments and the spatial distribution of LQ in CIs for 2008 and 2013, respectively. Departments located in the Île-de-France region are the most specialised in CI's with values higher than 1. Concretely, Hauts-de-Seine and Paris departments stand out with a LQ higher than 3 for both years. Despite the remaining most populated departments are not specialised in CI's, since they have values below 1, they concentrate most creative employment in France. These results have not significantly changed over these years.

[INSERT FIGURE 2 ABOUT HERE]

5. Results

Table 8 shows the results of the econometric estimation of CIs location determinants. Negative Binomial estimates are presented for all firm entries (column 1), creative entries (column 2) and non-creative entries (column 3) in order to compare the determinants of location decisions of different types of industries. In general terms, for all types of entries most of the explanatory variables are significant, but there are some remarkable differences among creative and non-creative industries. More specifically, population density (i.e., a proxy of agglomeration economies) has a negative effect over all industries and non-creative industries, although the coefficient is not significant for CIs[8]. Nevertheless, role of population density is not clear at all, as correlation analysis shows a significant and positive relationship with all entries, but specially with those of CIs, a result that could be understood in terms of an unknown relationship between location quotient of CIs and

[8] It is noticeable that although Chatelot (2010a) analyses determinants of CIs workforce location, he reaches a similar result for big urban areas in France.

population density, although the influence of density over entries seems to be blurred by other explanatory variables. Aggregated income level of departments also plays a different role as only boosts entries of CIs, which may suggest some structural differences in terms of markets of both types of industries as CIs may target upper income levels of population. In a similar way, specialisation in CIs push up entries in these industries, as well as existence of cultural amenities as museums does. Surprisingly, number of cinemas exerts a negative effect over all types of entries that is not significant for CIs. In terms of geographical position, a larger distance to Paris deter the entry of creative firms, as they may have more difficulties to establish networking and access to cultural amenities which are highly concentrated in the French capital. Finally, the most remarkable results correspond to specialisation in CIs (*LQ_creative*), as it enhances entries of CIs and all firms (Coll-Martínez and Arauzo-Carod 2017). This result supports our assumption about positive effects of specialisation in CIs in terms of attracting new economic activity, no matter the industry of entering firms. Noticeably, departments specialised in CIs are more likely to attract new businesses.

In spite of previous specific effects at industry level, there are common location determinants that act in a similar way over different types of industries. In this sense, higher public investments and share of manufacturing workforce shares reduce entries whilst human capital and unemployment have the opposite effect. Regarding weather conditions, rainy and sunny departments enhance entries.

[INSERT TABLE 8 ABOUT HERE]

Negative Binomial estimates are presented in Table 9 for entering firms belonging to arts (column 1), audio-visuals (column 2), publishing (column 3), advertising (column 4) and videogames (column 5) in order to compare the determinants of location decision for these CIs. This strategy allows us to analyse the location behaviour of specific CIs, given that overall results may not reveal some heterogeneities due to the locational specificities of each CI.

[INSERT TABLE 9 ABOUT HERE]

As expected, all of selected subgroups of CIs share a large proportion of location

determinants; although among them videogames seem to keep slightly distinct determinants. In this sense, all of them are attracted to areas with more people enrolled in education and benefiting from sunny days, whilst they are repelled from areas with more manufacturing activity as these areas generate negative externalities that do not fit with cultural and creative environments. However, some CIs subgroups present clear specificities. On the one hand, most CIs firms are positively associated with income levels and cultural amenities like museums but for videogames firms. On the other hand, higher levels of unemployment are positively and significantly associated to arts entries, but do not exert significant effects for the rest of CIs. However, distance to Paris is only negatively and significantly associated to the entry of arts and audio-visuals firms, as they may have more difficulties to generate networking and get access to cultural amenities that are highly concentrated in the French capital. Public investment at department level discourse all types of entries but only in a significant way for advertising and videogames firms. Finally, the specialisation index in each creative industry only has a positive and significant effect on the entry of audio-visuals, advertising and videogames firms, which indicates a strong dependence on localization economies around these activities whose competitiveness may rely strongly on clusterisation with firms of the same industry.

6. Conclusion

In this paper we estimated the location determinants of new creative industries (CIs) firms across departments in France over the period 2008 – 2013. The econometric results show that the location determinants of creative and non-creative firms are quite similar and that both creative and non-creative firms are positively affected by worker specialisation in CIs. Moreover, results show that there are some heterogeneities among CIs activities due to their locational specificities.

In terms of previous empirical contributions, on the one hand, these results are in line with findings and support the positive association between the concentration of creative workers and new firms' creation at a department level (Scott, 2000; Lee *et al.*, 2004; Stam *et al.* 2008; Coll-Martínez and Arauzo-Carod, 2017).

Policy implications from our results point to the importance of achieving a critical mass of creative activities as a necessary condition in order to help to attract firm entries from these industries. Nevertheless, this situation could reinforce excessive concentration of CIs in and around main urban areas, which is not a desirable situation from a territorial cohesion point of view. As this paper has focused on location determinants of CIs at a quite aggregated level, we will leave for future research the analysis of whether our results hold for alternative geographical aggregation levels such as municipalities or metropolitan areas. Additionally, in view of huge concentration of CIs in Paris and municipalities belonging to its metropolitan area (see Boix *et al.*, 2016) it would be advisable to carry out a detailed and spatially disaggregated analysis for this area.

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Tables

Table 1. Selection model's tests

Model 1 (All firms)	AIC	BIC	Vuong test
Poisson	172,031.2	172,109.61	-
Negative binomial	9,541.55	9,624.32	-
Zero-inflated Poisson	172,035.2	172,122.32	-
Zero-inflated negative binomial	9,545.55	9,637.03	-
Model 2 (Creative)	AIC	BIC	Vuong test
Poisson	13,890.58	13,968.99	-
Negative binomial	6,070.26	6,153.03	-
Zero-inflated Poisson	13,890.58	13,968.99	-
Zero-inflated negative binomial	6,074.26	6,165.74	-1.72
Model 3 (Non Creative)	AIC	BIC	Vuong test
Poisson	163,629.84	163,708.25	-
Negative binomial	9,486.6961	9,569.4622	-
Zero-inflated Poisson	163,629.84	163,708.25	-
Zero-inflated negative binomial	9,490.6961	9,582.1744	-
Model 4 (Arts)	AIC	BIC	Vuong test
Poisson	8,812.84	8,891.25	-
Negative binomial	5,356.50	5,439.27	-
Zero-inflated Poisson	8,816.84	8,903.96	-1.11
Zero-inflated negative binomial	5,360.50	5,451.98	-1.47
Model 5 (Audio-visuals)	AIC	BIC	Vuong test
Poisson	6,503.13	6,581.54	-
Negative binomial	4,559.39	4,642.15	-
Zero-inflated Poisson	6,495.85	6,582.97	0.91
Zero-inflated negative binomial	4,563.39	4,654.86	-0.88
Model 6 (Publishing)	AIC	BIC	Vuong test
Poisson	3,974.44	4,052.85	-
Negative binomial	3,360.88	3,443.65	-
Zero-inflated Poisson	3,816.52	3,903.64	3.79***
Zero-inflated negative binomial	3,308.36	3,399.84	2.84**
Model 7 (Advertising)	AIC	BIC	Vuong test
Poisson	6,011.27	6,089.68	-
Negative binomial	4,415.87	4,498.64	-
Zero-inflated Poisson	5,981.14	6,068.26	0.61
Zero-inflated negative binomial	4,404.32	4,495.80	0.50
Model 8 (Videogames)	AIC	BIC	Vuong test
Poisson	2,508.96	2,587.37	-
Negative binomial	2,377.21	2,459.98	-
Zero-inflated Poisson	2,339.90	2,427.03	4.78***
Zero-inflated negative binomial	2280.41	2,371.89	4.67***

Notes: *** p<0.01; ** p<0.05; * p<0.1.

Table 2. Summary Statistics

Variable	Description	Source	Obs	Mean	Std. Dev.	Min	Max
entry_t	Number of total firm entries	Own elaboration with INSEE	576	4048.54	3042.66	358	14608
entry_crea	Number of creative firm entries	Own elaboration with INSEE	576	208.42	216.09	9	1623
entry_noncrea	Number of non-creative firm entries	Own elaboration with INSEE	576	3840.23	2847.265	349	13849
entry_audio	Number of cinema and audiovisual firm entries	Own elaboration with INSEE	576	50.99	66	0	545
entry_arts	Number of music and arts firm entries	Own elaboration with INSEE	576	107.47	90.44	5	489
entry_pub	Number of publishing firm entries	Own elaboration with INSEE	576	14.14	30.09	0	322
entry_adv	Number of advertising firm entries	Own elaboration with INSEE	576	44.05	54.3	0	472
entry_videogames	Number of videogames firm entries	Own elaboration with INSEE	576	6.05	12.97	0	123
human capital	Number of secondary students for 1000 inhabitants	http://www.collectivites-locales.gouv.fr/	576	82.04	7.42	61.8	99.85
pop_density	Population per squared km on 1st January	Eurostat	576	557.64	2449.19	14.83	21347.01
income	Disposable income in €/inhabitant	http://www.collectivites-locales.gouv.fr/	576	11471.75	3934.11	821.07	53829
manufacturing	Manufacturing employment rate	Own elaboration with INSEE	576	0.23	0.08	0.04	0.41
unemployment	Unemployment rate	http://www.collectivites-locales.gouv.fr/	576	0.09	0.02	0.04	0.15
public investment	Actual investment expenditure in € / inhab.	http://www.collectivites-locales.gouv.fr/	576	256.62	78.82	66.78	666.64
LQ_creative	Location Quotient in Creative Industries	Own elaboration with INSEE	576	0.58	0.47	0.18	3.68
LQ_audio	Location Quotient in Cinema and Audiovisuals	Own elaboration with INSEE	576	0.5	0.64	0.06	4.75
LQ_arts	Location Quotient in Music and Arts	Own elaboration with INSEE	576	0.71	0.41	0.11	3.63
LQ_pub	Location Quotient in Edition	Own elaboration with INSEE	576	0.54	0.61	0.07	5.35
LQ_adv	Location Quotient in Advertising	Own elaboration with INSEE	576	0.65	0.44	0.04	3.85
LQ_videogames	Location Quotient in Videogames	Own elaboration with INSEE	576	0.52	0.66	0	4.24
dist_paris	Distance in km from the capital of Department to Paris	Own elaboration	576	353.75	205.77	0	918.85
rain	Cumulate rain in a year in mm	Eider – French Government	576	801.14	210.25	423.2	1685.2
sun	Cumulate sunny time in hours	Eider – French Government	570	1962.02	390.3	73.1	3058
cinema	Number of cinemas	CNC Eider – French Government	576	21.32	14.07	3	88
museums	Number of museums	INSEE	576	12.58	8.59	2	59

Source: Authors

Table 3. Correlation of main explanatory variables

	1	2	3	4	5	6	7	8	9	10	11	12
1. human capital	1											
2. pop_density	0.1212*	1										
3. income	0.3333*	0.5351*	1									
4. manufacturing	-0.175*	-0.3642*	-0.3338*	1								
5. unemployment	0.1250*	-0.0578	-0.0487	-0.1349*	1							
6. public investment	-0.1999*	-0.2245*	-0.1948*	-0.0716	-0.2007*	1						
7. LQ_creative	0.1974*	0.8466*	0.5928*	-0.4461*	-0.0627	-0.1979	1					
8. dist_paris	-0.3017*	-0.3144*	-0.2076*	-0.2821*	0.1367*	0.3835*	-0.2349*	1				
9. rain	-0.1130*	-0.1764*	-0.1342*	0.2458*	-0.1384*	0.1459*	-0.2390*	0.2385*	1			
10. sun	-0.1217*	-0.1296*	-0.0017	-0.4384*	0.2454*	0.2850*	-0.0236	0.6759*	-0.1144*	1		
11. cinema	0.4937*	0.5150*	0.5462*	-0.4618*	-0.0652	-0.1890*	0.57*	0.0151	-0.0027	0.1103*	1	
12. museums	0.3381*	0.4713*	0.4582*	-0.2453*	0.1324*	-0.2804*	0.5152*	-0.0920*	-0.1404*	0.0713	0.6272*	1

Source: Authors

Table 4. Creative Industries Classification

CIs Subgroups	Sectors	Code APE-NAF Rev. 2
Cinema & Audio-visuals	Reproduction of sound recording	1820Z
	Production of films and shows for television	5911A
	Production of institutional and advertising films	5911B
	Production of film for cinema	5911C
	Post-production of films and shows for television	5912Z
	Distribution of cinematographic films	5913A
	Editing and distribution of videotapes	5913B
	Projection of cinematographic films	5914Z
	Broadcasting and distribution of radio shows	6010Z
	Broadcasting of generalist channels	6020A
	Broadcasting of theme channels	6020B
	Photographic activities	7420Z
Music and life performances	Sound recording and music editing	5920Z
	Life performing arts	9001Z
	Life performing arts supporting activities	9002Z
	Arts and crafts artistic creation	9003A
	Other activities related to artistic creation	9003B
	Other activities related to entertainment	9329Z
Publishing	Publishing of books	511Z
	Publishing of newspapers	5813Z
	Magazine publishing	5814Z
	Other publishing activities	5819Z
	Other news agencies activities	6391Z
Advertising	Advertising agencies activities	7311Z
	Management of advertising media	7312Z
Videogames	Publishing of videogames	5821A
	Publishing of software systems	5829A
	Publishing of software for development tools and languages	5829B
	Publishing applicative software	5829C

Source: Authors following APUR-INSEE classification

Table 5. Creative Industries firm entries by year

CIs Subgroups	2008	2009	2010	2011	2012	2013
Cinema and Audio-visuals	1,652	4,953	5,076	4,646	5,357	5,315
Music and life performances	3,552	12,089	12,234	9,966	10,876	10,303
Publishing	794	1,158	1,125	1,193	1,568	1,447
Advertising	1,726	2,944	3,067	2,765	2,903	2,608
Videogames	266	374	391	432	746	748
All creative industries	7,990	21,518	21,893	19,002	21,450	20,421

Source: Authors with SIRENE data

Table 6. Creative Industries employment by year

CIs Subgroups	2008	2009	2010	2011	2012	2013
Cinema and audio-visuals	80,212	78,915	78,686	82,843	78,884	78,468
Music and life performances	36,105	35,718	38,021	37,988	38,473	38,947
Publishing	85,560	81,770	76,280	80,312	77,682	74,311
Advertising	115,186	109,198	102,121	109,414	108,515	106,470
Videogames	53,533	45,252	43,593	47,771	49,759	51,725
All creative industries	370,596	350,853	338,701	358,328	353,313	349,921

Source: Authors with INSEE data

Table 7. Ranking of the most specialised departments in Creative Industries (2008)

2008				2013			
#	Code	Department	LQ_creative	#	Code	Department	LQ_creative
1	92	Hauts-de-Seine	3.56	1	92	Hauts-de-Seine	3.62
2	75	Paris	3.53	2	75	Paris	3.38
3	93	Seine-Saint-Denis	1.21	3	93	Seine-Saint-Denis	1.14
4	78	Yvelines	1.06	4	78	Yvelines	1.04
5	31	Haute-Garonne	1.00	5	69	Rhône	0.91
6	69	Rhône	1.00	6	34	Hérault	0.91
7	34	Hérault	0.93	7	31	Haute-Garonne	0.86
8	35	Ille-et-Vilaine	0.88	8	35	Ille-et-Vilaine	0.82
9	37	Indre-et-Loire	0.87	9	13	Bouches-du-Rhône	0.82
10	13	Bouches-du-Rhône	0.86	10	33	Gironde	0.82

Source: Authors with INSEE data

Table 8. Location determinants of firms (NB)

Dep. Var:	(1)	(2)	(3)
Firm entries	All	Creative	Non-Creative
human capital	0.0216***	0.0244***	0.0215***
	(0.00748)	(0.00736)	(0.00748)
pop_density	-8.81e-05**	-6.34e-05	-9.01e-05**
	(4.13e-05)	(5.06e-05)	(4.08e-05)
income	1.34e-05	1.60e-05*	1.32e-05
	(8.45e-06)	(9.49e-06)	(8.39e-06)
manufacturing	-1.143**	-1.635***	-1.123**
	(0.478)	(0.530)	(0.476)
unemployment	4.646**	4.143*	4.672**
	(2.196)	(2.175)	(2.198)
public investment	-0.001**	-0.001*	-0.001**
	(0.0006)	(0.0006)	(0.0006)
LQ_creative	0.221*	0.294*	0.215
	(0.133)	(0.165)	(0.131)
dist_paris	-0.0003	-0.0006**	-0.0003
	(0.0003)	(0.0003)	(0.0003)
rain	0.0115**	0.0119**	0.0115**
	(0.005)	(0.005)	(0.005)
sun	0.0216***	0.0244***	0.0215***
	(0.0074)	(0.0074)	(0.0075)
cinema	-8.81e-05**	-6.34e-05	-9.01e-05**
	(4.13e-05)	(5.06e-05)	(4.08e-05)
museums	1.34e-05	1.60e-05*	1.32e-05
	(8.45e-06)	(9.49e-06)	(8.39e-06)
Time FE	Y	Y	Y
Constant	5.474***	1.841***	5.452***
	(0.597)	(0.605)	(0.597)
N	576	576	576
Departments	96	96	96
Wald X^2	2,470.14	2,544.89	2,314.86
Log pseudolikelihood	-4,751.777	-3,016.139	-4,724.348
lnalpha	-2.452***	-2.385***	-2.452***
	(0.138)	(0.143)	(0.138)
alpha	0.086	0.092	0.086
	(0.012)	(0.013)	(0.012)

Notes: Robust standard errors in parentheses. *** p<0.01; ** p<0.05; * p<0.1.

Table 9. Location determinants of Creative Industries Subgroups (NB)

Dep. Var:	(1)	(2)	(3)	(4)	(5)
Firm entries	Arts	Audio-visuals	Publishing	Advertising	Videogames
human capital	0.0194***	0.0312***	0.0219**	0.0307***	0.0455***
	(0.00623)	(0.00865)	(0.0102)	(0.00787)	(0.0137)
pop_density	-5.42e-05	-7.37e-05	5.50e-06	-5.73e-05	-5.25e-05
	(3.41e-05)	(5.83e-05)	(7.31e-05)	(4.00e-05)	(4.02e-05)
income	1.72e-05**	2.33e-05**	2.70e-05**	2.37e-05**	2.99e-06
	(7.54e-06)	(1.15e-05)	(1.10e-05)	(1.15e-05)	(1.01e-05)
manufacturing	-1.150**	-2.469***	-3.129***	-2.018***	-3.968***
	(0.534)	(0.613)	(0.843)	(0.650)	(1.098)
unemployment	4.484**	3.453	-1.943	3.034	4.335
	(1.875)	(2.695)	(3.563)	(2.359)	(4.895)
public investment	-0.000496	-0.000941	-0.00129	-0.00121*	-0.00221**
	(0.000512)	(0.000668)	(0.000883)	(0.000675)	(0.00102)
LQ_$	0.0978	0.261*	0.0507	0.326**	0.554***
	(0.109)	(0.135)	(0.178)	(0.131)	(0.0875)
dist_paris	-0.0008***	-0.0008**	-0.0008	-0.0002	-4.45e-05
	(0.000289)	(0.000379)	(0.000576)	(0.0004)	(0.000658)
rain	0.0117***	0.0106*	0.0151*	0.0114*	0.0119
	(0.00446)	(0.00590)	(0.00814)	(0.00613)	(0.0104)
sun	0.0194***	0.0312***	0.0219**	0.0307***	0.0455***
	(0.00623)	(0.00865)	(0.0102)	(0.00787)	(0.0137)
cinema	-5.42e-05	-7.37e-05	5.50e-06	-5.73e-05	-5.25e-05
	(3.41e-05)	(5.83e-05)	(7.31e-05)	(4.00e-05)	(4.02e-05)
museums	1.72e-05**	2.33e-05**	2.70e-05**	2.37e-05**	2.99e-06
	(7.54e-06)	(1.15e-05)	(1.10e-05)	(1.15e-05)	(1.01e-05)
Time FE	Y	Y	Y	Y	Y
Constant	1.342**	-0.0504	0.0322	0.212	-2.098*
	(0.569)	(0.684)	(0.838)	(0.694)	(1.197)
N	576	576	576	576	576
Departments	95	95	95	95	95
Wald X^2	1,997.07	2,100.50	633.19	3,623.50	704.08
Log pseudolikelihood	-2,659.253	-2,260.695	-1,661.443	-2,188.938	-1,169.608
lnalpha	-2.524***	-2.161***	-1.688***	-2.093***	-1.563***
	(0.137)	(0.160)	(0.190)	(0.158)	(0.392)
alpha	0.08	0.115	0.185	0.123	0.209
	(0.011)	(0.018)	(0.035)	(0.019)	(0.082)

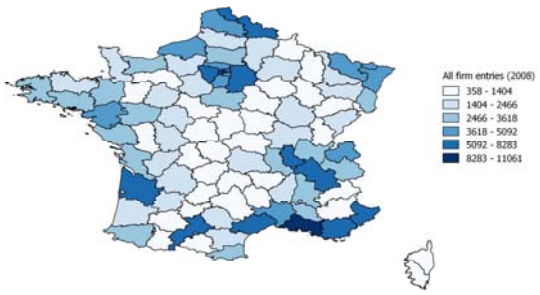
Robust standard errors in parentheses

*** p<0.01; ** p<0.05; * p<0.1.

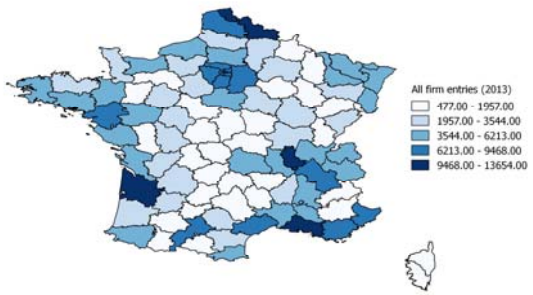
Figures

Figure 1. Firm entries by department

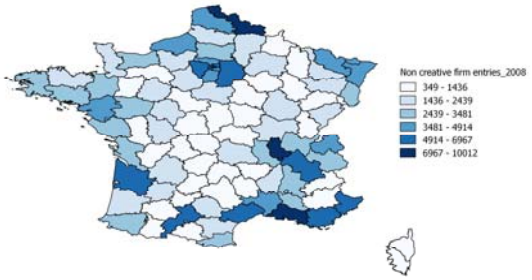
All firm entries (2008)



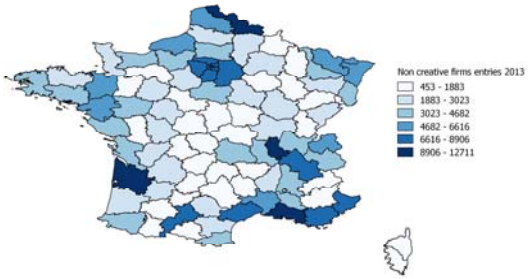
All firm entries (2013)



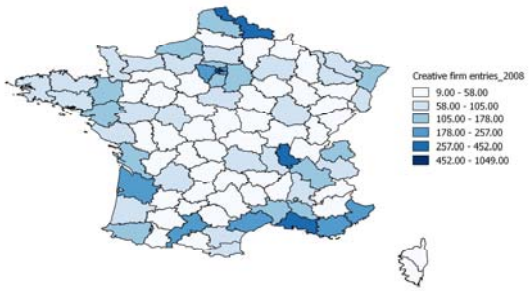
Non-creative firm entries (2008)



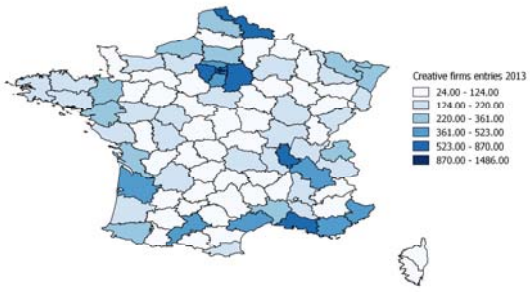
Non-creative firm entries (2013)



Creative firm entries (2008)



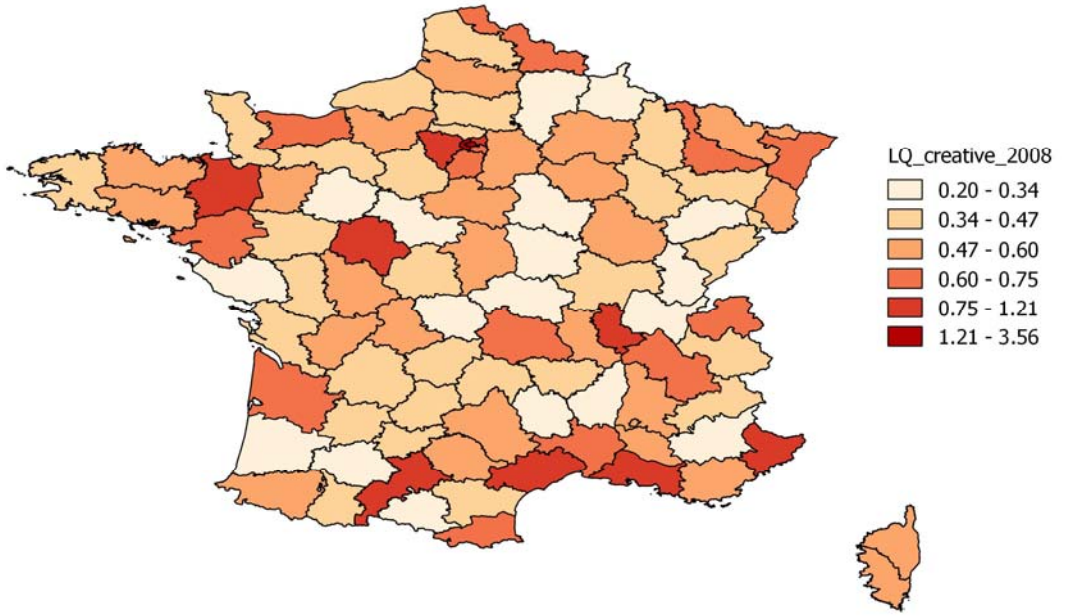
Creative firm entries (2013)



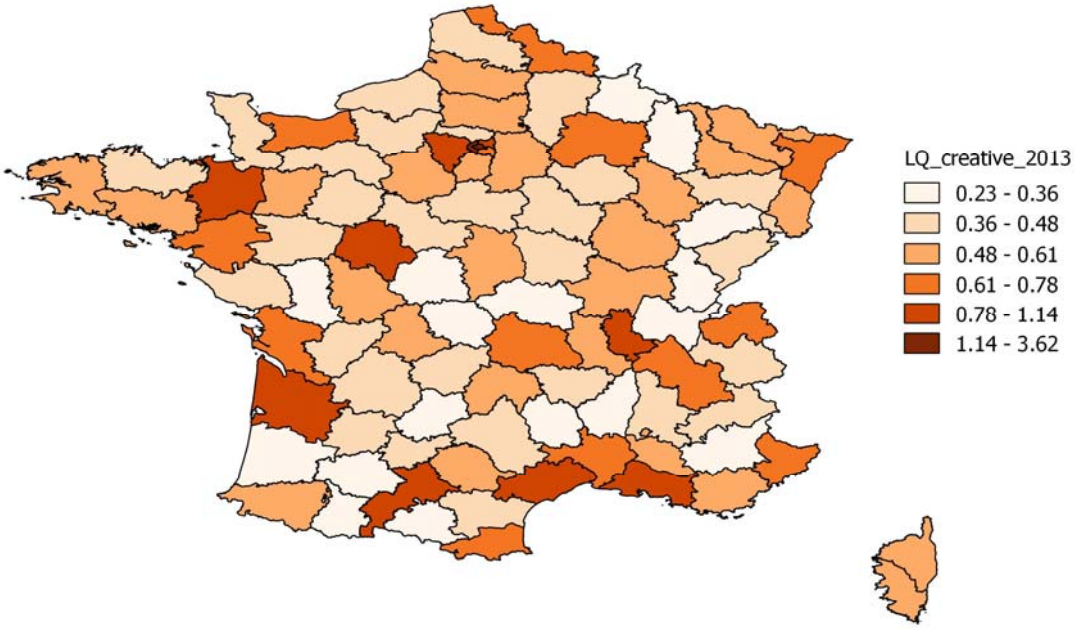
Source: Authors with SIRENE data

Figure 2. Specialisation in creative industries by department

2008



2013



Source: Authors with INSEE data