Chapter 16
The Importance of Creative Services Firms in Explaining the Wealth of European Regions

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1 Introduction

This paper shows the important impact that a specific set of services, those belonging to the creative industries, have on regional economic development and wealth generation. Creative industries are a set of knowledge-based activities focused on the generation of meaning, contents and aesthetic attributes through the use of creativity, skill and talent, and have the potential to create wealth from trade and intellectual property rights. A key hypothesis in this paper is that creative services firms are a "growth driver" that promotes wealth in the regions where they are located. This is due to the fact that firms in creative industries introduce new ideas that are subsequently transferred to other firms of the economy, increasing the output of the whole economy. The objective of the research is to provide causal evidence of the impact of creative services on regional wealth.

The two points of departure of the article are the theoretical framework provided by Potts and Cunningham (2008) and the empirical experiment by De Miguel, Hervás, Boix, and De Miguel (2012). Potts and Cunningham (2008) propose four alternative models to better understand how creative industries may be linked with the whole economy. In two of these models, the creative industries are thought of having normal or negative impacts on the economy; in another, they act as high-order systems impacting on the generation of innovation and facilitating technical change; and in a fourth (known as the "growth model"), on which we focus, the creative industries are conceived as having a positive impact on the output of the economy.

De Miguel et al. (2012) compared the growth effect in European regions. Using Eurostat's Structural Business Statistics data, the authors found that an increase of

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1 % in the employment share of creative industries caused a differential increase of about 1,400 euros in GDP per capita. However, they neglected a crucial aspect: the creative industries are composed of both manufacturing and services enterprises. If we differentiate between those firms engaged in creative services and those in creative manufacturing, the correlation with GDP growth is negative for creative manufacturing (−0.34), but positive for creative services (0.64) (Fig. 16.1). Since the share of creative services in a region's productive structure is much larger than the share of creative manufacturing, this causes the positive behaviour of the aggregated indicator. Consequently, in order to understand the specific influence of the creative services industry we must treat it separately from that of creative manufacturing.[1]

By focussing on the effect of creative services, the paper will redress the fact that the role of services as contributors to regional development is still generally undervalued, with services traditionally being seen as consumers rather than as generators of economic wealth (Alexander & Akehurst, 2005). A failure to recognise their role would undermine an economic planning process. Therefore, this paper contributes additional evidence to this important discussion.

Hitherto, the literature on the broader category of knowledge intensive services (KIS) and their effect on regions (e.g. Miles, 2001; Müller & Zenker, 2001; Wood, 2002) has neglected the specific role of creative services within regions. However, the importance of creativity and creative services was highlighted by UNCTAD (2010, p. 3), which said "a new development paradigm is emerging that links the economy and culture, embracing economic, cultural, technological and social aspects of development at both the macro and micro levels. Central to the new paradigm is the fact that creativity, knowledge and access to information are increasingly recognized as powerful engines driving economic growth and promoting development in a globalizing world. The emerging creative economy has become a leading component of economic growth, employment, trade and innovation, and social cohesion in most advanced economies." Our paper contributes to addressing a neglected area which UNCTAD says is of great importance, by focusing on the relationship between the creative services and the wealth of regions.

The structure of this paper is as follows: Sects. 2 and 3 introduce the theoretical framework, explaining the relationship between creative industries and knowledge-intensive services and the relationship between creative industries and wealth. Section 4 explains the methodology for comparing at the regional level the causal link between creative services and regional wealth. Section 5 presents the results. The paper ends with the conclusions and discussion in Sect. 6.

[1] In the latest classifications of activities (ISIC Rev.3.1 and NACE Rev.2) the only creative industries classified as manufacturing belong to the "fashion" sector, which is commonly assimilated to clothing and footwear industries. Within these industries it is difficult to separate those firms that focus on the intangible part (fashion design) from those more addressed to bulk production and, in many cases, a firm performs both activities.

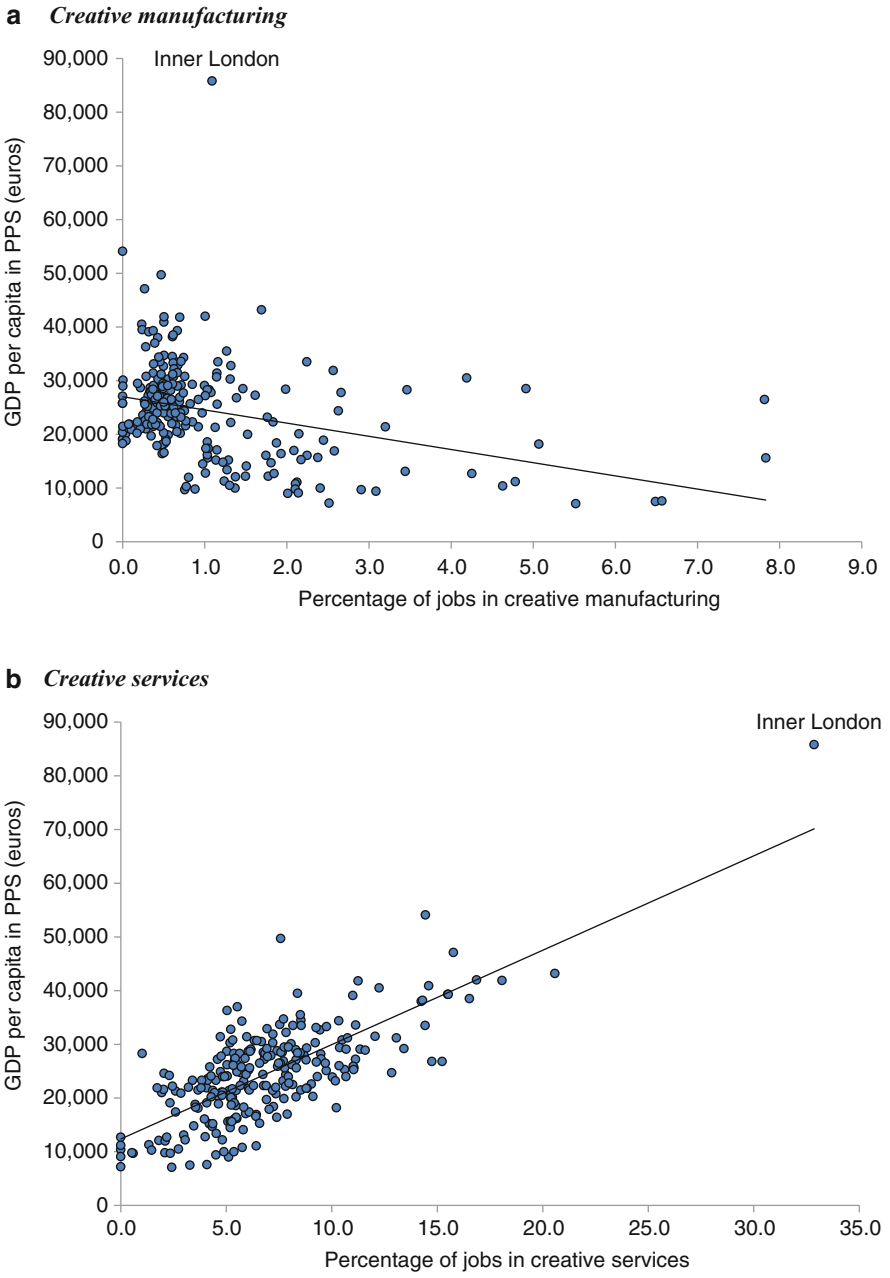

Fig. 16.1 Correlation between GDP per capita in power purchasing standard (PPS) and the percentage of creative manufacturing and creative services jobs in European regions in 2008 (250 regions with data available). *Source*: Elaboration from Eurostat

2 Creative and Knowledge-Intensive Services: Towards a Compatible Definition and Taxonomy

The British Department for Culture, Media and Sport (DCMS, 2009) defines **creative industries**, as "those industries that are based on individual creativity, skill and talent, and which have the potential to create wealth and jobs through developing intellectual property." The most comprehensive taxonomy of creative industries, which is also particularly appropriate to cross-country comparisons, has been proposed by UNCTAD (2010). This classification includes both manufacturing and service industries, although the majority of the sectors included in creative industries are services, especially knowledge-intensive services (KIS).[2]

There is a lack of literature that theoretically links creative services and knowledge-intensive services (KIS), exceptions being short discussions in Miles and Green (2008), Sunely, Pinch, Reimer, and Macmillen (2008) and Müller et al. (2009). In practice, creative services are typically identified as a sub-group of knowledge-intensive services, and their importance is often related to the ever-increasing dependence of manufacturing industries on the service sector (Redondo-Cano & Canet-Giner, 2010). Using the nomenclature of the OECD and Eurostat (2009), some knowledge intensive services can be categorised as "high-tech knowledge-intensive services" (such as audiovisual, broadcasting or computer programming services) and the remainder are "rest of knowledge-intensive services" (e.g. publishing, architecture or advertising).[3] Empirical research that relates creative services and KIS includes that of Chapain, Cooke, De Propris, McNeil, and Mateos (2009) which looked at their spatial co-location and Stoneman (2009) which focused on their linkages with soft innovation.

What differentiates creative services from the "rest of knowledge intensive services (KIS)?" First, the "knowledge economy" literature focuses on the use, production and management of knowledge and information as the main force for economic development (Drucker, 1969; Machlup, 1962; OECD, 1996) and has found strong theoretical applications in new growth theory (Lucas, 1988; Romer, 1986). On the contrary, the "creative industries" literature focuses on creativity, skills and talent and their potential for wealth and job creation (a good example is the recently emerged industry of videogames). The "creative industries" term originated in Australia with the report "Creative Nation: Commonwealth Cultural Policy" (DCA, 1994), although it was popularised by the Department of Culture, Media and Sports in the United Kingdom (DCMS, 1998) and elaborated upon by UNCTAD (2010).

A second differentiating factor derives from the practical implications of each approach. A good way to illustrate the difference is to relate the "knowledge economy" and the "creative economy" through the theory of "differentiated

[2] A detailed review of the literature on creative industries exceeds the scope of this paper. Good critical surveys can be found in UNCTAD (2010), O'Connor (2007) and Flew and Cunningham (2010).

[3] Strictly speaking, some concrete creative services, such as for example cultural retail, are in practice assigned by Eurostat to the "less-knowledge-intensive group" (LKIS).

knowledge bases" (Asheim & Hansen, 2009). The underlying idea behind this theory is the characterization of a specific (or critical) knowledge input on which an innovation activity is based. Asheim, Boschma, and Cooke (2011) distinguish three types of knowledge bases: (1) an "analytical base" derived from the production and use of explicit (codified) knowledge that originates from science and technology; (2) a "synthetic base," where knowledge is created through a more inductive process of testing, experimentation and practical work; and (3) a "symbolic base," where knowledge is related to the creation of contents, desires and aesthetic attributes of products.

The "knowledge economy" is considered to mainly refer to activities based on analytical and synthetic knowledge bases due to the fact that the economic activities are classified according to the intensity of use of research and development (as measured by the units of added value they contributed), and also according to intensity of use of human capital (as measured by the relative use of people with university degrees and by the use of human resources in science and technology). This analysis results in the differentiation of high, medium and low technology manufacturing (e.g. pharmaceutical industry, automotive industry and furniture respectively), and knowledge-intensive and knowledge-non-intensive services (e.g. telecommunications and wholesale trade respectively).

The "creative economy" is thought mainly to have a symbolic base involving the creation of new realities and artistic or cultural expressions in the form of contents, desires and aesthetic attributes. Since most of the workers in creative firms are talented and skilled, these activities tend to be classified as knowledge-intensive. This point is noted by UNCTAD (2010, p. 3), defining creative industries as "a set of knowledge-based activities, focused but not limited to the arts, potentially generating revenues from trade and intellectual property rights," and by the European Commission (2010, p. 13) and Power and Nielsén (2010, p. 7), where "creative and cultural activities are knowledge-driven industries that drawn to specialized labour markets and to clusters."

Table 16.1 contains NACE Rev.2 codes of the creative services activities in the UNCTAD (2010) list, showing the relationship with knowledge-intensive services. KIS that are defined as creative service industries are: "Audiovisual," "Broadcasting," "Computer Programming," "R&D," "Publishing," "Architecture and Engineering," "Advertising," "Design and Photography," "Arts, Entertainment and Recreation."[4]

[4] We intentionally avoid discussing how the notion of creative industries conceptually relates to regarding other concepts such as cultural industries or arts, as well as to different taxonomies. This discussion is addressed in Pratt (2007) and UNCTAD (2010). The justifications for our use of the UNCTAD taxonomy are that it is derived from a broad and rigorous debate about an appropriate taxonomy, and that it is more comprehensive than single country based taxonomies such as that of DCMS (2009). Two thirds of the creative industries are shared among the various taxonomies so that, in this sense, the empirical differences are moderate.

Table 16.1 Classification of services in terms of creativity and knowledge intensity, based on NACE Rev.2

Knowledge-intensive services	Creative	Non-creative
High-tech knowledge-intensive services (HTKIS)	59 audiovisual 60 programming and broadcasting 62 computer programming 72 R&D	61 telecommunications 63 information service activities
Rest of knowledge-intensive services (RKIS)	58 publishing 71 architecture and engineering 73 advertising 74 design, photography 90–93 arts, entertainment and recreation (section R)	50–51 water and air transport 64–66 financial and insurance 69–70 legal and accounting; head offices; management consultancy 75 veterinary activities 78 employment 80 security and investigation 84–88 public administration and defence, compulsory social security, education, human health and social work
Less-knowledge-intensive services (LKIS)	4779 retail sale of second-hand goods in stores	45–47 (except 4779) wholesale and retail trade 49 land and pipelines transport 52–53 warehousing, postal and courier 55–56 accommodation and food service 68 real estate 77 rental and leasing 79 travel agency 81 services to buildings and landscape 94–96 membership organisations, repair of computers and personal and household goods, other personal service 97–99 domestic personnel; undifferentiated goods; extraterritorial organisations

Source: Elaborated from UNCTAD (2010) and Eurostat (2009)

Note: 58—publishing includes: 581 publishing of books, periodicals and other publishing activities; and 582 software publishing

59—audiovisual includes: 591 motion picture, video and television programme activities; and 592 sound recording and music publishing activities

60—programming and broadcasting includes: 601 radio broadcasting; and 602 television programming and broadcasting activities

62—computer programming includes: 6201 computer programming activities; 6202 computer consultancy activities; 6203 computer facilities management activities; and 6209 other information technology and computer service activities

71—architecture and engineering includes: 711 architectural and engineering activities and related technical consultancy; and 712 technical testing

72—R&D includes: 721 research and experimental development on natural sciences and engineering; and 722 research and experimental development on social sciences and humanities

73—advertising includes: 731 advertising; and 732 market research

74—design, photography includes: 741 specialised design activities; 742 photographic activities; 743 translation and interpretation; and 749 other professional, scientific and technical activities

R—arts, entertainment and recreation includes: 90 creative, arts and entertainment activities; 91 libraries, archives, museums and other cultural activities; 92 gambling and betting activities; and 93 sports activities and amusement and recreation activities

3 Linking Creative Industries to Regional Wealth

Potts and Cunningham (2008) propose four models of how the creative industries might relate to the broader economy: "the welfare model," "the competitive model," "the growth model," and "the innovation model."

In the "welfare model," creative industries are conceived as being affected by "Baumol's disease" (Baumol & Bowen, 1966) and their rate of productivity growth is less than in the rest of the economy. They have a negative impact on an economy's production, such that they consume more resources than they produce ($dY/dCI < 0$, where Y is production and CI creative industries) and their growth comes at the cost of aggregate economic growth. However, the commodities produced are welfare enhancing ($dU/dCI > 0$, where U is the utility). In this model, policy prescriptions would focus on subsidies and price maintenance in order to protect the creative industries.

In the "competitive model," the creative industries are just another industry, and a change in their size or value has a proportionate effect on the rest of the economy. They are neutral (i.e. do not have more effect than do other activities) in respect of technological change, innovation or productivity growth: $dY/dCI = 0$ and $dU/dCI = 0$. This implies that the marginal benefit of a redirection of resources towards these industries is zero, and requires the same policy treatment as the rest of industries.

In the "growth model" the creative industries are a "growth driver" and their impact on the economy is more than proportional ($dY/dCI > 0$). This could be due to supply-side effects, such as the fact that their productivity is higher than other industries, or because creative industries introduce new ideas that are then transferred to other sectors of the economy, or because such industries facilitate the adoption and retention of new ideas in other sectors. Or/and there could be demand-side effects, such as where a growth in the GDP (Y) causes a proportionate increase in demand for creative industries services. Policy implications depend on the magnitude of each effect (supply and demand) but may include an awareness of a need to deal with creative industries as a "special sector" due to their effects on the whole economy.

The "innovation model" is based on the Schumpeterian tradition found in business and strategic literature. It reconceptualises the creative industries as a higher-order system that operates on the economic system, similar to science, education and technology in the national systems of innovation approach. Therefore, the main effects of creative industries are not their direct effects on production or wealth, but, rather, their contribution to the technical change.

4 Empirical Design

4.1 The Model

The preliminary evidence provided in the introduction suggests that creative services play a role indicated by the Potts and Cunningham's "growth model." Unfortunately, the

authors only provide a general framework and not the concrete mechanisms through which creative services affect the wealth of regions. In De Miguel et al. (2012), this was achieved by means of an empirical model consisting of a linear equation which compared the effects on the wealth of regions of agglomeration and productive structure, including the share of employment in creative industries in a region. To analyse the effects of agglomeration and structure, use was made of Eurostat and OECD classifications of activities by knowledge intensity, and differentiating creative and non-creative activities. Despite its simplicity, the model exhibited a high performance, explaining 60 % of the variance. However, further insights that draw on our conceptual discussion in Sect. 2 indicate that the equation is more complex than it first appears since differences in regional wealth are due to four forces: creativity (symbolic knowledge), other forms of knowledge (analytic and synthetic), the productive structure, and the effects of agglomeration economies.

We depart from the same framework, but we introduce two improvements. First, in the light of previous evidence (Fig. 16.1), our variable of interest is the more focused "creative services" (as measured by share of employment in creative services in respect of each region's total employment), and "creative manufacturing" is assumed to be a standard industry included in low-tech manufacturing activities.[5] Second, it is possible that the original equation was miss-specified since the only type of agglomeration economies included were localization economies derived from the existence of "average" regional clusters. Therefore, we will include as control variables the other two types of agglomeration economies: internal scale economies and urbanization economies.

4.2 Data and Variables

Our sample comprises 250 European regions at NUT2 from Eurostat's Structural Business Statistics (SBS), Science and Technology Statistics (STS) and Economic Accounts (ESA) databases, and corresponds to 2008.[6] SBS, in combination with the new NACE, provides a good source of data for this research, as the information is disaggregated from two to four digits. This detail is not usually required as the new NACE is particularly designed to deal with the requirements of the knowledge economy, so that creative industries are properly captured at the two digits level in most cases (Table 16.1). The activities of the NACE code R (Arts, Entertainment and Recreation) are not available in the SBS database and have been obtained from the STS database, which means that it also includes employees from the public sector.

[5] If creative manufacturing is estimated separately it exhibits an average negative impact on regional wealth. However, that does not change the evidence and implications of the general results.

[6] The countries for which data was not available, such as Greece, Luxembourg and Malta, were not included. Data for the year 2001 have also been used for the design of the exogenous instrumental variables.

The differences among databases have been taken into account to compute the total number of employees.

In the framework suggested by Potts and Cunningham (2008) the effect on output is captured using Gross Domestic Product (GDP) data. As we will compare differences in output across regions, GDP must be divided by the number of inhabitants, or employment, in each region. Thus, following De Miguel et al. (2012) we focused on GDP per capita. This variable mixes productive efficiency and income per capita, and is an indicator traditionally used as a proxy for the regional wealth in cross-country and cross-region studies (Barro & Sala-i-Martin, 1991; Quah, 1996).

To calculate the regional productive structure, data on employment was extracted from the previously mentioned codes, and the percentage of employment in each service sector with respect to total regional employment was calculated. The statistical calculations use the services groupings that appear in Table 16.1.

The term *agglomeration economies* denotes "all economic advantages accruing to firms from concentrated location close to other firms: reduced production costs due to large plant size; the presence of advanced and specialized services; the availability of fixed social capital (e.g. infrastructures); the presence of skilled labour and of managerial expertise, and of a broad and specialized intermediate goods market" (Capello, 2006, p. 18). The seminal works by Ohlin (1933) and Hoover (1937), most of the other classical texts, and the recent book of Capello (2006) differentiate three families of agglomeration economies: "internal to the firm" (scale economies), external "localization economies" (external to the firm but internal to the industry), and "urbanization economies" (external to the firm and external to the industry). As in De Miguel et al. (2012), we use as a proxy for "localization economies" the sum of regional clustered activities at the two digit level. It is considered that an activity is clustered when its Location Quotient for firms in the industry is above 1:

$$LQ_{ij} = \frac{\text{Firms in the NACE code } j \text{ in region } i / \text{Firms in the NACE code } j \text{ in the EU27}}{\text{Firms in the region } i / \text{Firms in the EU27}} \tag{16.1}$$

Although there is some correlation between those indicators used to identify regional employment structures and those used to denote localization economies, they employ different concepts and are measured using different data (employment in the first case and number of firms in the second one). Results in Fig. 16.2 present for 250 European regions the share of employment in creative services in each region's total employment, and the relative specialisation of each region (LQ) in creative services. The figure demonstrates an unequal distribution of the importance of creative services across the European regions. The regions that specialise more in creative services in terms of employment structure and LQ tend to be those that have a large metropolitan area, such as London, Paris, Amsterdam, Brussels or Madrid.

Following Lazzeretti, Boix, and Capone (2009), proxies used for "urbanization economies" include: the total population in the area (market potential); population

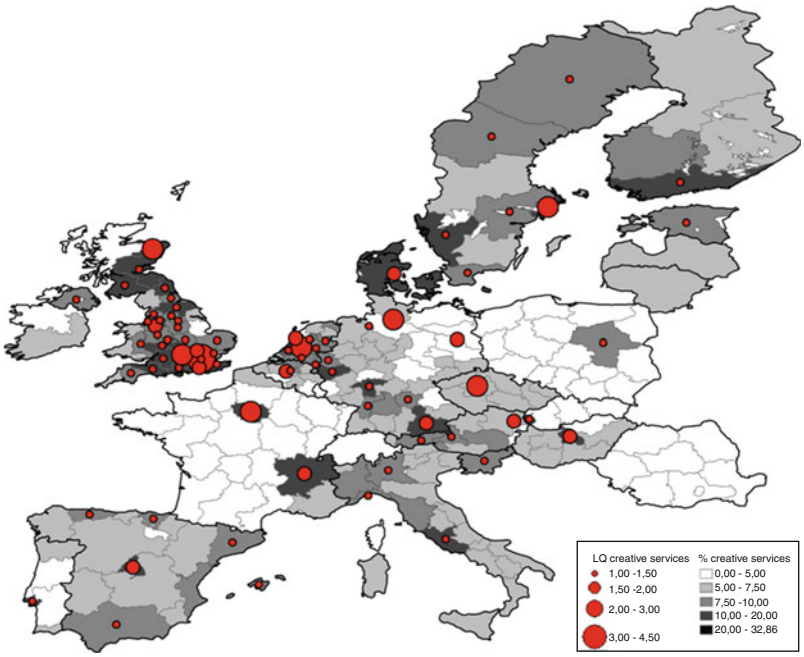

Fig. 16.2 Shares of creative services in regional employment, and relative specialisation of each region (location quotient) in creative services, for 250 EU regions. *Source*: Elaboration from Eurostat

density (population per km^2) which favours knowledge spillovers; and diversity of the productive structure at two digits which fosters cross-fertilization across sectors (inverse of the Hirschman–Herfindahl index calculated for employment in 60 sub-sectors in the economy in 2001, $IHHI_j = 1/\left(\sum_i L_{i,j}/L_{i,j}\right)^2$. Following again Lazzeretti et al. (2009), the proxy used for "internal economies" is the average firm size in the region (average number of employees by firm in the region). This captures scale economies and the organization of the production. Descriptive statistics are provided in Table 16.2.

4.3 *Disentangling the Supply-Side Effects: Simultaneity and Causality*

The equation used as the basis of the regression model was:

$$\frac{GDP_i}{\text{Population}_i} = \beta_0 + \beta_1 \text{Creative Services}_i + \beta_2 \text{Knowledge Structure}_i + \beta_3 \text{Agglomeration}_i + \varepsilon_i, \quad (16.2)$$

where *creative services* is the percentage of a region's *i* employment found in creative services. *Knowledge structure* includes four variables that are the share of employment in the region in: "high-tech services," "rest of knowledge-intensive services," "less-knowledge-intensive services," and "manufacturing" (and in every case creative industries belonging to these groups have been removed to avoid double counting). A*gglomeration* includes nine variables. These include five variables related to localization economies in the region (the number of clusters of respectively creative services, high-tech services, other KIS, less-KIS, and manufacturing); three variables related to urbanization economies (population, population density, and productive diversity); and one variable related to internal economies (average firm size).

In the Potts and Cunningham (2008) growth model, an increase in the share of creative industries caused an increase in the output (through a supply-effect), but an increase in regional production or wealth also translated into an increase of demand for creative industries services. In Eq. (16.2) both effects are simultaneous, and it is not possible to know the direction of the causality. In the absence of a robust theoretical model, three basic solutions are suggested in the econometric literature: the use of time-lagged variables, Granger tests in time-dynamic models, and instrumental variables.

As the equation is time-static, the use of instrumental variables is the most suitable methodology. This involves a system of two equations in which the second one is an auxiliary equation where the share of employment in creative services is the dependent variable. Justification for the content of the instrumental equation is provided by Lazzeretti et al. (2012) who in their article explain the reasons for the clustering of employment in creative industries. The authors introduce three main determining forces, namely: "culture and heritage," "the influence of agglomeration economies," and "the presence of a creative class."

$$\begin{aligned}\text{Creative services}_i = \beta_0 + \beta_1\ \text{Heritage}_i + \beta_2 \text{Agglomeration}_i \\ + \beta_3\ \text{Creative Class}_i + \varepsilon_i\end{aligned} \tag{16.3}$$

Heritage is measured using cultural endowments (the presence of UNESCO goods per million inhabitants). *Agglomeration* economies variables include the average firm size in the region, the average firm size in creative services in the region, the productive diversity in the creative services string and the population. Florida's *Creative class* is measured by patents per million inhabitants, R&D expenditures in relation to GDP and the percentage of the population that is creative class. Instruments for the percentage of employment in creative services are calculated for the year 2001 in order to assure their exogeneity. The fit (R^2) of the instrumental regression is 0.85.[7]

[7] We refer to Lazzeretti et al. (2012) for the detail in the elaboration of the variables used as instruments.

5 The Distinct Role of Creative Services in European Regions: Main Results

5.1 Results of the Regression Analysis

OLS and instrumental variable regressions were estimated, verifying the statistical significance of the model in Eqs. (16.2) and (16.3) (Table 16.3). The first column of Table 16.3 shows the estimates of the model only using the structure variables, the second only using the variables of agglomeration (including "localization," "urbanization" and "internal scale economies"), and the other two columns show the parsimonious estimation of the integrated model, combining all the variables and removing the statistically non-significant and collinear variables.

The results show that our initial hypothesis is confirmed: an increase in 1 % in the percentage of employment in creative industries in the region translates to an increase of 0.39 % in GDP per capita (that is, an increase of 1,479 euros per capita) (Table 16.3, column 3, $p < 0.01$). Therefore, creative services are a "growth driver" that promotes wealth in the regions where they are located. Furthermore, when compared with the other indicators, the share of employment in creative industries has the higher causal impact on the differences in GDP per capita of the regions.

This impact is slightly higher than the 1,424 euros provided by De Miguel et al. (2012) due to the fact that the latter also includes creative manufacturing which, having a negative impact, reduces the size of the coefficient. The instrumental variables estimates of the model show quite similar results (Table 16.3, column 4). As the endogeneity test (Durbin–Wu–Hausman test) does not reject the exogeneity of the creative services, it is preferable to use the results of column 3 because the OLS estimates are more efficient.[8] Therefore, our initial hypothesis on the existence of a positive supply-side effect of creative industries services on output per capita is proved.

There are two other relevant results. First, the effects of the employment structure seem to be more important than the effects of agglomeration, even if both are correlated. In fact, most of the variables of agglomeration become statistically and economically non-significant when are included in the same equation the variables of the employment structure (Table 16.3, column 3), exceptions being the number of clusters of less-knowledge-intensive services ($\beta = 526, p < 0.01$) and the population density ($\beta = 1.62, p < 0.05$). The good performance of the instrumental equation also suggests that the effects of agglomeration could be translating to the rest of the economy through the economic structure.

Second, whereas the share of persons employed in "high-tech non-creative services" does not have a statistically significant effect on the GDP per capita the

[8] This does not mean actually that the variable is exogenous, only that their effects on the consistency of the estimates are not relevant. In this case, OLS produce the best linear unbiased estimator.

Table 16.2 Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max
GDP per capita in PPS	24,465	9,005	7,100	85,800
%Employment in creative services	6.88	3.83	0.01	32.86
%Employment in high-tech services[a]	0.88	0.78	0.01	4.43
%Employment in rest of knowledge-intensive services[b]	28.25	6.45	13.98	42.71
%Employment in less-knowledge-intensive services[c]	27.77	4.17	14.55	45.42
%Employment in manufacturing	16.40	7.40	0.01	35.99
Number of clusters of creative services	2.70	2.23	0.00	8.00
Number of clusters of high-tech services[a]	0.85	0.64	0.00	2.80
Number of clusters of rest of knowledge-intensive services[b]	2.85	1.88	0.00	7.00
Number of clusters of less-knowledge-intensive services[c]	5.27	2.10	1.00	9.00
Number of clusters of manufacturing activities	9.39	2.96	3.00	16.00
Population	1,934,258	1,531,182	27,153	11,700,000
Population density (population/km^2)	363.14	890.89	3.30	9,405.70
Productive diversity	16.73	5.62	3.43	26.23
Average firm size in the region	8.21	7.02	1.00	44.22

Notes:

[a]Includes only telecommunications and information service activities as the rest (motion picture, video and television, sound recording and music, broadcasting, computer programming, and scientific research and development) are included in "creative services"

[b]Excluding publishing, architectural and engineering activities, advertising, and arts, entertainment and recreation, included in "creative services"

[c]Excluding retail sale of other goods in specialized stores, included in "creative services"

share of persons employed in "rest of knowledge-intensive services" does have a positive effect (166 euros, $p < 0.01$). This is due to the fact that in the first case the shares of these services are very similar across the EU regions whereas in respect of the non-creative RKIS there is more heterogeneity. Therefore, and shading the results by Leydesdorff and Fritsch (2006) and Leydesdorff, Dolfsma, and Van der Panne (2006), when the creative services are isolated from both categories, RKIS (Rest of knowledge-intensive services) seem to be more important than KIHTS (knowledge-intensive high-tech services) in explaining differences in wealth.

5.2 *A Further Insight into the Effects of Creative Services by Sub-sector, and the Incidence of Co-Location*

A further question revolves around whether the relation between creative services and GDP per capita holds for every kind of creative service or only for some of them. Table 16.4 shows the correlation coefficients between the shares of creative

Table 16.3 Final estimates. P-values in brackets

	(1) OLS Robust[d]	(2) OLS Robust[d]	(3) OLS Robust[d]		(4) IV Robust[d,e]
Dependent variable: GDP per capita in PPS	Coefficient	Coefficient	Coefficient	Elasticity (dY/dX)	Coefficient
Constant	−2,242.33	9,442.75	6,178.05		5,751.38
	(0.617)	(0.000)	(0.000)		(0.000)
% Employment in creative services	**1,707.73**		**1,479.48**	**0.3909**	**1,604.91**
	(0.000)		(0.000)		(0.000)
% Employment in high-tech services[a]	−503.72				
	(0.451)				
% Employment in rest of knowledge-intensive services[b]	**287.86**		**166.61**	**0.2006**	**156.32**
	(0.000)		(0.005)		(0.007)
% Employment in less-knowledge-intensive services[c]	203.21				
	(0.072)				
% Employment in manufacturing	99.48				
	(0.148)				
Number of clusters of creative services		**1,323.03**			
		(0.000)			
Number of clusters of high-tech services[a]		**−2,482.05**			
		(0.001)			
Number of clusters of rest of knowledge-intensive services[b]		91.09			
		(0.789)			
Number of clusters of less-knowledge-intensive services[c]		**526.24**	**526.26**	**0.1168**	**519.85**
		(0.025)	(0.003)		(0.003)
Number of clusters of manufacturing activities		−182.65			
		(0.337)			
Population		0.0004			
		(0.111)			
Population density (population/km^2)		**4.283**	**1.62**	**0.0185**	1.307
		(0.000)	(0.039)		(0.095)
Productive diversity		**515.78**			
		(0.000)			

(continued)

Table 16.3 (continued)

	(1) OLS Robust[d]	(2) OLS Robust[d]	(3) OLS Robust[d]		(4) IV Robust[d,e]
Dependent variable: GDP per capita in PPS	Coefficient	Coefficient	Coefficient	Elasticity (dY/dX)	Coefficient
Average firm size in the region		132.02			
		(0.167)			
R^2	0.5906	0.5258	0.6179		0.6162
R^2-adj	0.5822	0.5079	0.6116		–
Mean VIF	1.35	1.78	1.36		–
Durbin–Wu–Hausman endogeneity test (p-value)	–	–	–		0.13
Obs	250	250	250		250

Notes:
[a]Includes only telecommunications and information service activities as the rest (motion picture, video and television, sound recording and music, broadcasting, computer programming, and scientific research and development) are included in "creative services"
[b]Excluding publishing, architectural and engineering activities, advertising, and arts, entertainment and recreation, included in "creative services"
[c]Excluding retail sale of other goods in specialized stores, included in "creative services"
[d]Huber–White robust estimators used to prevent the problems of normality and heteroskedasticity
[e]Instruments for the percentage of employment in creative services are calculated for the year 2001 in order to reinforce exogeneity. They include cultural endowments (UNESCO goods by million inhabitants), average firm size in the region, average firm size in the creative services in the region, productive diversity in the creative services string, population, patents per million inhabitants, R&D expenditures on GDP and percentage of creative class

services in regional employment and GDP per capita. The relevant results are obtained by relating sectors to GDP per inhabitant. First, every creative service is significantly correlated with the GDP per capita, and the correlations range from 0.33 to 0.67.

Second, by taking into account only correlations higher than 0.5, the results show that some creative services are more important than others in explaining differences in the wealth of regions. These sectors are computer programming (HTKIS), advertising (RKIS), publishing (RKIS), audiovisual (HTKIS), architecture & engineering (RKIS), R&D (HTKIS) and creative retail (LKIS). These results lead us to believe that the wealth of a region depends, to a great extent, on a wide range of knowledge-intensive creative services.

Third, from the results in Table 16.4, we also observe that there is a positive and statistically significant correlation between the different creative services (from 0.2 to 0.8). Thus, we can conclude that there is a tendency for creative service to co-locate with one another, which is in line with the findings of Wernerheim (2010) for the services industries in Canada, and with De Propris, Chapain, Cooke, MacNeill, and Mateos-García (2009) for the creative industries in the UK. Taking correlations of more than 0.5 as strong correlations, the results show that:

Table 16.4 Co-location of different creative services sub-sectors

	GDP in pps	Retail (creative)	Publishing	Audiovisual	Broadcasting	Computer programming	Architecture and engineering	R&D	Advertising	Design, photography	Arts, entertainment and recreation
GDP in pps	1										
Retail (creative)	0.5091[a]	1									
Publishing	0.6600[a]	0.2791[a]	1								
Audiovisual	0.6169[a]	0.2770[a]	0.7512[a]	1							
Broadcasting	0.3847[a]	0.1833[a]	0.5993[a]	0.6581[a]	1						
Computer programming	0.6873[a]	0.3092[a]	0.7248[a]	0.6041[a]	0.4315[a]	1					
Architecture and engineering	0.5300[a]	0.3641[a]	0.4408[a]	0.3729[a]	0.3068[a]	0.5011[a]	1				
R&D	0.5256[a]	0.3262[a]	0.4801[a]	0.4121[a]	0.2420[a]	0.6763[a]	0.4260[a]	1			
Advertising	0.6733[a]	0.3022[a]	0.7966[a]	0.7399[a]	0.5889[a]	0.7563[a]	0.4168[a]	0.5013[a]	1		
Design, photography	0.3716[a]	0.2044[a]	0.4924[a]	0.5716[a]	0.4061[a]	0.5337[a]	0.4625[a]	0.3270[a]	0.4727[a]	1	
Arts, entertainment and recreation	0.3354[a]	0.2250[a]	0.4429[a]	0.4655[a]	0.3298[a]	0.4831[a]	0.2677[a]	0.3791[a]	0.4069[a]	0.4367[a]	1

Correlation coefficients between the shares of creative services sub-sectors in aggregate employment of 250 regions
[a]Statistically significant at 5 %

- Publishing strongly co-locates with audiovisual (HTKIS), broadcasting (HTKIS), computer programming (HTKIS), and advertising (RKIS);
- Audiovisual (HTKIS) strongly co-locates with publishing (RKIS), broadcasting (HTKIS), computer programming (HTKIS), advertising (RKIS), and design and photography (RKIS);
- Broadcasting (HTKIS) strongly co-locates with publishing (RKIS), audiovisual (HTKIS) and advertising (RKIS);
- Computer programming (HTKIS) strongly co-locates with publishing (RKIS), audiovisual (HTKIS), architecture and engineering (RKIS), R&D (HTKIS), advertising (RKIS), and design and photography (RKIS);
- Architecture and engineering (RKIS) strongly co-locates with computer programming (HTKIS);
- R&D (HTKIS) strongly co-locates with computer programming (HTKIS) and advertising (RKIS);
- Advertising (RKIS) strongly correlates with publishing (RKIS), audiovisual (HTKIS), broadcasting (HTKIS), computer programming (HTKIS) and R&D (HTKIS);
- Design and photography (RKIS) strongly co-locates with audiovisual (HTKIS) and computer programming (HTKIS);
- Finally, cultural and creative retail, as well as arts, entertainment and recreation, co-locate with the remaining sectors, although the coefficient is in every case lower than 0.5.

6 Conclusions

The main objective of this research has been to investigate whether creative services firms are a "growth driver" that promotes regional wealth. The paper disentangles the differences between "creative services" and "rest of knowledge-intensive services," and establishes a robust framework to understand to what extent different types of services contribute to the wealth of European regions.

An initial hypothesis of a supply-side effect of creative services on output per capita was confirmed using a robust procedure. An increase in 1 % in the percentage of employment in creative industries in the region translated into an increase of 0.39 % in GDP per capita, that is to say 1,479 euros in GDP per capita. This was a higher effect than was found for the presence of "rest of knowledge-intensive services," "manufacturing" or "agglomeration economies." All the sub-sectors in creative services proved to be positively and significantly correlated with GDP per capita, and several patterns of co-location between these sub-sectors were detected, which generated diverse profiles across the regions.

The contribution and results are relevant, not only because there is a lack of research concerning the role of creative services firms within regions, but also because our findings provide additional evidence to support the idea that services, particularly those related to the creative processes, are not consumers but rather net generators of economic wealth.

At this point, further conclusions are constrained by the limitations of the research. First, we focused on the impact of creative services on the wealth of regions (growth model), but not on their systemic effect on innovation in regional economies (innovation model). Second, it is important to know whether the wealth and innovation generating effects of creative services are confined within a region or do they spill over to other regions. Third, additional research on the combinations of creative services in regions could suggest ways to reinforce patterns of complementarity amongst creative services, and between them and other sectors, while taking into account regional diversities. Fourth, while the analysis has focused on the meso-level of the region, micro-level investigation at the level of the firm could provide additional evidence regarding profits, location decisions, heterogeneous behaviours, and/or evolutionary patterns.

Thus, if creative services impact basically on wealth and have highly local effects, they could be a significant objective for regional-driven policy. If, however, the geographical effects are supra-regional, then national policy or coordination between regions could play an important role. If the effects are focused on concrete segments of firms, the scope of the policy changes radically. On the other hand, if the wealth impacts of creative services derive basically from the supply-side, public policies should aim to provide the appropriate conditions for enterprise development and interaction, rather than provide subsidies and price policies to protect industries. Finally, if their effects on innovation spill over to the rest of the local economic system, other strategies such as financial support to creative services firms could be effective.

In any case, the field of study on creative services requires further research, looking at more types of effects, going deeper into industry and firm detail, and studying comparable long term series in order to capture time-dynamic effects.

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