A revised application of 3Ts Florida in peri-urban areas

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Abstract

This article analyzes the determinants and the distribution of Creative Class in peri-urban areas. Starting from Florida´s hypothesis on localization patterns (the famous 3Ts), the article uses unique measures to define tolerance and urban climate, to add innovative determinants and extend the analysis to peri-urban territory in Northern Italy. These measures are tested applying a principal component analysis and spatial regression models. The results partially confirm Florida. Creative class presence is strongly associated with socio-economic determinants, such us public expenditure, presence of creative and no-creative firms, volunteering; less than cultural amenities and technology. Tolerance has more controversial effects.

Introduction

Research on Creative class (CC) has evolved rapidly in the past two decades. Florida has been a key player in this analysis (2002, 2005, 2008), because he firstly defined creatives (distinguishing the core, professional and bohemian creatives) and their determinants (the 3Ts: Talent, Technology and Tolerance). Florida was very clear in that respect: CC prefers cities that have particular strengths in their cultural amenities and climate, technology development and talent attraction. Cities are then the preferred location as demonstrate a tolerant attitude and openness towards minorities in terms of sexual preferences and geographical provenance.

Many aspects of these hypothesis have empirically tested also in recent times (e.g. Clifton, 2008; Boschma & Fritsch, 2009; Chantelot et al., 2010; Boren & Young, 2013; Alfken et al., 2015). However, the majority of these studies suffers from either one of three weakness: referring just to urban areas, underestimate the importance of other determinants, in addition to the 3Ts, and using a definition of tolerance based on the idea of acceptance, but far from that of integration.

This paper aims at addressing each of these weakness.

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First, it refers to a new territory, the peri-urban. Peri-urban is not a suburb, but a 'third space' that extends between urban and rural areas. Its features depend on a mixture of spatial, economic and social transformations (Allen, 2003), which can be shaped by creatives. Their role in creative-led urban revitalization is highly valued and it performs an important function in encouraging creativity, openness and tolerance (Evans, 2009). Contemporarily, their presence is encouraged by its proximity to the city and therefore by the possibility of benefiting from urban climate and opportunities.

Second, the paper considers other localization determinants, like job opportunities, services' accessibility, amenities' availability, in addition to the 3Ts. Third, instead of considering traditional measures of tolerance, like Gay or melting pot indexes, it adopts new indicators such as civil unions and firms conducted by people with foreign background, because these indicators are a good proxy of a new idea of tolerance, closer to the integration one.

Consequently, the study attempts to address these limitations by answering the following questions:

1. Is Creative Class present in the areas considered peri-urban?
2. What is the role of 3Ts and other additional determinants in attracting CC?
3. Specifically, how does tolerance, defined by new indicators, affect the CC presence?

The empirical analysis focuses on the peri-urban areas in the Northern Italian regions. In these regions, knowledge of CC localization and its determinants is rather limited, although this category of professionals is particularly widespread and contributes most to local growth, in terms of occupation and value added (Symbola, 2019). Here, the growth of peri-urban areas has been equally consistent in recent years and pushed by demographic flows, so much so that they constitute autonomous territories, closely connected to the nearby urban areas, but with typically rural elements (ISTAT, 2018).

The paper is structured as follows: the second section describes the theoretical background behind the composition of Creative Class and their localization determinants, while the third section explains the adopted data and the methodology. The fourth section presents the results of the empirical analysis. The last sections discuss the results and include future research hypothesis.

Theoretical Background

According to Florida, the CC "consists of people who add economic value through their creativity" (2002, p. 68). What characterizes these people is the fact that they possess creative capital, which is defined as the "intrinsically human ability to create new ideas, new technologies, new business models, new cultural forms, and whole new industries that really [matter]" (Florida 2005, p. 32). With this, Florida proposes a large definition of creativity that not only include artistic and cultural tension, where originality is also undoubtedly required. Consequently, he distinguishes different categories of creatives: the *creative core*, i.e. those individuals who develop new technology or ideas or are engineers, architects, or teachers, from *creative professionals*, i.e. those who can solve problems that require extensive analyses, or a high level of education, and operate in medical care and finance fields. Then, Florida identifies *bohemians*, i.e. people engaged in artistic and cultural activities.

This distinction is largely used; however, there is a disagreement over how to apply it. Other definitions reframe CC within groups of types of knowledge production (Asheim & Hansen, 2009) or qualification level, rather than within professions as Florida does (Markusen et al., 2008). However, using qualification level excludes creatives with lower levels of education and seniority

and leads to a potential closeness of creativity concept to the "human capital" assumption based on educational attainment rather than occupation (Glaeser, 2005).

To tackle these inconveniences, Boschma & Frintsch (2009) use a CC definition based on skill content and the work process characteristics. In contrast, McGrahanan & Wojan (2007) reformulate Florida's definition excluding some categories of workers, such those operate in agriculture, business, physical and social science and all educational professions. However, being skill content-oriented, none of these approaches offer a clear-cut distinction among human and creative capital, as Glaeser points out. Another scholars adopt the industry affiliation; specifically, they consider the sectors of activity and select the most creative among them (e.g. Lorenzen&Andersen (2009), Flew (2012)). However, as it considers all workers within the selected creative sectors, also this approach does not operate a clear-cut distinction between creative and noncreative workers.

Regarding the CC localization, Florida (2002) assumes that this class is very specific in their residential choices, considering some soft location factors, specifically those related to the diversity, tolerance and openness. Preferring areas with intense social and cultural relations, leisure and cultural infrastructure and amenities, CC attributes less importance to other more traditional factors, like job opportunities or land prices.

Why could peri-urban areas attract the Creative Class?

The notion of creativity tends to be associated by the mainstream research with urban settings. First Florida places emphasis for urban areas on creating the right climate to attract CC. These areas in fact have a high endowment of urban facilities and small-scale cultural services. They offer an urban lifestyle with inspiring experiences and diversity (Zenker, 2009) that in turn simulate creativeness.

However, in recent times, literature on the CC localization is not so clear-cut. There is now a discrete number of studies demonstrating the ways in which rural areas attract CC (Naldi et al., 2015; Escalona-Orcao et al., 2016). Limited research highlight that CC is also present in peripheral areas and outer suburbs, demonstrating that the inner city is not the only environment in which this class operates (Petrov & Cavin, 2017). These studies refer to global metropolis: Florida (2005) focused on Washington districts; Bain (2013) on Toronto suburbs; Felton (2013) on outer suburban areas in Brisbane.

In these territories, vertical (with other creative and not creative firms/individuals) and horizontal (among creatives) relations strengthen integration with neighboring urban areas (Felton et al., 2010). These relations are not "urban-centric", but "hub-and-spoke" as they do not just privilege the inner city as the locus of creative activities (Gibson, 2012). Their geography demonstrates an interruption of the simple concentric-circle models, in which creativity diminishes with distance. Besides, creativity does not necessarily follow the same patterns as for urban areas. It follows in fact a specific path that has own form, duration and structure, while remaining generally consistent with the general principles set out by Florida (Selada, et al., 2011). Thirdly, proximity to large urban areas continues to be a weighty localization factor for CC who prefer to be located in municipalities close to larger markets (Stolarick, 2012). Fourthly, social changes in peripheral areas lead to social diversification and cohabitation may require greater tolerance. These considerations are also partially true for peri-urban areas, which therefore could attract creatives. Peri-urban areas are a relatively new scattered pattern of lower density settlements and urban concentrations along the edges of suburban built-up areas. They result from the conversion of

near rural territories and merge urban and rural features (sometimes, disorderly). Many service-oriented firms relocated here, including creative ones. This had two effects. The first one concerns the promotion of CC movement as it favors locating where creative firms are present (Bakhshi et al., 2014). The second one is related to the attraction of firms operating in the same sectors ("the creative cluster effect", Wu, 2005). This in turn promotes vertical and horizontal relations, already explained by Felton. However, the above-mentioned concentric-circle model may be interrupted here due to the lack of cultural amenities. The urban climate and the relative set of innovation, exchange of ideas and events, tends to decrease away from the city (Cattivelli, 2012). This depends on the urban-rural intermixing and the resulting "peri-urban climate" that could be just as vibrant and rich in diversity.

The proximity of peri-urban areas to the urban centers continues to be an important factor. As strongly integrated with urban economies (Monsson, 2013), these territories offer job opportunities, attract new economic activities and support local innovative and creative businesses, performing better than other territories during the recent crisis (OECD, 2018). Investments in infrastructure and smart strategies have reduced economic distances and expanded the daily commuting areas, facilitating people's access to urban areas.

Being the result of ongoing social transformations, peri-urban areas are a blank canvas that can be adapted to the needs of residents, with possible creative solutions. This is true also regarding their spatial organization and hence they offer the opportunity to be designed according to the main recent urban-revitalization principles.

The CC localization-based determinants
The localization-based determinants that impinge CC presence are numerous. The 3Ts of Florida (Talent, technology and tolerance) are obviously important and specifically tolerance play a crucial role. Regions with high tolerance towards diversity are most likely to attract CC (Boren & Young, 2013), since this acceptance increases social vibrancy, reduces barriers and promotes inclusion, (Li et al., 2016). This in turn attracts other talented individuals and high technology industries, spurring local economic growth. Diversity concerns the heterogeneity of lifestyle, ethnicity, and sexuality (Bereitschaft & Cammack, 2015; Rao & Dai, 2016). Its acceptation is measured by several indicators, like the gay (the gay household percentage) and melting pot index (the foreigners' household percentage) (Florida, 2002), around which there is not consensus. Creativity seems to be less related to tolerance (Vossen, et al., 2019), and specifically to the presence of foreigners and gays (Baez, et al., 2014). Furthermore, its measurement reported some methodological difficulties, due to the lack of data for privacy reasons, or influences controversially on economic growth (Hansen & Niedomysl, 2008; Haisch & Klopper, 2014). Regarding the other 2Ts, talent and technology, Florida underlines their importance in stimulating creativity and attracting new creatives. There is a strong group of scholars who argue the importance of other localization determinants: cultural and natural amenities (Grodach & Loukaitou-Sideris, 2007; Ling & Dale, 2011; Mansury, et al., 2012; Wedemeier, 2015), housing affordability (Lawton, et al., 2013) and quality of life (Van Oort, et al., 2003). Others suggest the relevance of local economic conditions, like job opportunities, presence of other creatives (especially bohemians as Boschma & Fritsch state, 2009) or creatives' clusters of firms (e.g. Martin-Brelot et al., 2010; Boix et al., 2014).

Finally, what Florida defines as urban climate, i.e. that urban vibrant atmosphere that solicits diversity, openness and cultural vitality. This atmosphere is typically located in urban areas and decreases in other nearby territories.

Data&Methods

The definition of CC

In this study, we adapt the Florida´s definition of CC to the industry affiliation approach as the data related to the workers and firms at municipal level are available in ATECO dataset (based on economic sectors distinction). We cannot use other approaches as the relative data are not available. We start identifying the most creative sectors and then we define as creatives all workers who operate internally. Within the sectors identified as creative, we cannot separate creatives and non-creatives. Specifically, we consider creative core individuals all professionals that operate in the following sectors: Information and communication services, Professional, scientific and technical activities, Education. We identify creative professionals as individuals who work in Health and social care, Financial and insurance activities, Real estate activities. Finally, we assume that bohemians are professionals included in "Artistic, sports, and entertainment activities" sector.

Peri-urban areas identification

The spatial, social and economic dynamics that are insisted upon here prevent the adoption of a unique definition of peri-urban and lead to a proliferation of urban-rural definitions. Among the more than 100 existing definitions (Cattivelli, 2012), we choose the one that satisfies two criteria simultaneously.
First, since "peri-urban" extends beyond administrative boundaries, we consider only definitions referring to the lowest administrative level, such as LAU2. Others based on regional level do not adequately represent the diversity required in these territories due to their excessive extension. Secondly, we prefer only definitions that evidence functional relationships among territories as peri-urban areas are strongly integrated or influenced by close urban ones. Among the definitions that meet these requirements, we adopt those developed by the OECD for the functional areas delimitation (OECD, 2012).
Based on two variables (population density and travel-to-work flows), OECD identifies the "core area" and the "hinterland". The core includes municipalities with the highest population density and commuters' in-flows; hinterland has the municipalities with less density and commuter attractiveness but integrated to the nearest core. In our study, we assume that the "core areas" are the "urban areas", and the "hinterland areas" as "peri-urban areas".

The selected CC localization determinants

The choice of localization determinants reflects the literature review and is conditioned by data availability. We only consider indicators which refer to municipal level, as peri-urban does not

exist as a statistical territorial unit and data at highest administrative level do not explain its specificities (Table 1, in Appendix).

In detail, we use different proxies of tolerance, talent and technology. As proxy of tolerance, we use three types of indicators. The first indicator concerns the number of firms conducted by foreign people (FORFIRM) and substitutes the melting-pot index. We prefer this indicator as it measures the long-term integration into society of people with a foreign background. The second type refers to the heterogeneity of lifestyle, ethnicity, and sexuality. The Gay Index is not detected by the Statistical Offices, as it concerns the sexual preference and therefore people's intimacy. Moreover, this indicator does not adequately represent homosexual couples' distribution. Considering people of the same sex who live together, it also includes roommates who are not in an amorous relationship (friends, relatives, colleagues, etc.). In substitution, we consider the number of Civil Unions (CIVILUNION). This indicator is a good proxy of tolerance: it demonstrates the social acceptance of homosexual couples and their freedom/right to formalize their union. Unfortunately, relative data are not yet liberally available, as municipalities started to collect these data since 2018 and have not released them yet. We insist on collecting directly these data from the municipalities: being the most controversial indicator for many territories (as outlined by Baez et al., 2014 and Vossen et al., 2019), we want to test its effect in our peri-urban municipalities. The third type of indicators concerns openness and acceptance diversity through solidarity. High number of non-profit institutions and volunteers (NOPROFITIST; NOPROFITVOL) outline the commitment of local society to overcome eventual social disparities.

As measure of talent, we consider the number of volunteers in cultural and creative activities (VOLUNTCREA). Part of the literature ignores the importance of this volunteering in attracting new talents and considers just creatives with an employment relationship or an economic contract. As these volunteers are very numerous in our peri-urban municipalities, it is right to consider their presence as an additional attracting factor. The indicators of creative individuals are the number of the professional creative (PROFCREA), those of creative core (CREACORE) and bohemian (BOHECREA). Their sum is the total of creatives, i.e. TOTCREA. These last four indicators are estimated as dependent variables. As measure of technology, we consider the employees in high-tech sectors per 100 employees, (HIGHTECH_EMP).

Regarding the cultural amenities, we consider cultural heritage resources (CULTAMEN). Data on natural amenities at municipal level are not available.

We explain the local economic conditions through three different types of indicators. The first indicator concerns the role of the quality of life as localization determinant and it is proxied by public expenditure incurred in services provision (TOTALEXPE) (Annoni & Weziak-Bialowolska, 2013). The second group is relative to the general attractiveness of a territory, which is measured by in- and out-movement of population from other municipalities (ATTRACT_IN), number of no-creative firms (NFIRM) as signal of the capacity of territory to generate value added, create new jobs and attract new workers, including the creative ones. The last group includes TOTCREAFIRM (i.e., the sum of creative core, creative professional and bohemian firms; in other terms, COREFIRM; PROFFIRM; BOHEFIRM) that measures the creative firms' agglomeration which is an important attraction factor, as stated by Bakhashi et al., (2014).

Finally, we consider the population density (POPDEN) as a "catch-all" variable and proxy of the urban climate, like (Boschma & Fritsch, 2009). However, this indicator partially explains this atmosphere referring only to population and not to cultural amenities and their accessibility. Consequently, we consider also the distance of peri-urban municipalities from the nearest urban centers in minutes (DISTANCE) to measure the accessibility to the urban climate and its amenities.

The study area

We test our model in the peri-urban municipalities in the regions of Northern Italy. These regions are the most creative regions in Italy (Symbola, 2019). Together, they account for 57.9% of the sector's value added and 56.1% of creative occupation at national level. (ibid.). These regions are affected by an intense process of land conversion for productive and residential purposes, which has led to a widespread peri-urban diffusion (ISPRA, 2018).
Applying OECD definition, the municipalities of Northern Italy are distinguished as shown in Figure 1.

Figure 1: Urban and peri-urban municipalities in the Northern Italy.
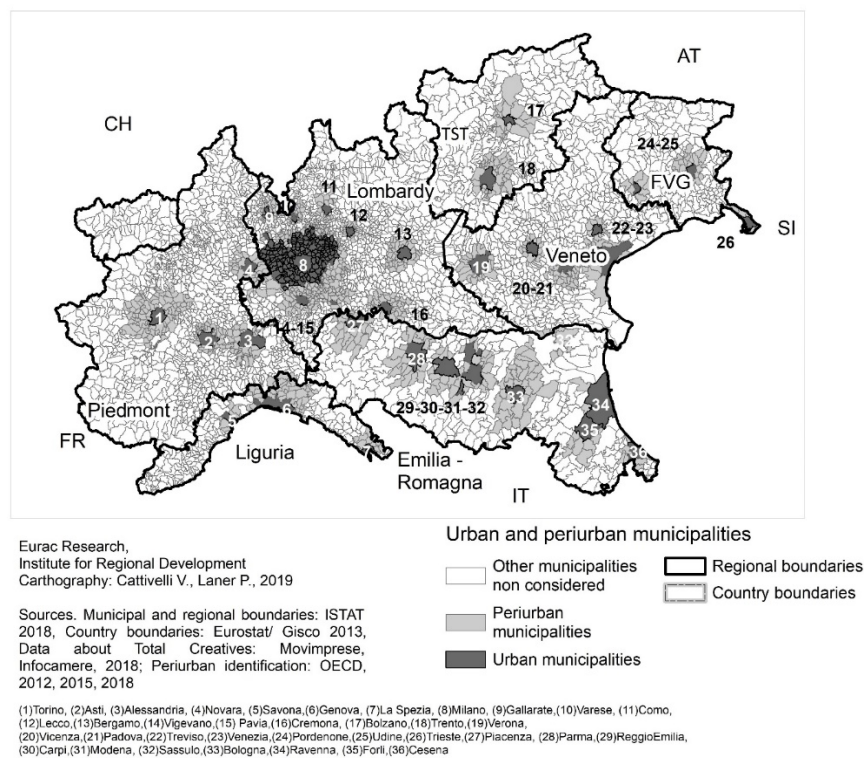
The adopted quantitative model

This section describes the quantitative model implemented to elaborate the evidences of literature and data and improve the CC localization´ comprehension by drivers.
The first step is devoted to the exploration of the distribution of indicators explained previously. We calculate principal descriptive statistics and Gini index for the whole set of peri-urban municipalities and then respectively to the different regions. In order to individuate different factors basing on the correlations existing among localization determinants and reduce the number of indicators, the principal component analysis (PCA) is performed. Subsequently, for the whole

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set of peri-urban municipalities, we apply the regression analysis in order to explore the relationship between the presence of different types of creatives and localization determinants. We perform the same procedure for each region considering the corresponding peri-urban areas. Traditional regression models assume mutual independency of observations, which is violated when the spatial data are analyzed. Spatial regression methods estimate spatial dependency and help to avoid the problems of unstable parameters and unreliable significance tests. In this study, the dependency issue is trickier as the municipalities are dependent one to another when we consider a peri-urban area in a region, but they can be considered independent otherwise. In order to deal with this situation, we convert the list of geographical coordinates into a spatial object and we construct spatial weights matrix basing on the distance between k nearest points (in this case k=3).

In order to examine the relationship between the outcome variable with a set of predictors we estimate four regression models, ordinary least square (OLS), the spatial lag model (LAG), the spatial error model (SEM) and Spatial Durbin Models (SDM). In each regression model we detect outliers and influential points by computing leave-one-out deletion diagnostics. The set of models are run twice, firstly, based on overall considered points and secondly after removing outliers and influential points. We test the spatial autocorrelation of the residuals by using Lagrange Multiplier test. After the autocorrelation validation we choose the model in which the residuals are not correlated. Results of log likelihood ratio and AIC are used to evaluate the model goodness of fit.

Results

Mapping of creatives in peri-urban municipalities
In general, creative class is present but unevenly distributed in peri-urban municipalities (Figure 2; Table 2). Its presence is larger in the municipalities closest to urban center and decreases in the farthest away ones (Spearman´s rho correlation: -0.154, p-value = 0.000). Milan's peri-urban area is very creative: its influence extends beyond regional boundaries and it is strongly linked with the rest of the Lombard peri-urban areas. Between Milan and Ravenna, there is the largest CC concentration. The peri-urban area around Torino is strongly creative; however, its influence does not extend to the rest of region. In Veneto, CC creates a sort of "creative zone" from Verona to Venezia. Trentino – South Tyrol's (TST) peri-urban area is less creative than in other regions. In Friuli Venezia Giulia (FVG), the peri-urban areas of Udine and Pordenone are more creative than that of Trieste.
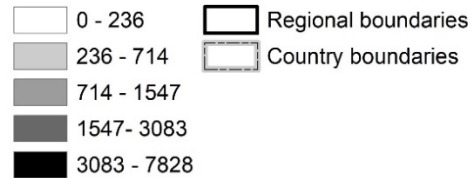
Figure 2. Total creative individuals for each peri-urban area in Northern Italy.
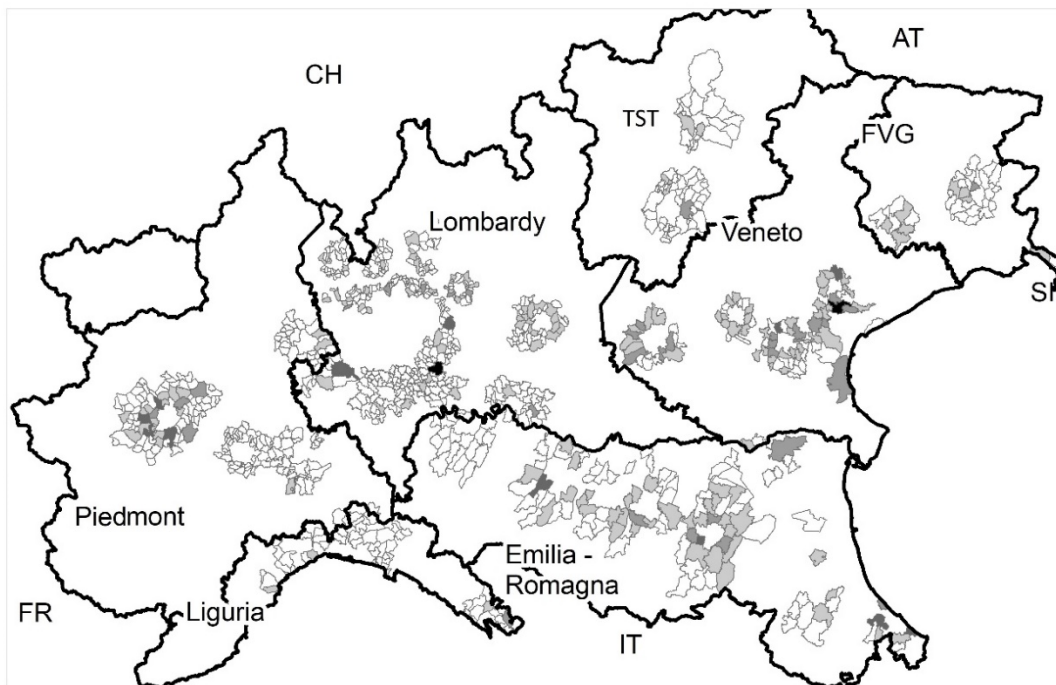
Total creative individuals (Absolute value)

☐ 0 - 236	▭	Regional boundaries
236 - 714	▯	Country boundaries
714 - 1547		
1547 - 3083		
3083 - 7828		

Compared to the relative urban center, individually each peri-urban municipality is less creative (Figure 3, based on geometrical intervals). In the case of Emilia-Romagna, FVG, TST and Veneto the sum of the creatives in peri-urban areas is higher than the total of those located in the urban centers of reference.

Figure 3. Total creative individuals in urban and peri-urban municipalities.
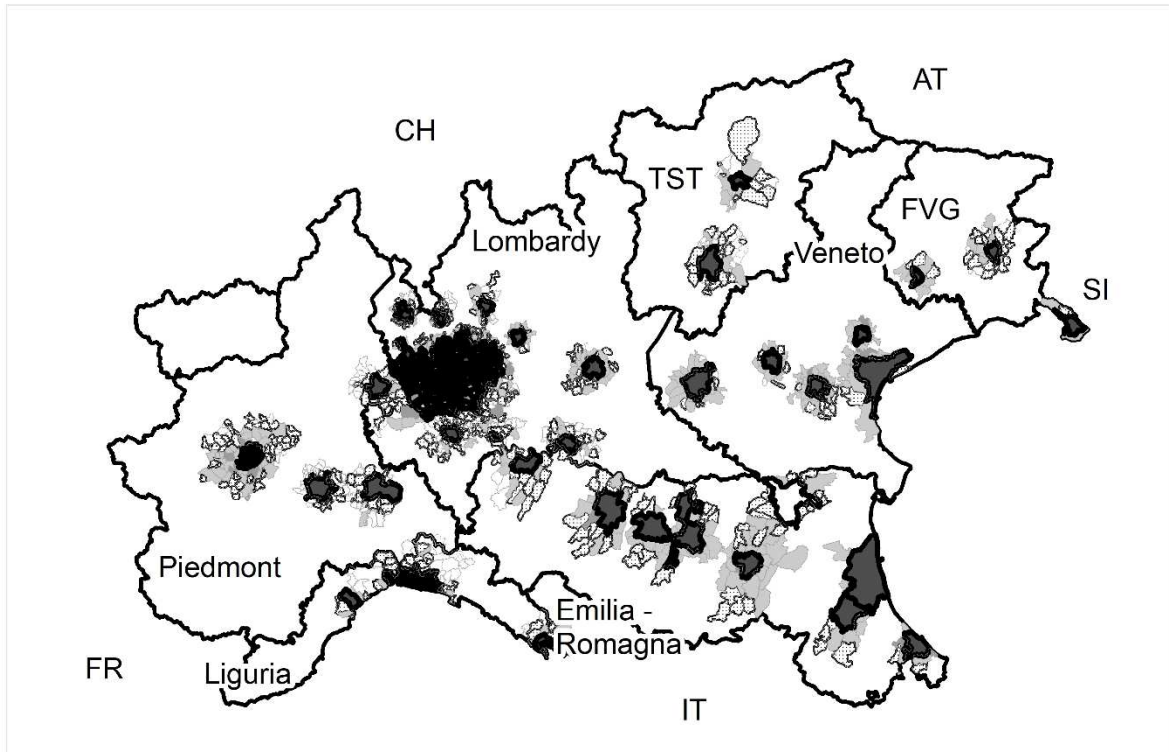
Total creative individuals.
Comparison between urban and peri-urban municipalities (Absolute value)

<Null>

Peri-urban municialities

Urban municipalities included in urban core

capitale_creativo_periurbano_norditalia_2019
Totale

1 - 16

16 - 165

165 - 1653

1653 - 16538

16538 - 165387

165387 - 1653881

Country boundaries

Regional boundaries

The spatial distribution of each category of creatives demonstrates a clear prevalence of professional creatives over other types, followed by the creative core. (Figures 4-6). The share of bohemians is much lower. Concerning their distribution, high values of Gini[1] indexes evidences the creatives' willingness to concentrate territorially, at least at regional level. However, there are some differences among regions. In Emilia-Romagna, FVG and Veneto, creatives are more dispersed in the regional peri-urban areas, while in the remaining regions, they are more integrated and concentrated in the respective peri-urban.

Specifically, professional creatives are present in all considered municipalities and specifically in those near to the largest urban areas (Figure 4, in Appendix). Even in the smallest municipalities, their presence is relevant and higher than other creatives. Peri-urban municipalities in Lombardy, Veneto and Emilia-Romagna are those most professional-oriented (Table 2). Liguria and TST, the least. Regarding the territorial dispersion, The Gini index is very high for the entire category of

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[1] Gini coefficient is a measure for describing the degree of territorial concentration. Its values range from 0 (even distribution across the territories) to 1 (extreme concentration in one territory).

creatives (0.71). In particular, in some regions, peri-urban areas have a limited dispersion of these creatives (TST, 0.78; Piedmont, 0.77), while for others areas the distribution gap is bigger (Emilia-Romagna 0.58; FVG 0.61). The Venetian peri-urban presents the least concentration: here creatives are present in almost all municipalities but are very dispersed across the region.

Creative core individuals demonstrate a similar spatial pattern to professional creatives (Figure 5, in Appendix). Their presence is very concentrated in both the peri-urban municipalities closer to the urban centers and to the most remote ones. This occurs in all the peri-urban areas considered, both larger and smaller ones. Emilia-Romagna and Veneto have some of the most core creative oriented peri-urban areas. However, they demonstrate the lowest values of Gini index: this underlines their dispersion across regional territory and depends on the presence of highly creative municipalities close to lesser municipalities. Disparities in territorial distribution are also evident in relation to these creatives (Table 2). Despite the north-south divide, particularly evident in the peri-urban area of Milan, Lombardy shows high levels of concentration. In TST, these creatives are also strongly concentrated (Gini equals to 0.73).

Bohemians shows a different spatial pattern (Figure 6, in Appendix). In all peri-urban municipalities, their number is lower compared to the rest of creatives. Larger municipalities and those closer to urban centers are more attractive for them. The peri-urban areas located near the major urban centers (Milan, Torino, Bologna, Venezia) have the highest number. Bolzano and Trieste peri-urban differ from other peri-urban areas in their region due to their high values. Bohemians are the most concentrated creatives. The relative Gini index is the highest in Liguria and Piedmont (over 0.8). Surprisingly, bohemians are less concentrated in FVG (0.53).

Descriptive statistics regarding the localization determinants (Table 3, in Appendix) demonstrate that in Emilia-Romagna peri-urban areas are the most tolerant, as the relative indicators for FORMFIRM & CIVILUNION assume the highest values. In Liguria and Lombardy, peri-urban areas are the most foreign´ business oriented, while FVG is the region where foreigners´ entrepreneurs are less present in the regional peri-urban. Civil unions are less frequent in Lombard and TST peri-urban. All peri-urban municipalities have a strong vocation for volunteering and high-technology oriented, especially in Lombardy and Piedmont. Cultural amenities are present over all in Emilia-Romagna, Liguria peri-urban, less in TST peri-urban. Evident differences are in the expenditure values, as FVG and TST peri-urban municipalities spend more on average than other regions. This is probably due to the fact that these two regions has a special legislative and fiscal autonomy, which the other regions do not have. Municipal productive systems include many non-creative firms in all regions, with more accent in Emilia-Romagna and FVG. Regarding the creative firms, professional and creative core ones are the most diffuse, especially, in those municipalities with a high number of professional and creative core individuals. Bohemian firms are less widespread, except for Emilia-Romagna and Veneto. Population density in peri-urban areas is similar in each considered region. However, Lombardy and TST are the two exceptions as they demonstrate the highest and lowest values, respectively.

The influence of different localization determinants
Before applying regressions models, we perform Principal Component Analysis (PCA), in order to individuate different dimensions existing among localization determinants and reduce the number of predictors. We start considering all localization factors described above, except the PROFCREA, CORECREA, BOHECREA and TOTCREA as they are the dependent variables. We

do not include also the CIVILUNION because we want to test it separately in the regression models and point out its relevance, assumed as controversial by Baez et al, (2014) and Vossen et al. (2019). We choose the criteria of cumulative percentage of 75% variance as a threshold for factors selection. Consequently, we identify 4 factors explaining 75.71% of variance. The first dimension (SOCIO-ECONOMIC CONTEXT) explains 48.76% of total variance and includes: NOPROFITIST, NOPROFITVOL, VOLUNTCREA, TOTALEXPE, TOTCREAFIRM, NFIRM. The next 3 dimensions include: ATTRACT_IN, HIGHTECH_EMP, POPDEN (dim 2, 9.88%), DISTANCE (dim 3, 8.77%), FORFIRM (dim 4, 8.30%).

Subsequently, we run multiple regressions to test the effects of the localization determinants on the presence of each creative's categories (bohemians, professionals, core) and for the total creatives.

The dependent variables are respectively TOTCREA, BOHECREA, PROFCREA, and CORECREA. We create separate models for three categories of creatives as different explanations may be significant for each type. We conduct the regressions for the whole area of Northern Italy and separately for the considered regions.

The first predictor we want to test is the dimension SOCIO-ECONOMIC CONTEXT resulting from the PCA. This predictor represents the role of social and economic environment in attracting creatives. Specifically, it considers the contribution of volunteering sector, the public expenditure and thus the services provision and their relevance in the quality of life, the job opportunities proxied by the number of firms, creative and not.

Additionally, we include in the model ATTRACT_IN as a general indicator of attractiveness of a municipality. To test the influence of tolerance, we use two predictors such as CIVILUNION and FORFIRM. The next group of regressors includes POPDEN and DISTANCE and measures how accessibility to urban climate influences the peri-urban attractiveness. Finally, we test the effect of CULTAMEN as proxy of municipal cultural heritage resources, and HIGHTECH_EMP that measures the importance of technology as CC localization determinant.

In the models with dependent variables such as PROFCREA and CORECREA, we include BOHECREA as a predictor in order to verify its influence in attracting the other two creatives' categories, following the thesis of Boschma&Frintch.

For the whole dataset and each region separately, we apply regression analysis. In our study, the municipalities are dependent one to another when we consider a peri-urban area in a region, but they can be considered independent otherwise. We account for this spatial autocorrelation through using the spatial Durbin models. After the assessment of model´s goodness of fit, the findings of the best solution are presented in the tables. Table 4 shows the results of the regression analyses for both total creative individuals and three creative categories for the entire Northern Italy.

Table 4. Regressions Explaining the CC for all considered peri-urban areas.

	TOTAL							
	TOTCREA		**BOHECREA**		**PROFCREA**		**CORECREA**	
	Beta	SE(Beta)	Beta	SE(Beta)	Beta	SE(Beta)	Beta	SE(Beta)
Constant	151.275***	25.314	13.880***	1.637	84.482***	16.160	44.090***	13.944
SOCIO-ECONOMIC CONTEXT	118.146***	3.255	6.632***	0.327	54.051***	2.408	44.250***	2.003
CIVILUNION	18.743***	3.479	1.282***	0.364	8.844***	2.164	6.445***	1.801
DISTANCE	0.288	0.484	-0.025	0.028	0.451	0.309	0.214	0.247
HIGHTECH_EMP	-1.844	1.173	-0.157	0.124	-1.568*	0.734	0.087	0.601
ATTRACT_IN	0.464	0.413	-0.098*	0.042	0.296	0.259	0.620**	0.212
CULTAMEN	-0.659**	0.194	0.003	0.020	-0.504***	0.123	-0.574***	0.118
FORFIRM	0.044	1.489	0.343*	0.158	-0.630	0.932	0.394	0.763
POPDEN	0.001	0.016	0.0004	0.001	-0.002	0.010	0.002	0.008
BOHECREA					0.525**	0.156	0.347*	0.138
	Value	Wald test	Value	Wald test	Value	Wald test	Value	Wald test
SEM Lambda λ								
SDM Lambda λ	0.193***	24.168			0.148***	13.385	0.198***	25.45
N	910		914		914		907	
DF	19		10		21		21	
LogLikelihood	-5793.005		-3775.72		-5395.011		-5164.464	
AIC	11624		7571.4		10832		10371	
OLS Adj. R²			0.546					

Statistically significant levels: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.'.

A key finding, and one that we expected, is that there is a strong positive statistical relationship between the share of total creatives and the socio-economic context in the whole data set. Creatives are attracted by peri-urban areas characterized by a strong vocation to volunteering. In parallel, they prefer peri-urban areas where local institutions provide public services and sustain high levels of public expenditure. Moreover, creatives are inclined to move towards peri-urban areas with a favorable entrepreneurial context, with a large presence of creative and not creative firms. This confirms CC predilection for places where creatives´ clusters of firms are already present (outlined by Boix et al. (2014)). Otherwise, creatives are in those peri-urban areas where not creative firms are largely located. This means that they are in search of job opportunities also in not creative sectors. The relevance of socio-economic context is evident also for each of the considered creative categories. Additionally, civil unions have a high positive effect on the presence of creatives' individuals. This means that CC are attracted by tolerant peri-urban places. The high-tech employee determinant is negative and significant for the professional creatives. This implies that the role of technology in attracting creatives in peri-urban areas is more controversial than Florida suggested. The attraction index results positive in the case of creative core individuals and slightly negative for bohemians. Unexpectedly, cultural amenities determinant results negative for total creatives, professional and core ones. This implies that for these types of creatives the cultural heritage resources influence negatively their localization choices. This happens in contrast especially to Grodach & Loukaitou-Sideris (2007).

The number of firms conducted by foreign people is positive for bohemians. This result confirms that bohemians are in general the most tolerant creatives. Positive effect of bohemians on explaining professional and core creatives confirms that creatives move towards places where other creatives are already present. No effect is remarked in the case of predictors such as distance and population density which means that the access to urban climate is not a relevant localization determinant.

Subsequently, Table 5 and Table 6 present the estimates for the same creative categories but with reference to Lombardy and Emilia-Romagna. Lombardy is the most creative region in Italy and Emilia-Romagna has collectively the highest values of tolerance/integration indicators in peri-urban areas. Tables 7-11 related to the remaining regions are included in Statistical Appendix. Specifically, for Lombardy, the socio-economic context has a strong positive effect when explaining both total creatives and the three types of creatives. The civil union presents a small negative effect on bohemians and contrarily a positive one on creatives core. None effect results in explaining professional creatives. This means that here the core creatives are those more attracted by tolerant peri-urban areas. Surprisingly, the cultural amenities result negative in explaining total creatives, professional and core ones. This probably depends on low concentration of cultural amenities in some Lombard peri-urban municipalities. High-tech employee has a negative effect on total creatives and professional ones which indicates that technology is not a positive localization determinant. The presence of active firms led by foreigners does not influence the presence of creatives except in the case of bohemians. Population density has a small negative effect for total creatives, professional and core ones. This implies that the access to urban climate is not considered as relevant localization determinants. Finally, bohemians are not statistically significant for professional and core creatives. In other terms, the large presence of bohemians is not a localization determinant in the choices of core and professional creatives.

Concerning Emilia-Romagna, the socio-economic context has a strong positive effect in explaining all types of creatives. Civil Unions result positively significant only for total creatives confirming the tolerant vocation of this region. In contrast to Lombardy, population density results

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positive particularly in explaining total creatives and bohemian. This indicates propensity of creatives in Emilia-Romagna to move towards peri-urban municipalities closer to the urban area. Bohemians results with positive effect on professional creatives and is not significant in explaining core creatives. This means that the professional creatives are attracted by bohemian-oriented peri-urban areas. Cultural amenities also here have negative effects for total creatives and bohemians. Instead, attraction index is negatively significant for bohemians and positive for professional creatives.

With reference to other regions, socio-economic context is the most important determinant in modelling the CC presence, always with positive effects. The strength of the remaining determinants depends on soci-economic and spatial characteristics of each region (tables 7-11).

Table 5. Regressions Explaining the CC in Lombardy

	LOMBARDY							
	TOTCREA		BOHECREA		PROFCREA		CORECREA	
	Beta	SE(Beta)	Beta	SE(Beta)	Beta	SE(Beta)	Beta	SE(Beta)
Constant	268.773***	20.539	10.756***	1.912	189.793***	13.671	80.411***	9.679
SOCIO-ECONOMIC CONTEXT	141.534***	5.684	6.003***	0.523	85.423***	3.987	48.705***	2.846
CIVILUNION	3.878	4.483	-0.872*	0.400	0.969	2.854	7.166***	2.046
DISTANCE	0.159	0.312	0.052 .	0.029	-0.185	0.202	0.145	0.146
HIGHTECH_EMP	-2.166*	1.067	-0.106	0.098	-1.777*	0.690	-0.490	0.487
ATTRACT_IN	0.084	0.049	0.009	0.037	-0.565*	0.262	0.239	0.188
CULTAMEN	-3.029***	0.084	-0.007	0.071	-0.860 .	0.498	-1.149**	0.381
FORFIRM	2.180	1.469	0.081	0.135	1.271	0.946	1.012	0.666
POPDEN	-0.048***	0.011	-0.002	0.001	-0.052***	0.007	-0.001*	0.005
BOHECREA					-0.182	0.250	-0.121	0.176
	Value	Wald test	Value	Wald test	Value	Wald test	Value	Wald test
SEM Lambda λ								
SDM Lambda λ								
N	355		351		354		353	
DF	10		10		11		11	
LogLikelihood	-2091.504		-1231.12		-1929.662		-1799.772	
AIC	4203		2482.2		3881.3		3621.5	
OLS Adj. R^2	0.796		0.664		0.825		0.719	

Statistically significant levels: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.'.

Table 6. Regressions Explaining the CC in Emilia-Romagna

	EMILIA ROMAGNA							
	TOTCREA		BOHECREA		PROFCREA		CORECREA	
	Beta	SE(Beta)	Beta	SE(Beta)	Beta	SE(Beta)	Beta	SE(Beta)
Constant	-41.527	137.789	-9.271	19.948	68.659 .	36.580	-3.227	40.632
SOCIO-ECONOMIC CONTEXT	110.134***	14.833	10.115***	2.032	46.301***	8.517	38.706***	9.123
CIVILUNION	28.573**	8.694	0.827	1.218	7.047	4.721	15.892	4.868
DISTANCE	-1.324	1.269	-0.178	0.173	-0.241	0.692	-0.497	0.749
HIGHTECH_EMP	-1.734	4.391	-0.461	0.594	-3.646	2.258	1.083	2.330
ATTRACT_IN	1.375	1.559	-0.588**	0.207	0.685 .	0.834	1.450	0.866
CULTAMEN	-1.737*	0.786	-0.267*	0.107	-0.544	0.420	-0.469	0.465
FORFIRM	6.590	9.849	-0.086	1.300	-0.881	5.006	1.359	5.341
POPDEN	0.383***	0.113	0.073***	0.016	0.033	0.070	1.200	0.071
BOHECREA					0.645 .	0.333	-0.202	0.374
	Value	Wald test	Value	Wald test	Value	Wald test	Value	Wald test
SEM Lambda λ							0.394***	18.593
SDM Lambda λ	0.261**	6.573	0.434***	25.081				
N	122		123		122		121	
DF	19		19		11		12	
LogLikelihood	-773.555		-534.156		-700.435		-706.307	
AIC	1585.1		1106.3		1422.9		1436.6	
OLS Adj. R²					0.658			

Statistically significant levels: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.'.

Discussion

Our study illustrates strong empirical evidence that CC is present and unevenly distributed across peri-urban areas in Northern Italian regions.

This class is concentrated above all in the largest peri-urban municipalities and in those closest to urban centers. This is true for all three categories of creatives' individuals (professional, core and bohemian creatives). In particular, the prevalence of the first two categories of creatives is evident everywhere; bohemian creatives are the least attracted creatives, as their absence is evident in the smallest municipalities and farthest from urban centers. In Emilia-Romagna, FVG, TST and Veneto the peri-urban areas are more creative than relative urban centers of reference. The situation changes in the remaining regions.

Towards modelling aspects, the most important determinant, with a positive effect in attracting creatives, is the factor including indicators related to the socio-economic dimension. At this point, we can assume that creatives are attracted by municipalities with a high public expenditure for services, a high commitment in volunteering and wide employment opportunities in the creative and non-creative sectors. This is true for all types of considered creatives. This happens also at regional level especially in Emilia-Romagna, Liguria, Piedmont and Veneto. Positive influence of bohemians on professional creatives we notice only for the entire set of peri-urban municipalities but not at regional level. This confirms that the presence of the most creative individuals, represented by the bohemians, in some cases results a driving force for attracting other creatives. As stated by Baez et al. (2014) and Vossen et al. (2019), also in our regions, tolerance has a controversial effect in attracting creatives. Considering all per-urban municipalities, union civils influence positively the existence of different creative individuals. The situation changes at regional level. It is worth noting that the registration of this indicator started in Italy only in 2018 and according to our knowledge this is the first study which uses this important data in explaining CC. In contrast, foreign-led active firms do not influence CC existence. However, in Venetian peri-urban areas, it impacts positively the presence of bohemians and total creatives.

In our study, cultural and technological indicators do not play the crucial role in attracting CC. Accessibility to urban climate, here proxied by the population density and distance from the main urban center, does not result as a decisive factor, in contrast to Florida. Certainly, these conclusions may depend on the particularity of spatial, economic and social situation within each considered region and the North Italy as a whole.

Conclusions

In this paper we examine the determinants and localizations of Creative Class in peri-urban areas. After a deep review of the literature we try to adopt and at the same time rives the Florida´s theory by modelling the CC presence in Northern Italy.

Its presence is strongly associated with socio-economic factors and, in some cases, it is influenced by tolerance determinants. The adopted methodological solutions based on the economic sectors to which creatives belong, is a unique way to define creative class in Italy. However, this could require further adjustment as they do not operate a clear-cut distinction with other less creative workers that operate in the same sector. Respectively to other studies, we analyze both the creative

class in the strict sense (bohemians) and we adopt the extended definition including also professional and core individuals.

For a complete overview of the creativeness of the North Italy, we would integrate the present study with the analysis of the contribution of creative individuals in local economic performance. In fact, explanations for economic regional growth in peri-urban areas are still lacking. Another possible extension of the analysis could concern creatives' distribution across other underexplored territories likes mountain or remote areas in Italy and other European countries.

Additionally, further investigation could be focused on the differences among peri-urban areas. Considering that peri-urban spatial, economic and social characteristics differ considerably among regions, it would be pertinent to analyze whether the presence of creatives depends upon these local-based characteristics. One of the additional aspects which could be investigated are the cultural differences between the considered creative groups.

The issue of "tolerance" deserves further consideration. Methodologically, gay or melting pot index are not a good proxy as they based on too-generic assumptions. Conversely, the number of civil unions, used in this paper, is a better indicator since it includes same-sex couples and in the future, it could be considered as a good proxy of openness. Our use of other indicators, such as those relating to the integration of foreigners, is a good starting point since they provide an idea about the extent to which a community is open to newcomers and how the latter are integrated into the community.

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