Civic Engagement in the Urban Space[1]

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Abstract

Explanatory factors of civic engagement mainly focus on trust and institutional quality, ethno-linguistic diversity and new forms of digitalised civic participation. We explore the relationship between civic engagement and socio-economic dimensions by conducting a first spatial analysis of civic engagement in three major urban Italian areas: Rome, Milan and Naples. We carry out explorative data spatial analysis and geographical regressions by using use secondary geocoded data from the 2014 Italian Participation Labour Unemployment Survey sampling 55,000 individuals, stratified over the Italian population aged 18-64. Civic engagement is measured in terms of individuals' involvement in voluntary activities. We find that when individuals interact with people with a different socio-economic status they are less inclined participate in civic engagement. Policies involving civic engagement are necessary in heterogeneous urban centres.

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1. Introduction

The overall decline of the civic participation in the Western democracies has been raising serious concerns among academics and policy makers especially given its generally recognised importance for institutional and economic performance (Putnam, 1993). However, although this decline has been well documented, it has not been effectively explained. Explanatory factors of civic engagement proposed so far focus mainly on trust and institutional quality (Letki, 2006), ethno-linguistic diversity (Alesina and Ferrara, 2000) and new forms of digitalised civic participation via internet (Whiteley, 2011). Still, the main shortcoming of these previous studies is the lack of mapping possible changes in civic participation across the space and along different socio-economic dimensions, essential to shade light on the phenomenon. Furthermore, much of these studies focus of the United States, while scant attention has been devoted to the European context (Tavaraes and Carr, 2013).

This work aims to tackle this gap by conducting, to our knowledge, the first spatial analysis of civic engagement. This approach becomes even more crucial considering the increasing phenomenon of "sorting" in the western democracies: citizens increasing trend to sort (cluster) along the dimensions of income and education across the space within the cities.

Civic engagement commonly refers to individuals' involvement in voluntary activities and it has a recognised role in promoting a vibrant habit of cooperation, solidarity and public spiritedness among the members of a community for the collective benefit (Putnam 1993).

Related studies have shown a positive association of civic engagement with institutional performance, life satisfaction, culture, social relations and economic development in Italy and in other Western societies (Alesina 2009; Coleman 1990; Letki 2006). However, little attention has been devoted to its geographical dimensions, particularly at the urban level, and to the geographical dimension of socio-economic factors such as income and education that may contribute to its organisational space. The novelty of this work stands on the importance attached to analysing civic engagement theoretically and empirically from its spatial dimension. The key research focus is, therefore, whether more homogeneous spatial areas in terms of income and education exhibit more civic engagement in large cities.

We consider civic engagement in term of voluntary activities. We use education and income as dimensions of sorting. Putnam (1993) uses income and education as proxies of social classes. Matching with people coming from the same social class can reinforce the initial

opinions. In its conceptual model of social capital, Lin (2001) argues that an individual holding an initial favourable socio-economic condition, including her dimension of income and education, locate the individual in a position of strength within her network and facilitate the individual to a better access of her social capital.

The context of analysis includes the three largest Italian cities: Milan, Rome and Naples, located respectively in the North, Centre and South of Italy. These cities exhibit relevant cultural and socio-economic differences and are characterised by distinct forms of urban geography. For instance, the city of Milan is characterised by a relatively regular urban geography. Instead, the cities of Naples and Rome present peculiar irregular urbanisations affected by natural and artificial barriers like hills, rivers, ports, archaeological areas and the volcano, in the case of Naples. These distinct urban geographies might condition both the social interaction and the socio-economic sorting of the residents. An exploratory spatial analysis will be able to estimate and map the relationship between civic engagement and socio-economic sorting across all these urban irregularities. This will provide more consistent insights for appropriate urban policies focusing on urban areas regeneration and socio-economic redistribution of resources.

In the field of studies on civic engagement, Italy has often served as experimental country due to its cross regional differences in terms of civic spirit, social capital and institutional quality (Banfield 1958; Putnam 1993). Different cities can face different patterns of spatial segregations even though all subject to similar global economic pressures (Musterd et al., 1998). Hence, focusing on different cities belonging to the same formal institutional framework allows us to conduct more consistent comparative analyses.

The analysis is conducted by using geocoded data collected from the Italian Participation Labour Unemployment Survey for a representative sample of about 55,012 respondents stratified by regions of residence and municipality. This type of data enables identification of the geographical location of the residence of each respondent allowing the project to produce different types of analyses. More specifically: to spatially group individuals on the basis of their civic engagement; to estimate and visually map the variation of civic engagement across different spatially located clusters; to attribute each group with a socio-economic heterogeneity score by using the average Euclidean distance on income and education among the individuals of each defined group; to detect whether more spatial socio-economic heterogeneous groups exhibit more civic engagement and to map this relationship through

geographical linear regressions where the coefficients can vary according to geographical space, revealing interesting patterns which otherwise would be disguised.

There are at least two reasons to focus on civic engagement. Firstly, it has been documented that civic engagement is a crucial factor for a better functioning of the political-institutional and economic systems. Secondly, urban areas are becoming more and more complex geopolitical spaces requiring more collective actions to face problems in a more efficiently.

We find that when individuals interact with people with a different socio-economic status they are less inclined participate in civic engagement. We suggest that policies involving civic engagement are necessary in heterogeneous urban centres.

2. Civic Engagement and Spatial Sorting

Well-functioning democracies require civic engagement and citizens' participation in the political and social affairs (Alesina and Giuliano 2009).

Civic engagement commonly refers to individuals' involvement in voluntary activities and it has a recognised role in promoting a vibrant habit of cooperation, solidarity and public spiritedness among the members of a community for the collective benefit (Putnam 1993). The importance of civic engagement, as voluntary activity, lays on the fact of being the dominant and most durable form of collective action, particularly in large contemporary cities (Rotolo and Wilson 2004). Civically engaged individuals tend to assume a prosocial behaviour. Within a social dilemma framework, they are natural co-operators seeking to maximise joint outcomes and to choose a win-win solution to disagreement (Bogaert et al. 2008). Individuals adopting this behaviour are inclined to cooperate for the benefit of the community due to a stronger sense of social responsibility (De Cremer et al. 2001). In fact, not surprisingly, in large urban areas, the diffusion of civic engagement has been found to have a positive effect on crime reduction, more equal redistribution of the socio-economic resources and efficient implementation of urban policies.

The involvement of individuals in local organisations, neighbourhood institutions and voluntary associations is also an ideal environment to boost social interactions and social ties (Morenoff et al. 2001; Peterson et al 2000; Veysey and Messner 1999) and to facilitate the so called "collective efficacy". This refers to the willingness and ability of the community members of a specific neighbourhood or socio-economic urban space to cooperate on behalf

of the common good to pursue effective social control and achieve public order (Sampson 2002). This is possible in socially cohesive neighbourhoods characterised by mutual trust and solidarity among their members (Sampson 1997).

Being civically engaged, though, might likely depend on the socio-economic conditions of the people that live next to me. The increasing of socio-economic segregation and inequality in many European cities in the last two decades have been affecting the spatial distribution of the rich and the poor within the same urban area (Tammaru et al. 2016). This has enhanced the phenomenon of sorting, the creation of socio-economic clustering, with consequences regarding the organisation of urban space and, inevitably, with implications for the spread of civic engagement. In this respect, works discussing the impact of the socio-economic homogeneity of a community on civic engagement have reached contradicting results. Some scholars argue that poor and low-educated individuals marginalised and clustered tend to be less engaged given the obstacles facing in accessing important social network and urban resources (Madanipour 2004). This inevitably reduces the efficacy of collective actions towards a fairer distribution of the resources (Atkinson, 2000; Madanipour, 2004). However, there is a relevant part of the literature arguing that socio-economic heterogeneity is not immune from undesirable consequences. Most people tend to prefer to live in proximity of whom is perceived to be similar in terms of ethnic group, income, religion, education and work (Feijten and Van Ham 2009; Van Ham and Tammaru 2016). Putnam (2007), for instance, argues that the increasing ethnic and social heterogeneity reduce social solidarity and social capital. In this respect, numerous empirical works report a negative association between socio-economic diversity and different social capital dimensions including social trust and civic engagement across local areas in several western economies (Alesina and La Ferrara 2000; 2002, Cost and Kahn 2003, Gustavvson and Jordahl 2008, among many others). Within the context of analysis of municipalities, using data from Japanese municipalities, Murayama et al. (2014) find that, on average, social trust is greater among people of low socio-economic status living in a district of low socioeconomic status and lower among people of low socio-economic status living in districts of high socioeconomic status (a sort of heterogeneity). The authors argue that living surrounded by neighbours with similar socio-economic traits reduces both psychological stress and a sense of relative deprivation. making the individual more comfortable with the rest of the neighbours and increase her trust on them. This heterogeneity effect is less prominent and significant among people with high socioeconomic status who they seem less influenced by their surroundings.

This empirical literature seems to be supported by at least two theoretical perspectives: the social identity theory, the conflict theory.

According to the social identity theory, individuals tend to connect with like-minded people (Bakker and Dekker 2012). Hence, when an individual perceives that her reference group is alienated from the rest of the community, she feels her social position more threaten by other out-group members and therefore trust towards unknown reduces (Bobo and Hutchings 1996). This complements with the argument advanced by the conflict theory where individuals tend to compete over scarce resources and goods (Bobo and Hutchings 1996). Hence, social diversity increases a sense of solidarity towards in-group members and it reduces towards out-group members even in the presence of geographical proximity. In fact, the spatially closer the individuals are with those different from their reference group the more they stick with the people that look alike and the less they trust out-group members (Putnam 2006). This implies that similarity among people reduces inter-individual conflicts and increases social network given that the members of the same community share similar values and norms.

3. Data

We rely on the data gathered by ISFOL[2] Plus (Participation Labour Unemployment Survey) in 2014. The questionnaire has been administered by CATI method (Computer Assisted Telephone Interview) to a representative sample of the Italian population aged between 18 and 64 (55,012 target respondents) stratified by Region of residence, Municipality type (urban/non-urban), gender, age, and employment status.

A large amount of information – about 200 variables – is organized into different modules: Pre-interview; Employed, Inactive and Searching a Job; Personal Information; Foreigners; Young People; Reconciling Work and Family; Disabled Persons Care; Public Services for Employment; Training.

For the purpose of our investigation, we selected those variables of the ISFOL Plus survey that may play a role on the adoption of behaviors related to civic engagement (Table 1) of those individuals residing in the Municipality of Rome (1,535 respondents) and in the

[2] ISFOL – *Istituto per lo Sviluppo della Formazione Professionale dei Lavoratori* (Institute for the Development of Workers' Professional Training) is a national research institution controlled by the Ministy of Labour and Social Policies. On the 1st of December 2016 it has been restructured and renamed into INAPP – *Istituto Nazionale per l'Analisi delle Politiche Pubbliche* (National Institute for the Analysis of Public Policies).

Metropolitan Area of Naples (2,332 respondents) and in the Metropolitan Area of Milan (1,917 respondents).

Civic engagement is a 3-dimensional measure obtained by a combination of 3 different indicators: a) participation to volunteering activities; b) participation to local activities together with neighborhood associations, churches, trade-unions, schools…; c) participation to protests and subscription of petitions or complaint letters. Indicators a) and b) are measured on a 4-level scale (0 = never; 1 = seldom; 2 = monthly; 3 = weekly). Indicator c) is measured on a 3-level scale (0 = never; 1 = seldom; 3 = monthly). In order to combine, by summing them, the 3 indicators into a single measure of civic engagement, we had to force indicator b) to vary between 0 and 3. This is justified considering the fact that a monthly participation to protest (or a monthly subscription of letters/petition) may be equivalent, in terms of chances to do it, to a weekly involvement in volunteering or local activities. The income level is measured by the average monthly net family income, reported in the questionnaire in a 6-level scale (where 0 equals to "up to 1,000 euros" and 5 corresponds to "more than 5,000 euros"), while the education level corresponds to the ISCED-97 scale. Basic descriptive statistics about civic engagement, education and income are reported in Table 2.

The added value of this dataset is the geo-localization of the individuals, e.g. observations. The individuals are geo-localized according to the geographical coordinates of the place in which they usually live. The projection of individuals in the three urban areas, according to their geographical location, is reported in Figure 1a (Milan), 1b (Rome) and 1c (Naples)[3].

[3] We used the software Google Maps to project the points onto the maps.

Table 1: Variables used in the analyses.

Variable	**Measure**	**Description**
civ_eng	Scale	Level of civic engagement
edu	Ordinal	Educational level, ISCED classification
inc	Ordinal	Average monthly family income, ordered in classes
age	Scale	Age
sex	Binary	Gender
foreign	Binary	Dummy variable for nationality different from Italian
emp	Binary	Dummy variable for employed
unemp	Binary	Dummy variable for unemployed
mob	Binary	Dummy variable for inter-regional mobility (individuals who moved to a different Region)
edu_m	Ordinal	Educational level of the mother, ISCED classification
edu_f	Ordinal	Educational level of the father, ISCED classification
hou_prop	Binary	Dummy variable for household property
hou_dim	Scale	Household size in squared meters
trust_friend	Binary	Relying on friends to address severe personal problems
trust_relatives	Binary	Relying on relatives to address severe personal problems
trust_self	Binary	Relying on myself to address severe personal problems
Lat	Degrees	Latitude
Lon	Degrees	Longitude

Table 2: Descriptive statistics for education, income and civic engagement levels.

a) Milan

	N	Minimum	Maximum	Mean	Std. Deviation	CV (%)
Education	1.917	1	6	4,01	0,813	20,27
Income	1.917	1	5	2,75	1,034	37,60
Civic Engagement	1.917	0	9	2,08	2,069	99,47

b) Rome

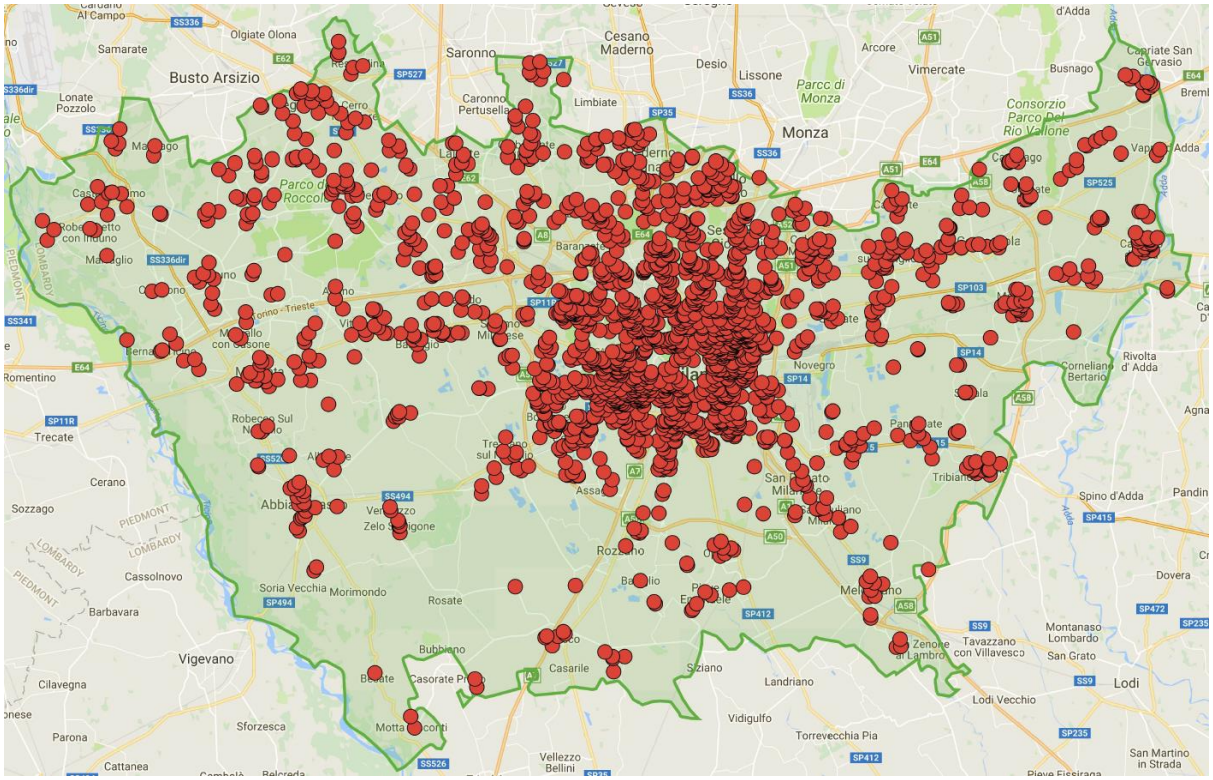
	N	Minimum	Maximum	Mean	Std. Deviation	CV (%)
Education	1.535	1	6	4,18	0,811	19,40
Income	1.535	1	5	2,68	1,024	38,21
Civic Engagement	1.535	0	9	2,24	2,081	92,90

c) Naples

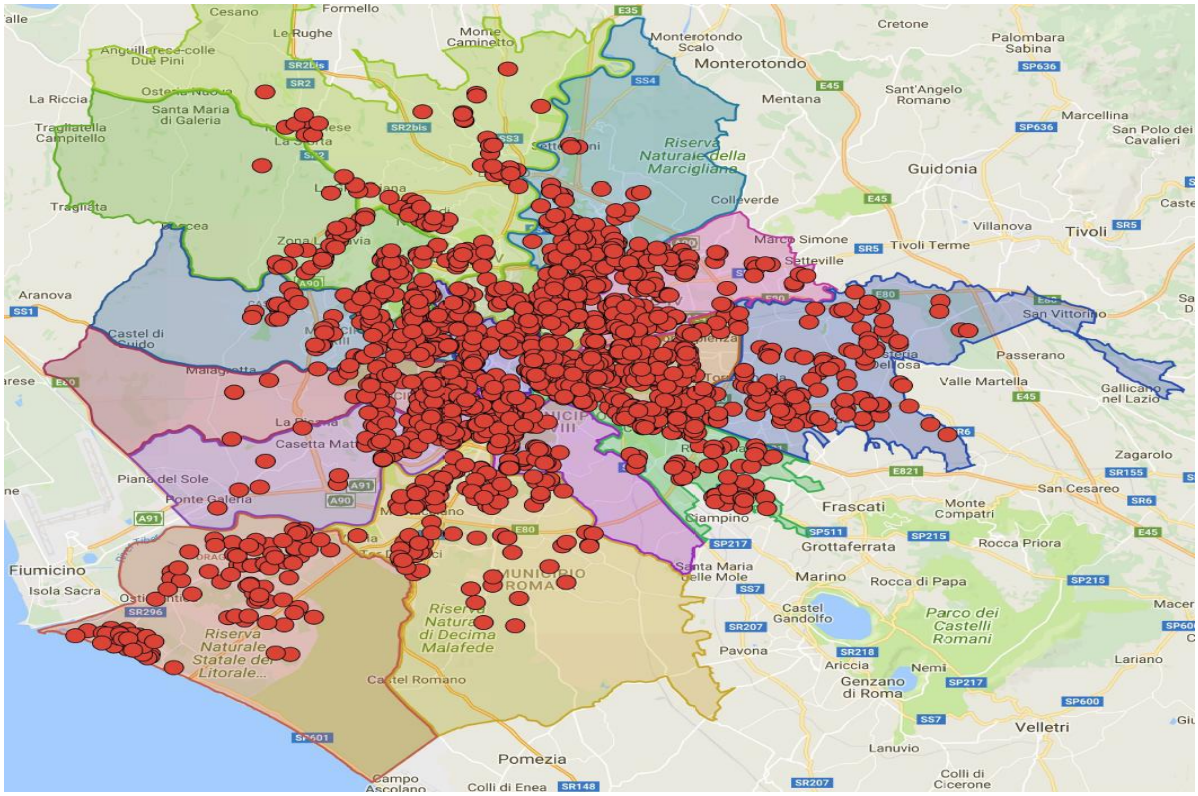
	N	Minimum	Maximum	Mean	Std. Deviation	CV (%)
Education	2.332	1	6	3,95	0,826	20,91
Income	2.332	1	5	2,21	0,945	42,76
Civic Engagement	2.332	0	9	2,33	2,094	89,87

Figure 1: Projection of the individuals according to their geographical coordinates

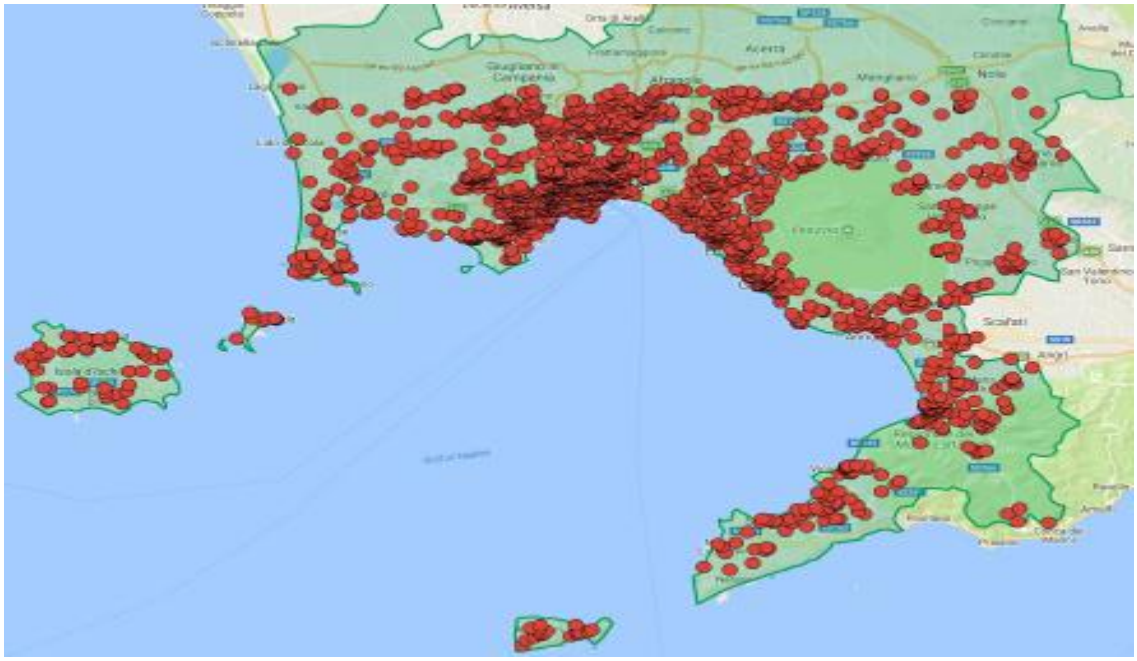
a) Milan



b) Rome



c) Naples



4. Methods and Techniques

The hypotheses are checked on the population of three cities – Milan, Rome and Naples – which exhibit relevant differences on cultural and socio-economic aspects and are characterized by distinct forms of urban geography. Multiple methods will be applied in order to control for the level of civic engagement exhibited by the population of the three cities according to the geographical distribution of the individuals: namely 1) spatial autocorrelation; 2) spatial clustering; 3) continuous geographical distance.

Spatial autocorrelation

We firstly explore the presence of local spatial auto-correlation in order to gain insights about the geographical patterns of our explanatory variables, namely the education level and the income level, and our dependent variable, namely the level of civic engagement. We calculate a Local Indicator of Spatial Autocorrelation (LISA)[4] based on Moran's *I* global autocorrelation (Anselin, 1995) for the civic engagement distribution and for Principal Component extracted from the distributions of education level and income level. The first

[4] The analysis will be carried on using the software GeoDA (Anselin et al., 2006).

principal component of income and education is meant to capture the socio-economic status of the individuals.[5] Moran's *I*, which is calculated as follows:

$$\boldsymbol{I} = \frac{\frac{\boldsymbol{N}}{\boldsymbol{s_0}} \sum_i \sum_j \boldsymbol{W_{i,j} Z_i Z_j}}{\sum_i \boldsymbol{Z_i^2}}$$

(where $\mathbf{Z_i}$ is the deviation of the variable of interest with respect to the mean, $\mathbf{W_{i,j}}$ is the matrix of weights and $\mathbf{s_0} = \sum_i \sum_j \mathbf{W_{i,j}}$) is then applied to each spatial unit *i* in order to have individual scores of local spatial autocorrelation (I_i):

$$I_i = \frac{z_i}{m_2} \sum_j W_{i,j} Z_j$$

where:

$$m_2 = \frac{\sum_i Z_i^2}{N}$$

Spatial clustering

Spatial clustering consists in grouping the individuals simply according to their spatial position. We need to identify a partition scheme which assigns the units in the same group if they are spatially close, and otherwise they are placed in distinct groups (1st step). Then (2nd step), the groups are rated according to the socio-economic homogeneity and the average level of civic engagements of the individuals. Thirdly, the relationship between homogeneity (heterogeneity) and civic engagement is checked.

Operatively, the units are partitioned into groups by using a spatial grouping technique which looks for a solution where all the spatial distances within each group are as similar as possible (step 1). To do so the algorithm employs a connectivity graph (minimum spanning tree) to find natural groupings. The optimal number of groups – in the range between 2 and 15 – is evaluated using the Calinski-Harabasz pseudo F-statistic, which is a ratio reflecting within-group similarity and between-group difference[6]. Then, we compute the socio-economic heterogeneity by calculating the average Euclidean distance calculated on income and education level among each couple of group's individual (step 2). This way we attribute a

[5] The correlation between the education level and the income level is low: 0.34 in Milan, 0.33 in Rome and 0.40 in Naples. Variance explained by the first principal component extracted: 68.65% (Milan); 66.70% (Rome); 70.07% (Naples).

[6] We used the software ArcGIS to partition individuals basing on spatial distance.

score to each group which measures its socio-economic heterogeneity: the higher the average distance the more heterogeneous the units in the group are. In step 3 we calculate Pearson's *r* coefficient in order to explore the relationship between heterogeneity and civic engagement.

Continuous geographical distance

We relax the on/off condition due to the partition into spatially constrained groups (clustering) by employing a continuous measure of geographical distance. This allows for checking the correlation between socio-economic proximity and civic engagement (*y*) controlling for the spatial proximity among individuals and the other variables listed in Table 1. The procedure requires some methodological steps and assumptions. At step 1 we calculate spatial distances starting from geographical coordinates (Lat, Lon) expressed in degrees, so we first transform degrees into radians:

$$Radians = \frac{Degrees * \prod}{180}$$

and we them apply the Haversine formula (Van Brummelen, 2013) for great-circle distance between two points on a sphere to compute the distance in km between two individuals *i* and *j*:

$$d_{i,j} = 2r * \arcsin\sqrt{\frac{1-\cos(\varphi_j - \varphi_i)}{2} + \cos(\varphi_i) * \cos(\varphi_j) * \frac{(1-\cos(\lambda_j - \lambda_i)}{2}}$$

Distance is transformed into proximity at Step 2. Since there is no unanimous consensus about how inter-individual proximity may scale against their strength in playing an influence on each other, we decided to work with four different assumptions and checking the robustness of the results. According to assumption a) proximity influence is the squared inverse of distance; assumption b) assumes a linear relationship; assumption c) is based on an inverted sigmoid; finally, assumption d) assumes a convex relationship (see Figure A1 in the appendix).

At Step 3 the proximity influence is combined with education heterogeneity and income heterogeneity. The proximity influence scores ($d_{i,j}$) define a squared matrix P where

$$\mathbf{P}_{i,j} = f(d_{i,j});$$

the education level differences among all the *i* individuals define a squared matrix E where $\mathbf{E}_{(i,j)} = \left| edu_i - edu_j \right|$;

and the income level differences among all the *i* individuals define a squared matrix I where

$\mathbf{I}_{(i,j)} = \left| income_i - income_j \right|$.

Matrices E and I are multiplied with matrix P, in order to obtain matrices A and B. Notice that the main diagonal of matrix A is a vector that reports the sum-product of education heterogeneity weighted by proximity influence:

$\mathbf{A}_{(i,i)} = \overrightarrow{\mathbf{v}_e}$;

and the main diagonal of matrix B is a vector that reports the sum-product of income heterogeneity weighted by proximity influence:

$\mathbf{B}_{(i,i)} = \overrightarrow{\mathbf{v}_i}$

In the final step, a unique measure of socio-economic heterogeneity weighted by proximity influence is calculated by applying a Principal Component Analysis to the two vectors and extracting the first component, which will be defined as prox-heterogeneity (*prox_heter*).

$prox\_heter = \mathrm{PC}(\overrightarrow{\mathbf{v}_e}, \overrightarrow{\mathbf{v}_i})$

Notice that the first component explains between 71% and 80% of the total variance, depending on the type of assumption over the relation between distance and proximity influence while correlation is not higher than 0.6 (Table 3). Also, the correlation between the four *prox_heter* distributions (calculated according the different assumptions about proximity influence) is satisfactorily high (Table 4).

Prox_heter is thus a variable that captures the socio-economic heterogeneity weighted by proximity. This is employed as our main explanatory variable in a multivariate regression model.

Table 3: Correlation between the vecters v_e and v_i and % of variance explained by the first component extracted.

Measure	$\rho(\overrightarrow{\mathbf{v}_e}, \overrightarrow{\mathbf{v}_i})$	**% of Variance explained**
prox_heter_inverse (1)	.605	80.26
prox_heter_linear (2)	.518	75.89
prox_heter_sigmoid (3)	.605	80.24
prox_heter_convess (4)	.416	70.80

Table 4: Correlation between the 4 prox_heter distributions.

	prox_heter_inverse	***prox_heter_linear***	***prox_heter_sigmoid***	***prox_heter_convess***
prox_heter_inverse	*1.000*			
prox_heter_linear	*.934*	*1.000*		
prox_heter_sigmoid	*.899*	*.972*	*1.000*	
prox_heter_convess	*.828*	*.930*	*.834*	*1.000*

5. Empirical Results

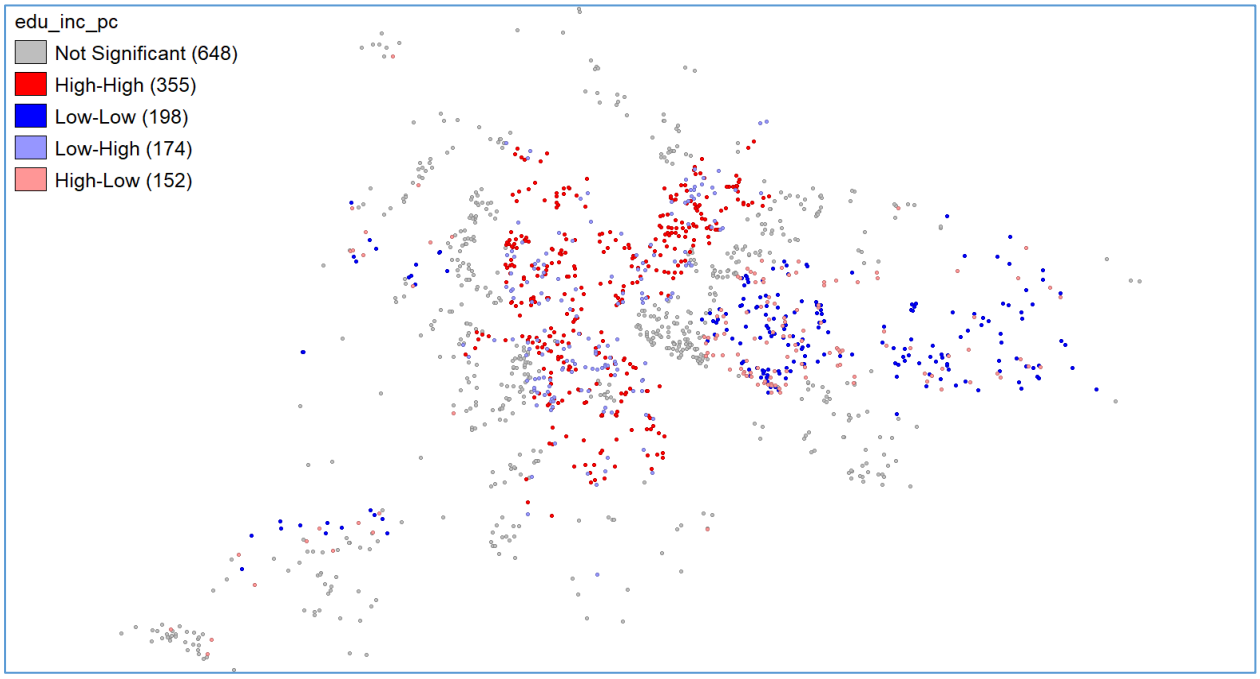
Exploring local spatial autocorrelation of education and income level and civic engagement.

Considering our variable of socio-economic status – i.e. the Principal Component of education level and income level (*edu_inc_pc*) - the geographical distribution of the LISA scores has a quite similar pattern in the 3 cities. The maps reported in Figure 3 show that in the central neighborhoods the autocorrelation for education and income is "high-high" (dark red dots), i.e. individuals with a high level of income and education tend to stay close with people with a similar level on income and education. "Low-low" autocorrelations (dark blue dots) are not wide spreading among the peripheries, yet they are quite clustered just in some peripheral areas: in the eastern part of Rome, in the north-eastern part of Naples and in the "close-west" of Milan. Notice that, the majority of the points in the peripheral areas do not show a significant correlation (grey dots) due to the lower population density and the consequent smaller size of the sample.

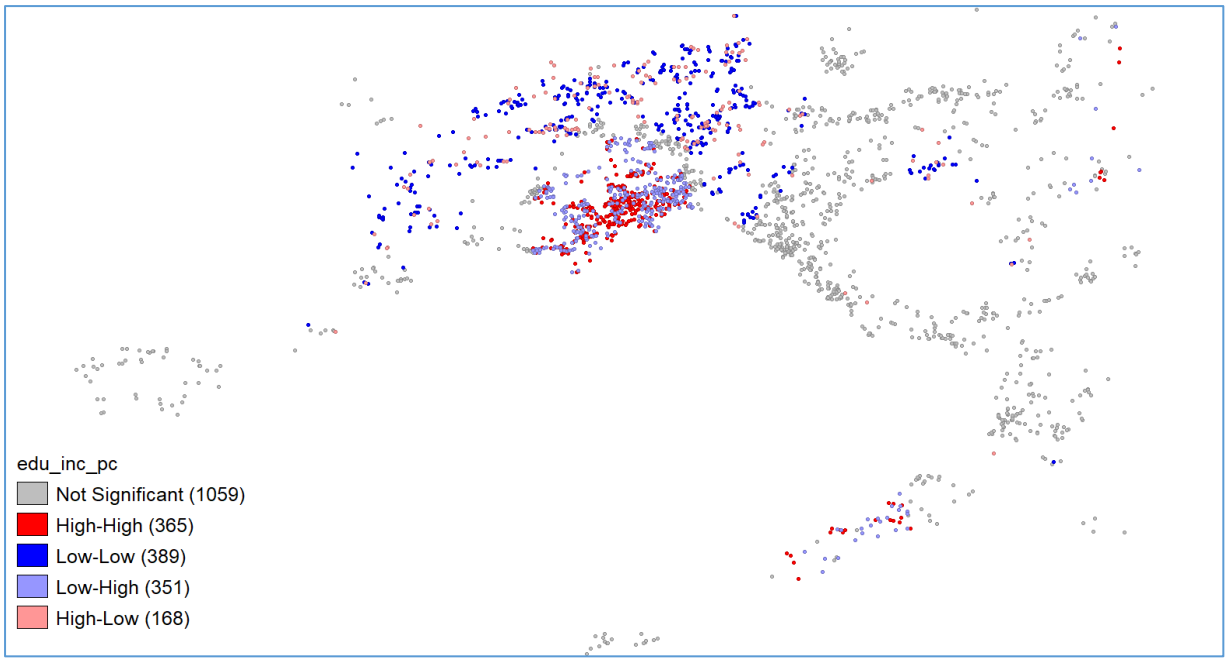
Despite direct correlations are quite clustered, both for high and low values, heterogeneity is also present. In the central areas there is a concentration of light blue dots, which represent individuals with a low level of education and income that are surrounded by individuals with a high socio-economic status (low-high inverse correlation). On the opposite, individuals with a high socio-economic status also inhabit the semi-peripheral areas where the concentration of low-low correlation is more common (light red dots).

Figure 3: Local Indicator of Spatial Autocorrelation for the PC of education level and income level.

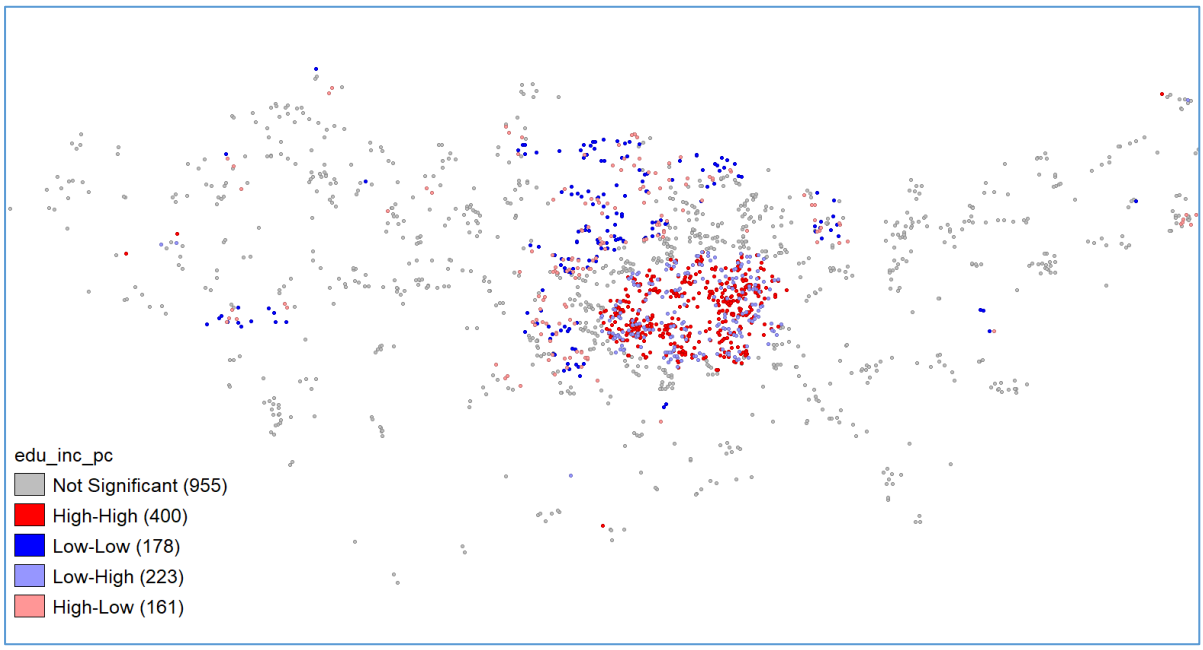
a) Rome



b) Naples



c) Milan

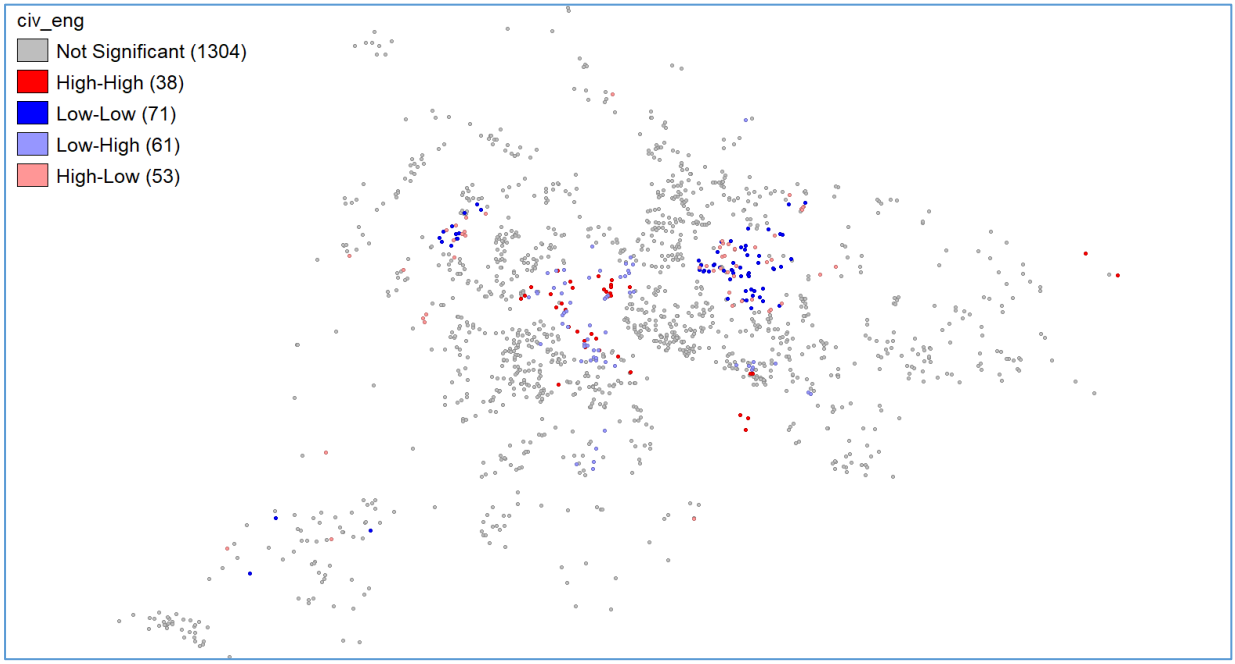


The picture is somehow different by exploring the geographical distribution of the civic engagement local indices of spatial autocorrelation. Regarding Rome and Milan, the high number of non-significant cases (grey dots) makes it difficult to draw some clear conclusions. However, there is a small cluster of "high-high" civic engagement (dark red dots) in the central areas of the two cities, similarly to what has been observed in the case of education

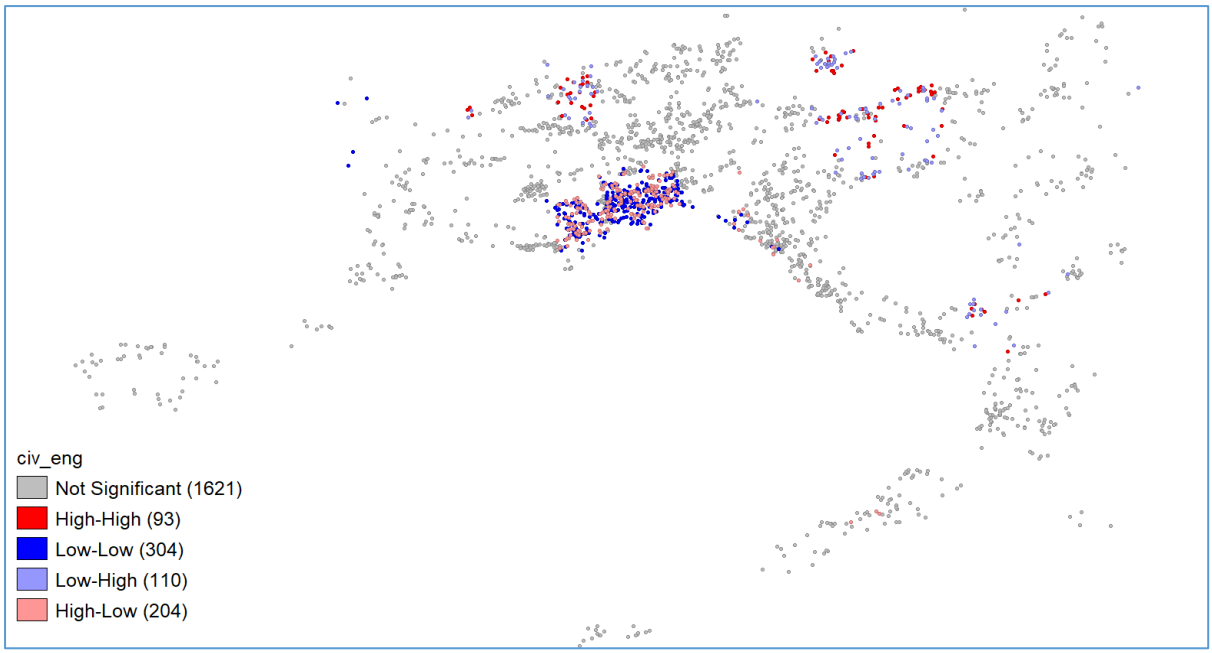
and income level. On the other hand, there is also little groping of "low-low" individuals both at the eastern and western peripheral areas. Naples is characterized a different pattern, instead. The central part of the city – close by the sea – which had a significant "high-high" pattern in the case of education and income level, shows a clustering of people with a low level of civic engagement (dark blue dots) that surround a minority of people who, on the contrary, tend to be more "civic engaged". Little clustering of individuals with a high level of civic engagement can be instead appreciated in the northwest and in the northeast of the city.

Figure 4: Local Indicator of Spatial Autocorrelation for civic engagement.

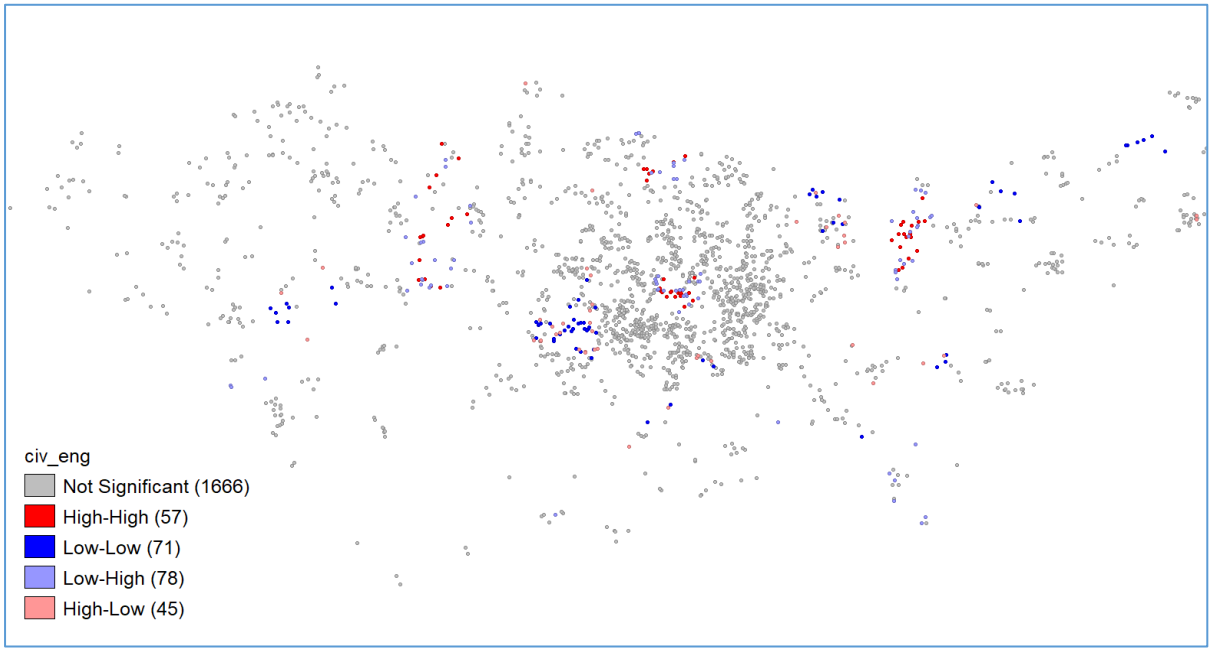
a) Rome



b) Naples



c) Milan



These results suggest a scarce spatial autocorrelation for civic engagement, a part for the presence of a cluster in Naples where people with low civic engagement tend to live nearby. As a consequence, we are not significant concerns of sorting.

Exploring the influence of education and income over civic engagement in spatial clusters.

The partition of the individuals based on their mutual geographical distance allowed the identification of 15 clusters in Roma and Naples and 12 in Milan. Tables 5 a) to c) report the descriptive statistics for each cluster: the number of individuals, the average socio-economic heterogeneity (measured as the average of the differences between education and income levels among all the individuals included in each cluster) and the average civic engagement level.

Table 5: Partition in clusters, average distance calculated on education and income, average civic engagement

a) Milan

Cluster Number	N of units	Percent	av_dist (edu; inc)	av_civ_eng
1	126	6,6	1,52	2,33
2	129	6,7	1,46	2,16
3	36	1,9	1,59	1,94
4	61	3,2	1,54	1,89
5	37	1,9	1,64	2,49
6	230	12,0	1,61	2,07
7	81	4,2	1,43	2,02
8	326	17,0	1,70	2,13
9	301	15,7	1,61	2,05
10	366	19,1	1,65	2,01
11	85	4,4	1,62	2,00
12	139	7,3	1,54	2,06
Total	**1.917**	**100,0**		

b) Rome.

Cluster Number	N of units	Percent	av_dist (edu; inc)	av_civ_eng
1	96	6,3	1,52	2,35
2	40	2,6	1,24	2,45
3	39	2,5	1,42	1,77
4	49	3,2	1,50	2,22
5	15	1,0	1,36	1,13
6	161	10,5	1,66	2,02
7	53	3,5	1,38	2,00
8	96	6,3	1,88	2,83
9	159	10,4	1,64	1,89

10	167	10,9	1,57	2,38
11	189	12,3	1,59	2,19
12	74	4,8	1,74	2,41
13	171	11,1	1,60	2,33
14	62	4,0	1,51	1,84
15	164	10,7	1,42	2,52
Total	**1.535**	**100,0**		

c) Naples

Cluster Number	**N of units**	**Percent**	**av_dist (edu; inc)**	**av_civ_eng**
1	18	0,8	1,82	2,22
2	70	3,0	1,50	2,07
3	124	5,3	1,39	2,30
4	34	1,5	1,66	2,44
5	63	2,7	1,34	2,25
6	146	6,3	1,39	2,71
7	116	5,0	1,52	2,55
8	97	4,2	1,52	2,26
9	572	24,5	1,63	2,18
10	158	6,8	1,41	2,17
11	160	6,9	1,41	2,57
12	98	4,2	1,34	2,55
13	316	13,6	1,55	2,24
14	216	9,3	1,47	2,56
15	144	6,2	1,44	2,21
Total	**2.332**	**100,0**		

Pearson's correlation coefficients (*r*) calculated on the average cluster heterogeneity in terms of education and income level (av_dist(edu; inc)) and the average cluster civic engagement (*av_civ_eng*) show that the specific urban contest matters when checking the relation between socio-economic heterogeneity. As reported in Table 6, a positive relation between heterogeneity and civic engagements arises in the case of Rome, while in the case of Naples is homogeneity to be correlated with civic engagement, while the measures are not correlated in Milan.

In other words, in Rome's spatial clusters the higher is the education and income heterogeneity, the higher is the civic engagement of the observations and vice versa; in

Naples it occurs the opposite trend – the higher the education and income heterogeneity of people living in locally specified clusters, the lower their civic engagement.

Table 6: Correlation of Average Distance (Education and Income) with Civic Engagement by city

	Rome	**Naples**	**Milan**
Pearson's *r* coefficient	.42	-.29	.09

Exploring the influence of heterogeneity of socio-economic conditions *over civic engagement controlling through a multivariate regression approach.*

In this section we report the results of multivariate estimates of the following model:

$$Y_i = \alpha + \beta X_i + \gamma Z_i + \varepsilon_i$$

Our dependent variable (Y_i) is our measure of CE; while our main explanatory variable X_i is our proximity measure of heterogeneity, which reflects to what extent each individual lives close to individuals with a different socio-economic background. We also include a set of interaction variables (Z_i) that capture the joint effect of proximity with the degree of income of the individual. This should give us some indication of the relative importance of proximity along the range of income. The observations of the three cities are pooled together in the same sample.

One of the added values of the data is the substantial amount of control variables at the individual level we can rely on. The first set of controls include the level of education and income, sex, age[7], and two dummies variables for Milan and Rome, with Naples being the base category. A second set of variables concerns other individual characteristics and labour market characteristics that can affect the opportunity cost and the time available to engage in civic activities. We control for whether the individual is originally from a different region that the one she lives in at the moment; we expect this kind of people to be relatively less interested in CE. We also control for the employment and unemployment status as this can affect the cost opportunity of CE (here the base category is inactive, e.g. students and retired people).

A second set of control regards the background of the family, namely the level of education of the father and the level of education of the mother. There is an argument about people that can be less interested in CE when they do not rely on the public sector, when they for

[7] Including age squared does not change the results; this has been omitted accordingly.

instance attend private school, bring children in private activities (like sport or music) and so on. The variable "attended private school" is aimed to capture this effect, thus we expect the coefficient to be negative. The interested in CE is expected to grow when people are expected to live in a place for a while. The variable "house of property" is a proxy of the commitment of the individual in the area they live in, thus we expect the coefficient to be positive.

A third set of control variables addresses the literature that links trust to CE. This research unanimously predicts a positive correlation between the two, thus we expect our three measures of trust – trust on friends, trust on relatives and trust on myself - to correlate positively with CE.

We enter each set of controls in the estimates, from Model 1 to Model 4, and then the interaction variables in Model 5 (Table 7). Our variable of interest "proximity heterogeneity" is always negatively correlated and significant at 1%, dropping to 5% in Model 4 when trust is included. This suggests that people interacting with people from a diverse background are less likely to engage in civic activities. This first result confirms those theories and empirical results that posit that heterogeneity hamper CE. By looking at Model 5, one can observe that the results are driven by low-medium income (€ 1,000-2,000 per month, family gross income) and medium income individuals (€ 2,001-3,000).

As for the control variables, they behave quite reasonably. Both education and income predict CE, as well as being female. As envisaged above, mobility reduces CE while unemployment improves it. Trust – in all its forms - arises as a strong predictor of CE.[8]

As shown above, our variable of CE is composed of three dimensions of CE: activity in associations, involvement in voluntary activities, and protest. Table 8 reports the results when we employ each of them in turn as a dependent variable. It arises that the result are driven by the associational dimension, while voluntary activities and protest play no significant role.

[8] In these estimates we measure the proximity by employing the square root of the inverse of the distance. Replicating the same model using different method to transform the distance in proximity, namely a linear method, an inverted sigmoid, and convex, do not affect the results, hence we do not report the table.

Table 7: Estimating Civic Engagement (dependent variable); (ordered logit)

	Model 1		Model 2		Model 3		Model 4		Model 5	
prox_heter	**-0.076*** **	(0.026)	**-0.076*** **	(0.026)	**-0.081*** **	(0.028)	**-0.076** **	(0.031)	0.093	(0.078)
education	**0.265*** **	(0.030)	**0.274*** **	(0.030)	**0.272*** **	(0.035)	**0.247*** **	(0.039)	**0.261*** **	(0.039)
income	**0.093*** **	(0.026)	**0.111*** **	(0.027)	**0.109*** **	(0.028)	**0.133*** **	(0.031)	**0.139*** **	(0.034)
female	0.048	(0.048)	0.049	(0.049)	0.065	(0.051)	**0.102***	(0.055)	**0.098***	(0.055)
age	0.005	(0.010)	0.011	(0.011)	0.010	(0.012)	0.008	(0.015)	0.007	(0.015)
age_sq	-0.000	(0.000)	-0.000	(0.000)	-0.000	(0.000)	-0.000	(0.000)	-0.000	(0.000)
rome	**-0.233*** **	(0.064)	**-0.198*** **	(0.065)	**-0.199*** **	(0.069)	**-0.179** **	(0.075)	**-0.204*** **	(0.075)
milan	**-0.317*** **	(0.057)	**-0.282*** **	(0.058)	**-0.287*** **	(0.061)	**-0.307*** **	(0.066)	**-0.319*** **	(0.066)
mobility			**-0.183** **	(0.073)	**-0.167** **	(0.076)	**-0.219*** **	(0.084)	**-0.231*** **	(0.084)
employed			-0.091	(0.059)	-0.090	(0.061)	-0.090	(0.064)	-0.085	(0.064)
unemployed			**0.129***	(0.072)	0.116	(0.074)	**0.134***	(0.076)	**0.134***	(0.076)
edu_father					-0.013	(0.039)	0.003	(0.042)	0.004	(0.042)
edu_mother					0.015	(0.041)	-0.001	(0.044)	0.001	(0.044)
priv_school					**-0.181***	(0.101)	-0.142	(0.108)	-0.144	(0.109)
house_prop					0.039	(0.069)	-0.054	(0.072)	-0.050	(0.072)
trust_friend							**0.438*** **	(0.074)	**0.443*** **	(0.075)
trust_relatives							**0.218*** **	(0.058)	**0.220*** **	(0.058)
trust_self							**0.271*** **	(0.072)	**0.266*** **	(0.072)
2.income#c.prox_heter									**-0.188***	(0.097)
3.income#c.prox_heter									**-0.268*** **	(0.097)
4.income#c.prox_heter									-0.110	(0.103)
5.income#c.prox_heter									-0.166	(0.112)
1.mobility#c.prox_heter									-0.119	(0.090)

Note: standard errors are in parenthesis. * Significant at the 10% ** Significant at the 5% *** Significant at the 1%

Table 8: Estimating Civic Engagement (dependent variable); (ordered logit)

	voluntary activities	association	protest
proximity measure	-0.081	-0.170***	0.002
	(0.085)	(0.031)	(0.034)
All controls included as for Table ..			

Note: standard errors are in parenthesis. * Significant at the 10% ** Significant at the 5% *** Significant at the 1%

Discussion and conclusions

A great deal of studies have analysed to what extent a homogenous versus heterogeneous urban environment encourage the civic participation of citizens. Most of these studies have been carried out in the U.S., or in Norther European countries, as for instance Sweden. In these cases, the degree of homogeneity/heterogeneity is defined along the ethnic and linguistic dimensions.

This paper addresses this topic in three major Italian countries exploiting a unique dataset that makes it possible to carry out a geo-localized econometric analysis. Instead of characterising diversity along the ethnic-linguistic profile, it does so by considering two dimensions, income and education, that have been used in economic and sociological research as proxies of socio-economic status.

In order to explain the civic engagement of citizens, we built our main explanatory variables as a measure of heterogeneity proximity which reflects to what extent each individual lives close to individuals with a different social background. As such, we assume that this variable reflects to what extent citizens interact with people with a different social background, as for instance at the school of their children, in social places (e.g. parks, churches or supermarket), or in some community joint activity such as neighbourhood committees.

Our explorative analysis shows the presence of some spatial correlation in the socio-economic dimension, as usual in urban centres. By contrast, little spatial correlation is observed regarding the level of civic engagement. This seems to suggest some degree of sorting along the socio-economic status which is not reflected into the attitudes of citizens to engage in civic activities.

Our multivariate analysis shows that more diverse urban environment discourages the civic participation of the citizens. Even after controlling for several individual characteristics, such

as income and education, labour market status, mobility etc., our measure of proximity is negatively correlated with our measure of civic engagement. Thus, citizens living close to different pairs are less likely to involve in social activities such as voluntary activities, association or to take part in some protest.

These findings confirm some results that are already familiar in the literature on ethnic diversity (e.g. Alesina and La Ferrara 2000, Filippetti 2020). It further shows that it is not just ethnic or language differences that hamper civic participation, but social differences are also a sufficient condition for that outcome. This can have far-reaching implications. From a normative perspective, diversity is a fundamental engine of economic growth, in that there is growing consensus in research that more diverse environments nurture creativity and innovation (e.g. Landry and Wood, 2012; Filippetti and Guy, 2020). Furthermore, diversity is important also because it tends to reduce income inequality by encouraging marriage among people from different backgrounds. However,, while there are some valid reasons to encourage heterogeneous environment, at the same time, heterogeneity seems to jeopardize social cohesion and political participation (Alesina and La Ferrara 2000; Putnam 2006).

This seems to be a central dilemma for policy makers in cities in the coming future.

Citizens' prosocial behaviours are influenced by the socio-economic characteristics of their surrounding social context (Sampson 1997). In this respect, social cohesion is more likely to exist where social interactions occur in a socioeconomic homogeneous context where members share the same social norms and recognise each other as part of the same community. However, this socioeconomic homogeneity can also be a limitation especially in the presence of high concentration of merely low-income residents (Sampson and Morenoff. 2006). Here, even though personal ties are strong in areas of concentrated disadvantage, they may be weakly linked to collective actions with limited possibilities to generating collective efficacy (Sampson et al. 1999). "Socio-economic ghettos" might become less integrated, engaged and socially civic. This, in turn, might have a negative impact on the proper functioning of the markets and institutions as well as limiting effective collective actions and the re-alignment of socioeconomic resources. In this regard, addressing the spatial organisation of socio-economic factors such as income and education will help interpret the mapping of civic engagement in large urban areas. This, we believe, contributes to better understand one the most fundamental dimension of social life.

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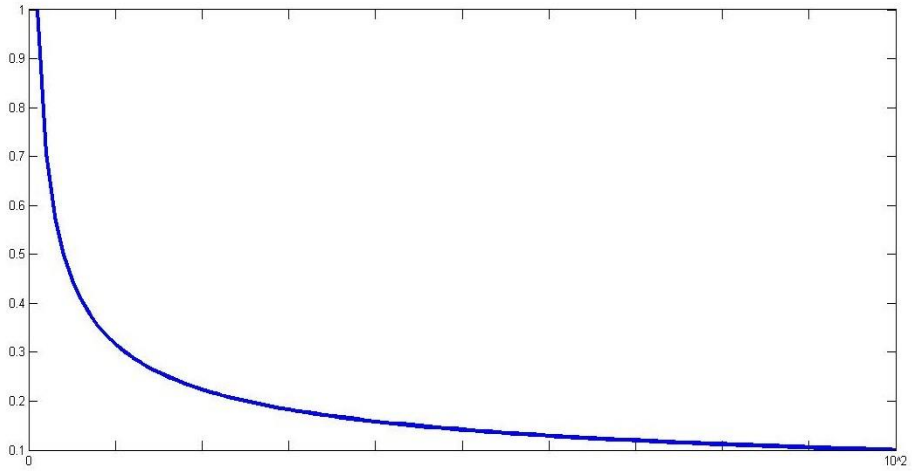
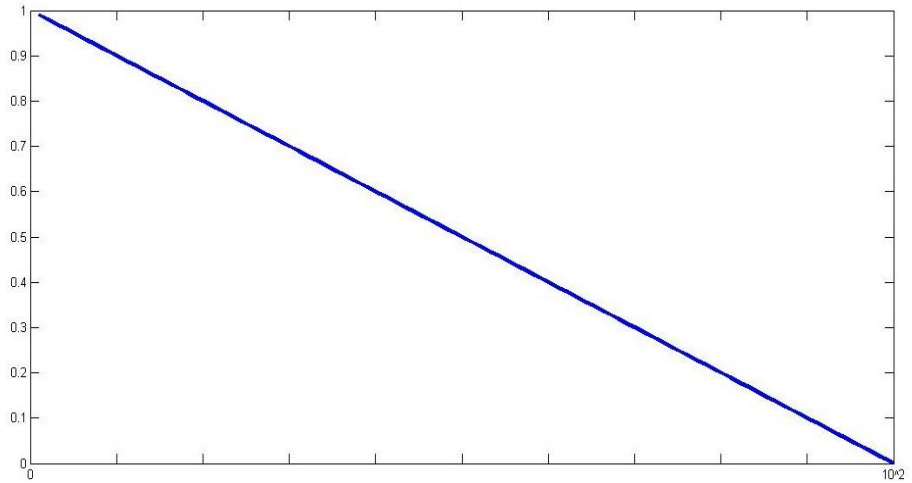
Appendix

Figure A1: The four assumptions to model the relation between distance and proximity influence.

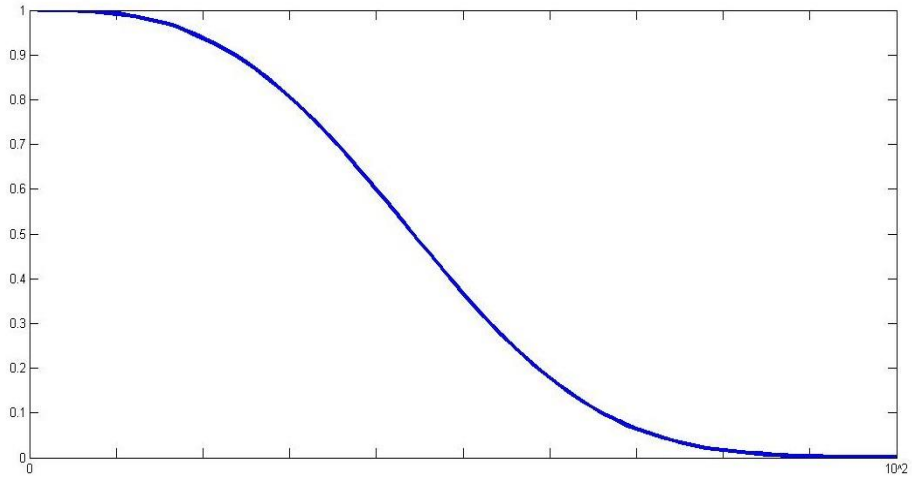
a) Squared inverse $f(d) = \sqrt{\frac{1}{d}}$



b) *Linear* $f(d) = \frac{\max(d) - d}{\max(d)}$



c) *Inverted sigmoid* $f(d) = e^{-\left(\frac{2d}{\max(d)}\right)^3}$



d) *Convex* $f(d) = \frac{\max(d)^3 + d + d^2 - d^3}{\max(d)^3}$