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Document de travail
Working paper

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DT n° 11

June 2008

Health status, Neighbourhood effects and Public choice: Evidence from France

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Abstract

Observation of socioeconomic statistics between different neighbourhoods highlights significant differences for economic indicators, social indicators and health indicators. The issue faced here is determining the origins of health inequalities: individual effects and neighbourhood effects. Using National Health Survey and French census data from the period 2002-2003, we attempt to measure the individual and collective determinants of Self-Reported Health Status (SRH). By using a principal component analysis of aggregated census data, we obtain three synthetic factors called: “economic and social condition”, “mobility” and “generational” and show that these contextual factors are correlated with individual SRHs.

Since the 80s, different French governments have formulated public policies in order to take into account the specific problems of disadvantaged and deprived neighbourhoods. In view to concentrating national assistance, the French government has created “zones urbaines sensibles” (ZUS) [Critical Urban Areas, CUA]. Our research shows that in spite of implementing public policy in France to combat health inequalities, by only taking into account the CUA criterion (the fact of being in a CUA or not), many inequalities remain ignored and thus hidden.

Keywords: Health, Neighbourhood Effect, Housing policy
JEL code: I10, I30, R28,

Acknowledgments: This research supported by Direction Interministérielle à la Ville (DIV). Our thanks go to François Héran, Fréderic Gilli, Nicolas Sirven, Robert Pampalon and Sarah Curtis for their comments. All remaining errors are ours.

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Understanding the discriminating nature of territories demands knowledge of the genesis of disadvantaged neighbourhoods. Recent research has led to better understanding of the economic, sociological and psychological dimensions of the mechanisms which explain the individual behaviour of households in relation to their choice of habitat and the different structuring phenomena of towns (Fujita, 1989; Cutler, Glaeser and Vigdor (1999), Fujita and Thisse, 2002). Individuals can make several simultaneous choices that are more or less constrained. The underlying decision of the geographical location of a household is the result of a compromise between the household's resources and the supply on the housing market. It therefore becomes a rational choice conditioned by financial constraints, allowing better-off households to choose their housing location, as opposed to more modest households who find themselves at the end of the housing chain (Rosenthal, 1997). The concentration of disadvantaged areas on the outskirts of urban centres is very often the consequence of these individual choices (Schelling, 1978).
Socioeconomic statistics between different neighbourhoods highlight significant differences for economic indicators (unemployment, income, profession), social indicators (type of household, age, number of children) and health indicators (health status and access to healthcare). Determinants of health status have been addressed initially from the point of view of individual factors. Age, social origin, employment and risk behaviours are significant determining factors of health status. However context effects can affect health status (Kawachi and Berkman, 2003, Acevedo-Garcia and Lochner, 2003; Subramanian, Kawachi, Kennedy, 2001; Congdon, Shouls and Curtis, 1997) because people live in different environments. Flowerdew, Manley and Sabel (2008) define four mechanisms to describe the relationship between contextual effects and individual health status. Firstly, there is the natural environment effect, for instance atmospheric pollution and water problems. The second effect concerns health care availability. Thirdly, there may be different social and cultural norms if populations are homogenous in different areas. Finally, "It may be that the health effects of deprivation apply to relative rather than absolute deprivation".

Studies analyzing context factors are often based on English and North American data or from North European countries (Duncan, Jones and Moon, 1998, Curtis, 1990; Diez Roux, 2001, 2008; Philibert, Pampalon et al., 2007; Kawachi and Berkman, 2003). In France, because of the lack of sufficient data, empirical studies on the specific relationships between urban factors and health still remain very partial. Parizot, Renahy et al. (2004) performed a survey on health and access to healthcare in seven deprived neighbourhoods in the Ile de France (Paris region). Although they highlight explanatory factors of access to dental, mental and female healthcare utilisation, they do not distinguish the effect of individual determining factors from neighbourhood factors (the situation of households cannot be compared with household behaviours in advantaged neighbourhoods). Chaix, Boelle et al. (2005) show how the density of specialists and percentage of highly educated people by area can affect the probability of consulting a specialist.

Since the 1980s, the French government has formulated public policies to take into account the specific problems of disadvantaged and deprived neighbourhoods. In order to focus national

assistance on urban policy, the French government set up 753 “zones urbaines sensibles” (ZUS) [Critical Urban Areas, CUA] in 1996. These neighbourhoods are characterised by the presence of high-rise estates and disadvantaged neighbourhoods. A third of social housing is in CUAs, whereas CUA dwellings represent only 8% of households. In spatial terms, these neighbourhoods are most often located on the outskirts of historic urban centres and were built during the 60s and 70s. This residential isolation of one part of the population occupying the most deprived positions in terms of social hierarchy may constitute an environment of social disadvantage for those people living in these areas. The accumulation of individual inequalities in a CUA could therefore create candidates for neighbourhood effects. Classifying an area as CUA or non-CUA corresponds to a certain socioeconomic reality, but it still remains a political decision. There are deprived neighbourhoods outside CUAs that have greater difficulties than some neighbourhoods in CUAs. Allonier, Debrand et al. (2006) show that (independently of individual characteristics) adults residing in a CUA declare themselves to be more often in poor health, and to suffer more frequently from at least one functional incapacity. This study does not introduce context variables but only the fact of living in a CUA or not.

To study the impact of individual or contextual determining factors on individual health, we use the 2002-2003 National health survey (Enquête Décennale Santé) which enables us to relate individual self-reported health status (SRH) with a very large number of individual socioeconomic variables. Moreover, we added a set of contextual socioeconomic determining factors to this individual basis from census data. In view to highlighting whether context effects exist in France, we formulated context variables from census data by carrying a principal component analysis. These context variables were then introduced in a Probit model to explain why individuals declare to be in bad health.

Data and Method

Our research uses the 2002-2003 National health survey conducted by the French national statistics agency (INSEE) and data from the census population of 1999. The principal objective of the National Health Survey is to assess people’s health status (self reported health, declared morbidity, quality of life, deficiencies, disabilities, handicaps) and its determining factors (social data, smoking, alcohol consumption, among others). The National health survey consists of a representative sample of households (around 40,000 people), of which all the individuals in a household are interviewed. People living in a CUA represent 7.0% of individuals and 6.7% of households. This research focuses exclusively on urban areas of cities where at least one CUA can be found. The final sample consisted of 16,505 individuals (over 18), of which 2,013 people resided in a CUA and 14,492 lived outside it.

Regarding individual variables, we used the self-reported health status (SRH). This indicator reflects global individual health status. Individuals responded to: “What is your general health status like?” People who replied “very good” and “good” are considered as positive SRH and those replying “average”, “bad” and “very bad” are considered as negative SRH. This indicator is strongly influenced

by morbidity and is correlated with mortality (Mossey et Shapiro, 1982; Idler and Benyaamini, 1997; Burström and Fredlund, 2001). What is more, it is associated with a number of behaviours (Stronks, van de Mheen et al., 1997; De Salvo, Fan et al., 2005). The other individual and socioeconomic characteristics are: age, gender, level of education, individual socioprofessional category, situation in relation to work, nationality, length of time in house, city size, household income, and information on living in a CUA or not.

Individuals' socioeconomic characteristics are associated with SRH (Table 1): respondents belonging to the highest socioprofessional categories declare themselves to be less frequently in poor health. Individuals who live in a CUA always perceive themselves to have poorer health status than those residing outside a CUA. This is also true when we compare declarations of health status by gender: women living in CUAs perceive themselves to be in poorer health than those not living in a CUA (36% versus 29%). Similarly, 28% of men living in a CUA perceive themselves to be in poor health versus 22% of men not living in a CUA. The proportion of people who have reached secondary education level and feel in poor health is higher among those residing in a CUA than those not living in one (20% for CUA inhabitants versus 17% for those not living in a CUA). Manual workers always report that they are in poorer health than professionals.

<< table 1 >>

The context variables are aggregated data from IRIS (Ilots regroupés pour l'Information Statistique - statistical areas). An IRIS is used to define a neighbourhood and is composed of groups of blocks of flats with around 2,000 inhabitants and covers all French towns with more than 5,000 inhabitants. This is the smallest geographical statistical unit in France. We know the contextual variables of a neighbourhood for each individual. It should be noted that since there are many context variables, it is difficult to simultaneously include all them in our analysis. In order to understand these relationships and establish the main context elements, "synthetic factors" have been created. The context data is processed by principal component analysis in order to determine principal context factors and summarise the information provided by all the aggregated variables.

The coordinates of context variables on the synthetic factors are presented in Table 2. They can be directly interpreted as correlations between the constructed synthetic factors and the initial context variables. We choose three synthetic factors that explain 65.5% of the initial variance. Each neighbourhood has a "position" on these synthetic factors. The first synthetic factor stands for a proxy of wealth (% of unemployed; % foreign population % with no qualifications % of social renters). It can be interpreted as a factor of "economic and social condition" (% of people having moved in after 1990, % of people with lower graduate level % of private renters). The second synthetic factor reflects more or less strong "residential mobility". The third synthetic factor is more of a "generational" factor (% of people aged over 60 years old % of homes built after 1982 % of people under 20 years old).

<< table 2 >>

One way to separate context effects from composition effects is to use hierarchical models, known as “mixed” or “multilevel” models in social epidemiology. These models are used to take into account the correlations that can exist between individuals living in the same neighbourhood and to match the proportion of the variance attributable to composition effects in relation with those due to neighbourhood effects. While there is no well-defined rule concerning the minimum number of persons to be observed in the same geographic area in order to work with this type of model, Goldstein and Paterson (1998) suggest a minimum of 20-25 subjects. Consequently, these models require a minimum number of case studies for each analysis unit, which was not the case in our study. Our sample contained 1 household and 2 individuals per neighbourhood1 (median).

However the database provides two advantages. Firstly, we can generalise these results for the whole of France given that this survey is representative of the French urban population. Secondly, the small number of households per neighbourhood allowed us to minimize the statistical problems with regard to intra-neighbourhood correlations. This ensured there were no problems with dependency between individuals’ data and aggregated data. In fact, the size of neighbourhoods from 2,000 to 5,000 households and the number of households per neighbourhood survey is sufficiently small (less than two on average). Consequently, we can assume the independence of individual results on the aggregated data. The characteristics of these households cannot therefore influence the aggregate context variables with respect to neighbourhoods. However, this point does not solve the problem of causality (Oakes, 2004; Subramanian, 2004). Individual characteristics do not impact on the aggregated data and it is not possible to know why people live in a given area even if we control by length of time in a house. Nevertheless, multilevel models which use individual and aggregated data have been shown to be appropriate methods of understanding the influence of context on health. Many works using this approach have highlighted the impact of neighbourhood characteristics on health status (Curtis, 1990; Philibert, Pampalon et al, 2007; Kawachi and Berkman, 2003; Diez roux, 2007). Thus we compared our results with the output of the multi level method (see annex 1) and the results are very close.

Several studies (Dietz-Roux, 2001, 2007; Chaix, Boelle et al. 2005 and Flowerdew, Manley and Sabel (2008)) have shown the significance of limitations imposed by using administrative zoning and by not taking the continuity between areas into account (boundary effects). On the contrary, spatial analysis methods take into account the continuity between areas in a territory. Such methods require the

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Per neighbourhood	Average	Median	Total
Nb. individuals	3.1	2	15,552
Nb. households	1.8	1	9,082

availability of very fine data concerning the location of housing, though these data are not in our database (Auchincloss, Diez Roux et al., 2007). However, the smaller the geographic area is, the more precise the contextual information and the greater the boundary effect are. Consequently, it was necessary to decide the optimal size of geographic area for our study (Lupton, 2003). If we use Kearns' and Parkinson's (2001) approach, it is necessary to study neighbourhood effects on self-reported health status to identify a level between the first level (dwelling area) and the second level (the locality). For the French case, we considered the Iris level to be the most pertinent, taking into account household characteristics.

Testing for neighbourhood effects were carried out in four steps. First, we analysed the probability of being in bad health using only individual characteristic determinants within a Probit model. In the second stage, we add the dummy variable of being a CUA inhabitant or not. In the third stage, we introduce each context factor and simultaneously measure their marginal effects on the probability of being in bad health. This method allows us to compare these marginal effects with the marginal effect associated with the individual characteristics. Finally, we take into account all factors: individual characteristics, context factors and CUA dummy. Thus we compute marginal effects on the probability of self-reporting bad health. We compared the results obtained with those obtained if we had used the odds-ratio method and the results are very close. We preferred to use the marginal effect method because it is possible to include certain continuous variables to describe neighbourhood effects in our estimation.

Results

Do neighbourhood effects exist in France?

The first estimate2 is performed without any context effect (synthetic factor) or dummy relating to living in a CUA or not (Table 3). Ceteris paribus, being less qualified, manual worker or elderly is associated with being in poor health. However, neither length of time in a home nor the size of the city seemed to correlate with self-reported health status. Regardless of the context factors, the estimated results concerning the individual determining factors are quite stable and the results are coherent with previous works on this topic. The synthetic factors do not change the individual determining factors but modify the probability of being in poor health oneself. For example, by introducing CUA residency into this equation, the probability of CUA inhabitants declaring themselves to be in poor health is increased by 2.23 points compared with those not living in a CUA.

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[2] For the estimation we took out individuals who were on the extreme positions for each axis percentiles [1% - 99%]. The estimates use 15 552 individuals and 4 949 areas.

[3] It is the marginal effect on the probability of being in bad health, i.e. the variation of probability if the discrete change of the dummy variable is from 0 to 1. For instance, the CUA marginal effect is about 2.22 points and the gender marginal effect is equal to 3.75 points

<< table 3 >>

The first synthetic context factor is negatively correlated with the probability of declaring oneself in poor health. The negative coefficient shows that the higher the social and economic level of the neighbourhood is, the lower the probability of declaring oneself to be in poor health is. Individual effects are therefore not the only determining factors of SRH. By adding the CUA dummy, we note that the negative correlation between individual SHR and the synthetic factor (1) persists. The CUA effect is considerably reduced from 2.2 to 0.16 and is not significant.

It appears that the synthetic factor (2) relating to residential mobility is positively associated with individual SRH. This suggests that living in a “none mobile” neighbourhoods increases the probability to be in bad health. The coefficient associated with living in a CUA or not is still positive and non significant, when simultaneously introducing the CUA effect and the synthetic factor (2). Nevertheless, the p-value associated with the CUA coefficient is very close to the threshold of 10% (p-value = 10.6). With the synthetic factor (3), which is more of a “generational” factor, the associated coefficient is negative and significant. Thus individuals who live in young neighbourhoods seem to declare themselves to be in poor health less frequently than others. The coefficients associated with the synthetic factor and the fact of living in CUA are simultaneously significant, which is contrary to estimates using the synthetic factor on “economic and social condition”.

Linear or quadratic effect, that is the question?

In this initial approach, we assumed that the synthetic factors have a linear impact on SHR. However, this hypothesis can be too strong. By introducing the square value of synthetic factors (Table 4), we show that for the synthetic factor (3), the coefficients associated with both the linear form (factor) and the quadratic form (factor * factor) are significant, as is the CUA effect. Thus people associated with extreme (positive or negative) values in the synthetic factor (3) reported worse health status than people associated with medium values. Note that for factor (1) and (2) we do not reject the linear hypothesis: the introduction of the square calculation for the other synthetic factors does not alter the explanations.

<< table 4 >>

Discussion

Our paper presents four main results. The first concerns the distinction between individual characteristics and contextual effects. The results of individual determinants from French data are comparable to the results shown in the international literature (Subramanian, Acevedo et al, 2005; Lindstrom, Merlo and Ostergren, 2002 and see also the special issue of Social Science and Medicine, November 2007). Moreover, the estimations with or without synthetic context factor for individual determinants are quite stable. The coefficient values and the standard deviation associated with individual determining effects remain very close. Thus information included in the context factors is different from the information contained in the individual variables. We can envisage two possibilities: we have omitted the inclusion of certain individual variables in our model that strongly correlate with context factors, or else we have placed strong emphasis on a context effect. The second solution seems to be the most probable since usual individual determinants of health status are included in our estimations (age, gender, wage, level of education and nationality). Even if we have omitted individual variables, it is highly unlikely that their effects significantly modify the impact of context variables.

CUA's has a good proxy for the Social and economic conditions

The second result deals with coefficients associated with synthetic factors and their interactions with the CUA variable. "CUA effect" reflects negative externalities related to the accumulation of social inequalities (concentration of poverty, poor quality of environment, among others). Being a CUA resident significantly increases the probability of an individual declaring themselves as being in poor health by 2.2 points (see Table 3). By simultaneously introducing the first synthetic factor and the CUA dummy, the coefficient associated with this synthetic factor has negative significance whereas the coefficient associated with the CUA variable is not different from zero. By comparing the respective impacts of the "Social and economic condition" factor and the fact of being a CUA resident on perceived individual health status, we observe that even by taking the extreme values of the first synthetic factor and retaining only the values associated with percentiles p5 (value = 4.30, non-deprived) and p95 (value = - 5.60, deprived), the difference in proportion of persons in poor health is + 4.3 points compared to 2.2 points for the CUA effect (see table 5). Similar effects are obtained when dividing it into deciles and computing an Odds ratio. The values of p5 and p95 correspond approximately to the average of the factor in the first and last deciles.

The "Social and economic condition" factor takes better account of the heterogeneous character of neighbourhoods than the single CUA dummy and helps to highlight the influence of socioeconomic characteristics on health status. The gradient of the differences between neighbourhoods is very significant, as much for disadvantaged neighbourhoods as non-disadvantaged ones and cannot be summarised by the CUA variable alone. In France, there are 753 CUAs. It is the town councils that request CUA status for some of their neighbourhoods, often on the basis of political considerations, though socioeconomic factors are taken into account as well. Consequently, certain neighbourhoods

in CUAs should not be while certain neighbourhoods outside CUAs should be included in them. By comparing the first synthetic factor effect with the individual characteristic effects (see table 5), we note that, with regard to an individual declaring themselves as being in poor health, the difference between living in a disadvantaged neighbourhood or not (+ 4.2 points) is greater than the difference between the age groups 45-59 years and 60-79 years (+ 3.7 points4) and gender (+ 3.9 points). This difference is slightly smaller than that observed between nationalities (+ 5.6 points), professions (+9.7 points), employment statuses (+ 10.8 points), wages (+ 11.1 points) and levels of education (+ 13.4 points).

<< table 5 >>

Migration effect

The third result concerns the mobility factor which represents the flows of people that will construct future towns as opposed to the two others that represent an overview of towns today. Housing economists demonstrate that towns are continually evolving and that it is equally important to study both the status of towns and their population dynamics; furthermore, it is primordial to understand the creation of deprived neighbourhoods (Aaronson, 2000; Ayala and Navaro, 2007). Also, individual factors that explain residential mobility are often quite similar to those that explain health status. Here again, the results from French data (Debrand and Taffin, 2005) are comparable to the results taken from the international literature (Rossi, 1955; Speare, 1970; Mincer, 1978; Hughes and Mc Cormick, 1981; Henley, 1998; Böheim and Taylor, 1999). Our estimations show that the mobility factor has a linear effect on the probability of reporting bad health. This effect (+3 points) (p95= 4.43; p5=-5.22) is lower than that measured for the “Social and economic condition” factor but is higher than the CUA effect.

Although Van Lenthe, Martikainen and Mackenbach (2007), regarding a Dutch city, assume that *“selective migration will hardly contribute to neighbourhood inequalities in health and health-related behaviour”*, we can assume that mobility runs counter to the creation of social networks (Kan, 2007). Consequently, in our opinion we feel that our result is a pertinent contribution to the literature on understanding the relationship between Health, housing and social capital (Carpiono, 2008; Ziersch, Baum et al. 2005; Veenstra, Lunginaah et al. 2005; Sundquist and Yang, 2007; Lindstrom, Mghaddassi and Merlo, 2004; Deri, 2005). Moreover, this result appears to partially agree with the theory of “anomies” described by Durkheim (1897) and used by Curtis, Copeland et alii (2006) to explain one of ecological factors between, on the one hand, high levels of social fragmentation and individual isolation and, on the other hand, high levels of psychiatric hospital use. In addition to the four variables presented by Flowerdew, Manley and Sabel (2008), selective migration may be a new type of contextual effect. If endogenous characteristics exist for a population that moves in or out of an area, then it may be possible that these characteristics modify the SRH for the people staying in it.

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[4] The marginal effect between individuals in class (45/59 years) and in class (60/79 years) is about 3.72 points (29.38-25.66) - see table 4.

By simultaneously introducing the fact of being a CUA resident and the second synthetic factor, the coefficient associated with the CUA dummy remains fairly high, but is not significant at 10% (t-stat = 1.63; p_value = 10,6). The information included in the CUA variable does not appear to be included in the contextual mobility factor. This is due to the fact that the level of education is very important in determining this synthetic factor and that it varies sharply according to neighbourhood and whether the subject is a CUA resident or not.

Socially mixed neighbourhood effect

The fourth result concerns the “generational” factor: young households and large families in recently built neighbourhoods (associated with extreme positive values on the synthetic factor) compared to elderly households living in relatively old homes for a long time (associated with extreme negative values on the synthetic factor). As with the first factor, we compared the results of the models with the CUA variable alone, with just this factor and with these two elements introduced simultaneously. The linear form is not sufficient to take into account the effect of this contextual factor. Here we are faced with a Guttman effect (Williamson, 1978; Podani and Miklos, 2002) and therefore need to take a quadratic form into consideration to measure the effect of the third contextual factor on health. Contrary to the results obtained with the first two factors, the most important differences are not between the most extreme positions but rather between an intermediate position and both the far ends (see fig. 1).

<< fig 1 >>

The negative symbol of the linear part indicates that at relatively the same position, individuals who live in neighbourhoods with positive coordinates for the “generational” factor are in better health than those who live in neighbourhoods with negative coordinates. In fact, the most favourable position is occupied by households living in neighbourhoods with a wide variety of inhabitants (i.e. age) and buildings (i.e. year of construction) (see figure 1). The maximum marginal effect is +3.35 points (p95= 2.92; p5=-2.47). It is lower than the marginal effect of the first factor, but higher than that observed for the second factor. This effect is the sum of the linear effect and the socially mixed neighbourhood effect. The latter represents the gain achieved by mixing “new” and “old” neighbourhoods and “young” and “old” households. Generally, this phenomenon highlights either the ethnic composition of neighbourhoods (Neeleman, Wilson and Wessely, 2005; Fagg, Curtis et al. 2006), or the tenure (homeowner, tenant) of households (Atkinson and Kintrea, 2000).

The last remark on this factor is that the coefficient associated with the CUA dummy (2.7 points) is significant, which is not surprising. Since the “Social and economic condition” factor does take into consideration all the information included in the CUA variable, it appears logical that the information included in this synthetic factor would be different from that included in the CUA variable. Consequently, the effects measured with the third factor are added to the CUA effect.

Concluding remarks

With the analysis reported above we may distinguish two main concluding remarks. Firstly, in France as in other countries, individual characteristics make up a significant share of the causes of individual health status. However, it is also essential to include the environment where the individuals live in the determinants. We find three types of contextual effects termed “Social and economic conditions”, “Mobility” and “Generational”, that can be traced back in the context variables used in the principal component analysis. It will be possible to include other context variables to describe other dimensions of context. The strength of the results obtained with our 36 context variables is maintained but would be improved by additional information. The context with the strongest effect corresponds to “Social and economic conditions”. The effects for the two other contexts are very close. Consequently, it is necessary to take a multidimensional approach to understand the complexity of neighbourhood effect. The marginal effects for the three factors are greater than the CUA effect alone. This result is normal but useful. It is normal because dummy variables summarize certain situations very differently and heterogeneity is more prevalent in non-CUA neighbourhoods than in CUA neighbourhoods. Moreover, some non CUA neighbourhoods have the same social and economic characteristics as CUA neighbourhoods. Consequently, if inequalities are observed using the CUA criterion alone, even greater inequalities will remain hidden. Nonetheless, it would be wrong to consider that the total neighbourhood effect will be the aggregated sum of the three contexts, because none of the neighbourhoods are simultaneously in the most deprived contexts. If we wish to obtain only one synthetic indicator of neighbourhood effect, it would be necessary to compute the individual sums of the three contexts.

According to French political tradition, which has always advocated the rejection of communitarian policy as a lever for public policies, it seems important to implement geography-oriented policies to limit territorial inequalities relating to health status. Although CUA and non-CUA classifications correspond to a certain socioeconomic reality, their application still remains a political decision. There are deprived neighbourhoods outside CUAs that have greater difficulties than certain neighbourhoods in CUAs. For a “macro” or a government analysis, the CUA criterion is a good indicator for observing the evolution of health in the most deprived areas, but our work clearly shows that this criterion may be inadequate for obtaining certain “micro” or precise results, because it takes no account of the heterogeneous nature of neighbourhoods. Furthermore, as the CUA criterion is essentially determined by socioeconomic and institutional characteristics, it takes no account of other contextual variables. Mayors and district policy-makers require more than only the CUA criterion as an indicator of the health of their populations. Moreover, different statistical methods could be used to study a particular area (for instance, spatial analysis methods) or different variables (healthcare availability, urban transport, difference between characteristics of employment area and living area, etc.) but all these variables are often unavailable in the French census database. This problem could be overcome by confirming our results through work on other databases concerning smaller areas.

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Table 1: Proportion of people declaring themselves to be in poor health in relation to individual characteristics and living in a CUA

	inhabitants of CUA	inhabitants outside CUA	All
Income quartile			
quartile 1	38.5	37.1	37.3
quartile 2	31.7	30.2	30.4
quartile 3	27.2	22.6	22.9
quartile 4	17.0	15.2	15.3
Education level			
No qualifications	43.4	45.3	44.9
Under graduate	30.2	30.3	30.3
Graduate	20.0	16.9	17.2
Post graduate	14.4	12.3	12.4
Profession			
Farmers	71.2	52.2	52.8
Craftsmen & Traders	29.2	27.7	27.8
Professionals	19.2	14.7	14.9
Intermediary professions	25.5	22.0	22.2
Employees	34.0	30.4	30.9
Manual workers	37.8	36.2	36.6
Not applicable	23.9	16.3	17.5
Working status			
Employed	21.7	16.5	17.1
Unemployed	29.6	29.2	29.3
Non-active	45.1	38.4	39.3
Nationality			
French by birth	29.7	24.9	25.4
French by acquisition	39.6	35.4	36.3
Foreign EU 15	48.4	34.7	36.3
Foreign outside EU 15	36.0	29.7	32.1
Sex			
Female	36.0	29.0	30.0
Male	28.0	22.0	23.0
Age			
18/29 years old	12.4	10.1	10.5
30/44 years old	24.3	16.5	17.5
45/59 years old	43.8	28.6	30.3
60/79 years old	55.8	45.0	46.1
80 years old and over	69.9	60.6	61.5
Length of time in home			
Less than 13 years	28.8	20.8	21.8
13 years and more	36.4	31.8	32.3
Size of town			
Less than 50 000 people	41.3	27.8	30.5
Between 50 000 and 200 000 p.	31.5	28.6	29.0
More than 200 000 p.	33.0	25.9	26.7
Paris	28.5	23.7	24.3

Table 2: Variable coordinates on synthetic factors

	Factor 1	Factor 2	Factor 3
% of unemployed	-0,84	0,31	-0,24
% of unemployed 15-24 years/all active 15/24 years	-0,57	0,55	-0,21
% of long-term unemployed/all unemployed	-0,28	0,41	-0,31
% of unemployed women/all active women	-0,78	0,38	-0,23
% of active with a job/total active population	0,83	-0,32	0,24
% active 15-24 years	-0,44	-0,14	0,13
% employed active women/all employed active	0.49	0,24	-0,53
% of people with STC/employed active population	-0,66	-0,30	-0,25
% of people having moved in after 1990	-0,38	-0,80	0,16
% of people living in the same household since 1990	0,28	0,79	-0,15
% of people living in the same town since 1990	-0,22	0,64	-0,36
% of people living in the same region since 1990	0,08	0,80	0,03
% of families with 3 children and +	-0,54	0,44	0,46
% of single-parent families	-0,80	-0,08	-0,06
% French population	0,63	0,09	-0,23
% foreign population	-0,63	-0,09	0,23
% with no qualifications	-0,76	0,54	-0,05
% of people with undergraduate level	0,56	-0,56	0,21
% of people with graduate level	0,55	-0,68	0,19
% of people with lower graduate level	0,29	-0,71	-0,07
% of people under 20 years old	-0,31	0,55	0,66
% of people aged between 20 and 39 years old	-0,38	-0,72	0,12
% of people aged between 40 and 59 years old	0,59	0,37	0,20
% of people aged over 60 years old	0,30	0,05	-0,78
Average number of rooms in household	0,48	0,65	0,20
Average number of people per room	-0,58	-0,10	0,43
% of block of flats	-0,58	-0,65	-0,05
% of block of flats with more than 10 flats	-0,54	-0,48	0,11
% of individual houses	0,59	0,65	0,05
% of home owners	0,83	0,36	0,03
% of social renters	-0,72	0,26	0,31
% of private renters	-0,01	-0,77	-0,44
% of homes built before 1948	0,02	-0,34	-0,55
% of homes built between 1949 and 1981	-0,24	0,40	0,15
% of homes built after 1982	0,33	-0,09	0,56
Interpretation of factors as synthetic factors of context/proxy variable	Social and economic condition	residential mobility	generational

Table 3 Marginal effect on the probability of being in bad SRH with linear neighbourhood effects

P(SRHbab=1)=22.9	No factor		Factor 1 Social and economic condition		Factor 2 Mobility		Factor 3 generational		Factor 1 – 2 - 3	
		CUA		CUA		CUA		CUA		CUA
Age *(ref. 18/29 years)*										
30/44 years old	11,74 **	11,83 **	11,96 **	11,96 **	11,53 **	11,63 **	11,75 **	11,86 **	11,74 **	11,74 **
45/59 years old	25,66 **	25,81 **	26,08 **	26,08 **	25,49 **	25,63 **	25,62 **	25,79 **	25,86 **	25,86 **
60/79 years old	29,38 **	29,64 **	29,98 **	29,99 **	29,43 **	29,64 **	29,19 **	29,46 **	29,84 **	29,84 **
80 years old and over	43,89 **	44,22 **	44,52 **	44,53 **	44,17 **	44,41 **	43,52 **	43,83 **	44,45 **	44,44 **
Sex *(ref. male)*										
Male	3,75 **	3,74 **	3,75 **	3,75 **	3,77 **	3,76 **	3,75 **	3,74 **	3,77 **	3,77 **
Education Level (*ref. upper graduate*)										
No qualifications	6,92 **	6,81 **	6,65 **	6,64 **	6,90 **	6,81 **	6,93 **	6,79 **	6,61 **	6,61 **
Graduate	-3,17 **	-3,10 **	-3,12 **	-3,12 **	-3,01 **	-2,97 **	-3,26 **	-3,19 **	-3,03 **	-3,03 **
Post graduate	-6,62 **	-6,51 **	-6,53 **	-6,53 **	-6,29 **	-6,22 **	-6,79 **	-6,69 **	-6,33 **	-6,33 **
Income quartile (*ref. quartile 2*)										
quartile 1	3,95 **	3,86 **	3,72 **	3,72 **	4,05 **	3,96 **	3,87 **	3,75 **	3,73 **	3,73 **
quartile 3	-2,50 **	-2,43 **	-2,28 **	-2,28 **	-2,51 **	-2,45 **	-2,42 **	-2,31 **	-2,17 **	-2,17 **
quartile 4	-7,77 **	-7,71 **	-7,40 **	-7,41 **	-7,78 **	-7,73 **	-7,69 **	-7,60 **	-7,30 **	-7,29 **
Profession *(ref. intermediate professions)*										
Farmers	0,82	1,03	1,49	1,49	0,77	0,95	1,07	1,37	1,77	1,77
Craftsmen & Traders	-3,39 **	-3,31 **	-3,27 **	-3,26 **	-3,24 **	-3,19 *	-3,54 **	-3,48 **	-3,27 **	-3,27 **
Professionals	-4,15 **	-4,16 **	-4,13 **	-4,13 **	-4,00 **	-4,02 **	-4,24 **	-4,26 **	-4,04 **	-4,04 **
Employees	0,48	0,46	0,36	0,36	0,49	0,47	0,46	0,43	0,34	0,34
Manual workers	4,06 **	3,99 **	3,81 **	3,81 **	3,90 **	3,86 **	4,04 **	3,95 **	3,58 **	3,58 **
Not applicable	-6,17 **	-6,18 **	-6,20 **	-6,20 **	-6,13 **	-6,15 **	-6,18 **	-6,19 **	-6,18 **	-6,18 **
Working status (*ref. employed)*										
Unemployed	8,82 **	8,79 **	8,71 **	8,71 **	8,82 **	8,80 **	8,77 **	8,73 **	8,66 **	8,66 **
Non-active	10,87 **	10,85 **	10,85 **	10,84 **	10,78 **	10,77 **	10,82 **	10,79 **	10,69 **	10,69 **
Nationality (*ref. French by birth)*										
French by acquisition	4,81 **	4,67 **	4,48 **	4,47 **	4,75 **	4,64 **	4,90 **	4,75 **	4,49 **	4,49 **
Foreign EU 15	4,10 *	4,12 *	4,08 *	4,08 *	4,32 **	4,31 **	4,00 *	3,99 *	4,21 **	4,21 **
Europe out EU 15	1,73	1,29	0,82	0,81	1,75	1,39	1,94	1,46	1,04	1,05
Size of city *(ref. Paris)*										
- 50 000 people	-0,49	-0,61	-0,62	-0,62	-1,32	-1,34	-1,03	-1,29	-2,25	-2,25
[50 000 - 200 000 [	-1,39	-1,47	-1,30	-1,31	-2,02 *	-2,02 *	-1,89 *	-2,07 **	-2,64 **	-2,63 **
+ 200 000 people	-0,48	-0,48	-0,42	-0,42	-0,96	-0,90	-0,97	-1,06	-1,57 *	-1,57 *
Length of time in home (less 13 years)										
more than 13 years	-0,65	-0,66	-0,59	-0,59	-0,90	-0,88	-0,63	-0,64	-0,86	-0,86
CUA		2,22 *		0,16		1,86		2,68 **		-0,05
Contextual variables										
factor 1			-0,43 **	-0,42 **					-0,46 **	-0,46 **
factor 2					0,31 **	0,28 **			0,37 **	0,37 **
factor 3							-0,46 **	-0,55 **	-0,55 **	-0,55 **
log likelihood	-7670,86	-7668,97	-7665,05	-7665,04	-7668,27	-7666,97	-7668,88	-7666,24	-7659,27	-7659,27

*Significance: * : 10 %, ** : 5 %*

Table 4 Marginal effect on the probability of being in bad SRH with quadratic neighbourhood effects[+]

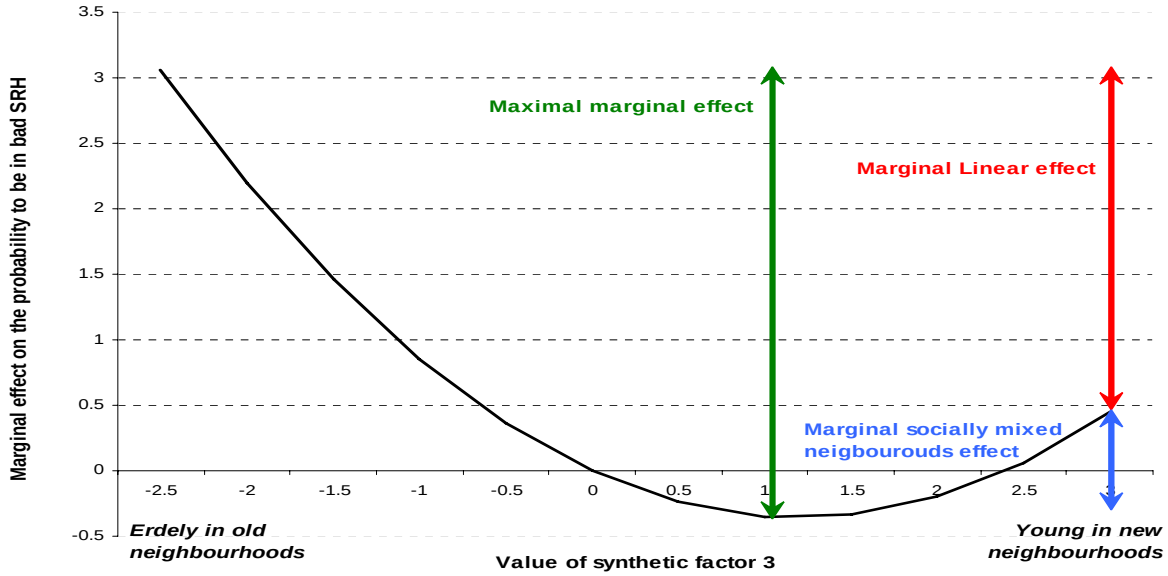
	No factor		Factor 1 Social and economic condition		Factor 2 Mobility		Factor 3 generational		Factor 1 – 2 - 3	
		CUA		CUA		CUA		CUA		CUA
CUA		2,22 *		0,96		1,86		2,66 **		0,78
Contextual variables										
Factor 1			-0,51 **	-0,47 **					-0,54 **	-0,50 **
Factor 1*Factor 1			-0,04	-0,05					-0,05	-0,06
Factor 2					0,31 **	0,28 **			0,44 **	0,44 **
Factor 2*Factor 2					0,00	0,01			-0,02	-0,02
Factor 3							-0,60 **	-0,69 **	-0,58 **	-0,59 **
Factor 3*Factor 3							0,25 **	0,25 **	0,22 **	0,22 **
*Log-likelihood	-7664,21	-7664,21	-7664,21	-7663,99	-7668,26	-7666,96	-7665,65	-7663,04	-7655,29	-7655,15

[+] Individual determinants are similar to those in table 4. The results obtained are similar.

Table 5: Linear marginal effects of context factor

		Social and economic condition	Mobility	Generational
Values of synthetic factors				
Max		5,46	5,82	5,26
99%		5,05	5,45	4,28
95%	**(A)**	4,30	4,43	2,92
Median		0,46	0,41	-0,06
5%	**(B)**	-5,60	-5,22	-2,48
1%		-8,12	-6,63	-3,37
Min		-9,51	-7,56	-3,76
Variation P95- P5	**(A-B)**	9,90	9,66	5,40
Linear coefficient	**(C)**	-0,43	0,31	-0,46
Marginal effect on the probability of reporting bad health (in absolute value between P95- P5)	**|(A-B)* (C)|**	4,26	2,99	2,48

Fig. 1 Quadratic marginal effect of generational factor



Annex 1:

Probit method $y_i = 1_{y_i^* > 0}$ avec $y_i^* = \beta X + \alpha F + \varepsilon_i$

Multilevel method $y_{ij} = 1_{y_{ij}^* > 0}$ avec $y_{ij}^* = \beta X + \alpha F + \eta_j + \varepsilon_{ij}$

Where:

- y_i is an SRH dummy variable for i-individual and y_{ij} is an SRH dummy variable for i-individual in j-neighbourhood.
- *X* are socio economic factors
- *F* are the context factor
- ε_i and $\eta_j + \varepsilon_{ij}$

	Probit				Multilevel method			
	CUA		3 factors		CUA		3 factors	
	coef	st-dev	coef	st-dev	coef	st-dev	coef	st-dev
constant	-1.362	0.058	-1.329	0.060	-1.425	0.062	-1.388	0.065
Age								
30/44 years old	0.370	0.042	0.366	0.042	0.387	0.045	0.382	0.045
45/59 years old	0.769	0.043	0.768	0.043	0.808	0.046	0.805	0.046
60/79 years old	0.857	0.052	0.860	0.053	0.897	0.056	0.898	0.056
80 years old and over	1.194	0.072	1.196	0.073	1.240	0.076	1.241	0.077
Sex								
Male	0.124	0.026	0.125	0.026	0.129	0.027	0.130	0.027
Education Level								
No qualifications	0.214	0.033	0.208	0.033	0.227	0.034	0.221	0.034
Graduate	-0.105	0.037	-0.103	0.037	-0.111	0.038	-0.109	0.038
Post graduate	-0.223	0.038	-0.215	0.038	-0.231	0.040	-0.222	0.040
Income quartile								
quartile 1	0.125	0.032	0.122	0.033	0.129	0.035	0.126	0.035
quartile 3	-0.082	0.034	-0.073	0.034	-0.086	0.036	-0.077	0.036
quartile 4	-0.266	0.036	-0.248	0.037	-0.280	0.039	-0.263	0.039
Profession								
Farmers	0.034	0.137	0.067	0.137	0.036	0.145	0.067	0.144
Craftsmen & Traders	-0.114	0.056	-0.109	0.057	-0.118	0.059	-0.114	0.059
Professionals	-0.143	0.044	-0.136	0.044	-0.147	0.046	-0.140	0.046
Employees	0.015	0.036	0.010	0.036	0.015	0.038	0.011	0.038
Manual workers	0.128	0.040	0.115	0.040	0.130	0.042	0.119	0.042
Not applicable	-0.218	0.059	-0.221	0.059	-0.234	0.062	-0.235	0.062
Working status								
Unemployed	0.268	0.047	0.266	0.047	0.276	0.049	0.273	0.049
Non-active	0.349	0.038	0.345	0.038	0.367	0.040	0.363	0.040
Nationality								
French by acquisition	0.147	0.050	0.142	0.050	0.146	0.052	0.141	0.052
Foreign EU 15	0.130	0.067	0.134	0.067	0.139	0.071	0.143	0.071
Europe outside EU 15	0.042	0.056	0.037	0.056	0.035	0.059	0.030	0.059
Size of built-up area								
- 50 000 people	-0.020	0.051	-0.078	0.054	-0.007	0.058	-0.068	0.061
[50 000 - 200 000 [	-0.049	0.034	-0.085	0.036	-0.048	0.038	-0.089	0.041
+ 200 000 people	-0.016	0.028	-0.051	0.030	-0.019	0.031	-0.057	0.034
Length of time in home								
more than 13 years	-0.022	0.025	-0.027	0.026	-0.026	0.027	-0.031	0.027
CUA	0.072	0.037	0.026	0.048	0.079	0.041	0.027	0.053
Contextual variables								
factor 1			-0.017	0.005			-0.017	0.006
factor 1 * factor 1			-0.002	0.001			-0.002	0.001
factor 2			0.014	0.005			0.015	0.005
factor 2 * factor 2			-0.001	0.001			-0.001	0.001
factor 3			-0.019	0.008			-0.022	0.009
factor 3 * factor 3			0.007	0.003			0.008	0.004
log likelihood	-7669		-7655		-7648		-7635	
rho					0.092	0.015	0.089	0.015

Health status, Neighbourhood effects and Public choice: Evidence from France

Thierry Debrand (Irdes), Aurélie Pierre (Irdes), Caroline Allonier (Irdes), Véronique Lucas (Irdes)

Observation of socioeconomic statistics between different neighbourhoods highlights significant differences for economic indicators, social indicators and health indicators. The issue faced here is determining the origins of health inequalities: individual effects and neighbourhood effects. Using National Health Survey and French census data from the period 2002-2003, we attempt to measure the individual and collective determinants of Self-Reported Health Status (SRH). By using a principal component analysis of aggregated census data, we obtain three synthetic factors called: "economic and social condition", "mobility" and "generational" and show that these contextual factors are correlated with individual SRHs.
Since the 80s, different French governments have formulated public policies in order to take into account the specific problems of disadvantaged and deprived neighbourhoods. In view to concentrating national assistance, the French government has created "zones urbaines sensibles" (ZUS) [Critical Urban Areas, CUA]. Our research shows that in spite of implementing public policy in France to combat health inequalities, by only taking into account the CUA criterion (the fact of being in a CUA or not), many inequalities remain ignored and thus hidden.characteristics that may influence the new retirees' health insurance demand.

Contexte géographique et état de santé de la population : de l'effet ZUS aux effets de voisinage

Thierry Debrand (Irdes), Aurélie Pierre (Irdes), Caroline Allonier (Irdes), Véronique Lucas (Irdes)

Une première recherche de l'Irdes a mis en évidence un état de santé plus dégradé chez les habitants des zones urbaines sensibles (ZUS). Cette nouvelle étude montre, dans la suite logique de la précédente, l'impact des caractéristiques
des quartiers d'habitation sur l'état de santé des personnes qui y vivent. En effet, indépendamment des caractéristiques individuelles, des effets de contexte peuvent aussi influencer l'état de santé.
Les résultats suggèrent que vivre dans un quartier où se cumulent les difficultés économiques et sociales augmente la probabilité de se déclarer en mauvaise santé. Il en est de même pour les personnes vivant dans des quartiers où la mobilité résidentielle est faible. Enfin, les habitants des quartiers récemment construits et avec une forte présence de jeunes sont en meilleure santé que ceux qui vivent dans des quartiers anciens habités par des ménages plus âgés.
Le critère administratif ZUS est un bon zonage pour observer l'évolution de la santé dans les zones les plus défavorisées. Cependant, il ne permet pas d'appréhender l'ensemble des facteurs de contexte géographique jouant sur l'état de santé de la population.
Ces résultats confirment l'importance de mettre en oeuvre des politiques territorialisées dans l'objectif de lutter contre les inégalités d'état de santé.

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ISSN : 2102-6386