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Health in the cities: When the neighborhood matters more than income

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ABSTRACT

Using a rich Italian cross-sectional dataset, we estimate the effect of a neighborhood problems aggregate (including pollution, crime, and noise) on self-assessed health, presence of chronic conditions and limitations in daily activities. We address the self-selection of the residents in their neighborhoods, as well as the possible endogeneity of income with respect to health, through instrumental variable methods and several endogeneity tests. The main novelty is the sound estimation of the neighborhood effect on health using observational data, which has the advantage of providing general results that are not dependent on any experimental design. This allows us to fully compare the neighborhood effect with the traditional socioeconomic determinants of health. Our main findings are that low quality neighborhoods are strongly health damaging. This effect is comparable to the primary/upper secondary education health differential and is even higher than the impact that poor economic circumstances have on health.

1. Introduction

An important part of the research on urban-related issues is dedicated to the effect that the characteristics of the neighborhoods in which people live have on a wide range of social and economic outcomes, such as wages, educational attainments, and criminal behavior. This research is carried out with many difficulties and even some skepticism. Indeed, especially in the field of economics, there is a strong debate about the possibility of properly identifying neighborhood effects given the self-selection of the residents in their neighborhood. This point is crucial, as this self-selection can bias the estimation of any model where neighborhood characteristics are used as determinants of any given outcome. The difficulty to identify a clear causal effect has deterred economists from exploring the consequences of the neighborhood, especially when the outcome of interest is thought to be correlated with neighborhood choice. One of these outcomes is, undoubtedly, health. In the case of health, the identification problem arises because the sorting mechanism of the individuals into their neighborhood may directly depend on health status (e.g. sick individuals may want to avoid living in polluted areas) and on any unobserved determinant of health that is correlated with neighborhood choice.

Interestingly, although social scientists in other disciplines mostly make use of observational data and do so without dealing with the identification problem, the economic literature on the neighborhood effect on health heavily relies on one single experiment: the Moving To Opportunity (MTO) program. The objective of this experiment was to determine whether families who moved from inner-city, high-poverty areas to low-poverty areas could attain better outcomes, including health-related ones (see Katz et al., 2001 for a detailed description of the program). All of the studies based on this experiment have found significant health benefits for moving to better areas (Katz et al., 2001; Ludwig et al., 2001; Rosenbaum and Harris, 2001; Kling et al., 2007). However, the evidence provided is far from being general, as this experiment only took place in five US cities (Baltimore, Boston, Chicago, Los Angeles, and New York) and, more importantly, was limited to low income families.

The lack of evidence on the effect of the place of residence on health is especially penalizing in urban economics because geographical health inequalities are a dramatic urban issue. Geographical variations in health are most often present at aggregate levels (e.g. at the county level in the US, Murray et al., 2006, and

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at the regional level in Italy, Costa et al., 2003), but health differentials become truly outstanding between bad- and good-quality neighborhoods within cities. A thought-provoking example is given by Hanlon et al. (2006), who calculated that the discrepancy in life expectancy at birth between the richest (Calton) and poorest (Lenzie) districts of Glasgow amounts to as much as 30 years. Remarkably, this health differential is comparable in magnitude with the average increase in life expectancy that took place in the most developed countries throughout the entire 20th century (Cutler et al., 2006).

In this paper, we aim at filling this literature gap by making use of observational data from a national representative survey while simultaneously dealing with the identification issue. The purpose is to produce more general results that relate to the whole population and not only to few specific segments of it. Our study also compares the neighborhood effect with the traditional determinants of health used in economic models, namely income and education, which have been the subject of an extensive multidisciplinary literature. Unlike previous evidence on the health effects of the neighborhood coming from the US (see Diez-Roux et al., 1997; Anderson et al., 1997; Katz et al., 2001; Ludwig et al., 2001; Rosenbaum and Harris, 2001; Kling et al., 2007 among others), we conduct our analysis in a European country. Italy is a natural candidate for this analysis, as it shows the highest geographical variation in health among the member countries of the Organisation for Economic Co-operation and Development (OECD). To conduct this research, we used data from the income and living conditions survey carried out in 2004 by the Italian Statistical Office. This survey presents the considerable advantage of directly recording neighborhood characteristics along with health and individual characteristics, a feature that is not common in surveys on income and living conditions.

The empirical strategy consists of analyzing the effect of a neighborhood problems aggregate that measures the presence of pollution, crime, and noise on three different health outcomes: Self-Assessed Health (SAH), chronic conditions, and limitations in Activities of Daily Living (ADLs). The identification issue is addressed by performing a whole series of endogeneity tests based on Instrumental Variable (IV) estimations. Another important characteristic of this study is that it also deals with the possible endogeneity of income with respect to health by means of an IV method. Note that not only retrieving the causal effect of income on health is important per se, but also is removing any possible second-order bias that this important determinant of neighborhood choice can transmit to the neighborhood effect on health. Finally, this additional sophistication allows us to properly compare the effect of the neighborhood to that of income and other individual determinants of health. Such a comparison is very important, as it enables the assessment of the potential of neighborhood-level policies relative to more traditional measures that aim at enhancing public health in urban communities.

The rest of the paper is organized as follows. The second part gives an overview of the literature on the neighborhood effect on health. The third describes the econometric model and empirical strategy adopted. The fourth presents the data and main variables used in the analysis. The fifth displays and interprets the results. Finally, the last part discusses and concludes the paper.

2. Related literature

Macintyre et al. (2002) conceptualize the effect that the neighborhood has on health with a theoretical framework based on human needs. The authors suggest evaluating the extent to which a given neighborhood is able to provide what humans need to live a healthy life (e.g. air, water, food, and security). In this framework, area-based measures are divided into residential inputs which are resources that individuals may choose to use or not (e.g. police staff, public and private investments in school) and residential outputs which are measurable outcomes such as crime and pollution levels. Note that residential outputs are not solely determined by the residential inputs but are also affected by collective functioning and practices such as social cohesion and participation.

A growing empirical literature has documented numerous associations between various characteristics of the environment in which people live and different types of health outcomes. There is strong evidence of a positive association between the socio-economic characteristics of the place of residence and several health outcomes, such as cardiovascular risk factors (Davey Smith et al., 1998), diseases (Diez-Roux et al., 1997), mortality (Anderson et al., 1997) as well as several health-affecting behaviors, such as smoking (Karvonen and Rimpela, 1996; Reijneveld, 1998), alcohol use and a lack of physical activity (Karvonen and Rimpela, 1996).

Neighborhood characteristics can potentially affect health through several channels. Some of these involve aggregates of individual characteristics such as average income and educational levels. For instance, a high concentration of poor, less-educated individuals might adversely affect health because of the faster spreading of unhealthy lifestyles that are more concentrated among people in depressed socio-economic circumstances (Christakis and Fowler, 2007, 2008; Crane, 1991; Evans et al., 1992; Trogdon et al., 2008). In addition, deprived neighborhoods might have reduced levels of social capital, trust and social cohesion, all of which are positive determinants of health (Kawachi et al., 1997; Kawachi and Kennedy, 1997; Wilkinson, 1996). Health could also be affected by other neighborhood characteristics that are purely contextual in the sense that they do not directly depend on individual characteristics and, in particular, not on the case mix of income and education. One of these purely contextual factors is the environmental quality of the neighborhood, which notably includes pollution, filth, noise and the presence of toxic substances. Empirical evidence indicates that these neighborhood-level variables are very strongly associated with health (Cadum et al., 2002; Chappie and Lester, 1982; Joyce et al., 1989; Seskin, 1979). Another important factor is the level of crime and vandalism in the neighborhood, which might adversely affect individual health both directly, by harming physical integrity, and indirectly, by leading to social isolation, stress and lack of physical activity (Macintyre et al., 1993; Piro et al., 2006; Sooman and Macintyre, 1995). Crime is even thought to be the most important determinant of bad health in highly deprived neighborhoods in the United States (Minkler, 1992).

The main methodological limitation of all the above studies is the difficulty of identifying the neighborhood effect. Indeed, if health is a determinant of neighborhood choice, then a reverse-causality bias would be present. Such a perspective is however not held in the urban economics literature, as the studies that have investigated the determinants of residential choice do not consider health as being a potential determinant of neighborhood choice (Bayoh et al., 2006; Ioannides and Topa, 2010). A second type of endogeneity bias might arise because individuals might select their neighborhood according to unobservable factors that are correlated with their health. For instance, individuals enjoying physical activity may want to live in areas with gyms and green parks in order to exercise. In such case, the self-selection of sporty individuals into places with sports infrastructures would lead to a spurious positive relationship between these places and good health. Another