The Journal of the Economics of Ageing 1-2 (2013) 50–59

Contents lists available at ScienceDirect

The Journal of the Economics of Ageing

journal homepage: www.elsevier.com/locate/jeoa

Full Length Article

Community effects on elderly health: Evidence from CHARLS national baseline

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ARTICLE INFO

Keywords:
Community effects
Elderly health
SES
CHARLS

ABSTRACT

There is increasing interest in neighborhood or area effects on health and individual development. China, due to its vast regional variations in health infrastructure and geography and relative immobility of older residents, provides a rare opportunity to study such effects. Utilizing China Health and Retirement Longitudinal Study (CHARLS) baseline survey 2011–2012 which covered over 17,000 individuals in 450 randomly selected communities/villages, this paper addresses two questions: whether community/village characteristics matter for individual health and SES (Socio-Economic Status), and why they matter. Our statistical results indicate that community/village characteristics have strong associations with individual health and SES. We find that health infrastructure is important even after controlling for community income level. Using surface water increases the likelihood of worse health compared to tap water and even underground water. Compared to moving away by trucks, non-management of waste, and other management such as dump in local site or nearby water body are associated with worse health and SES outcomes. Toileting system without water has the worst influence on individual health and education achievements. Using hay or coal as cooking fuel has the largest negative effect on health and SES outcomes. Geography also plays a role. Extreme weather conditions cause people to be more depressed, and face severe difficulties in ADL (Activities of Daily Living) or IADL (Instrumental Activities of Daily Living) and other negative health conditions. Local landscapes also affect individual health and SES outcomes as mountainous and hilly areas exacerbate individual health status and SES outcomes.

Introduction

In all societies, the most salient adult outcomes reflect the attributes, choices and behaviors of individuals, their families, friends, and employers. Perhaps equally important are the attributes, opportunities, and constraints that are related to the communities in which people live. This may be especially the case in a country such as China in light of the vast heterogeneity that exists among communities both at a moment of time and in the extent of changes at observed at the community level over time. Communities and villages in China have historically been assigned a central role in the delivery of most essential public services including schools, health care and insurance, and places for social interactions among its residents.

Previous analyses indicate that community-level effects play an unusually large role in explaining adult health outcomes of Chinese residents, often dominating the collective impact of individual level attributes (Strauss et al., 2010; Smith et al., 2012). This result leaves unanswered the more basic question of why and how communities are so important in the Chinese context. Providing some answers to this question is the main motivation of this paper.

One major concern in this research would be how to determine whether the association of community-level characteristics to individual health outcomes is simply due to the fact that people living in communities or villages with worse facilities are those who have lower SES (Socio-Economic Status) or other traits leading to poor health. Evidence of the association between poor individual SES and poor health being "large and pervasive across time and space" is abundant (Smith, 2004). This question can be addressed if both individual/family SES information and community-level characteristics are available.

In this paper, we use a new data source—the Chinese Health and Retirement Longitudinal Survey (CHARLS)—that is nationally representative of those ages 45 and over in the Chinese population in 2011–2012. This data contain detailed demographic, health, and economic information on individuals and families who are part of the study. CHARLS also contains a community-level questionnaire that details current and historical information on the nature of the community, including its economic structure, the provision of basic public services including schools, health care, sanitation, and water supplies. This data allow us to relate the adult life experiences of individuals to the attributes of the places where they

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http://dx.doi.org/10.1016/j.jeoa.2013.07.001

have lived. It also allows us to examine the effects of community characteristics while controlling individual/family SES.

This paper is divided into six sections. The next section describes CHARLS data and the main household and community-level variables that will be used in our analysis. Geographical disparities of health and SES outcomes in China provides a brief demonstration of the potential importance of geographic/administrative communities/villages for the health and SES outcomes of Chinese population. characteristics of communities in CHARLS summarizes the main characteristics of our community-level variables in CHARLS. This summary shows considerable heterogeneity in China on the attributes of communities. Our main empirical findings are contained in empirical findings while the final section highlights our main conclusions.

Data: CHARLS

The China Health and Longitudinal Study (CHARLS) is a nationally representative longitudinal survey of the middle-aged and elderly population (45+) in China along with their spouses, which includes an assessment of the social, economic, and health circumstances of community-residents.[1] The purpose of CHARLS is to study the main health and economic adjustments to rapid population aging in China. The national baseline survey of CHARLS was conducted between June 2011 and March 2012 on 17,692 respondents. The survey followed strict randomization procedures. At the first stage of sampling, 150 county-level units were randomly chosen with the probability proportional to scale (PPS) from a sampling frame containing all county-level units of China excluding only Tibet. At the second stage, three communities (administrative villages in rural areas or resident committees in urban areas) were randomly chosen with the PPS method from a sampling frame containing all communities in the county-level units. At the third stage, all dwelling units in a community were listed to create a sampling frame following an extensive mapping and listing operation using a software developed by the CHARLS team which utilized Google Earth map images, from which a certain number of dwelling units were randomly chosen. In rare cases where the dwelling contained more than one household with age-eligible individuals, the computer randomly picked one. If a household had more than one age-eligible member, again the computer randomly chose one as the main respondent. Spouses of main respondents were automatically included.

CHARLS respondents will be followed every two years using a face-to-face CAPI interview. CHARLS has been harmonized with leading international research studies in the Health and Retirement Study (HRS) model to ensure adoption of best practice and international comparability of results. CHARLS baseline data include detailed information of respondents and their living spouses. The CHARLS main household questionnaire contains information on basic demographics, family, health status, health care, employment, household economy (income, consumption and wealth). All data are collected by face-to-face computer-aided personal interviews (CAPI). Both questionnaire and field procedures were repeatedly tested to ensure high data quality.

The main adult outcome variables include key adult health and SES outcomes. Adult health include self-reported general health status, doctor diagnoses of chronic illnesses, depression, word recall, lifestyle and health behaviors (physical activities, smoking, drinking), subjective expectation of mortality, activities of daily living (ADLs), and instrumental activities of daily living (IADLs). It is worth noting that some health variables, such as hypertension, weight and height, are obtained from health measurements conducted in the field.

Financial dimensions of SES in CHARLS are measured in terms of income, wealth and consumption expenditure. CHARLS separately measures income and assets at the individual level as well as at the household level. CHARLS income components include wage income, self-employment income, agricultural income, pension income and transfer income, where wage income is collected for each of the household members, and transfer income separates government transfers specific to individuals from those to households.

Asset measurements collected at household level include housing, productive assets, financial assets, consumer durables and land. Information on ownership status, value and characteristics of current residence as well as other housing owned by the household are recorded. Deposits and other investments are measured at the individual level, but debts are asked both for respondent and spouse, and for the household.

Household expenditures are collected in CHARLS since the literature has shown that expenditure can be a better welfare measures than income in developing countries (Strauss and Thomas, 2008). Consumption items are collected at weekly, monthly and yearly frequencies respectively to minimize recall bias. Food expenditure is collected on weekly basis. It includes expenditures on dining out, food bought from market and values of home-produced food consumed. Food expenditures induced by inviting guests for important events are collected to better reflect household food expenditure per capita in a normal week. Monthly-based expenditures are those usually spent each month, including fees for utilities, nannies, communications, etc. Yearly-based items record expenditures occurred occasionally in a year, including traveling, expenditures on durables, and education and training fees.

In addition to the household survey, a detailed community-level questionnaire was formulated. As detailed in the section that follows, this community questionnaire focuses on important infrastructure available in the community, plus the availability of health facilities, prices of goods and services that are also often used by the middle aged and the elderly.

Geographical disparities of health and SES outcomes in China

Although research interest in the determinants of population health in both developed and developing countries has surged over the past few decades, one issue that needs greater attention is understanding effects of community characteristics on health and SES outcomes of residents and how these effects then translate into large health and SES disparities across geographical boundaries. To illustrate, Murray et al. (2006) found that the gap between the highest and lowest life expectancies across different race-county combinations in the United States is 35 years. Similarly, Rosenzweig (1982) found strong influence of community infrastructure and climate factors on child morality and fertility in Colombia.

China can be an important experimental ground for examining community effects because with the rigid household registration system (*hukou*), China has traditionally restricted geographical mobility so that the distribution of people across communities especially in the age groups considered here is more exogenous especially in the age groups we consider in this paper. Despite the Chinese government's constant interventions aimed at improving social environmental factors that could produce health benefits and reduce disparities associated with geography, there apparently still exist exceedingly wide gaps across communities and villages.

Table 1 presents the distribution of health and SES variations across two types of geographical and administrative units in China—counties and communities. For each type of geographic unit for each health and SES outcome, Table 1 lists the mean and

[1] For a detailed description of the CHARLS survey, see Zhao et al. (2012) Cohort Profile: The China Health and Retirement Longitudinal Study *International Journal of Epidemiology*. Forthcoming.