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Economic development and gender inequality in cognition: A comparison of China and India, and of SAGE and the HRS sister studies

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ABSTRACT

This paper examines cognition measures by age and gender from two types of studies in China and India. It finds that despite some notable differences in samples and measures, a general strong association of cognition in older ages with education emerges as a potential explanation for gender gaps and cohort differences. Female disadvantage in cognition is greater in India, both before and after controlling for education. The process of rural–urban migration draws more cognitively able women to cities in China but not in India. The advent of modern longitudinal studies of aging in these developing countries holds great promise for future work.

Introduction

Aging, once a luxury of wealthy populations, is advancing rapidly in the developing world. The context of development creates unique patterns and challenges for population aging, such as vast inequality across regions and cohorts that pass through stages of development at different times (Kowal and Collaborators, 2012). The aged population of today and tomorrow is the legacy of development in the past. One of the signal challenges of aging is cognitive decline, and one of the signal consequences of inequality in economic and educational resources is inequality in cognitive ability. Cognition affects the capacity to acquire and use information, to make good decisions, and ultimately to remain independent and care for oneself. It thus severely constrains policy aimed at caring for the elderly. One recent paper projects that the legacy of low cognition in the older populations of today's developing countries will put them at a disadvantage for many years to come (Skirbekk et al., 2012).

This paper focuses on one particular dimension of inequality in cognition – gender differences. Previous research has shown that gender differences are larger in India and China than in developed countries, and that in China these differences appear to be related to economic development (Lei et al., 2012). We propose to broaden this descriptive work in two ways. First, by drawing on the WHO Study of Global Aging and Adult Health (SAGE) as a comparison to the HRS-like studies for China (CHARLS) and India (LASI) we hope to identify robust relationships and potentially guide further development of aging studies in these important countries. Second, the comparison of India and China is inherently interesting in view of the very different political and economic contexts for development. Of particular interest for the study of cognition is whether the cognitive stimulation of environments in adulthood can compensate for disadvantages in childhood education. Urban and rural locations offer substantially different environments for developing and maintaining cognitive function both at early and later stages of life. China and India differ in their recent internal migration histories. We explore differences in cognition in urban and rural areas, and among migrants who spent their early and later years in different environments.

Because of the very recent availability of partial data from the full baseline sample of CHARLS, we will focus first on China, comparing the two studies and introducing the measures and methods. We then turn briefly to India for comparison with China. Since level of education has been shown to be strongly associated with cognitive ability and the risk for cognitive decline later in life (Tucker and Stern, 2011), we describe trends in education across cohorts alongside trends in cognition for both countries.

Two studies of China's older population

We show in Fig. 1 the unweighted sample sizes in the two studies for ages 50 and older. The total sample sizes are very similar, and we show the hypothetical distribution of a similarly-sized sample using the 2010 Chinese Census age distribution. Broadly speaking, both SAGE and CHARLS capture the older population fairly well, and neither study deliberately oversamples specific age groups within the 50+ population. The SAGE 50+ sample is

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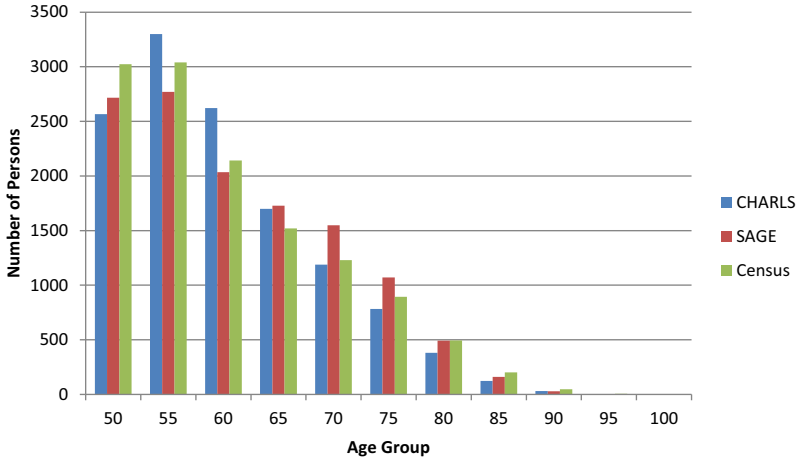

Fig. 1. Unweighted sample sizes in CHARLS and SAGE, by age, compared with Census.

somewhat older: CHARLS has relatively large samples between 55 and 65, and SAGE has relatively larger samples over age 70. We do not show here the effect of sampling weights in the two studies, which do not necessarily match exactly the Census distribution.

Education

We begin with education, as measured by self-reported years of schooling. This is shown by (three-year moving averages of) year of birth in Fig. 2. The large education gap of nearly nine years between the US and China in the birth cohorts before 1940 closes to about six years in the cohorts born around 1960. The gender gap in education in the US is small, and reverses from a small male advantage to a small female advantage. In China, the gender gap is significantly larger, and its evolution differs between CHARLS and SAGE. Women have slightly higher education in SAGE in most cohorts, mainly because of smaller proportions with no formal schooling than in either CHARLS or the China Census of 2012, but the two studies remain close throughout. For men, the two studies are close through the cohorts of 1940. After that point, the education of men in SAGE improves less quickly, so that by the cohorts around 1960 there is very little gender gap according to SAGE. In CHARLS, men's education continues to rise and the gender gap closes little between the cohorts of 1940 and 1960. This is an important contrast between two studies of the same population, with significant implications for the study of cognition. More information is needed about the SAGE sample to understand the contrast.

We also point out the dip in educational attainment for cohorts born in the early 1950s. These are the children whose education would have been disrupted during the Great Leap Forward of 1958–60. We do not explore this issue, but the fact that both Chinese studies are able to detect these effects is noteworthy.

Cognition measures

Because of the importance of cognition and cognitive decline among older adults, the HRS and its sister studies have made cognitive measurement a priority. The Mini-mental State Exam (MMSE) (Folstein et al., 1975) and the related Telephone Interview for Cognitive Status (TICS) (Brandt et al., 1988) are the touchstones for the approach used in the HRS studies, which emphasizes effective assessment in short batteries. The SAGE studies also measure cognition, using well-established tests, but tests which differ from those in the HRS family of studies in ways that make direct comparison difficult to impossible. It is also important to consider the specific mental capacities measured by different cognitive tests, as these respond differently to age, education, and gendered social experience. The capacities tapped by one or more of the studies in this paper are: episodic memory, orientation, attention (mental status), working memory, and language (retrieval fluency). The HRS also has measures of numeracy and a numeric test of fluid intelligence, both of which could easily be added to studies in China and India.

Verbal episodic memory

The single most important domain of cognition to measure in an aging population is short-term memory. This is generally done with word recall tasks. The ability to recall words read from a list

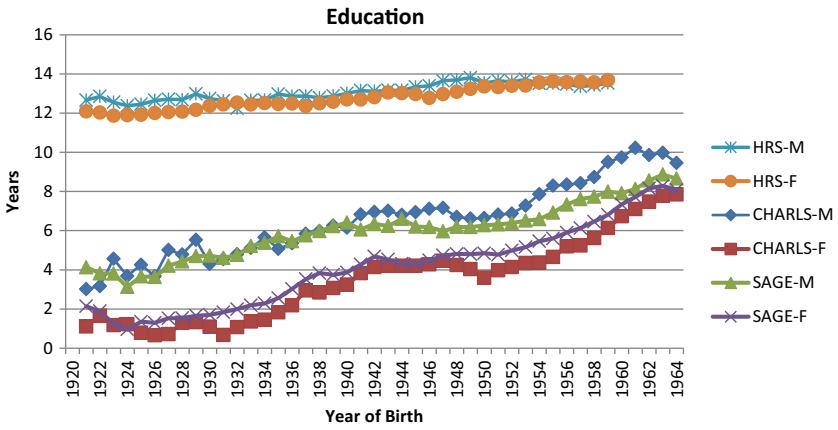

Fig. 2. Years of schooling, by year of birth in the US and China.