# Inequality of opportunity in health in old age in China and India

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## Background

China and India have a large and rapidly aging population. They have also experienced growing disparities in health across social, economic, and spatial dimensions (Subramanian et. al., 2008, Tang et al., 2008).

In the literature, on inequality, there is a shift in focus from inequality in outcome to inequality in opportunity to achieve the outcome (Pignataro, 2012, Roemer and Trannoy, 2016).
As equalizing outcome
- ignores differences in tastes and preferences of individuals for which they are responsible.
- fails to fully appreciate the differences in the individual's resources that are associated with the outcome (Dworkin, 1981a, 1981b).

In addition, studies indicate that the idea that disparities have their origin beyond individual control can generate public support for redistributive policies (Alesina and Angeletos, 2005, Bénabou and Tirole, 2006).

## Inequality of opportunity: Roemer's approach

Roemer (Roemer, 1998, 2002) makes the distinction between efforts, as factors affecting outcome which are within an individual's control, and circumstances as those beyond.
He also acknowledges that individual's efforts are associated with their circumstances.
Roemer's approach is widely used in studying inequality of opportunity in health as it captures a number of important mechanisms (Rosa Dias, 2014).
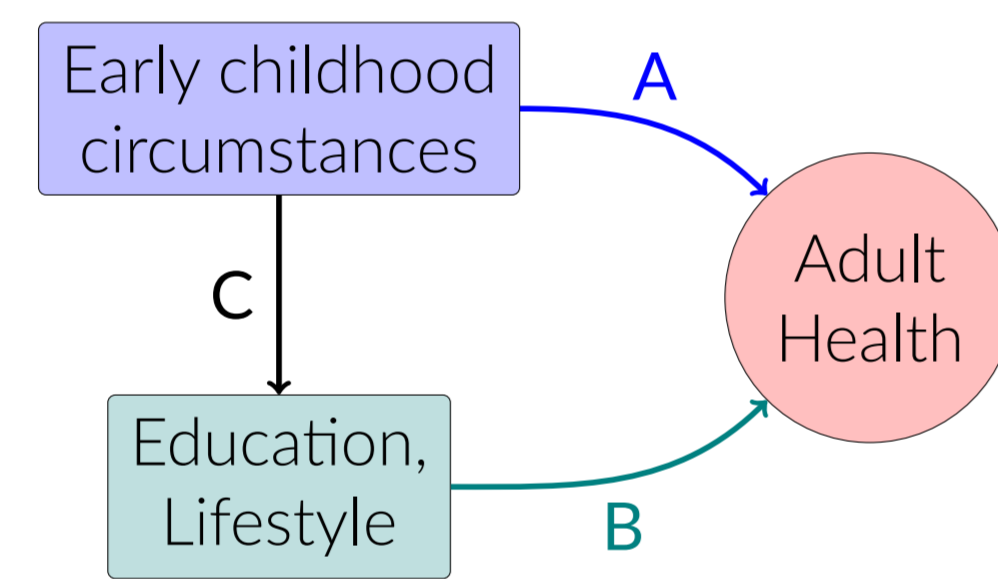
**A**: Parental Socioeconomic status affecting early childhood health (Case et al., 2005, Currie and Almond 2011, Barker, 1995, Wadsworth 1997) with effects on adult health. Or, indirectly through the inter-generational transmission of SES, with consequences on adult health (Marmot et. al., 2001). **B**: Education (Grossman, 2006) and lifestyle choices (Contoyannis and Jones, 2004) affecting health **C**: Inter-generational transmission of health behaviors and preferences for health and lifestyle (Ahlburg, 1998, Wickrama et al., 1999).

## Research Hypotheses: Main

Both countries embarked on markedly different developmental trajectories since the middle of the 20th century. The main purpose of this research is to examine the role of these different development paths on inequality of opportunity.
**China**: Abolition of private ownership of means of production, collectivization of agriculture during the Great Leap Forward (1958-62), Cultural Revolution (1966-76). Aggressive welfare programs in health and human development since the 1970s. Establishment of a highly efficient and centralized state bureaucracy.
**India**: Limited implementation of redistributive policies like the Land Reform Act of 1949 as the political structure of local governments were dominated by the landed class (Besley and Burgess, 2000). Limited success of the public programs for its dependence on the private sectors capacity and incentives to deliver the program needs (Malenbaum, 1982).

Such differences are likely to affect the contribution of circumstances in total inequality.
- *Hypothesis 1*: The importance of circumstances will be lower in China than in India.
- *Hypothesis 2*: The importance of circumstances will reduce more over time in China compared to India.

## Research Hypothesis: Gender

Male-female gaps in health, longevity, education, and employment have reduced at a faster rate in China than in India (Das Gupta et al., 2004, Drèze and Sen, 2013).

An important contributor is the Chinese state's effort to empower women particularly through labor force participation since the Maoist era (Cook and Dong, 2011).
In addition, communes reduced the power of the family over women (Andors, 1983 cited in Das Gupta et al., 2004). Equal rights were further strengthened in the Marriage Law of 1950.

Both government intervention and overall outcomes in India were significantly behind that in China.

- *Hypothesis 3*: Gender disparities in the importance of circumstances in overall inequality in health will be lesser in China compared to India.

## Analytical strategy

Reduced form relation between health outcome $H_i$ with circumstance $C_i$ and effort $E_i$.

$$H_i = \alpha + \beta_1 C_i + \beta_2 E_i + \beta_3 D_i + \beta_4 L_i + \epsilon_i \quad (1)$$

$D_i$, and $L_i$ are demographic and location variables and $\epsilon_i$ are the errors.
Following Roemer, to remove any effect of circumstances in effort, we alternatively consider

$$H_i = \alpha + \beta_1 C_i + \beta_2 \hat{E}_i^* + \beta_3 D_i + \beta_4 L_i + \epsilon_i \quad (2)$$

where,

$$\hat{E}_i^* = \hat{\alpha}' + \gamma_1 C_i + \gamma_2 D_i + \eta_i \quad (3)$$

As a measure of inequality, we use variance (Roemer and Trannoy, 2016, Zheng, 1994).

To examine the contribution of different factors we use Shapley value decomposition of variance (Shorrocks, 2013). The contribution of a source in the natural decomposition of variance is given by the covariance between each source of health and the outcome.

$$\sigma^2(\hat{H}_i) = cov(\hat{\beta}_1 C_i, \hat{H}_i) + cov(\hat{\beta}_2 E_i^*, \hat{H}_i) + cov(\hat{\beta}_3 D_i, \hat{H}_i) + cov(\hat{\beta}_4 L_i, \hat{H}_i) \quad (4)$$

(Relative) Measure of Inequality of Opportunity: $cov(\hat{\beta}_1 C_i, \hat{H}_i)/\sigma^2(\hat{H}_i)$

We examine this for each country and by birth cohorts and gender.

## Data and variables

*Data*: Study on Global Ageing and Adult Health WAVE 1: China(2007-10), India(2007)
Sample size for 50+ population: 13367 - China; 7150 - India

*Dependent variable* - A health index variable: First we regress objective measures of health available in the survey like underweight/overweight, indicators for high-risk waist-to-hip ratio, hypertension, lung functioning, maximum grip strength, time taken to walk, visual acuity, a composite index of cognitive ability, age, and sex on a subjective health variable.
Then use the standardized probability of "good" or better health to create a continuous index. (This strategy is similar to that by Groot, 2000 and Jürges, 2007).

*Main Independent variables*
**Circumstance variables** include parental SES measured by father's education and occupation, whether mother ever went to school and ever worked; person's height (Bozzoli et. al., 2009, Case and Paxson, 2008) as an indicator of childhood nutritional and disease environments.
**Effort variables** include indicators of lifestyle choices like consumption of tobacco and alcohol, fruits and vegetables and years of schooling.
**Demographic variables** include age cohorts (those born before, around the time of, or after the foundation of the People's Republic of China (1949) and independent India (1947)) and gender.
**Locational variables** include rural/urban dummies and provinces/states.

## Results

- Circumstances play an important role, more than effort in its contribution to health inequality.
- China fares poorly compared to India in removing the importance of circumstances in inequality.
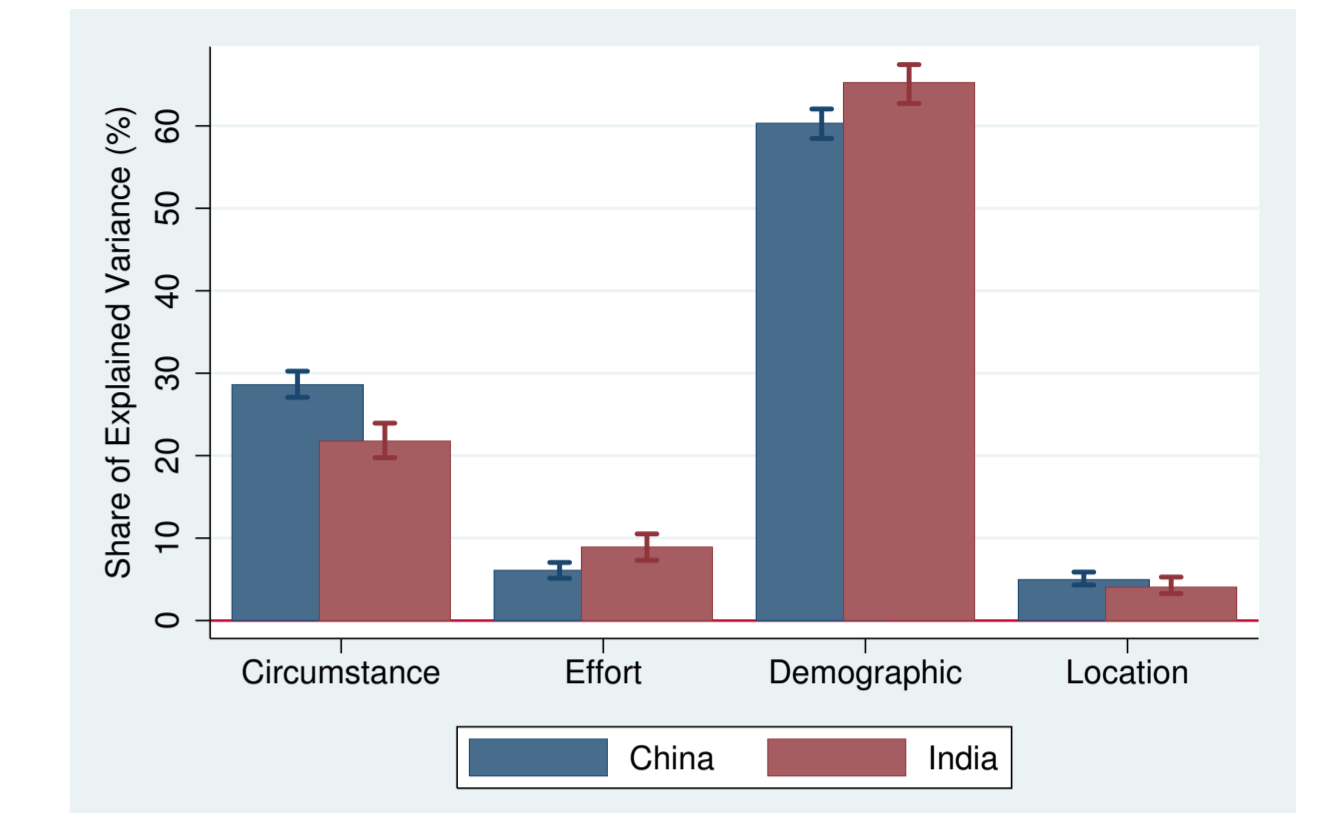


Figure 1. Contribution of different factors in health inequality (with bootstrapped 95% C.I.).

*Possible reasons*: Great Leap Forward was accompanied by famines; Cultural Revolution was accompanied by rustication (Manning and Wemheuer, 2011, Walder, 2015, 2016).
Land redistribution after 1949 was not necessarily egalitarian and created its own form of stratification (Potter and Potter, 1990).
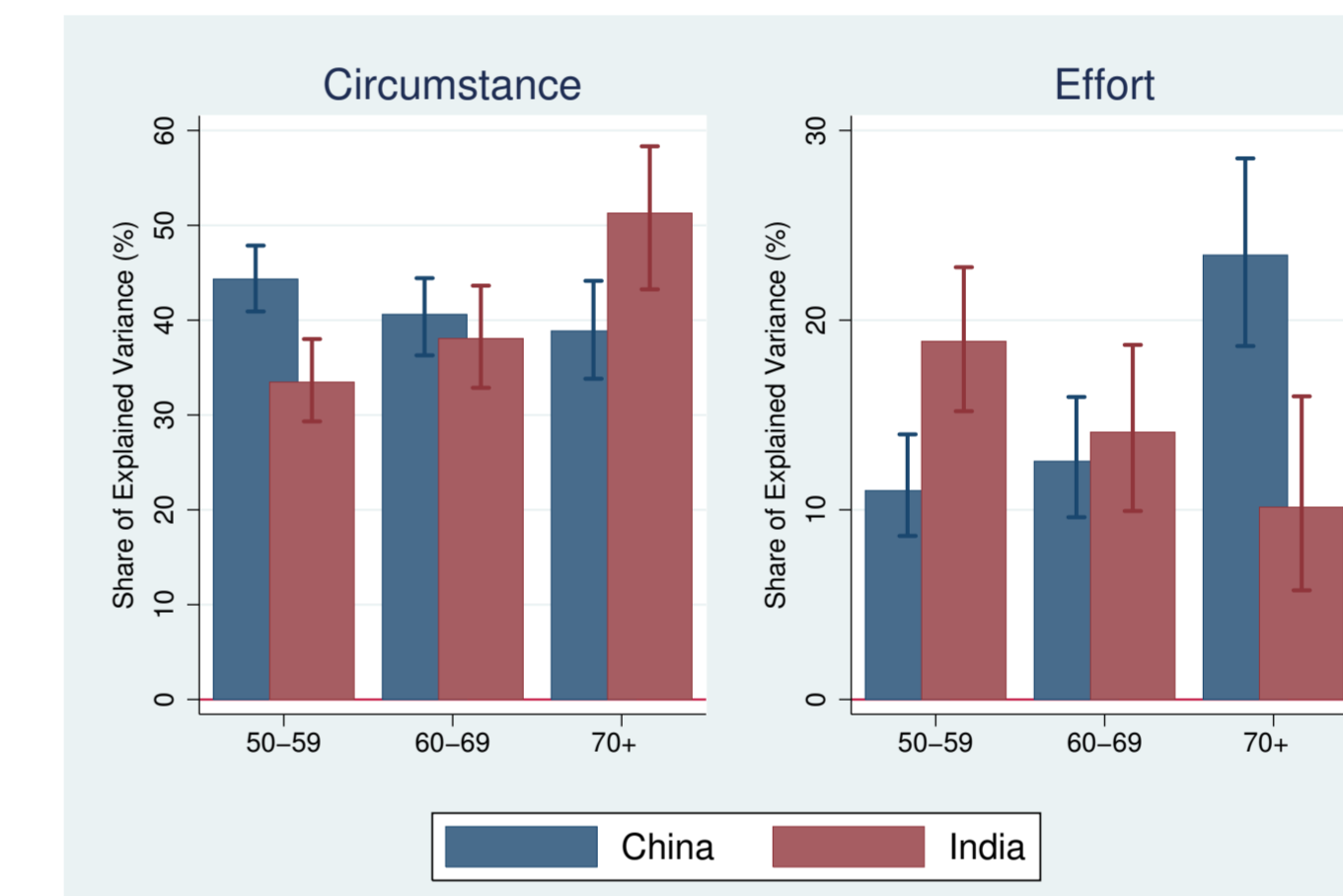


- The importance of circumstances has declined over time in India, while it shows similar contribution for different cohorts in China.
- The importance of effort is significantly higher among the oldest cohort in China.

Figure 2. Contribution of different factors in health inequality by age cohorts (with bootstrapped 95% C.I.).



- While circumstances are less important in India, it mainly favors the male.
- The importance of effort is also lower among females in India, indicating the strong role of external factors in determining inequality.
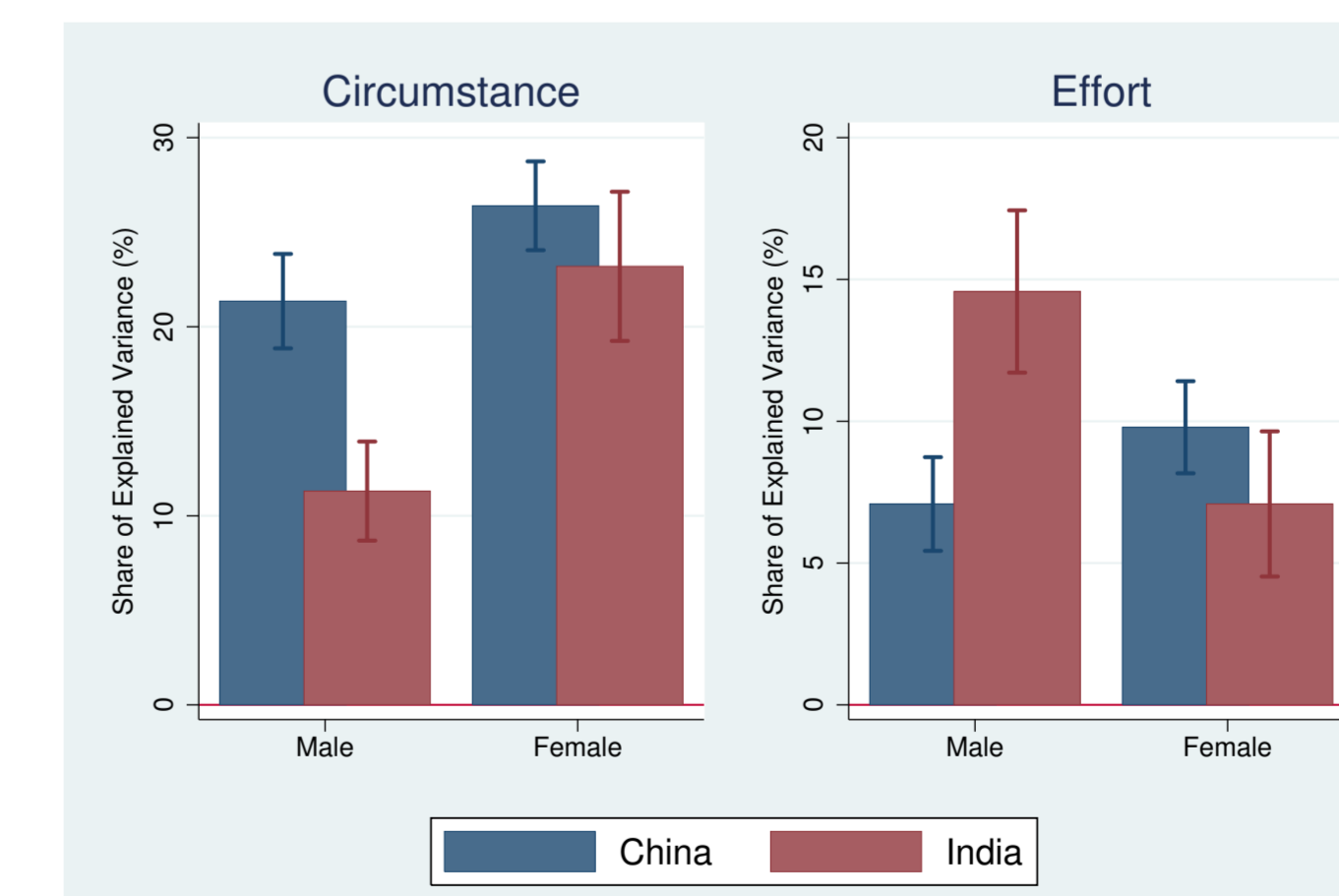
Figure 3. Contribution of different factors in health inequality by gender (with bootstrapped 95% C.I.).

## Conclusions

- The cross-country comparison highlights the limitation of drastic policies in diluting the relation between circumstances and health among aging population in China.
- For India, the results highlights not only the need for redistributive policies acknowledging the role of circumstances, but also a need to put gender in the center of any such policies.