Disparities in Health, Wealth, and Well-Being among Elderly in Developing Countries : Evidence from the Indonesia Family Life Survey

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Extended Abstract

With the "graying" of populations in many countries, one important issue that emerged in recent years is the relationship between aging and inequality. The complex relationship between aging and inequality is inextricably linked to the complex relationship between health, wealth, and well-being of the elderly.

There are several reasons why disparities in health, wealth, and well-being of elderly could exist and may persist. *First*, health and wealth evolve over the life cycle. Health very early in life may affect health and well being throughout the life course. Subsequent investment in health and health shocks at different points in life may shape health and well being later in life. Similarly, resources owned by individuals or families early in life, investments made since then, and shocks experienced throughout the life course determine wealth and well being of the elderly. Whatever inequality in health or wealth that existed early in life may persist or even be amplified in older age. *Second,* health may affect socio-economic status and well-being through various pathways; at the same time health and health behavior may also be affected by resources owned by individuals, households, and communities. Therefore, inequality in health may reflect inequality and at the same time reinforce inequality in other domains.

In recent years, advances in methodology and the increasing availability of surveys on aging and health in developed countries have enabled researchers to increase the understanding of the relationship between ageing and inequality. Much less have been studied in the context of developing countries, where the issue of aging and inequality could also be important for additional reasons. *First,* while currently the populations of developing countries are relative young compared to developed countries, the developing countries are experiencing much more rapid increases in the number and percentage of older people.[1] *Second,* the lack of government and institutional support for older population in developing countries and the decrease in the number of younger population that can support the older generation mean that providing care and support for older people will be a daunting challenge for these countries. Family resources and the disparities between families may play an important role in influencing the disparities in health and wealth of elderly individuals. *Third,* the still ongoing epidemiological shift from communicable diseases to non-communicable diseases that is occurring in the developing countries that are at the same time are aging rapidly may present different challenges than those that have been faced by developed countries.

This paper will take advantage of a recently available data from a developing country. We will utilize data from four waves of the Indonesia Family Life Surveys, including the newly available IFLS4, to focus on the relationship between socio-economic factors and health later in life. Results from our current

[1] National Institute on Aging (2009) *Why Population Aging Matters: A Global Perspective*.

research[2] (Witoelar, Strauss, and Sikoki 2009) show evidence of inequality across social status of health outcomes and inputs. While the study is cross-sectional, we are able to show that at least part of the relationship between SES and health outcomes is causal. The paper that we are currently proposing will try to further the study by utilizing the panel nature of the data and look at the issues in dynamic context that will involve, among other things, taking into account individual fixed effects. The data that we will be using allow use this approach.

Data

The Indonesia Family Life Survey is a longitudinal household survey that collects a vast array of information from individuals, households, communities, and health and education facilities. Information collected from individuals and households include key socio-economic variables such consumption expenditure, income, assets, education, a number of labor market outcomes including work history, and migration history. Other topics such as fertility and marital history, transfers, were also collected. On health, extensive measures of health, such as self-reported and nurse-reported health status, activities of daily living, morbidity experience, uses of health facilities were collected. In addition, biomarkers were taken, such as height, weight, waist circumference, blood pressure, pulse, hemoglobin level, and lung capacity. In IFLS4, some additional health measures were added including blood cholesterol levels (total and HDL), grip strength and leg length.

The first wave of IFLS, collected in 1993, interviewed 7,224 households and around 22,000 individuals. Health measurements were taken from around 24,000 individuals. Starting from IFLS2 (1997), the IFLS also track and interview some members who left their original households, even if they moved outside the enumeration areas. In IFLS2, the total number of households interviewed, including the split-off households was around 7,600. Around 29,000 individuals had their health measured. In IFLS3 (2000), the number of households interviewed was around 10,400 and the number of individuals who had their health measures taken was close to 36,500. In the new IFLS4 collected in 2004, the number of households interviewed is around 13,500, and almost 42,000 individuals had their health measured.

Tracking the movers helps to keep attrition rates – an inherent weakness of any longitudinal survey – of the IFLS low. For longitudinal analysis of health, this is important because migration is typically positively correlated with human capital and health. Unobserved factors affecting decision to migrate may also be affecting some dimensions of health. The longitudinal nature of the survey, the availability of an extensive set of health measures, and low attrition rates makes the IFLS very suitable for our analysis on the relationship between poverty and health in later life.

Socio-Economic Variables

As discussed above, information on key variables indicating socio-economic status (SES) are available in all waves of the IFLS. This includes key variables such as consumption expenditure (from which an indicator of economic status such is whether a household is below a defined poverty line can be constructed), education (including education of parents as well as other household members, and assets, which can also be used to define poverty.[3] Data from four waves of the IFLS spanning over 14

[2] Witoelar, Firman, John Strauss, and Bondan Sikoki (2009) *Socioeconomic Success and Health in Later Life: Evidence from the Indonesia Family Life Survey,* manuscript.

[3]While questions on household assets were asked in all waves of IFLS, IFLS4 was the first one to use unfolding brackets to deal with non-responses in the wealth module.

years will be utilized to look at the relationship across time. The longitudinal nature of the data enables us to look at the changes as well as levels.

Health Markers

In this paper, we will focus on a number of health markers that are known in Indonesia to be problems among the elderly and that are in addition known to be closely related to socio-economic indicators such as income, wealth, and poverty. We will focus on the older population, those 45 years and older, to be comparable to the Health and Retirement Study (HRS) and its offshoots.

The importance of looking at several health outcomes cannot be overstated. Health is multidimensional and hard to measure. For example, while some health indicators may suggest that an individual is relatively healthy, other health indicators may suggest otherwise. Often the only available data on health comes from self-reported responses, of which interpretations are complicated by the fact that they may not reflect true health outcomes but influenced by other factors that may affect other outcome of interest. Even objective measures of health are, too some extent, subject to measurement errors, although good training of field enumerators who collect the data may minimize the errors.

The importance of looking at multiple measures extend to the issue of inequality. For example, while for some health measures there can be variation across income, for other health measures, there may not be disparities at all, as illustrated in the tables below. Under- and over-nutrition seem to vary with income, as does cognitive capability (as measured by numbers of words recalled in a module designed to measure short term memory); but hypertension seem to have no relationship with pce.

Health outcomes of Adult Female Age 45+ by PCE quintiles, 2007

PCE Quintiles	Mean BMI	% under-nourished	% overweight	% with Hb below threshold	% with hypertension	Number of words recalled
1	21.6	24.2	21.2	27.0	53.4	2.4
2	22.3	21.0	23.6	29.5	52.0	2.7
3	22.7	18.1	30.6	20.6	52.0	2.8
4	23.7	13.2	38.0	25.1	53.8	2.9
5	24.9	8.5	50.1	21.9	52.9	3.6
All	23.1	16.9	32.9	24.7	52.8	2.9

Health outcomes of Adult Male Age 45+ by PCE quintiles, 2007

PCE Quintiles	Mean BMI	% under-nourished	% overweight	% with Hb below threshold	% with hypertension	Number of words recalled
1	20.3	26.6	6.6	27.7	43.3	2.8
2	21.1	19.1	10.4	23.6	42.0	3.0
3	21.6	19.5	16.7	14.4	42.9	3.3
4	22.4	12.3	21.0	18.3	45.3	3.6
5	23.8	8.7	37.0	14.3	49.9	4.0
All	21.8	17.1	18.4	19.6	44.8	3.3

The paper will go beyond looking at bivariate relationship and cross-sectional approach such as the above. We will instead investigate, under dynamic context, the inter-relationship between health, wealth, and well being of elderly by focusing the following health outcomes:

- **Body mass index**. Body mass index, defined by weight (in kg) divided by height (in m) squared have been shown to be associated with various health outcomes. Extreme values of BMI: undernourished (below 18.5), overweight (above 25) and obese (above 30) are associated with elevated morbidity and mortality. Studies have also shown the association between BMI and income: BMI rises as aggregate income increases, and the distribution of BMI shift to the right as development proceeds. In Indonesia, data from IFLS2 and IFLS3 shows that while a fraction of adults are still undernourished, a relatively high fraction of adults are overweight, especially among women with the incidence around 25 and 30% in 1997 and 2000 respectively.[4] The substantial degree of overweight is an example of a phenomenon that is of increasing importance in poor countries as well as rich.

- **Waist circumference**. Waist circumference along with BMI is a predictor of coronary heart disease, by indicating body fat content.

- **Blood hemoglobin levels**. Blood hemoglobin levels are of interest because low levels indicate problems of iron anemia, which can have various negative functional consequences.[5] Iron deficiency is associated with lower endurance for physical activity. For some types of employment, iron deficiency may affect productivity significantly.

- **Word recall.** Immediate and delayed word recalled is used as one of the cognitive measures, namely the episodic memory measure. In IFLS4, like HRS, respondents are read a list of ten simple nouns and they are immediately asked to repeat as many as they can, in any order. After answering unrelated questions on morbidity, the respondents are then asked again to repeat as many words as they can. We use the average number of correctly immediate and delayed recalled words as our memory measure.[6]

- **Activities of daily living/instrumental activities of daily living (ADL/IADL**). The self-assessment of basic physical functioning and activities of daily living (ADLs) provide useful information about a person's functional status and have been shown to be correlated with SES measures (see for instance, Strauss et al., 1993).[7] In addition to ADLs, in 2007 the survey also collects self-assessed information about instrumental activities of daily living (IADL), which includes activities not necessary for fundamental functioning, but required to be able to live independently.

[4] John Strauss, Kathleen Beegle, Agus Dwyiyanto, Yulia Herawati, Daan Pattinasarany, Elan Satriawan, Bondan Sikoki, Sukamdi, Firman Witoelar (2004), *Indonesian Living Standards: Before and After the Financial Crisi*s, Singapore: RAND/ISEAS.

[5] Hemoglobin levels may also be low if a person has an infection, or for other reasons.

[6] McArdle, John, James P. Smith and Robert Willis, 2009. "Cognition and economic outcomes in the Health and Retirement Survey", manuscript, RAND Corporation, Santa Monica, CA.

[7] Strauss, John, Paul Gertler, Omar Rahman and Kristen Fox, 1993. "Gender and life-cycle differentials in the patterns and determinants of adult health", *Journal of Human Resources*, 28(4):791-837.

- **10-question version of Center for Epidemiologic Studies Depression Scale** (**CES-D**). The CES-D scale is one of the most common measures to determine individual's depression quotient. This scale has been used in other population-based surveys and was added in IFLS4.

- **Self reported general health status** (**GHS**). Perceptions of general health are found predict subsequent mortality in surveys such as the HRS and ELSA (for example, Banks et al., 2009), even though there is a worry that how one reports their health may be affected with how often they see doctors, or other, more general views of the world.[8] [9]

- **Smoking.** A recent study using a longitudinal health and ageing survey in Europe shows that smoking and low physical activities are consistently linked with deterioration of health among elderly.[10] Smoking among adult males is prevalent in Asia and is very prevalent in Indonesia. The incidence of smoking among men 15 years and older is about 70 percent, and most smokers started smoking at fairly young age. [11]

- **Physical activites.** Studies have suggested that time spent on energy-intensive activities may be able to explain the rising rate of obesity [12] and explain cross-country differences in obesity among older Americans and Europeans .[13] Lack of physical activities is linked to deterioration of health among elderly in Europe. [14] IFLS4 added questions on whether individuals perform different types of physical activities in the past week.

[8] Strauss, John and Duncan Thomas, 1995. "Human resources: empirical modeling of household and family decisions", in J.R. Behrman and T.N. Srinivasan (eds.), *Handbook of Development Economics, Volume 3A*, Amsterdam: North Holland Press.

[9] Strauss, John and Duncan Thomas, 1998. "Health, nutrition and economic development", *Journal of Economic Literature*, 36(3):766-817.

[10] Börch-Supan, Axel, Agar Brugiavini, Hendrik Jürges, Arie Kapteyn, Johan Mackenbach, Johannes Siegrist, Guglielmo Webger, 2008. First Results from the Survey of Health, Ageing and Retirement in Europe (2004-2007). Mannheim Research Institute for the Economics of the Aging (MEA).

[11] Witoelar, Firman, John Strauss, Pungpond Rukumnuaykit, (2006). "Smoking behavior among youth in a developing country:The case of Indonesia". Mimeo, University of Southern California.

[12] Cutler, David M., Edward Glaeser, and Jesse M. Shapiro, 2003. "Why Have Americans Become More Obese?" *Journal of Economic Perspective.* 17(3): 93-118.

[13] Michaud, Pierre-Carl, Arthur H.O. van Soest, and Tatiana Andreyeva, 2007. "Cross Country Variation in Obesity Patterns among Older Americans and Europeans". Forum for Health Economics and Policy, 10(2).

[14] Supan, et al. (2008)