EC4300: Microeconometrics

Assessing the Health of Costa Rica's Elderly Population

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Outline

Research Question

What effects do socioeconomic variables have on the self-reported health status of older adults in Costa Rica?

Objective

Analyze the role of *health as a form of human capital*, as well as the impact of various social, economic, environmental, and demographic factors on it. Understanding and/or controlling these aspects can have an impact on individuals' productivity, which can help drive investments in health.

Literature

An early study was conducted by Jewell et al. (2007), titled *The health status of the elderly in Latin America*.
I replicate it using data from CRELES (*Costa Rican Longevity and Healthy Aging Study*), a study conducted by researchers from the University of California, Berkeley, and the University of Costa Rica.

- Population: Individuals born between 1945 and 1955 and residing in Costa Rica between 2010 and 2011, and their partners.
- Final sample: 3289 older adults.

Source: CRELES

Methodology

Model developed by Grossman (1972). In any period (t), individuals derive utility from:

- Income
- Health capital stock (H_t)
  - Health stock inherited from the previous period (H_{t-1}), net of depreciation
  - Health investment made in the previous period (I_{t-1})

$$H_t = (1 - d_{t-1})H_{t-1} + I_{t-1} \tag{1}$$

With $d_{t-1} \in (0, 1)$ as the depreciation rate for period $t - 1$.

Methodology

Solving for the optimal health stock at T:

$$H_t = \prod_t \alpha_{T-i}\theta + \sum_j I_{T-j} \prod_k a_{T-k} \tag{2}$$

$i = 1, ...T; j = 1, ...T; k = 0, ..., j-1; a_T = 1$. With θ as the initial health stock and $a_{t-1} = 1 - d_{t-1}$. In general, the function of health stock at T is defined as:

$$H_T = F\left[d, I, \theta\right] \tag{3}$$

Methodology

Starting from:

$$H_T = F\left[d, I, \theta\right]$$

We define:

$$H_T = \Omega\beta + \epsilon \tag{4}$$

As the econometric derivation of the health stock for period T. In Ω, the approximated variables of F are found. We define β and ϵ as vectors of coefficients and errors, respectively.

Are there data for depreciation and health investment?

No. It is not possible to specifically determine the data as one could, for example, with GDP.

Empirical Model

Starting from:

$$H_T = F\left[d, I, \theta\right]$$

We define the variable *self-rated health*, which represents the self-perceived health status of the study population, as follows:

$$\begin{aligned} health &= 1 \;\; \text{Poor} \\ health &= 2 \;\; \text{Good} \\ health &= 3 \;\; \text{Very good or excellent} \end{aligned} \tag{5}$$

For which an ordered logit model is defined.

Variables

I follow a similar approach as Jewell et al. (2007) and define the variables as follows:

Table: Health Depreciation, d

Variable	Description	Kind
age	Age	Discrete
female	Female	Indicator
exercise	Frequently exercises	Indicator
havesmoked	Has smoked	Indicator

Variables

Table: Health Investment, *I*

Variable	Description	Kind
educ	Educational level (years)	Discrete
readwrite	Knows to read or write	Indicator
food	Enough money for food	Indicator
marital	Has been in a relationship	Indicator
ebais	Visits EBAIS	Indicator

Variables

Table: Initial Health Stock, θ

Variable	Description	Kind
childpov	Was poor in childhood	Indicator
childhealth	Health condition in childhood	Categorical

Hypothesis

$$H_T = \Omega\beta + \epsilon$$

- There is a negative relationship with variables related to depreciation.
- Variables approximating health investment have a positive impact.
- The initial health stock has a positive effect.

Table: Marginal Effects on Self-Reported Health

Variable	Marginal Effect		
	Low	Moderate	Good
Age	0.006	-0.002	-0.003
Education	-0.070***	0.028***	0.043***
Marital Status	0.007	-0.003	-0.004
Female	0.045	-0.017*	-0.027
Exercise	-0.058**	0.021**	0.036**
Have Smoked	0.036	-0.014	-0.021
Read or Write	-0.059	0.026	0.034
Food	-0.186***	0.092***	0.094***
EBAIS	-0.109***	0.041***	0.068***
Child Poverty	0.006	-0.002	-0.003
Child Health			
Very good	-0.143***	0.074***	0.069***
Good	-0.225***	0.103***	0.123***

* p<0.10, ** p<0.05, *** p<0.01

Conclusions

- Good self-perception of health in the elderly is positively related to good health coverage, higher education, and adequate nutrition.
- Regarding the probability of the elderly having a good self-perception of health, both health investment and the initial stock have a positive effect. Conversely, depreciation has a negative impact.
- In contrast to the original paper, public health coverage has a positive and significant impact on the probability of the elderly having an excellent self-perception of health. I suggest that the robustness of the Costa Rican healthcare system causes this result.

Grossman, M. (1972). Front matter, the demand for health: A theoretical and empirical investigation. In *The demand for health: A theoretical and empirical investigation*. NBER.

Jewell, T., Rossi, M., & Triunfo, P. (2007).El estado de salud del adulto mayor en américa latina. *Cuadernos de Economía*, *26*(46), 147–167.