Disease and Development: The Effect of Life Expectancy on Economic Growth

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Outline

- The Paper: Motivation and Contribution
- The Paper: Methodology
- Replication Analysis
- My Contribution

The Paper: Motivation and Contribution

- Better health conditions $\rightarrow$ life expectancy
- life expectancy $\stackrel{?}{\rightarrow}$ economic growth
- Acemoğlu and Johnson: Effect of life expectancy on economic growth between 1940-1980
  - 1940-1980
    - wave of global drug and chemical innovations
    - establishment of the World Health Organization
    - change in international values
- Main Result: No evidence that increase in life expectancy have a remarkable effect on economic growth as all its effect is dominated mostly by population growth

The Paper: Methodology

- Solow growth model with human capital
- 1st Implication: Higher life expectancy $\rightarrow$ higher population $\rightarrow$ decrease per capita GDP
- 2nd Implication: Higher life expectancy $\rightarrow$ higher productivity $\rightarrow$ accumulation of capital $\rightarrow$ increase per capita GDP

$$y_{it} = \pi x_{it} + \gamma_i + \mu_t + Z'_{it}\beta + \epsilon_{it}$$

The Paper: Methodology

$$y_{it} = \pi x_{it} + \gamma_i + \mu_t + Z'_{it}\beta + \epsilon_{it} \quad (1)$$

- y is log income per capita
- x is log life expectancy at birth
- π is the parameter of interest
- γ is fixed effect which is a function of the parameters: A_i, TFP
- h_i, human capital
- N_i,total population (and employment)
- μ_t is time varying factors common across all countries
- Z_{it} is vector of other control variables
- Data: 75 countries from Western Europe, Oceania, the Americas and Asia between 1940 and 1980 (or 2000). Most of the data is collected from UN Demographic Yearbooks and League of Nations.

Replication Analysis

- OLS and 2SLS
- OLS: biased, inconsistent due to omitted variable and reverse causality

TABLE 3
LIFE EXPECTANCY, GDP, GDP PER CAPITA, AND GDP PER WORKING AGE POPULATION: OLS ESTIMATES

	Whole World: Just 1960 and 2000 (1)	Base Sample: Just 1960 and 2000 (2)	Base Sample: Just 1940 and 1980 (3)	Low- and Middle-Income Countries Only: Just 1940 and 1980 (4)	Base Sample: Just 1940 and 2000 (5)	Low- and Middle-Income Countries Only: Just 1940 and 2000 (6)
	A. Dependent Variable: Log GDP					
Log life expectancy	1.17	1.55	.78	.65	.85	.43
	(.56)	(.35)	(.33)	(.42)	(.28)	(.38)
Number of countries	120	59	47	36	47	36
	B. Dependent Variable: Log GDP per Capita					
Log life expectancy	−.42	−.19	−.81	−1.17	−1.14	−1.79
	(.58)	(.54)	(.26)	(.38)	(.27)	(.41)
Number of countries	120	59	47	36	47	36
	C. Dependent Variable: Log GDP per Working Age Population					
Log life expectancy	−1.01	−1.03	−.78	−1.10	−1.26	−1.78
	(.60)	(.60)	(.26)	(.38)	(.24)	(.38)
Number of countries	51	47	46	35	46	35

NOTE.—OLS regressions with a full set of year and country fixed effects. Robust standard errors are reported in parentheses. Long-difference specifications with two observations per country, one for the intial date and one for the final date. In all regressions the independent variable is the log of life expectancy at birth. "Whole world" is the set of countries for which we have data on the variables in the regression shown. The base sample is the set of countries for which we can estimate 2SLS regressions. The assignment of countries to the low-, middle-, and high-income categories is based on income per capita levels for 1940. See the text and App. A for definitions and details.

Replication Analysis

- 2SLS : unbiased, consistent
- Predicted Mortality instrument for life expectancy

$$M_{it}^{I} = \sum_{d \in D} [(1 - I_{dt}) M_{di40} + I_{dt} M_{dFt}] \qquad (2)$$

- M_{it}^{I} : Predicted mortality
- I_{dt}: dummy for intervention for disease d at time t
- M_{di40}: Pre-intervention mortality (pre 1940)
- M_{dFt}: Mortality rate from disease d at the health frontier

Replication Analysis

Results:

- positive relation between life expectancy and population growth
- slight positive relationship between log GDP and log life expectancy
- negative relationship between GDP per capita and log life expectancy
- No evidence on large increase in life expectancy lead to significant increase in per capita GDP

My Contribution

- So far: Replication analysis and generate an index for armed conflict (ongoing)
- Introducing a new instrument : Armed conflict
- Armed conflict may destroy physical and human capital $\rightarrow$ validity?
- Hence; Sargan test for validity
- If not,
  - continue with the same instrument
  - find another instrument: investment on long term contracts ?