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Is health capital formation good for long-term economic growth? – Panel Granger-causality evidence for OECD countries

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ABSTRACT

A large body of both theoretical and empirical literature has affirmed a positive impact of human capital accumulation in the form of health on economic growth. For rich countries, however, the existing empirical evidence is mixed. This paper revisits the question whether health capital formation stimulates GDP growth in rich countries applying a new empirical methodology: the panel Granger-causality framework. The results do not lend support to the view that health capital formation fosters long-term economic growth in the OECD area.

1. Introduction

Macroeconomists' interest in health is based on the intuition that a healthy population is likely to be more productive than a sick one. Therefore, improving the health status of the population should foster economic growth *ceteris paribus*. The World Health Organization's Commission on Macroeconomics and Health (2001), for instance, supports this view:

> Improving the health and longevity of the poor is an end in itself, a fundamental goal of economic development. But it is also a *means* to achieving the other development goals relating to poverty reduction. The linkages of health to poverty reduction and long-term economic growth are powerful, much stronger than is generally understood.

The reason why health could have a positive impact on economic growth is that health is an element of human capital. Ever since Solow's (1956, 1957) model of economic growth has been 'augmented' by human capital, the growth-enhancing role of human capital accumulation has been recognized. The pioneering empirical studies by Barro (1991) and Mankiw et al. (1992) focused on the educational dimension of human capital, yet it has been known for long that human capital can also be accumulated by improving the health status of the population (Schultz, 1961; Mushkin, 1962). Weil's (2007) paper is the

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Table 1
Macroeconomic growth studies with a focus on health.

Study	Growth measure	Health measure	Countries and time period	Coefficient
Knowles and Owen (1995)	Log difference of GDP per employed person between 1985 and 1960	Log of (80 years minus life expectancy at birth)	84 countries 1960–1985	0.381*
Knowles and Owen (1997)	Log difference of GDP per employed person between 1985 and 1960	Log of (80 years minus life expectancy at birth)	77 countries 1960–1985	0.582*–0.797*
Rivera and Currais (1999a)	Log difference of GDP per employed person between 1990 and 1960	Log of the share of health expenditure in GDP	OECD-countries 1960–1990	0.22*–0.33*
Rivera and Currais (1999b)	Log difference of GDP per employed person between 1990 and 1960	Log of the share of health expenditure in GDP	OECD-countries 1960–1990	0.21*–0.22*
Bloom et al. (2001)	Growth rate of per-capita GDP	Log of life expectancy at birth	104 countries 1960–1990	0.04*
Bhargava et al. (2001)	Growth rate of per-capita GDP	Log of the adult survival rate	73–92 countries 1965–1990	0.181*–0.358*
Heshmati (2001)	Log difference of GDP per employed person between 1990 and 1970	Log of per-capita health expenditure	OECD-countries 1970–1992	0.175*
Webber (2002)	Growth rate of GDP per employed person	Calorie intake per-capita	46 countries 1960–1990	0.08–0.22
McDonald and Roberts (2002)	Log of GDP per employed person	Log of (80 years minus life expectancy at birth)	77 countries 1960–1989	0.12*
Rivera and Currais (2003)	Log difference of GDP per employed person between 2000 and 1960	Log of the share of health expenditure in GDP	OECD-countries 1960–2000	0.18*–0.26*
Rivera and Currais (2004)	Growth rate of GDP per employed person	Public health expenditure	17 Spanish regions 1973–1993	0.13*
Bloom et al. (2004)	Growth rate of per-capita GDP	Log of life expectancy at birth	104 countries 1960–1990	0.04*
Jamison et al. (2005)	Log of per-capita GDP	Log of the adult survival rate	53 countries 1965–1990	0.50*
Weil (2007)	(Proportional reduction in variance of) log of GDP per-capita	Adult survival rate (among others)	92 countries NA	0.099

* Statistically significant at the 5% level.

most recent in a chain of studies that have affirmed the growth-enhancing role of health capital formation empirically (cf. Table 1).[1,2]

However, Weil (2007, p. 1295 and 2005, pp. 153–161) also suggests that health's positive effect on GDP is strongest among poor countries. For rich countries, the existing empirical evidence on whether health capital formation stimulates GDP growth at all is mixed. For instance, while Heshmati (2001) and Rivera and Currais (1999a, 1999b, 2003, 2004) find a positive effect of health expenditure growth on productivity growth for OECD countries (or Spanish regions, respectively), Knowles and Owen (1995, 1997) as well as McDonald and Roberts (2002) reject the hypothesis that life expectancy is a statistically significant explanatory variable for productivity growth in high-income countries. Bhargava et al. (2001) even estimate a negative effect of the adult survival rate[3] on economic growth for the US, France, and Switzerland. Acemoglu and Johnson (2007) reach a similar conclusion.

This paper revisits the question whether health capital formation stimulates GDP growth in rich countries. The main difference in the paper against most of the literature surveyed in Table 1 is its focus on *long-term* economic growth. While it is relatively uncontroversial that a positive shock to investment in physical or human capital will stimulate economic growth contemporaneously, it is less clear what happens over a longer time horizon. Health capital augmented endogenous growth models, for instance (e.g., van Zon and Muysken, 2005; Pugno, 2006), predict that a permanent increase in the investment rate in health capital will increase economic growth permanently. In order to test whether this is the case we need a methodology that keeps track of the time-lags involved and that ascertains that causes, if we can identify them, precede effects. Both these aspects suggest choosing the methodology of Granger-causality testing for the empirical part of this paper. To be more specific, the paper will apply the relatively new empirical methodology of dynamic *panel* Granger-causality tests in order to test the effects of health capital formation on long-term economic growth.

The paper is organized as follows. The next section introduces the data and methods to be used in the estimations. Section 3 presents the results of the causality analysis and robustness checks, and Section 4 concludes.

[1] Of course, there are many more studies that include health-related variables among a sometimes very large set of explanatory variables for economic growth. The papers listed in Table 1 stand out due to their explicit focus on health. For similar compilations, cf. Tompa (2002) and Bloom et al. (2004).

[2] There is no asterisk behind the Weil (2007) coefficient because Weil arrives at his estimate not by means of regression analysis. The only regression study that finds no significant effect is Webber (2002), which is also the only study that uses calorie intake as a proxy for health capital formation. Note that the coefficients reported in the last column of the table are not directly comparable since the models and samples differ.

[3] Drawing on current life tables, the adult survival rate measures the probability that a 15-year-old will reach the age of 60.