



The contribution of increased life expectancy to economic development in twentieth century Japan

Kerry Jane Hickson

University of Cambridge, HPSS, Downing Place, Cambridge, United Kingdom

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ABSTRACT

This paper estimates the value of improved health in Japan over the twentieth century. By valuing the decline in the death rate and appending this to existing measures of GDP per capita it is possible to calculate health augmented GDP per capita growth and generate original results about the monetary value of improved life expectancy over the twentieth century in Japan. The findings of the paper indicate that this is a pertinent exercise because GDP per capita growth approximately doubles when it is extended to include increases in the life expectancy of the population of Japan. These results also provide a justification for the increase in health care service spending that was evident at the close of the twentieth century.

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1. Introduction

Accompanying Japan's successful industrialisation were similarly impressive improvements in health. During the twentieth century life expectancy increased by 36 years, 28.5 of which occurred between 1947 and 2000 (JMHV, 2001). Increases in life expectancy are an important manifestation of improvements in human welfare. However these developments have been unrecognised by conventional 'Hicksian' or production based measures of economic growth, which only consider national output and income.

The motivation for this paper is to value Japan's health in conjunction with existing GDP per capita measures in order to provide a more accurate indication of Japan's economic development. This more comprehensive measure of economic growth will be achieved through adjusting real income to reflect the value of improving health status. The intuition is that the same annual income with a long and healthy life should be ranked as a higher living standard than that income with a short and diseased life. Hence, people are better off when they live longer and this fact should be recognised in measures of their income, living standards, and national product. This feature is especially pronounced given Japan's world leadership in average life expectancy.

Health care expenditure is included in measures of national income, and represents a growing fraction of gross domestic product (GDP). Between 1955 and 1973 Japan's health care spending as a ratio of GDP increased from 2.7% to 3.9%, and by the close of the twentieth century represented over 5% of GDP (Maddison, 2001). Although the cost of health care has been documented there has not been an attempt to value the equivalent output or return on health care over the twentieth

E-mail address: kh422@cam.ac.uk.

Table 1
Growth rates of real GDP per capita, Japan, 1900–2000 (% per annum).

Decade	GDP per capita growth rate
1900–1910	1.0
1910–1920	2.6
1920–1930	0.9
1930–1940	4.4
1940–1950	–4.0
1950–1960	7.3
1960–1970	8.9
1970–1980	3.2
1980–1990	3.4
1990–2000	0.7

Sources: author's calculations from Maddison (2001).

century in Japan. Existing techniques that measure the price and quantity of health care are highly defective, and there are no efforts to represent improvements in the length of life. Therefore, measurement of health service output poses a difficult but increasingly relevant challenge that motivates the adoption of a more utility based or 'Fisherian' calculation of economic growth to include an estimate for health care output, in terms of the value of additional life years health care spending or inputs have delivered.

The contributions of the paper are fourfold: the application of a novel methodology will generate original estimates of 'Fisherian' or utility based GDP per capita growth in twentieth century Japan; the results of calculating GDP per capita augmented for health output will specifically highlight the extra contribution that improved mortality has contributed to more detailed measures of growth; these original estimates of health augmented GDP per capita will emphasise the magnitude of Japan's economic development during the twentieth century; the paper also generates optimistic conclusions about the productivity of health care spending which provides a justification for the increase in health care service spending that was evident at the close of the twentieth century under the mandatory long-term care insurance.

The paper is organised as follows. In the next section the key features of Japan's economic and health growth will be summarised. Section 3 presents the methodology that will be used to generate original results about the value of Japan's health augmented GDP per capita growth. Section 4 presents these results and Section 5 concludes.

2. Remarkable growth: economy, health, and government policy in twentieth century Japan

This section summarises twentieth century GDP per capita growth trends, government initiatives towards improving the health of the nation and the health outcomes, as measured by life expectancy.

2.1. Economy

During the twentieth century, particularly the post war period, Japan experienced one of the most successful industrialisation episodes in world history. Initial modern economic growth began with the Meiji Restoration in 1868, after which Japan took-off at a relatively rapid rate of pre-modern economic growth.¹ Another important area of economic development in the pre World War One period was the increase in standards of living and per capita income, by nearly 30% (Smitka, 1988).

The financial crisis of 1920 and the financial panics during the 1920s, combined with the World Depression from 1929 and World War Two burdened Japan with economic problems (Francks, 1992). In contrast, by 1955 Japan had completed her reconstruction and began to enter a phase of rapid economic growth. Numerous reasons have been postulated for such successful growth, from a high investment rate to a unique industrial structure, and a highly educated workforce, among other contributing factors.² Additional improvements in the standards of living of the population were yielded by the rise of affluent society and increased levels of consumption and commendably, increased national equality in wages (Gordon, 1993).

During the 1970s Japan's catch-up growth came to an end. The decline in domestic demand-led economic growth was exacerbated by OPEC's fourfold increase in oil prices from late 1973.³ By 1986 Japan was enjoying demand-led recovery with momentum that continued until the economic 'bubble' burst at the end of the 1980s (Akihiro & Woo, 2001). During the final decade of the twentieth century Japan's economy grew at a mere 1%.⁴ Table 1 summarises the per decade growth rates experienced in twentieth century Japan.

The magnitude of Japan's growth achievements over the twentieth century and especially in the post-war era, are reflected in Table 2 which compares Japan's GDP per capita growth with that in the USA and the UK.

¹ For a detailed outline of Japan's early twentieth century growth see Okawa and Rosovsky (1973).

² For a detailed consideration see Horioka (1990), Hunter and Storz (2006), and Flath (2005) for a general overview.

³ For more coverage of this point see Smitka (1988).

⁴ See Mikitani and Posen (2000) and Amyx (2004) for details about the continuing growth problems caused by the financial crisis and Gao (2001) for an explanation about the effects of mature growth.

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