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Pollution, health and economic growth

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ABSTRACT

This paper examines the growth impacts of aid allocation on health-care and pollution abatement in an endogenous growth model, and finds that the aid tied to them contributes positively to the equilibrium growth rate. Nonetheless, the growth rate can be reduced or even impaired if the ratio of aid on pollution abatement is lowered.

1. Introduction

Air pollution, including carbon monoxide, nitrogen dioxide, ozone, particulates, sulfur dioxide and lead, has threatened the health of human beings in ways that range from obvious symptoms of illness to subtle physiological changes in the body. According to the World Health Organization (WHO, 2009) report, indoor and outdoor air pollution were respectively listed as the 10th and 14th leading risk factors of global deaths in 2004. In February 2014, WHO in particular cautioned that air pollution in Beijing should be regarded as a crisis to health. The threat of air pollution to health has been widely recognized and cannot be overlooked.

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Table 1
Indicators of the health expenditure ratios of selected countries in 2010.

Countries	Total expenditure on health as % of GDP	General government expenditure on health as % of total government expenditure	External resources for health as % of total expenditure on health	Per capita total expenditure on health (US$)
Japan	9.5	18.4	–	4,065.4
United States	17.9	22.4	–	8,361.7
United Kingdom	9.6	16.0	–	3,502.8
France	11.9	16.3	–	4,690.9
Germany	11.6	18.7	–	4,668.3
Ethiopia	4.9	13.5	39.4	16
Ghana	5.2	12.1	16.9	67
Mozambique	5.2	12.2	24.2	21
Tanzania	6.0	13.8	48.8	31
Uganda	9.0	12.1	25.9	47

Source: World Health Statistics (WHO, 2011).

A deteriorating environment, which affects health and may possibly cause an epidemic, can result in an adverse impact on labor productivity and consequently on economic activities (e.g., Eglin, 2001). For example, during the 2003 SARS period, GDP fell by 0.25% (NT$22 billion) in Taiwan. This concern has attracted substantial attention around the world, and many countries and international organizations have started to implement countermeasures for environmental issues, most notably those discussed in the Kyoto Protocol. Sustainable development involving how to balance economic growth and environmental quality is a key consideration for policy makers (e.g., Shieh, Chen, Chang, & Lai, 2014). However, due to the lack of private and government funds, environmental conservation in many countries has relied on foreign aid. The purpose of this paper is thus to consider the growth effect of aid allocation on healthcare and pollution abatement, and then to investigate the tradeoff between environmental protection and economic growth in the economy.

In addition, concerns with regard to health and diseases can influence the demand behavior of consumers. Diseases, especially infectious diseases (such as SARS in 2003 and the Ebola virus in 2014), have already become a serious factor in determining consumption. When SARS occurred in 2003 in China, consumers avoided going to public places to engage in leisure activities. This lowered the demand for goods and services, and thereby had a negative impact on the utility of consumers (cf. Agénor, 2008).

It is noted that expenditures on healthcare are lowered for developing countries compared to developed countries. As reported in Table 1, the healthcare expenditures are 4.9%–9% of GDP for the selected developing countries, while they are 9.5%–18% for the developed countries. Table 1 also reveals that the health funding in those developing countries mainly relies on foreign aid (17%–49%). In recent years, international humanitarian relief organizations, in accordance with disasters caused by diseases or wars in low- and middle-income countries, have initiated health aid-related activities. Organizations, such as the Médecins Sans Frontières (MSF) (or Doctors Without Borders), Aide Médicale Internationale (AMI) and International Committee of the Red Cross (ICRC), have actively participated in the international medical reliefs and in the provision of assistance in public health. Namely, in 2013, an estimated 8,223,000 people (31% for women and 50% for children) benefited from ICRC-supported healthcare facilities (ICRC, Annual report 2013).

Moreover, Fig. 1 illustrates the development of health aid since 1973: health aid has been increasing at an average annual growth rate of 5.4%, and this growth rate even accelerated to 13% between 1998 and 2002. According to the OECD (2013) report, two largest recipients of health aid are on HIV/AIDS (37%) and infectious diseases (20%), followed by basic health (17%), general health (14%) and reproductive health (12%).

According to the world's rapidly aging population, rising incidences of chronic disease and so on, have combined to make the health care industry to become one of the world's attentions (Chen, Lin, Tseng, & Chen, 2015). In the literature, Van Zon and Muysken (2001), Chakraborty (2004), Aísa