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Inefficiencies in the Japanese National Health Insurance system: A stochastic frontier approach

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ABSTRACT

In this study, I examine the cost inefficiency and production inefficiency of municipal insurers operating under the Japanese National Health Insurance system. I employ insurer-level panel data for 2005 and 2010 and adopt stochastic frontier cost and production models to overcome analytical problems encountered in previous studies. The cost frontier estimates indicate that adverse effects on efficiency are associated with aging of the insured population, soft budget constraints due to government subsidies, insurer contributions to the elder care systems, and an increase in care provider densities. A positive effect on efficiency is associated with an expansion in insurer scale. The production frontier estimates suggest that cost inefficiencies decreased by roughly 15 percent between 2005 and 2010. The correlation between cost inefficiency and technical inefficiency is not particularly strong, whereas the correlation between cost inefficiency and allocative inefficiency is strong and positive.

1. Introduction

The development of health insurance systems has contributed to improvements in health, quality of life, and life expectancy throughout the world. In Japan, the revision of the National Health Insurance Act in 1958 created a universal public health insurance system by requiring uninsured individuals to become insured through the municipality-based Japanese National Health Insurance (JNHI) system[1]. The Japanese universal health insurance system has enabled Japanese citizens to access high quality health care services at affordable prices. As a result, health levels and life expectancy in Japan became the highest in the world in only a short time (Ikeda et al., 2011; Ikegami et al., 2011). Table 1 shows life expectancies at birth and the ratio of health care expenditures to gross domestic product (GDP) for a group of developed countries over the past half century. The data indicate that life expectancy in Japan has reached the highest level in the world, although Japan's health care expenditure share of GDP has, until recently, been below the Organisation for Economic Co-operation and Development (OECD) average.

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[1] An overview of the public health insurance system in Japan is provided in Appendix A.

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Table 1
Life Expectancy (LE) and Health Care Expenditure (HCE) share of GDP, selected developed countries.

	Canada		France		Germany		Italy		Japan		United Kingdom		United States		OECD Average	
	LE (years)	HCE (% of GDP)	LE (years)	HCE (% of GDP)	LE (years)	HCE (% of GDP)	LE (years)	HCE (% of GDP)	LE (years)	HCE (% of GDP)	LE (years)	HCE (% of GDP)	LE (years)	HCE (% of GDP)	LE (years)	HCE (% of GDP)
1960	–	5.4	70.3	3.8	69.1	–	–	–	67.8	3.0	70.8	3.9	69.9	5.1	67.9	3.8
1970	–	6.9	72.2	5.4	70.6	6.0	–	–	72.0	4.4	71.9	4.5	70.9	7.1	69.8	5.0
1980	75.3	7.0	74.3	7.0	72.9	8.4	74.0	–	76.1	6.4	73.2	5.6	73.7	9.0	72.6	6.6
1990	77.6	8.9	76.9	8.4	75.3	8.3	77.1	7.7	78.9	5.8	75.7	5.8	75.3	12.4	74.8	6.9
2000	79.0	8.8	79.2	10.1	78.2	10.4	79.9	7.9	81.2	7.6	77.9	7.0	76.7	13.7	77.1	7.8
2005	80.1	9.8	80.3	11.0	79.4	10.8	80.8	8.7	82.0	8.2	79.2	8.3	77.4	15.8	78.5	8.7
2010	–	11.4	81.8	11.7	80.5	11.5	82.4	9.4	82.9	9.6	80.7	9.6	78.7	17.7	79.8	9.5

Source: OECD Health Statistics 2013 (http://www.oecd.org/els/health-systems/oecdhealthdata2013-frequentlyrequesteddata.htm).

The excellent past performance of Japan's universal health insurance system notwithstanding, the future financial sustainability of the system is threatened by demographic and economic factors. Many JNHI insurers are in poor financial condition. According to Japan's Ministry of Health, Labour, and Welfare (MHLW) (2015), 905 JNHI insurers (52.7 percent of the total) experienced budget deficits in 2013[2], and for 486 of those the deficits were chronic. The MHLW (2015) also reports that the total deficit of JNHI insurers in 2013 was approximately 314 billion yen after excluding non-statutory transfers from general municipality funds. With the public finances of JNHI insurers on track to insolvency, the MHLW is currently attempting to design policy reforms – including consolidating municipal insurers at the prefectural level and reforming the health care system for the elderly – to avert more serious systemic problems. The tenuousness of the present situation can be traced to a number of factors including: the aging population of enrolled members; increases in the number of low-income members; an increase in the number of small-scale insurers; decreases in premium payment rates; and regional disparities in health care expenditures and premiums (Yamada, 1997; Kishida, 2002; Izumida, 2003; National Health Insurance Division, Health Insurance Bureau, & The Ministry of Health, Labour, and Welfare, 2006; Yuda, 2010). In addition, because large subsidies are provided to JNHI insurers by central and local governments (Yuda, Iwamoto, Suzuki, & Morozumi, 2012), some insurers have a soft budget problem, i.e., they have little incentive to improve the cost efficiency of their operations (Tajika & Yui, 1999; Suzuki, 2001; Yoshida & Kawamura, 2008). Moreover, the moral hazard of both patients (e.g., more frequent visits to medical institutions) and care providers (e.g., induced demand) leads to excessive expenditures that may exacerbate insurers' fiscal conditions (Yuda, 2010; Bates, Mukherjee, & Santerre, 2010).

The purpose of this study is to examine factors affecting the financial condition of JNHI insurers. Several previous studies have estimated the cost functions of JNHI insurers. Tajika and Yui (1999) examined the cost structure of insurers based on the balance sheets of 495 municipal JNHI and Elderly Health Care System (EHCS) insurers in five prefectures in 1997. Their OLS results indicate that an increase in the share of premium revenue has a statistically significant negative effect on total health-care benefits. These results suggest that more generous financial support results in higher health care expenditures because subsidies from central and local government cover the budget deficit of JNHI insurers caused by their lower premium payment rates in recent years. Tajika and Yui conclude that the current system may deter insurers from improving their methods of securing premium revenue and promoting efficiency in the allocation of health-care services.

Suzuki (2001) uses data from 44 municipal JNHI insurers in Osaka prefecture from 1994 to 1996 to examine the effects of the subsidies on these insurers' financial conditions. By estimating cost functions, Suzuki (2001) finds that insurers with serious deficits tend to be the recipients of substantial subsidies. Yoshida and Kawamura (2008) examine whether different budget systems cause different degrees of moral hazard in municipal JNHI and Long-Term Care Insurance (LTCI) insurers. Utilizing several municipality-level datasets and employing a stochastic cost frontier model, they find that the soft budgets are more pronounced for JNHI than LTCI insurers because of insured individuals' excessive demand for health services. This moral hazard also implies that the marginal effect of the health service on health outcomes is weaker for JNHI than LTCI insurers. More recently, in the United States, Bates et al. (2010) have used metropolitan-level data to examine the effects of health insurance on the technical efficiency of healthcare production by employing both data envelopment analysis (DEA) and multiple regression analysis. They find that insurance coverage generates inefficiencies, but the efficiency loss appears to be relatively small on the extensive margin.

Previous studies of Japanese insurers are subject to certain analytical problems. First, their cost functions do not include output variables and factor prices, which are critical to properly estimate cost functions. In addition, most of the exogenous variables in the equations have little theoretical justification. The results are thus difficult to interpret from an economic

[2] Year data refer to the government fiscal year which begins April 1 and ends March 31.