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主 論 文 の 要 旨

論文題目

Public Health Spending and Child Mortality: Revisiting the Effectiveness and Efficiency in Asia and the Pacific

(公共保健支出と小児死亡率：アジア太平洋地域における有効性と効率性の再検証)

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論 文 内 容 の 要 旨

Universal Health Coverage (UHC) is the current global commitment to health, especially among WHO member countries. Health financing is acknowledged as the core instrument to achieve UHC. However, the effectiveness and efficiency of public health spending on improving population health remain two critical concerns, especially in developing countries. This dissertation attempts to investigate public health spending in developing countries in Asia and the Pacific. It specifically aims to 1) revisit the effectiveness of public health spending on child mortality 2) revisit the efficiency of public health spending in reducing child mortality, and 3) identify public health spending-related lessons learned from the most efficient countries, especially on leakage control and attacking inequality. This dissertation mainly focuses on low- and middle-income countries in Asia and the Pacific region.

Firstly, the health production function, which was originally developed by Grossman in 1976, is employed to estimate the effect of public health spending on child mortality. In addition to this objective, this dissertation examines whether or not this effect is explained by the measurement of public health spending utilized—measured as a share of gross domestic products, a share of government spending, and per capita. This dissertation employs two variables of child mortality—infant and under-5 mortality rates. A careful econometric analysis is used. For instance, Lewbel’s approach is applied to generate heteroscedasticity-based instruments to run two-stage least square (2SLS) regression. Robustness analyses include utilizing lagged public health spending and limiting samples to low and lower-middle income countries (LLMIC). Additional robustness analyses include adding extra explanatory variables, excluding GDP per capita, using a two or three-year moving average, and using both conventional and generated instruments. This dissertation finds that public health spending is not statistically associated with child mortality—neither infant nor under-5 mortality rate. In other words, the effectiveness of public health

spending is questioned. There are three possible reasons to justify this result including a high proportion of private health spending, the leakage of public health spending, and pro-rich incidence of public health spending. In conclusion, it is suggested that improving the quality of public health spending is also needed rather than merely stressing the size of public health spending in developing countries in Asia and the Pacific region.

Secondly, given the fact that no significant relationship between public health spending and child mortality is proved, the second objective intends to estimate the efficiency of public health spending on reducing child mortality rate. In other words, the focus turns from the size to the quality of public health spending. Public health spending per capita (PHSPC) is primarily employed as the input, and infant and under-5 mortality rates are outputs. Both conventional and bootstrapped output-based data envelopment analyses (DEA) are employed. Sensitivity analyses are also conducted including using input-based DEA, adding extra outputs such as life expectancy, employing additional input like GDP per capita, and substituting PHSPC by public health spending as a share of GDP (PHSGDP). The efficiency scores of 34 countries are estimated annually from 2002 to 2014.

As a result, all six analyses confirm that Malaysia and Sri Lanka are the two most efficient countries compared to other low- and middle-income countries in Asia and the Pacific. Conventional output-oriented DEA identifies Malaysia and Sri Lanka as the two most efficient countries. Results are slightly changed when bootstrapped DEA is employed. No efficiency score is equal to one. Malaysia and Sri Lanka are identified as the first and second most efficient country, respectively. Malaysia and Sri Lanka are still the two most efficient countries when input-oriented DEA is used. Using different combinations of inputs and outputs produce the same results. Malaysia and Sri Lanka are also identified as frontiers from 2002 to 2014 when life expectancy at birth or GDP per capita is added as an additional output or input, respectively. Results remain the same even though PHSGDP is employed as the input. Therefore, it is concluded that Malaysia and Sri Lanka are the two most efficient countries among selected developing countries in Asia and the Pacific. Except for the examples set by these two countries, there is need for development to strengthen the quality of public health spending. In addition to efficiency estimation, the determinants of efficiency are also examined. Both efficiency scores generated from conventional and bootstrapped output-based DEA are employed. Three econometric models are employed including panel-fixed effect, Tobit, and truncated regression models. These second-stage analyses find that bootstrapped efficiency scores produce more robust estimates among these three models than the conventional one. The results are consistent that the size of public health spending is negatively associated with efficiency. Income inequality—representing inequality—discourages the efficiency whereas control of corruption—a proxy of leakage control—significantly contributes to efficiency. Therefore, improving leakage control and attacking inequality are two promising factors in enhancing the quality of public health spending.

The last objective aims to examine lessons learned from the two most efficient countries—Malaysia and Sri Lanka. What have these two countries practiced and implemented to improve leakage control and attack health inequality? A comparative study of Cambodia, Malaysia, and Sri Lanka finds that the first step for improving leakage control is the development of a national health account (NHA), which acts as a tool to reduce leakage. Both efficient countries have already produced fifth report of the NHAs. This comprehensive NHA enables the government to monitor public health spending explicitly. In addition to this, building local institutional capacity is also fundamentally crucial. The first report of the Cambodia's NHA was actually produced in 2014, and WHO and Clinton Health Access Initiative technically and financially supported it. It is hence a must to institutionalize NHA to local organizations such as Cambodia's Ministry of Health.

Two major lessons can be learned on attacking inequality and reaching the poor. Firstly, it is essential to ensure that the sectors or programs that absorb the dominant share of public health spending benefit the poor. Both efficient countries have allocated a high proportion of public health spending to the hospital sector, and the poor proportionately benefit more from hospital spending than the rich. Unlike these two countries, Cambodia's hospital health spending reaches the rich more than the poor, which is the same for many developing countries. These results are probably caused by the second lesson—Malaysia and Sri Lanka have practised two-step protection. First, user-fees are limited in these two countries. Many medical services and medicines are free to all households regardless of household income or economic status. Second, there is unofficial poor protection from medical staff. For instance, health facility directors limit the upper charge on the poor in Malaysia, and Sri Lanka's medical staff tend to avoid to ask the poor patient to purchase medicine; instead, they ration the available stock to poor patients. Unlike these countries, Cambodia has only practiced official protection using a targeting approach. Some health financing schemes have been established including poor exemption, both government and non-government-based health equity funds, and vouchers. Surprisingly, the impact of this health financing is still to be discussed and studied. Hence, Cambodia has to work more to ensure that the poor are protected.

In conclusion, this dissertation provides a series of analyses. It starts from the size of public health spending and the quality of public health spending, and ends with how to improve the quality of public health spending. This dissertation confirmed that the effect of public health spending on child mortality is still dubious in the context of developing countries in Asia and the Pacific. It also stressed that except Malaysia and Sri Lanka, other developing countries still need to put more effort to reach their potential or efficient level. Two critical factors are leakage control of public health spending and attacking health inequality. The comparative chapter concludes that there is a hope that developing countries could achieve universal health coverage. There are a few key lessons learned for developing countries. Developing a comprehensive a national health account and its institutionalization are needed as a mean to control the leakage of public health

spending. Attacking health inequality may rely on ensuring pro-poor hospital spending, limiting user fees, and protecting the poor. A new lesson learned for most developing countries and Cambodia is the limited user fee. Given these findings, this dissertation has some policy implications as follows:

- The size of public health spending should not only be paid attention to, but the equality of public health spending also needs to be a priority.
- Improving the efficiency of public health spending or quality is needed. Two promising issues are the leakage control of public health spending and attacking inequality.
- Developing a comprehensive national health account is an inevitable step to improve leakage control. Moreover, building local institutional capacity to produce a national health account is also a must for developing countries.
- It is fundamentally critical to ensure that sector or programs accounting for a high proportion of public health spending benefit the poor, especially hospital spending.