CHAPTER II

LITERATURES REVIEW

Since Newhouse, J.P. had published his paper "Medical Care Expenditure" in 1977, there have been many studies about health care expenditure. In this chapter, a review of these past achievements is conducted. In general, differences in health care expenditure across countries are explained by differences of national income and health systems, while the difference within a country, depends on demand and supply factors. According to U. G. Gerdtham and B. Jonsson (2000), the works of health care expenditure may be classified into two groups, first-generation studies and second-generation studies. First-generation studies analyzed international cross-sectional data for a particular year, while second-generation studies used panel data among the countries. In this paper, an analysis of the data will be conducted for a single year, followed by a review of first-generation studies.

2.1 Income Elasticity

As Gerdtham et al.(1992) pointed out, "there is no straight forward theory" on the determinants of health care expenditure. Despite this, many studies have tried to formulate some general hypotheses.

Newhouse (1977) analyzed the relationship between national income and health expenditure among 13 developed countries[5] using 1972 data[6]. This pioneering study offered two interesting suggestions. One was that the difference in aggregate income can explain 92% of variance in the health care expenditures. The second was that the income elasticity of health care is more than 1, namely health care is considered to be a "luxury good" in economics terms. This means that the rich can access more health care services, while the poor have less access to health care services. Leu (1986) ran multiple regressions in linear and log-linear form with the data from 19 OECD countries around 1977. Income elasticity was reported 1.18 to 1.36, which supports Newhouse's conclusion.

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[5] 13 countries are Australia, Austria, Canada, Finland, France, Germany, Greece, Italy, Netherlands, Norway, Sweden, United Kingdom and United States.

[6] The data of Canada and Sweden are in 1971, France is in 1970, and Germany is in 1968.

Parkin et al. (1987) used 1980 data among OECD countries with different functional forms, such as, linear, semi-log and double-log, exponential. They also adopted different conversion factors, which are exchange rates and PPP (Purchase Power Parities). The result that income elasticity of health care was around unity was different from Newhouse's. Gbsemete and Gerdtham (1992) also supported this finding and indicated the income elasticity was not significantly more than 1. Gerdtham et al.(1992) also attained a similar result, finding that income elasticity from regression is 1.327, over unity.

On the other hand, studies that analyze the relationship between income and health care expenditure within a country are limited. According to Newhouse (1992), estimates of the income elasticity of demand for health care in U.S. are around 0.2-0.4 between 1940 and 1990.

Tokita (2004) estimated income elasticity of health care expenditure for inpatient and outpatient services separately by ageing group and non-ageing group. Income elasticity for inpatient services was 0.6925 (ageing group) and 0.22101 (non-ageing group), while for outpatient services, it was 0.5679 (ageing group) and 0.4860 (non-ageing group).

The above-mentioned, past studies resulted in an income elasticity of more than 1, when they conducted an international comparison analysis of health care expenditure. At the same time, they found that income elasticity is lower than 1, when they analyzed the relationship within a country.

These results are entirely different, partly because some studies used macro data, such as national health expenditure, but others used micro data, such as household survey. Gerdtham and Jonsson (2000) explained the difference as follows. First, individuals or households with insurance pay small fraction of actual health care costs, meaning that income has less of an impact on health expenditure as an "income restriction." Second, the estimates of studies were inappropriate, because the models omitted some variables. Third, an inadequate distinction between prices and quantities was noted.

Table2-1 Income elasticity

Authors	Sample size	Year	Income Elasticity	Significant factors other than Income***
Newhouse(1977)	13	around 1972	1.15-1.31	-
Gerdtham et al. (1992)	19	1987	1.327	Urbanization(-), Share of health care expenditure on Inpatient(+) and public(-), Fee for service(+)
Gbsemete and Gerdtham(1992)	20	around 1985	1.069	Percentage of births attended by health staff(+), Foreign Aid(+)
Leu(1986)	19	around 1974	1.18 1.36 1.21	Population under 15(+), Public financing(+), Public bed(+), Centralized national health system(-), Urbanization(+)
Parkin, McGuire and Yule(1987)	23 18 18	1980	1.18[a] 1.12[a] 0.90[b]	-
Gerdtham and Jonsson(1992)	22	1985	1.243[a] 1.429[b] 1.435[c]	-
Tokita(2004)	47	1993	0.6925[d,f] 0.2210[e,f] 0.5679[d,g] 0.4860[e,g]	Number of Doctors(+), CT scan(+), Public bed(+), Population over 60(+)
Hitiris and Posnett(1992)*	560 (20 countries)	1960-1987	1.026[a] 1.160[b]	Population over 65 years(+)
Lopez-casasnovas and Saez(2001)**	110 (8countries)	1997	0.3003	Population over 65(+), Public health care expenditure(+)

[a]adjusted by exchange rate

[b]adjusted by PPP

[c]adjusted by Health PPP

[d]ageing group

[e]non-ageing group

[f]inpatient service

[g]outpatient service

*estimated by panel data analysis

**estimated by multilevel hierarchical analysis

***The sign in parenthesis shows the effect to health care expenditure

2.2 Other Factors Affect to Health Care Expenditure

Newhouse(1992) argued that there are some factors other than income growth to increase health care expenditure in both demand side and supply side. Two factors are considered as to affect demand of medical services, which are ageing and the coverage of health insurance. On the other hand, two factors are considered as to affect supply of medical services, which are supplier-induced demand and differential productivity.

Leu(1986) confirmed that population under the age of 15, urbanization, public financing other than income has positive impacts on health care expenditure. This study investigated which health care system lead lower health care expenditure and suggested centralized national health systems have lower health care expenditure than decentralized non-nationalized systems.

Gerdtham et al.(1992) found that three explanatory variables, "share of population living in town", "share of inpatient services on total health care expenditure", "share of health care expenditure by public sector on total health care expenditure" and "fee for service" have significant effect on health care expenditure. If population in urban area increase 1 %, health care expenditure decrease 0.17%.

Gbesemete and Gerdtham(1992) use five variables, "Percentage of births attended by health staff(PBA)" "Percentage of population under 15 years of age(POP<15)" "Percentage of urban population to total(URBAN)" "Crude birth rate(BIRTHS)" "Foreign aid received(AID)", excluding income, as explanatory variables and, then, concluded PBA and AID are significant positively. When PBA and AID increase 1% respectively, health care expenditure also increase by 0.284% and 0.182%. But they added the interpretation of urbanization variable is unclear theoretically.

Tokita(2004) found that health care expenditure at prefecture level was affected by supply side factors, number of doctors, number of beds and number of CT scan. In demand side, ageing was incremental factor for health care expenditure with relatively high coefficient.

2.3 The Problems of Estimation

There are some problems when we estimate the income elasticity of health care expenditure. Gerdtham, U. -G. and Jonsson, B. (2000) summarizes estimation method's problems as follows; (1)no well-grounded theory for estimation,

(2)difficult to assess the quality of data, (3)small sample size, (4)the suitability of assumption that there has homogeneous property among countries, (5)static analysis. In these problems, (3) and (4) could be solved by using panel data analysis. Moreover, the cross-sectional study in a country (by region or province) same as our study also could avoid problem (3) and (4).

Even Newhouse's suggestions that the difference of aggregate income can explain almost all of variance in the health care expenditure and income elasticity is more than 1, are acceptable intuitively, some studies opposed. Parkin et al. (1987) criticized that Newhouse (1977) was based on microeconomic concepts but using macro data. They points out the daunting problem, "problem of aggregation, and misspecification arising from omitted variables or inadequate functional form, and the conversion factor problem".

In the response to Parkin et al. (1987), Newhouse(1987) explained the meaning of difference in health expenditure among the countries. He insisted that whether health care is a "luxury good" was secondary issue. More importantly, income elasticity exceed zero and surpass the elasticity in estimates from within-country cross-sectional analysis.