

## CHAPTER 3

### LITERATURE REVIEW



#### 3.1 Market Failure and Government Regulation

In every country, the government intervenes in the health care sector. For example, most of the OECD countries share more than 80% of the Total Health Expenditure by public financing. Even the United States, the most developed market economy, shares about half of the total health expenditure financed by public provision<sup>22</sup>. Governments provide some or all of the health services, and regulate the supply side of the health sector. In addition, doctors are required to obtain national licensure before starting treatment. Such government interventions, which deviate from the theory of market economy, come from the peculiarity of health care services. These deviations from the market system are generally justified by claiming that health care services are the goods with a market failure. That is, the equilibrium does not correspond to a Pareto-optimal allocation in non-regulated markets.

Zweifel and Breyer (1997) argued that the point of departure for the theory of market failure is provided by the First Theorem of Welfare Economics, because health care services have the following characteristics: 1.) Health goods have the characteristics of public goods. 2.) The consumption of health goods gives rise to external effects. 3.) The production of health goods is characterized by increasing returns to scale. 4.) The prerequisite for a perfectly competitive market, that is, market transparency and consumer sovereignty, are not met. Because patients do not have enough information to judge the services, providers decide the needs, and the way of treatments. This holds the line against other consumer goods. Another characteristic of health care services is merit-goods. That is, health care services are quasi-public goods and expected to be provided or to be financed by the public.

About 80% of Japanese hospital (and almost all of the clinics) are owned by private medical corporations (Health and Welfare Statistics, 2001). Doctors were allowed to construct their hospitals anywhere until 1986<sup>23</sup>. However, after the amendment of the Medical Law in

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<sup>22</sup> Medicare for elderly, Medicaid for indigent and disabled people and so on.

<sup>23</sup> In 1986, the Medical Law changed and the maximum number of beds within the Secondary Medical Areas was set. Thereafter, providers were not allowed to increase beds in the high per

1986, the governors of prefectures were allowed to prohibit the increase of public medical facilities, and allowed to warn providers of attempts to increase beds in private health facilities. This stopped the concentration of health facilities in areas where there were high per capita number of beds, but it did not alleviate the disparity in facilities made before 1986. In addition, patients have been able to choose any health facilities, even tertiary care hospitals, for outpatient care. Although medical fees are fixed across the country, providers are extremely competitive in other areas within the Japanese health care field. According to the present medical fee system, investment costs for private hospitals must be managed within the confines of the reimbursement from health insurance and user charges. Therefore, the providers have incentive to achieve target income.

Uncertainty regarding health service provision lends itself to a difference in physician practice. This is called the Small Area Variations (SAV)<sup>24</sup>. Variations in medical treatment such as overall surgery rate are found in small areas, depending on physicians practice style. However, Folland concluded the empirical results indicate that SAV is not important in determining either an aggregate index of market area utilization or the average intensity with which patients are treated by physicians. In Japan, there are third party monitoring systems for medical insurance claim that is organized in each prefecture. Although this is considered to be one of the source of regional difference amongst prefectures, it can not be easily measured (Health Insurance System Study Group, 2001).

### **3.2 Equity and Efficiency in Health Resources Allocation**

There are various definitions about equity. Equity in health care can be categorized in two ways: vertical equity and horizontal equity. The former is defined as the redistribution of income to individuals/families with lower income. The latter means that differences in benefits should take into account age, family size, etc. (Bar N., 1992). According to Culyer and Wagstaff, there are four definition of equity: equality of utilization, distribution according to need, equality of access, and equality of health (Culyer and Wagstaff, 1993).

Williams A. and Cookson R. (2000) claimed that equity in health has to be distinguished from equity in access to health care, or equity in the distribution of health care

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capita number of beds areas.

<sup>24</sup> Wennberg(1982), Folland and Stano (1989)

resources. When the term access is used in policy statements and much of the academic literature, it means the receipt of treatment (Wagstaff A. and Doorslaer E., 2000). In the United Kingdom, the Resource Allocation Working Party (RAWP) formula has been used for achieving equity among regions since 1976. The mortality data was weighted to regional populations in order to obtain a fair-share funding target. RAWP attempts to channel more funds to regions which were more deprived but which have received relatively less funding in the past. It focuses on the equity in expenditure and resource allocation (Greengross et al., 1999).

### **3.3 Empirical Evidence about the Determinants of Total Health Expenditure**

There has been many studies examined the determinants of Total Health Expenditure and its regional differences. Research methods and variables used in these analyses were different between the analyses of the international comparison and the analyses of inter-regional comparison in the country. In this section, researches conducted by foreign researchers and by Japanese researchers were also reviewed.

#### **3.3.1 Previous Studies in Foreign Countries**

A strong positive correlation between national income and national expenditure on health care has been consistently found by researchers. Most of them such as Newhouse (1977), Leu (1986) and Parkin et al (1987) examined the determinants of aggregate health care expenditure. Real per capita health care expenditure is hypothesized to be a function of real per capita income and some other variables. The details of their studies are as follows:

Newhouse J.(1977) examined the relationships between per capita GDP and per capita Total Health Expenditure through regression models. The samples used in this study were 13 OECD countries Australia, Austria, Canada, Finland, France, West Germany, Greece, Italy, Netherlands, Norway, Sweden, UK and the United States. He found that health spending was a luxury good by showing the positive relationships between per capita GDP and per capita Total Health Expenditure. He also explored to find other determinant of Total Health Expenditure in addition to GDP. A centralized system had previously been thought to be able to keep expenditure lower than a decentralized system world. Results of his study implied that wealthier countries might desire and be able to pay for a more decentralized, but more expensive, medical care system. Thus, the margin of medical care services have less to do with

common measures of health status such as relief of anxiety, somewhat more to do with the relief of anxiety, accurate diagnosis, and heroic measures near the end of life.

Parkin, et al. (1987) examined the relationship between the aggregate health care expenditure and national income using the data of 18 OECD countries. The method they used was a regression model. They pointed out that international comparisons should be based on Purchasing Power Parity (PPP) rather than exchange rate conversion, underlining the importance of prices as well as quantities in the relationship, and leading to the conclusion that the aggregate data showed health care to be a necessity good rather than luxury good. When PPP was used, the income elasticity of total health expenditures were less than unity (0.9).

Hitiris and Posnett (1992) studied international differences in health expenditure. Previous studies examined relatively small numbers of countries. However, they re-examined the results of previous work on the determinant of health expenditure using a sample of 560 pooled time-series and cross section observations. Their findings that a strong positive relationship exists between per capita health spending and GDP (which has been reported in previous studies) were confirmed with the larger sample. The importance of some non-income variables is also confirmed, although the direct effect of such factors appears to be small. The relative price of health care is also an important determinant of the demand for health. The omission of this variable may lead to a downward bias in the estimated income elasticity, and at the same time, lead to an understatement of the role of non-income variables.

Gerdtham U., et al. (1992) examined the determinants of aggregate health care expenditure. Their systematic analysis of the relationship between health expenditure and other variables across 19 OECD countries<sup>25</sup> showed the effect of aggregate income, institutional and socio-demographic factors on health care expenditure. The results indicate that institutional factors of the health systems, in addition to per capita GDP, contribute significantly to the explanation of the health care expenditure variation between countries. Three example of this are, the way physicians in outpatient care are paid, the mixture of public/private funding and inpatient/outpatient care.

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<sup>25</sup> The 19 countries are: Australia, Austria, Belgium, Canada, Denmark, France, Germany, Greece, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, UK and the United States.

Phelps (1992) examined the uncertainty in knowledge about the efficacy of medical interventions using data from the United States. He summarized the evidence that doctors behave very differently in selecting treatments, depending on the region where they work. This creates a large variation in the quantities of care delivered to seemingly standard population. He thought that this evidence of variations left almost by default the idea that incomplete diffusion of information must be largely responsible. The reasons for the incomplete diffusion of information are difficulties in collecting information about the success of medical procedures, difficulties in establishing property rights to such information (even if it were to be collected), and liability considerations that hinder adoption of any information that is collected.

Cutler D. and Sheiner L. (1999) explored the source of regional variation in Medicare expenditure in the United States. They found that a substantial amount of the difference of Medicare expenditure could be explained by differences across areas in the health of the elderly population. Their finding suggests that some of the geographic variation in Medicare spending is efficient. But even accounting for differences in the health of the population, significant variations in Medicare spending remained. The strongest factors were supply variables such as, for-profit hospitals and specialist physicians.

Fuchs et al. (2001) examined 313 U.S. areas for differences in medical utilization and mortality of white citizens aged 65-84 in 1990. The method used in the study was OLS models. The variables included in the analysis were education, real income, cigarette sales, obesity, air pollution, percentage of Black population, and dummy variables for seven regions and five population size categories. Their findings are as follows:

1. Using metropolitan and rural areas as units of observation, mortality is an important explanatory variable for both Medicare spending and use of services among whites, age 65-84, and is quantitatively more important in explaining this spending than are economic and demographic variables.
2. Florida is very different from the remainder of the country in having observed rates of use that are much higher than predicted and observed mortality that is much lower than predicted.
3. There is a city size gradient in use, Metropolitan areas with populations between 250,000 and 500,000 have higher rates of use than smaller cities and non-metropolitan areas, and

areas with more than 500,000 people have still higher use.

4. Even with measures specific to whites, aged 65-84, the following three variables do not exert an important or robust effect on use or mortality: real income, a measure of inequality or dispersion in income, and the proportion of individuals with less than a high school education
5. Even with measures not specific to whites, aged 65-84, and indeed measured at the state level, cigarette consumption, obesity, and air pollution affect mortality measured across metropolitan areas

### 3.3.2 Previous Studies in Japan

This section shows the previous studies about the determinants of Total Health Expenditures for Elderly and its regional differences conducted in Japan. Despite the same fee table<sup>26</sup> in all prefectures, there has been a large gap in the average Total Health Expenditure for Elderly amongst prefectures (Health Insurance System Study Group, 2002). Studies which analyze the determinants of the per capita Total Health Expenditure for Elderly became popular in the middle of the 1980s. On the contrary, the studies on the determinants of Total Long-term Care Expenditure are few. This section shows a comprehensive review of the previous studies on the determinants of area differences of the Total Health Expenditure for Elderly and the Total Long-term care Expenditure.

There are two ways to analyze the determinants of the Total Health Expenditure for Elderly. The first one is to calculate the relationship between explanatory variables and Total Health Expenditures for Elderly directly. The other one is to calculate the relationship between one of the three elements of the Total Health Expenditures for Elderly as dependent variables and other independent variables such as supply of health services, area characteristics etc. The three elements of the Total Health Expenditures for Elderly are the hospital admission rate per population<sup>27</sup>, the average inpatient days per claim<sup>28</sup> and the average health expenditure per person per day. The point to notice here is that the reimbursement procedure is operated on a

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<sup>26</sup> List of medical charges for reimbursement from Health Insurance

<sup>27</sup> The rate is calculated by dividing the number of claims per year by the population.

<sup>28</sup> New claims are calculated in each month in Japan. Therefore, the duration of each claim is limited to 31 days.

calendar month basis. Therefore, the average inpatient days per claim is limited to days within each calendar month, and is different from the average inpatient days. The results of previous studies in Japan are as follows:

Maeda (1984) analyzed the determinants of per capita Total Health Expenditures for Elderly through the average inpatient days per claim, and the average health expenditure per person per day. He used the data of the total health expenditure for people 50 years old or over who covered by the National Health Insurance. The prefectures were separated into 5 groups with the criteria being the length of stay and per capita Total Health Expenditures for Elderly per day. His findings were:

1. Prefectures characterized by longer inpatient days (Hokkaido Prefecture and Kochi Prefecture)

Hospital admission rates in these prefectures are not high, but the average length of stay per admission is higher than other prefectures. In addition, “the average health expenditure per person per day” is not high. This means that the patients tend to continue to receive care at hospitals when they are in convalescence. Determinant of the high health expenditure in these prefectures is considered to be the availability of health service such as the number of beds.

2. Prefectures characterized by shorter inpatient days (Ibaraki Prefecture, Chiba Prefecture, Gifu Prefecture and Shizuoka Prefecture)

Both the THEE for inpatient care and outpatient care are lower in these prefectures. This means that the demand for elderly health care is lower. The characteristics of these prefectures are the lower number of hospital beds per capita. This implies that it is difficult to find health service facilities when services are needed. This is especially true in the case of Chiba prefecture, which is located in adjacent to Tokyo. The population growth there is amongst the highest in Japan. Therefore the increase in health care facilities cannot catch up with the population growth rate.

3. Prefectures characterized by higher per capita THEE per diem. (Kyoto Prefecture and Osaka Prefecture)

These two prefectures have a higher per capita THEE per diem compared to other prefectures. When the expenditure is dissected, the percentage used for drugs, medical examination and treatments are higher, i.e. extremely generous treatments are provided in

these prefectures. Although home health care services for elderly have been prevalent in the Tokyo area, these are not prevalent yet in the Kyoto and Osaka areas. Therefore, hospitals substitute for nursing care services. In addition, because the number of beds was high, a higher THEE were found in these prefectures.

4. Prefectures characterized by lower per capita THEE per diem. (Ooita Prefecture, Saga Prefecture, Miyazaki Prefecture and Kagoshima Prefecture)

All of these prefectures are located in Kyushu Island. The characteristics of these prefectures are more beds per capita, longer inpatient days and lower per capita THEE per diem. Expenditures for drugs and treatments are not as high, but the share of nursing care is higher.

5. Prefectures characterized by medium inpatient days and medium per capita THEE per diem (Tokyo Prefecture and Kanagawa Prefecture)

The average number of inpatient days and the average per capita THEE are considered medium. The expenditures per diem are slightly higher than the national average, but the average inpatient days are lower than the national average. This area is urbanized and a lot of advanced medical facilities are located in these prefectures. This means that the share of acute hospitals is higher. Therefore, most of the patients tend to be discharged relatively quicker or transferred to the other convalescent wards. In addition, the categorization and cooperation amongst hospitals (such as acute care, chronic care, home care and medical services with public assistance) are considered to be smooth. Compared to other prefectures, the per capita THEE is on an average level. The frequency of hospital admission is higher than average.

Sakuma (1986) analyzed the regulatory factor of the rate of elderly visiting to medical facilities including hospitals and clinics. The methods used in the study were factor analysis and multiple regression analysis. He introduced the factor analysis into the study of patients' behavior. The major results were as follows:

1. The visit rate has a positive and significant correlation to those variables that are characteristic of urban life (availability of transportation etc). On the contrary, a negative correlation is found to the variables typical of rural life, such as the rate of home-ownership etc.



2. The twelve clusters were formulated through 29 variables, and then the twelve variables were selected from each cluster, which was based on the highest correlation with the visit rate, and used for the factor analysis.
3. The results of factor analysis were concluded as: the first component was related to urban life, the second component was poor health status, and the third component was related to sparsely populated areas.
4. Three components were used for the multiple regression analysis. The correlation coefficient was then calculated to be 0.679, and the contribution ratio was 46.1%. Thus, the  $\beta$  of the first component was 0.561, that of the second component was  $-0.327$ , and that of the third component was  $-0.2000$ . Therefore, the component related to urban life style was most important factor amongst them.

According to the previous study conducted by Maeda (1984), longer inpatient days resulted in an increase in the Total Health Expenditure for Elderly. Therefore, Mori and Miyake (1988) calculated the correlation between the average number of inpatient days and other independent variable, as well as the correlation between the Total Health Expenditure for Elderly and other explanatory variables. The indicators showed that the supply of health services, such as the number of doctors and beds were positively correlated with the Total Health Expenditure for Elderly. Then they examined multiple regression analysis with the data which have significant correlation with Total Health Expenditure for Elderly. The number of beds, the number of doctors, seasonal labor rate amongst total labor, average number of family members were selected as the determinants of Total Health Expenditure for Elderly.

Iizuka (1990) also analyzed the per capita Total Health Expenditures for Elderly in Hokkaido prefecture, which has the highest Total Health Expenditures for Elderly every year. He conducted a time series analysis using data gathered from 1973 to 1985. As a result, he found that the number of hospitals and the number of doctors are correlated with Total Health Expenditures for Elderly. Regarding disease prevalence, cancer and cardiovascular diseases are positively correlated with Total Health Expenditures for Elderly. These diseases resulted in an increase in Total Health Expenditures for Elderly, whereas an increase in cerebrovascular disease had a negative correlation. Regarding indicators of the economy, the rate of public assistance is positively correlated with Total Health Expenditures for Elderly.

The percentage of females who are gainfully employed outside the home results in a negative correlation with the Total Health Expenditures for Elderly, because it is assumed that women who work are less able to be available to provide home health care. Therefore, when the elderly need long-term care services, family where women works tend to utilize facility services, even though they are afford to utilize home care services. Another reason for this relationship is the percentage of working women are relatively higher in urban areas, i.e. the relationship is a spurious correlation of the urbanization and Total Health Expenditures for Elderly. Home ownership and available floor space are two indicators related to the determinants of Total Health Expenditures for Elderly.

Even though there are enough family members to take care of an elderly family member and even if there is enough money to do the same, if the floor area of a house is small, they would not be able to continue home care services. The correlation between the home ownership and Total Health Expenditures for Elderly is negative. However, the correlation between the average floor space and Total Health Expenditures for Elderly is positive.

Fukawa T., is a member of the Tiikisa Kenkyukai which is study group for researching the regional difference of health expenditure. He examined the regional differences of health expenditure amongst prefectures using the claims that contains the data about the name of illness and medical treatment (Tiikisa Kenkyukai, 2001). He classified the whole country into 8 regions, and analyzed the disease prevalence among regions, and also analyzed the difference of health expenditure among disease groups. His findings were that the difference of the disease prevalence amongst regions did not influence the difference of health expenditure significantly.