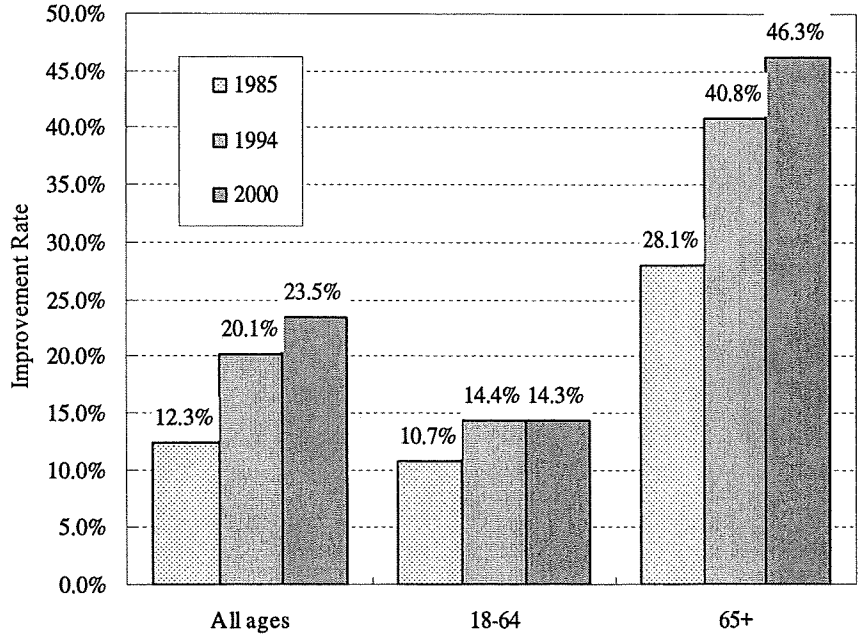
Table 2 MLD & SCV in terms of disposable income in Japan

	1985	1994	2000	1985-2000
		MLD		
All ages	0.146	0.171	0.196	0.050
18-64	0.142	0.166	0.193	0.051
65+	0.227	0.226	0.222	-0.005
		SCV		
All ages	0.267	0.293	0.336	0.069
18-64	0.263	0.279	0.323	0.060
65+	0.401	0.410	0.410	0.008

Source:Same as table 1

Figure 2 Income redistribution effect in Japan(Improvement rate by age)



Source:Same as table 1

Note: "Improvement Rate" is defined as the rate of change between the Gini index in terms of market income and the index in terms of disposable income.

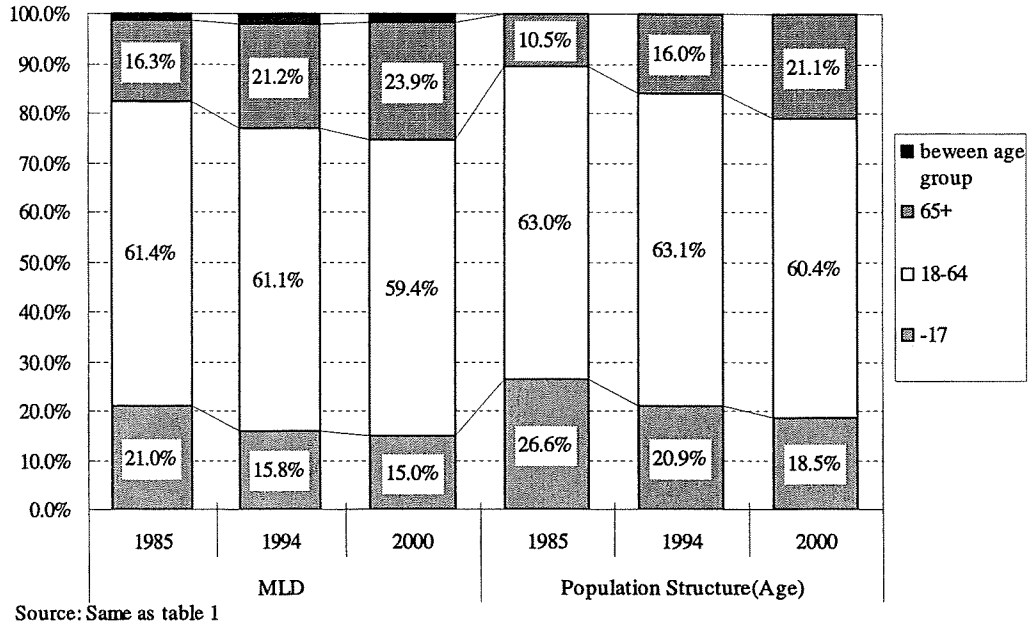
Table 3 Decomposition of SCV by type of income in Japan

		SCV			Employment income			Property income	Business income	Social security benefits	Direct taxes and social insurance premiums
					Household head	Spouse of head	Others				
All ages	1985	0.267	100.0%	104.7%	65.0%	17.5%	22.3%	5.3%	9.5%	2.7%	-22.2%
	1994	0.293	100.0%	108.5%	67.1%	18.3%	23.1%	6.1%	8.7%	0.8%	-24.2%
	2000	0.336	100.0%	102.0%	64.3%	17.7%	20.0%	7.7%	8.1%	1.7%	-19.5%
18-64	1985	0.263	100.0%	106.9%	67.3%	17.6%	22.0%	4.9%	8.7%	2.1%	-22.8%
	1994	0.279	100.0%	111.9%	70.7%	18.8%	22.4%	5.0%	7.4%	0.6%	-24.8%
	2000	0.323	100.0%	106.4%	69.5%	18.5%	18.4%	5.9%	6.8%	0.9%	-20.1%
65+	1985	0.401	100.0%	92.0%	50.5%	14.2%	27.3%	7.7%	13.9%	7.4%	-21.0%
	1994	0.410	100.0%	86.6%	46.0%	12.5%	28.1%	12.2%	13.9%	8.4%	-21.2%
	2000	0.410	100.0%	77.9%	40.2%	12.5%	25.2%	15.8%	12.0%	11.8%	-17.5%

Source: Same as table 1

Note: Numbers of the each type of income is the decomposition analysis result when SCV of the disposable income is 100%.

Figure 3 Decomposition of MLD and Population by age group in Japan



Source: Same as table 1

Table 4 Decomposition of change in income difference in Japan

	Change of MLD	Population structure change	Income diference change
1985→2000	0.050	0.008	0.042
		16.1%	83.9%

Source: Same as table 1

Note: % is the number when total change of MLD is 100%.

Table 5 Poverty rate in Japan

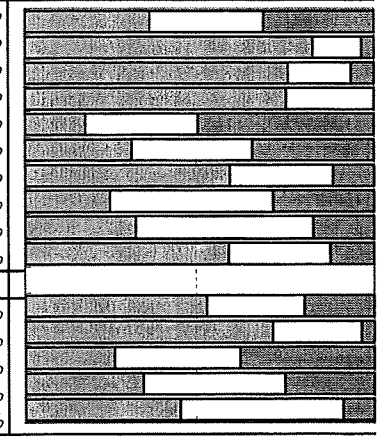
	Disposable income			Market income		
	1985	1994	2000	1985	1994	2000
All ages	11.9%	13.7%	15.3%	12.5%	19.1%	24.1%
-17	10.8%	12.0%	14.3%	8.3%	11.2%	12.9%
18-64	10.6%	11.9%	13.5%	10.5%	14.0%	16.5%
65+	23.0%	22.9%	21.1%	35.5%	49.4%	56.0%

Source: Same as table 1

Note: Poverty rate is the percentage of those who earn income below the given income level (poverty line) to the population.

Table 6 Income difference by type of household in Japan (2000)

Type of household				Disposable income	distribution household members			
Age of head	Number of adult and child		working		% to all members	1st to 3rd decile	4th to 7th decile	8th to 10 th decile
Below 65 years	One adult	No child	With worker	269.4	3.2%			
			No worker	121.4	0.7%			
		With child	With worker	131.0	1.2%			
			No worker	119.7	0.1%			
	Two or more adults	No child	Two or more workers	334.2	22.5%			
			One worker	271.6	6.7%			
			No worker	181.9	1.1%			
		With child	Two or more workers	262.7	23.2%			
			One worker	227.8	14.4%			
			No worker	159.3	0.1%			
65 years and over	One adult		With worker	216.2	0.5%			
			No worker	139.4	2.4%			
	Two or more adults		Two or more workers	287.5	11.2%			
			One worker	249.3	6.1%			
			No worker	190.3	6.6%			



Source: Same as table 1

Table 7 Poverty rate by type of household inJapan(2000)

Type of household				Poverty rate		
Age of head	Number of adult and child		working	Market income(1)	Disposable income(2)	(2)-(1)
Below 65 years	One adult	No child	With worker	20.3%	21.6%	1.3%
			No worker	78.3%	60.9%	-17.5%
		With child	With worker	56.5%	57.9%	1.4%
			No worker	75.3%	52.1%	-23.2%
	Two or more adults	No child	Two or more workers	9.0%	9.2%	0.2%
			One worker	24.3%	16.6%	-7.7%
			No worker	73.5%	30.2%	-43.3%
		With child	Two or more workers	8.5%	10.6%	2.0%
			One worker	9.8%	12.3%	2.5%
			No worker	38.4%	46.0%	7.6%
65 years and over	One adult		With worker	61.7%	33.6%	-28.1%
			No worker	93.4%	48.3%	-45.1%
	Two or more adults		Two or more workers	24.4%	14.7%	-9.7%
			One worker	50.4%	18.0%	-32.3%
			No worker	90.1%	23.1%	-67.1%

Source: Same as table 1

5. 保健医療サービスの利用の水平的公平に関する研究

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「医療負担のあり方が医療需要と健康・福祉の水準に及ぼす影響に関する研究」
平成15年度報告書

保健医療サービスの利用の水平的公平に関する研究

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要　旨

保健医療サービス利用の不平等が着目されている。OECD 加盟国間の比較研究が進められているが、わが国はその枠組みに入っていない。そのため、保健医療サービス利用の不平等度について、国際比較を含んだ形の研究はあまり進められてこなかった。そこで、独自の調査データを用いて、入院日数、受診頻度と所得水準などとの関係を分析した。その結果、保健医療サービスの利用には不平等はないが、その費用負担については高所得層で多いという傾向が見られることが明らかになった。

Horizontal Inequity in Health Care Utilization in Japan: Comparisons with OECD Countries

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Abstract

We compare health care inequity in Japan with that in other OECD countries in 2002 and 2003. To overcome Japanese data problems, we conducted an original survey in addition to Comprehensive Survey of Living Condition including Income Redistribution Survey. Although some problems remain, we obtained internationally comparable results on health care inequity for Japan. We test the utilization measure by the number of outpatients, the number of days of inpatient utilization in the previous year, out-of-pocket payments in the previous year and other measures, such as a yes/no indicator for outpatient or inpatient utilization in a lifetime. The results show that there is no inequity in outpatient or inpatient utilization, but out-of-pocket payments show significant pro-rich inequity.

Keywords: Horizontal Inequity, Japan, International Comparisons, Concentration Index, Kakwani Index, Needs

1 Introduction

Inequity in health care has recently become one of the most pertinent and relevant issues in health economics and health policy. Much research on methodology and international comparisons has been carried out by Wagstaff et al. (1989, 1991), Van Doorslaer and Wagstaff (1992), Wagstaff and Van Doorslaer (1993, 1994), Van Doorslaer et al. (1997, 2000), and Kakwani et al. (1997). In particular, research on horizontal inequity has been undertaken by Van Doorslaer et al. (2000) and, most recently, by Wagstaff and Van Doorslaer (2000).

Eleven OECD countries have been studied on the basis of reasonably comparable definitions of health inequity. Unfortunately, Japan has not been included in previous studies. While Ohkusa and Honda (2003a) use the Comprehensive Survey of Living Conditions for Japan (CSLC), this survey only reports whether individuals are currently visiting a doctor, rather than the frequency of visits to a doctor or hospitalization during the previous year, as surveys for other OECD countries do. Unfortunately, no national survey contains both this information and other socio-demographic information. Hence, an original survey is needed. Mainly due to financial limitations, the sample size of our original survey was far less than that of a national survey. However, it may still be representative even though it uses two-stage strata, as does the CSLC. Our survey supplements the CSLC and is comparable with those for other countries.

We performed the survey in March of 2002 and 2003, and we obtained about 3,000 observations. There were various reasons why we could not complete the survey in one phase. The most important reason was financial difficulty. We had funds to survey about 1,500 individuals in one year but it was insufficient to survey 3,000 individuals. Fortunately, the funding was available in the succeeding year and thus we could survey over two years. The second reason was related to

some concerns about bias due to the small sample. Of course, we analyzed the 2002 data of our original survey (Ohkusa and Honda 2003b), but some problems seemed to remain, which might have been due to the small sample or other survey procedures. To overcome the small sample or other problems, we needed a more appropriate survey once again. The third reason concerns the definition of variables that indicate inpatient utilization. In the 2002 survey, we had surveyed only inpatient utilization in a lifetime until the year of the survey or within a year. However, in other OECD countries, the number of hospitalized days is also surveyed and analyzed. Hence, we added some questions about hospitalized days in the 2003 survey.

Before considering the measurement of health care, the institutional background in Japan is summarized. In 1961, Japan completed the introduction of compulsory public health insurance with coverage for all residents. In 1997, a new law was introduced requiring coinsurance rates of 20% for the employed and 30% for others, such as the self-employed and dependents. For people over 70 years of age, out-of-pocket payments (OPP) are limited to approximately 4000 yen (about US$36 in 2001 prices) per month. However, large firms sometimes subsidize their employees by reducing their co-payments to less than the legal requirement. Medical services are provided as welfare to very poor people who cannot afford to pay the premiums. Thus, everybody can access medical services in Japan.

The public health insurance system provides reimbursement on a fee-for-service (FFS) basis. Although the government regulates the price of treatment and drugs almost every year, it cannot directly control the choice of treatment and/or drugs, unlike the Utilization Review at Managed Care. Unlike the National Health Service (NHS) and Sickness Fund, the insurer cannot control the budget ex ante.

There is no regulation of the medical services chosen by patients, as undertaken by the gatekeeper in the NHS, or different coverage as in the HMO. In other words, there is no practical difference between general practitioners and specialists. The coinsurance rate is the same for services provided in hospitals and clinics (either public or private), but congestion may implicitly impose an opportunity cost. The number of beds is strictly regulated, but provision of outpatient services is virtually unregulated.

Private insurance plays only a minor role because public insurance has such a comprehensive coverage of medical services. Shigeno (2000) shows that private insurance appears to complement public insurance only through its income effect. Hence, private insurance in Japan is very different from that in the USA and European countries, which is why Japan is usually excluded from international comparisons in health economics.

2 Data

Our original survey was conducted in March of 2002 and 2003 for the whole of Japan. In 2002, 640 questionnaires were distributed and 570 were completed and returned, which provided information on about 1,450 adults. In 2003, the corresponding figures were 900, 783 and 1,596 respectively.

These households voluntarily contracted with the firm that conducted the survey to complete the various surveys. The households surveyed were randomly sampled by two-stage strata, but decisions to cooperate were deliberate. Therefore, particular attention should be paid to the sampling bias that can arise from this type of sampling. In fact, the survey has no unemployed and few self-employed respondents, and there is a slight bias towards richer households. However, this bias could be controlled for by appropriately weighting informa-

tion. Hence, not only are subsequent regression results weighted by income and by region, so are the summary statistics. The sample excludes institutionalized individuals.

Unfortunately, even after combining the two years, our sample of 3,046 respondents is the smallest used for a health care inequity study for any OECD country. The second smallest is a sample of 3,374 respondents for Sweden used by Van Doorslaer et al. (2000). Other countries for which sample sizes of less than 4,000 have been used are East Germany (3,844) and Denmark (3,955). These were conducted in the early 1990s and so could be updated. Although comparable, our data set for Japan is much smaller than the surveys for other OECD countries. This is due primarily to financial problems, which cannot be fixed in the short term. Therefore, we have to use our small data set to analyze health care inequity in Japan, even though smaller samples may lead to bias.

The basic framework of the surveys conducted in the two years are almost identical. However there are some differences in sampling and in the questionnaire. First, in the 2002 survey, we selected a few prefectures to survey. By comparison, in 2003, the survey was distributed randomly to the whole of Japan. Second, the categories of income and OPP are finer in the 2003 survey than in the 2002 survey; in the first year, there were nine and eight categories in income and OPP respectively, while in the second year this was changed to 23 and 22 categories respectively. This change may improve the preciseness of income and OPP, and thus contribute to gaining a more reliable estimator.

The main variables are defined as follows. Outpatient utilization is defined in two ways. The first indicator of outpatient utilization is whether an individual visited a doctor in the previous year, while the second definition uses the number of visits. Although the latter is used in international comparisons, the former is similar and has been used previously (see, e.g., Ohkusa and Honda, 2003a).

Note again that there is no practical difference between general practitioners and specialists.

Inpatient utilization is defined in a similar way to outpatient utilization, but we set two reference periods, i.e. utilization in the previous year, which is used in OECD studies, and utilization in the lifetime until the survey year. Based on these reference periods, the first indicator of inpatient utilization is whether an individual was hospitalized in the reference period and the second definition uses the number of hospitalized days. Hence, we use four types of inpatients utilization. Hereafter, the difference between reference periods is indicated by a superscript, i.e. "Inpatient^{a}" indicates utilization of inpatient service when the reference duration is the previous year and "Inpatient^{b}" indicates utilization of inpatient services when the reference duration is the lifetime until the survey year.

OPP is defined at the household level. Note that because the questionnaire defines OPP as payment for medication, it is not limited to co-payments for medical services, but also includes non-prescribed drugs and other medical services that are not covered by public health insurance. Thus, we assume that its mode in each category is the number. Since the highest category is open-ended, we use the same interval as in the second highest category. Income is also measured at the household level in nine/twenty three categories. Hence, we make the same adjustment as for OPP. Moreover, income is adjusted to household structure as follows.

$$\text{Adjusted Income} = \frac{\text{Income}}{(\text{Number of Adults} + 0.5\ \text{Number of Children})^{0.75}} \quad (1)$$

where children are less than 16 years old. Chronic disease is represented by a dummy variable that indicates whether individuals suffered from symptoms even

if they were not currently visiting a doctor.

Summary statistics are shown in Table 1. In the previous year, 74% of individuals visited a doctor and the average number of visits was 10.4, i.e., almost once a month. On the other hand, about 5.7% of individuals were hospitalized in the previous year, but about half of the individuals were hospitalized in their lifetime until the survey year. The hospitalized days reflect such a difference, i.e. the number of hospitalized days in the lifetime is about ten times larger than hospitalized days in the previous year. Average OPP per year per capita is about 60 thousand yen (about $50). Per capita income adjusted for the number of adults in the household is about 3.2 million-yen (about US$25,000).

3 The Measurement of Horizontal Inequity

In measuring horizontal inequity, three aspects need to be clarified: the definition of demand for medical care; the definition of needs; and the estimation methods. The definitions and estimation methods used in this paper are described below. Social and economic conditions are defined individually by household disposable income per equivalent adult, as in previous studies.

3.1 Definition of Needs

Concerning the definition of needs, existing studies use incidences of chronic illness (Van Doorslaer and Wagstaff, 1992) and self-assessment of health (Van Doorslaer et al., 1997). Conversely, Van Doorslaer and Wagstaff (2000) define needs as the estimated demand for medical care, which is explained by self-assessment of health (SAH) and/or chronic illness, in addition to demographic characteristics such as age and gender.

In this paper, we define needs as the estimated demand for outpatient or inpatient services, or the OPP of the ith person, which indicates the ith smallest

amount of income adjusted for household structure, with the dependent variable D_i. The explanatory variables used are age A_i, gender G_i, self-assessment of health H_i, and chronic disease S_i. Thus the estimated equations in the full version are:

$$\begin{aligned} D_i^* &= \alpha_0 + \sum_j \alpha_A^j A_i^j + \sum_j \alpha_{AGj} A_i^j G_i + \alpha_G G_i + \sum_l \alpha_H^l H_i^l + \alpha_S S_i + \varepsilon_i \\ D_i &= \begin{cases} 1 & \text{if } D_i^* > 0 \\ 0 & \text{otherwise} \end{cases} \end{aligned} \tag{2}$$

where superscripts indicate dummy variables. Age categories are divided into years as follows: 16-24, 25-44, 45-64, 65-74, and 75 plus, as in Van Doorslaer et al. (2000). Since self-assessment of health is classified into five categories, there are four dummies for this variable.

The model estimated is a heteroscedasticity-consistent probit for whether individuals utilize outpatient and inpatient services. The predicted probability, $\Phi(\hat{D}_i)$, is interpreted as Needs n in the context of this procedure. For the number of visits to the doctor or the number of days hospitalized, the negative binominal model is employed, as in previous research. These utilization variables are reported on an individual basis, for all household members. Thus, there may be intra-family correlation through income, lifestyle, or access to medical institutions. To account for this, we add random household effects to the model.

Since OPP is a continuous variable, we estimate a linear model for the log of OPP. Since OPP is a household-level variable, we cannot use individual effects.

3.2 Estimation Method

First, the Concentration Index for medical care or needs is defined following Kakwani et al. (1997):

$$2\sigma_R^2 \frac{\mu_i}{\mu} = \alpha_0 + \alpha_1 R_i \tag{3}$$

where μ_i is the demand for medical care, μ is the average of μ_i over persons, R_i is the cumulative proportion up to the ith person in order of income adjusted for household structure, and σ_R^2 is its variance. The estimated α_1 is the Concentration Index of the demand for medical care. Similarly, the Concentration Index of needs is defined by replacing μ by n, which is a measure of needs.

Following Wagstaff and Van Doorslaer (2000), the variance of the Concentration Index is adjusted as follows:

$$Var(\text{Concentration Index}) = \frac{1}{N}\{\sum_{i=1}^{N} f_i a_i^2 - (1 + \text{Concentration Index})^2\} \tag{4}$$

$$a_t = \frac{\mu_i}{\mu}(2R_{i-1} - \text{Concentration Index}) + 2 - q_{i-1} - q_i \tag{5}$$

$$q_i = \frac{1}{\mu}\sum_{s=1}^{\cdot} \mu_s f_s$$

The horizontal inequity measure is obtained by using the following estimation method:

$$2\sigma_R^2 \left[\frac{\mu_i}{\mu} - \frac{n_i}{n}\right] = \beta_0 + \beta_1 R_i \tag{6}$$

$$Var(\text{Horizontal Inequity}) = \frac{1}{N}\left(\frac{1}{N}\sum_{i=1}^{N}(a_i^{\mu} - a_i^{n})^2 - \text{Horizontal Inequity}^2\right) \tag{7}$$

$$a_i^{\mu} = \frac{\mu_i}{\mu}(2R_i - 1 - \text{Concentration Index for } \mu) + 2 - q_{t-1}^{\mu} - q_i^{\mu}$$

$$q_i = \frac{1}{\mu}\sum_{s=1}^{\cdot} \mu_s f_s$$

$$a_i^{n} = \frac{n_i}{n}(2R_i - 1 - \text{Concentration Index for } n) + 2 - q_{t-1}^{n} - q_i^{n}$$

$$q_i = \frac{1}{n}\sum_{s=1}^{\cdot} n_s f_s$$

The estimated coefficient of β_1 is interpreted as horizontal inequity (Wagstaff et al., 2000, Van Doorslaer et al., 2000).

4 Empirical Results

Table 2 shows the empirical results for "Needs". Note that these numbers are the estimated coefficients and not the marginal effects, and hence they cannot be interpreted directly. It is apparent that SAH and age significantly affect outpatient utilization, but may not affect inpatient utilization and OPP. Overall, Wald tests and F tests indicate a good fit.

Table 3 indicates the distribution of actual "Needs", while predicted "Needs" are shown in Table 2. Actual utilization is higher in the highest and the lowest income groups, but this is not the case in the predicted Needs. Overall, predicted Needs do not seem to reflect income classes, except for the highest income class.

The Concentration Index, which measures inequality in utilization, is summarized in the Table 4. Clearly, these numbers indicate no inequality in utilization in terms of the number of outpatients or inpatient days. However, there are some progressive cases in the yes/no indicator of outpatient service or inpatient utilization in the lifetime. Moreover, the Index suggests evidence of progressiveness in OPP. In other words, the rich have tended to spend more than the poor do. However, since "Needs" have not been taken into account, we cannot discuss inequity.

Figures 1 to 7 show the Concentration Curve of each variable. Since these lines measure the deviation of the Concentration Index from the diagonal line, positive (negative) numbers indicate that the Concentration Curve passes below (above) the diagonal line. Thus, positive (negative) numbers imply that the rich

(poor) have relatively more utilization or OPP. The Concentration Curve for utilization in Figures 2 to 6 moves around zero, but the curves in Figure 1 and 7 clearly move below zero. This leads to the positive Concentration Index in Table 4.

Next, we move to the Kakwani Index, which is the Concentration Index above minus Needs. Figures 8 to 14 illustrate the difference between the actual utilization and Needs. At a glance, the lines in Figures 8 and 14 move below zero, but in the other figures, the line moves around zero. This is similar to the properties of Figures 1 to 7.

To confirm and test the impression given by the Figures, we undertake empirical investigations. The bottom row of Table 4 summarizes the empirical results for β_1 in equation (5), and the lower panel summarizes horizontal inequity adjusted for regions.

As the results indicate, the null hypothesis of no inequity cannot be rejected for the number of outpatients and the number of days of inpatient utilization. However, for the yes/no indicator of outpatients and inpatient utilization in the lifetime or OPP, the results indicate pro-rich inequity, as suggested by the figures. In addition, in the case of no year or regional dummies, inpatient utilization in the previous year indicates pro-rich inequity, even though it does not indicate any inequality in Table 4. Conversely, the Kakwani Index of OPP without year and regional dummies indicates inequity, but when we add a year dummy into equation (5), the index is significantly positive. This may reflect the changing measurement in the two survey years. With regional dummies, the magnitudes are 0.014, 0.028 and 0.082 for outpatients, inpatient in a lifetime and OPP respectively. Without regional dummies, the corresponding magnitudes are 0.020, 0.037 and 0.074. The Kakwani Index of inpatient utilization in the previous year without year or regional dummies is 0.08, which is very high compared to OPP.

5 Concluding Remarks

We found that the hypothesis that there is no inequity cannot be rejected, and Japan would have enjoyed one of the greatest degrees of equity in health care among OECD countries. However, the point estimate for the number of outpatient services without regional dummies (0.0002 to 0.0011) is larger than those for Spain (-0.0137), Ireland (-0.0098), Italy (-0.0098), and Belgium (-0.0001), and smaller than those for the UK (0.0074), Canada (0.0072), Greece (0.0273), Austria (0.0389), Portugal (0.0524), and the USA (0.0532)[1)]. Thus, Japan enjoys the best equity not only in the statistical sense, but also in the economic sense.

We can compare inpatient utilization measured in days in Japan with other OECD countries (Van Doorslaer et al., 2000). Our point estimate -0.123 is the smallest among Belgium, Denmark, Finland, the Netherlands, Sweden, Switzerland, the UK and USA[2)]. Thus, Japan has the greatest most pro-poor inequity. However, the Kakwani Index is not significant in Japan. As Belgium and the UK have significant pro-poor inequity, the extent of pro-poor inequity in Japan is behind these countries in the statistical sense.

From this study, we can learn about the huge differences between the yes/no indicator and the number of utilization days. The yes/no indicator in outpatient service always indicated pro-rich inequity, but utilization in terms of the number of outpatients never showed significant inequity. Moreover, yes/no indicators of inpatient utilization sometimes showed pro-rich inequity, but the number of days of inpatient utilization did not. Therefore, our previous research result (Ohkusa and Honda 2003a), which reported pro-rich inequity before 1997, but equity in 1998 in the yes/no indicator of outpatients, might be misleading for horizontal inequity in Japan. We cannot reconsider this result as we did not perform a survey like the one in this study before 1998. Nevertheless, we have to check the

robustness of the result obtained in this research. This remains a topic for future study.