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Who has Benefited from the Health Services System for the Elderly in Japan?

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Abstract

This paper examines the demand and supply of medical services for the elderly in a health services system characterized by a per-month fixed copayment and a selective capitation fee scheme for outpatients with chronic diseases. The results indicate that the beneficiary, in particular the household dependent, visits a physician more frequently because the actual copayment decreases for the household dependent, but is nearly the same for the head of the household. A physician, however, provides more services to the beneficiary, partly because of the lowered copayment. The medical fee per visit for the beneficiary also increases because the physician adopts the capitation fee scheme. This will be selected only where capitation is more profitable than fee-for-service. As a result, physicians, as well as the insured, benefit from this particular health services system.

Keywords: Capitation; Copayment; Cream skimming; Fee-for-service; Health service systems for the elderly

JEL classification: I10, I11, I18

1. Introduction

All Japanese are covered by the public health insurance system. In particular, those more than 70 years of age are eligible to benefit from a health services system for the elderly commencing in 1973 that encouraged the use of medical services by setting a very low out-of-pocket fee, or copayment. We focus on the system from 1996 to 1997 that was characterized by a per-month fixed copayment, and a selective capitation fee scheme applied to patients with typical chronic diseases. The latter was introduced in April 1996, with the government aiming to control the total amount of medical fees with the capitation fee, while maintaining generous copayments. This system, however, will not only eventually influence patients' incentives but also physicians' incentives. Accordingly, we investigate empirically the effects the system had on the incentives for both the insured and physicians.

We hypothesize that the beneficiary will have an incentive to demand more medical services than before since he/she has to pay a lower copayment under the per-month fixed copayment scheme than under the proportional copayment scheme. The beneficiary of the system only has to pay the per-month-based fixed copayment, regardless of whether he or she is the head or the dependent,[1] while the non-beneficiary has to pay a proportional fraction of the total medical fee, say, 10% for the head and 30% for the dependent. Thus, the beneficiary bears a constant fee, regardless of the number of visits or the amount of medical services received in a given month.

On the other hand, a physician will have an incentive to provide more services to the beneficiary because patients do not hesitate to visit a physician under the per-month

[1] In 1997 the health services system for the elderly in Japan was reformed. A per-visit-based fixed copayment scheme was initially introduced on the demand side, followed in 2000 with a proportional copayment scheme.

fixed copayment scheme. Moreover, the physician may have an incentive to adopt the capitation fee scheme, but only where it is more profitable than fee-for-service. The capitation fee scheme can only be applied for typical chronic diagnoses of the elderly, including hypertension, diabetes and so on. Under the fee scheme, the reimbursed fee for physicians is fixed at some amount for one visit per month, and is only doubled for two or more visits. In general, since the reimbursement is constant per capita per month under capitation, a physician cannot receive greater reimbursement by providing more medical services. As a result, capitation is likely to be less profitable for physicians than fee-for-service, although capitation in Japan has given physicians an opportunity to make greater profits.

The capitation fee scheme in the health services system for the elderly is distinct in that clinics are allowed to select their reimbursement scheme, that is, to select whether they adopt the new capitation scheme or follow the fee-for-service as before. Once a clinic selects capitation, all patients with typical diagnoses for which the capitation scheme is applicable follow the fee scheme. That is, a clinic cannot apply the fee schemes, whether capitation or fee-for-service, selectively patient by patient. Thus, only those clinics whose average per-capita per-month fee is below the capitation fee are willing to adopt the capitation scheme. Per-visit medical fees of the beneficiaries with typical diagnoses will then increase. On the other hand, the fees of patients with other diagnoses may also increase because a physician provides more services to the beneficiary under the fee-for-service with little concern for the decrease in the number of patient' visits. After all, no matter which reimbursement scheme a clinic selects, the patient's medical fee will increase after the patient becomes the beneficiary.

In order to see if a patient demands more, or if a physician provides more, medical services when he/she becomes the beneficiary of the health services system for the elderly, we use the data on claims (*reseputo* in Japanese) from hospitals or clinics to health insurance associations that provide firm-based health insurance for employees and their dependents. The data include the age of the insured, the number of visits and the medical fee per month, the copayment, and other characteristics of individuals relevant to our research. We also prepare individual-based data that aggregate the claim-based data by individual. We use both the individual and claim-based datasets for demand- and supply-side analyses.

It has already been examined how the insured change their demand for medical services with a change in the cost-sharing proportion. Long et al. (1998), for example, examined whether the insured increased the consumption of medical services when he/she prospects to be uninsured or to be covered by a less generous plan or *vice versa*. They found little evidence that people anticipate changes in their insurance status and arrange their health care accordingly. By way of contrast, Hurd and McGarry (1997) found that the elderly, who are the most heavily insured with the Medigap plans, use the most health care services, controlling the adverse selection problem in the purchase of insurance. Both these studies suggest that those insured with more generous health care plans may not necessarily increase their demand for medical services. Note, however, that they focus on the US case where public health insurance plays a relatively less important role than private insurance. On the other hand, associated with the effects of changes of the proportional copayment rates in the countries where people are covered by public health insurances, Chiappori et al. (1998) used French data to study the effects of an increase in the copayment rate on visits of patients, Cockx and Brasseur (2003) used Belgium data, Pohlmeier and Ulrich (1995) used German data and Yoshida and Takagi (2002) used Japanese data. They found the increase of copayment generally discouraged the demand.

These studies, however, did not include changes in the provider's behavior associated with the change in the copayment rate. This appears to be partly because it is difficult to separate the change in medical service provision by a physician from the change in patient demand due to limitations in the data employed. In our data set of claims, we regard the number of visits per month as a proxy for demand and the medical fee per visit as the proxy for supply. Since it is the physician who mainly decides the type and amount of treatment to be provided to a patient, he/she can control the per-visit medical fee. On the other hand, it is the insured who can decide how frequently he/she visits a physician in a month. Thus, we can distinguish between the demand-side and supply-side changes.

On the supply side, many studies focus on the prices of medical services that a physician faces in light of the physician-induced demand hypothesis. McGuire and Pauly (1991) theoretically discuss both the income and substitution effects on the physician's provision of medical services in response to changes in the relative prices of services. This is applied in empirical work by Yip (1998) that examined changes in the number of coronary artery bypass grafts and Gruber et al. (1999) in the use of cesarean delivery over the period 1988–1992. Another aspect of the demand inducement is that physicians will change medical service provisions in response to the demand function's shift. Gruber and Owings (1996) showed that obstetricians/gynecologists deliver more births by the more lucrative cesarean section than by vaginal delivery in response to a shift in demand caused by the decline in the fertility rate. Currie and Gruber (2001) suggest that physicians will change treatment depending on the generosity of the patient's insurance. Accordingly, a generous health system for the elderly, on both the supply side and the demand side, as represented by the fixed copayment and fee-for-service systems, may affect the physician's provisions of medical services.

On the other hand, the capitation fee scheme for some chronic diagnoses is expected to enhance the efficiency of medical service supply, while keeping the quality of service equal to the fee-for-service. This depends, however, on the assumption that patients select a provider by observing the quality of service, that prospective payment is decided by observing the actual treatment cost, and that treating all patients demanding treatment is efficient for providers, as argued by Rogerson (1994) and Ma (1994). When one of these assumptions is violated, a physician will accept only those patients whose illnesses are not severe, so that the actual cost of treatment is far below reimbursement. This is called cream skimming. In theory, Ellis (1998) shows that prospectively paid physicians provide excess services to low-severity patients and insufficient services to high-severity patients, even when providers compete against each other. From this, we can predict that allowing a physician to select capitation or fee-for-service will induce a physician to enjoy cream skimming in the sense that a physician will adopt capitation only when the average cost of treatment is below the prospective payment.

This paper's contributions are as follows. First, we show that patients not only demand more medical services, but physicians also provide more services when the insurance copayment is reduced. Second, since the selective capitation fee scheme was exploited by physicians, it has failed to control total medical fees. Section 2 explains the data, Section 3 shows the estimation results for the demand and supply sides, and Section 4 concludes.

2. The data set

We used data on claims from 122 health insurance associations. In principle, people working for a large firm and their dependents are covered by the health insurance provided by the firm-managed health association. There were about 1800 firm-managed health insurance associations in Japan in the second half of the 1990s. When the insured visits the same clinic several times in a particular month, the clinic sends a claim to the patient's health insurance association for the total medical fee incurred in that month detailing the number of visits, the diagnoses, the kinds of treatment, the medical fee and the copayment. We focus on the insured that become the beneficiaries from April 1996 to August 1997, a period of 17 months. We also present the characteristics of the insured given by the associations: that is, the age, gender and income of the household head, including those who did not visit a clinic in the surveillance period.

Note that in our data the number of dependents (or females) is larger than the number of household heads (or men). In general, people who retire at the designated retirement age (mostly 60 years of age), and receive a public pension are obliged to quit the health insurance association they belonged to and join the municipality-managed National Health Insurance. The proportion of the elderly who are still involved in a firm-managed health insurance association after 70 years of age is therefore not high. So the elderly in our data are those who still work for a company, even if they are more than 70 years old, or are dependents of children or relatives covered by firm-managed health insurance. If a retired person receives only the minimum public pension, he or she can be certified as a dependent of a son or daughter, and will thus be covered by firm-managed health insurance. The latter seems to be typical for dependents in our data.[2]

We construct two data sets in this study. One is individual based and the other is claim based. On the demand side, we use the individual-based data to examine whether or not the insured will be more likely to visit a physician after becoming a beneficiary of the health services system for the elderly due to a reduction in out-of-pocket payments. The claim-based data are used to determine whether the number of claims and/or per-claim visits increase. On the supply side, we can find with the individual-based data whether the per-visit medical fee for a patient on average increases when a physician adopts the capitation fee scheme, while the claim-based data allows us to ascertain whether a physician provides more medical services to patients of the beneficiary.

3. The estimation results

3.1 Estimation results on the demand side

We adopt the per-day probability to visit a doctor as our measure of patient demand for medical services using the individual-based data. We are concerned with whether the insured will increase demand for medical services when they become a

[2] This restriction of the data may or may not affect the results, but the magnitude will not be large even if it does since we use information on possible medical service demand factors for patients, mainly household income, and control for them in our study.

beneficiary. Since the lengths of the two periods, being a beneficiary or a non-beneficiary, differ across the individuals in our data, we cannot directly compare the number of visits between the two periods, although it is often used as a measure of demand. Thus, we use the ratio of the number of visits to the total number of days: that is, the number of total visits in the beneficiary or non-beneficiary periods divided by the number of days in the period, namely, 30 days times the total number of months in the periods.[3] This measure is then regarded as the per-day probability of visiting a doctor.

3.1.1. Data description and estimation results with the individual-based data

Table 1 presents descriptive statistics of the demand-side variables in the individual-based data. The sample size is 1965, and the proportion of the number of heads and dependents is 16% and 84%, respectively. The proportion of males is 27%. The average length of the periods is about 8.5 months for both the beneficiary and the non-beneficiary periods and their standard deviations are also nearly equal. The ‘zero-excluded’ column focuses on the 1585 patients (or about 81% of the total number insured) who visit a physician at least once in each period. Most of the patients in the zero-excluded column are regarded as patients suffering from chronic disease.

First, we clarify how we will evaluate the actual cost of medical services that patients must pay out of their pockets in order to see if the insured increase their demand for health service with respect to the decrease in the actual cost. Before the insured are 70 years old, in principle they have to pay the proportional copayment, say 10% for the head and 30% for the dependent, for the total medical fee. But there is a

[3] Note that we set 30 days in a month because the data do not specify on which days a hospital or a clinic is closed and these differ among hospitals or clinics and by month.

three-level financial support scheme for heavy users of medical services: a high-cost medical care benefit provided by the central government, a public expense provided by local governments, and an additional benefit from the health insurance associations. With a high-cost medical care benefit, the surplus copayment over the threshold copayment per month is reimbursed to the insured. Local government support is given to low-income households, the physically or mentally handicapped, and infants. So the actual copayment (AC) or actual copayment rate (ACR) is the nominal copayment less the benefits or the actual copayment divided by the per-month total medical fee, respectively.

Now let us compare the change in the out-of-pocket fees of the insured with the actual copayment or actual copayment rate. We can see that both AC and ACR decrease more for the dependent than they decrease for the head. The AC and ACR of the dependents decrease from 17.63% to 8.67% or from 2191 yen to 1013 yen after becoming the beneficiary, respectively, while those of the head change slightly from 8.96% to 10.04% and from 1162 yen to 1018 yen, respectively. The findings about the AC and ACR are consistent with the findings on the per-day probability of a visit. The head does not increase visits because his/her actual copayment rate becomes slightly higher, while the dependent increases visits because his/her actual copayment rate is lowered.

The zero ratios are the proportion of the insured who never visit a doctor in the beneficiary or non-beneficiary periods. The ratio is 12.6% in the non-beneficiary period in total, but decreases to 9.7% in the beneficiary period. In more detail, the ratio for the dependent decreases while that for the head is unchanged. This implies that the insured, particularly dependents, are more likely to visit a doctor after becoming a beneficiary.

Figure 1 uses patient data to depict both the head's and dependent's density functions of the per-day probability of visiting a physician at least once in both the beneficiary and non-beneficiary periods. We find that the dependent's density function for the non-beneficiary period shifts to the right, although the head's function does not change as much. In particular, the peak of the dependent's density moves from 0.05 in the non-beneficiary period to 0.08 in the beneficiary period. This implies that dependents who visit less than twice a month in the non-beneficiary period subsequently increased their visits.

Nineteen representative diagnoses are selected from those described in the claims as the dummy variables in the estimation.[4] More than 60% of the patients are covered by these diagnoses. The most frequent diagnosis is hypertension, covering 22% of non-beneficiaries and 20% of beneficiaries. The remaining diagnoses only cover between 2% and 4% of diagnoses. We select renal failure for one of the representative diagnoses because the medical fee per visit is extraordinarily high compared with other diagnoses, although the proportion of renal failure is only 0.1%.

We examine if the insured increase their demand for medical services using two approaches. The first approach is to examine whether the insured with no visits in the non-beneficiary period now visit or still do not visit a physician, or whether those insured who have visited a physician do or do not cease visiting a physician when they

[4] The diagnoses are: 1) diabetes mellitus; 2) endocrine, nutritional and metabolic disorders; 3) disorders of the eyes; 4) cataract; 5) hypertensive disease; 6) ischemic heart diseases; 7) occlusion of precerebral and cerebral arteries; 8) gastric and duodenal ulcer; 9) gastritis and duodenitis; 10) liver diseases; 11) dermatitis; 12) inflammatory polyarthropathies; 13) arthrosis; 14) spondylopathies; 15) low back pain and sciatica; 16) disorders of bone density and structure; 17) renal failure; 18) symptoms, signs and abnormal clinical and laboratory findings not elsewhere classified; 19) injury, poisoning and certain other consequences of external causes. In the claims, more than one diagnosis is often described in a sequential order. We take the diagnosis at the top of the sequence as the diagnosis of the claim because it is often the patient's main disease.

become beneficiaries. Then there are four cases that relate to visiting or not visiting a physician in the non-beneficiary period or in the beneficiary period. Most of the insured, that is, about 81% or 1585 of the 1965 insured, belong to the case of visiting in both periods, while only 3% belong to the case of no visit in either period. We employ a random-effects panel Probit model for the analysis that captures the individual heterogeneity as random effects in the non-beneficiary and the beneficiary period for each individual.

The second approach is to examine whether the insured who visit a physician in both periods increase the per-day probability of a visit using quartile regression as well as least squares. We are interested in the marginal effects of the explanatory variables on the quartile of the per-day probability of a visit, say 25th percentile, median and 75th percentile, as well as the effects on the mean, because the distribution of the per-day probability of a visit, as shown in Figure 1, is not symmetric but rather is skewed.

In estimating the Probit model, the effects of becoming the beneficiary to the visit is captured by the parameters of the cross-products of the beneficiary length, that is the number of months in the period, and the head or the dependent dummies. The reason to incorporate such cross-products is that we need to deal with the following problems. The first is that it depends on the length of the periods whether or not an individual visits a physician, since the lengths of the non-beneficiary and the beneficiary periods differ by individual in our data set. The longer the length, the more the individual is likely to visit a physician, assuming the probability of a visit is the same in each month.[5] The second is that the effects of the elderly heath care systems on the probability of

[5] Let us examine the simple case where the probability of a visit per month is 0.1. When the period is two months, the probability of at-least-one visit is $(1 - 0.1) \times 0.1 + 0.1 \times (1 - 0.1) + 0.1 \times 0.1 = 0.19$, which is larger than 0.1 which is the probability when the surveillance period is one month.

visits are different between the head and the dependent because the dependent's actual copayment rate decreases more drastically than the head. So we incorporate two types of cross-products: one is the cross-product of the insurance status dummy (the head or the dependent) and the lengths of the periods both for the non-beneficiary and the beneficiary periods; the other is the cross-product of the insurance status dummy and only the lengths of the beneficiary period, that is the cross-products take a value of zero in the non-beneficiary period. To make the idea clearer, we explain it with the following equation:

$$\begin{pmatrix} Y_{i1}^{*} \\ Y_{i2}^{*} \end{pmatrix} = \begin{pmatrix} \mathbf{x}_{i1} \\ \mathbf{x}_{i2} \end{pmatrix} \boldsymbol{\beta}_1 + \begin{pmatrix} \mathbf{d}_i \times L_{i1} \\ \mathbf{d}_i \times L_{i2} \end{pmatrix} \boldsymbol{\beta}_2 + \begin{pmatrix} \mathbf{0} \\ \mathbf{d}_i \times L_{i2} \end{pmatrix} \boldsymbol{\beta}_3 + \begin{pmatrix} v_i \\ v_i \end{pmatrix} + \begin{pmatrix} u_{i1} \\ u_{i2} \end{pmatrix}, \qquad E\left[\begin{pmatrix} u_{i1} \\ u_{i2} \end{pmatrix} \begin{pmatrix} u_{i1} & u_{i2} \end{pmatrix} \right] = \sigma^2 \begin{pmatrix} 1 & \rho \\ \rho & 1 \end{pmatrix} \tag{1}$$

where Y_{it}^{*} $(t = 1, 2)$ is the unobserved utility of the insured, $\mathbf{x}_{it}$ the row vector of the explanatory variables other than the cross-products, $\mathbf{d}_i$ (1×2) the vector of the insurance status, for example, $\mathbf{d}_i = (1 \;\; 0)$ meaning the *i*th individual being the head, L_{it} $(t = 1, 2)$ the lengths of the periods, v_i the random effect, and u_{it} $(t = 1, 2)$ the errors, with standard deviation and correlation coefficient σ and ρ, respectively. If $Y_{it}^{*} > 0$, we can observe the insured visits to a physician.

The estimated parameters of the first cross-products, that is the second term of the right-hand side of Eq. (1), $\boldsymbol{\beta}_2$ (2×1), mean the average effects of the amount by which the probability of a visit increases for both periods and whether or not the effects are different between the head and the dependent, if the length becomes marginally one month longer. On the other hand, the estimated parameters of the second cross-products,

$\boldsymbol{\beta}_3\,(2\times 1)$, mean the amount by which the probability of a visit further increases on the first cross-products, if the length of the beneficiary period becomes marginally one month longer. The estimation results in Table 2 show the parameters of the cross-products for the length of the beneficiary period. Since the dependent dummy is significantly positive, this implies that the dependent is more likely to visit a physician when she or he becomes the beneficiary, while the head does not.

Other than the cross-products, the remaining explanatory variables, $\mathbf{x}_{it}$, are a gender dummy (male = 1), head's income, and the constant term. The estimated parameter of the gender dummy is not statistically significant, but income is positively significant. The marginal effect of income is about 0.008, which implies that a 100,000 yen (nearly $US900) increase in per-month income increases the probability of a visit by 0.8%.

Table 2 also shows the results of the quartile and median regressions, as well as OLS, using the data on the insured who visit a physician at least once in both periods. In this estimation, the demand-side effects of becoming a beneficiary are captured mainly by the cross-products of the beneficiary dummy, which takes a value of 1 if the insured is the beneficiary, otherwise 0, and the head or dependent dummies. The cross-products of the beneficiary dummy and the diagnosis dummy are included in the estimated model, but the estimation results are omitted from the table. The estimates of the cross-products are positive but insignificant for the dependent in all regressions, while being insignificantly positive for the head in the 75th percentile regression and insignificantly negative in the other regressions. Although Figure 1 appears to show that the dependent of a beneficiary visits a physician more frequently than before, the quartile and OLS regressions results do not reinforce this fact. So we cannot say that the dependent visiting a physician in both periods significantly increases his or her visits after becoming a beneficiary.

3.1.2. Data description and estimation results with the claim-based data

With the claim-based data, we can examine whether per-month visits increase in the beneficiary period. Since the amount of per-month copayment is fixed when the insured becomes the beneficiary, the insured may have an incentive to visit a physician more than before so that the per-month visits may increase. We construct two data sets for this analysis. The first consists of all 37,482 claims, and the other of the claims of patients visiting in both periods (35,485 claims). The descriptive statistics of the variables of interest in the latter are shown in Table 3. Note that the values in the table are not very different from those using the former data set. We can see that per-month visits increase in total from 2.476 to 2.588, that is, from 2.307 to 2.493 for the head and from 2.515 to 2.617 for the dependent. On the other hand, the actual copayment or copayment rate decreases in total from 1,932 yen to 1,013 yen or from 17.25 to 12.82, respectively. Out-of-pocket payments for dependents decrease, but those for the head do not.

Table 3 also describes the other variables in the claim-based data. The number of claims in the non-beneficiary period is 17,249, while that in the beneficiary period is 18,236, an increase of about 1000 claims. This implies that a beneficiary is likely to visit a physician more readily than a non-beneficiary, which is the same result as the panel Probit estimation results. In particular, the proportion of dependents' claims increases from 81% to 85%: this is also consistent with the earlier estimation results.

We estimate the number of per-month visits with a truncated Poisson regression model since the dependent variable is a counting variable truncated at zero. We conduct the estimation with both data sets described earlier. Table 4 shows the results. Note that the diagnosis dummies are included among the explanatory variables, but the results are omitted since most of the cross-products are insignificant. The estimation results for the cross-product of the insurance status dummies (head or dependent) and the beneficiary dummy show that only the dependent increases per-claim visits in the case of all claims. On the other hand, the parameter for the dependent is negative but insignificant in the case of the claims of patients visiting in both periods. However, the negative value of the dependent's parameter does not necessarily contradict the results of Table 2 or the data description of Table 1. These results show that only per-claim visits decrease. Since the dependent increases the number of claims, the per-capita average per-month visits increase. This is also true for the head. The number of the head's claims also slightly increase so that the head may not change the per-capita average per-month visits, although the parameter of the cross-product is significantly negative. Moreover, considering the results of the two cases together, we find that dependents who visits a physician only in the beneficiary period tend to visit more frequently than those who visit in both periods. This may be because the former is encouraged to visit a physician by the lower medical fee so that he/she visits more frequently than the latter with chronic disease whose visits are controlled by a physician, with required regular visits in both periods. One possible reason is the capitation fee scheme, given that the cost of the third and later visits are not reimbursed to physicians.

In sum, from the estimation results of the individual-based and the claim-based data, we find that it is easier for the insured to visit a physician when he/she becomes a beneficiary of the health service system for the elderly. In particular, the dependent is likely to visit a physician more frequently, while the head does not change the number of visits.

3.2 Estimation results of the supply side

We adopt two approaches to examine if a physician changes the quantity of medical services provided when a patient becomes a beneficiary. The first compares the distributions of the per-visit fee between the beneficiary and non-beneficiary periods using the claim-based data. The second compares the distributions of the per-visit fee among the beneficiaries of the diagnoses to which the capitation fee scheme is applicable using the individual-based data. Note that the data set of the second approach comprises the insured who visit a physician at least once in both periods. In the first approach, we examine if the distributions of the per-visit fee differ between the beneficiary and the non-beneficiary to see if a physician provides more services to the beneficiary. In the second approach, we examine if the increase in the per-visit fee to the beneficiary to whom the capitation is applicable is larger than it is to the beneficiary without diagnosis. If so, a physician whose average cost of patients is lower than the capitation reimbursement will adopt the capitation fee scheme.

3.2.1. Estimation results with the claim-based data

We employ quantile regression methods, median regression, 25th percentile and

75th percentile regressions, as well as OLS, to examine in which fee groups of patients or in what types of patient diagnoses a physician changes the quantity of medical services.

The explanatory variables are classified into five categories. The first is the dummies for gender, insurance status (head or dependent), financial support by the government or by a health insurance association. The second is the treatment length of the diagnosis on the claim, that is, the number of years from the first visit for the diagnosis to the latest visit. The third is the 19 diagnoses dummies as well as the analyses in section 3.1. The fourth consists of the cross-products of the beneficiary dummy and the first, second and third variables except for the gender dummy. The fifth category is the lengths until the patient turns 70 years old or those past 70 years measured by the number of months. The financial support dummies consist of a high-cost medical care benefit dummy, an additional benefit dummy, and a public expense dummy. The dummies for the treatment length of the diagnosis are the first-visit dummy, no-more-than-5-year dummy, no-more-than-10-year dummy, and more-than-10-year dummy.[6] We expect that a patient with longer treatment years has a chronic disease and thus their per-visit fees will increase when they are the beneficiary, partly because a physician provides more medicine or laboratory tests than before and partly because a physician adopts the capitation fee scheme. With the estimates of the cross-products, we can examine if the quantity of the service changes depending on eligibility or if the changes are different between the head and the dependent. We predict that the per-visit fee of the dependent beneficiary will increase because the actual copayment of the

[6] In the claims, the first month to start the treatment for a specific diagnosis is described. We can then find how long a patient visits the same physician for the same specific diagnosis.

dependent decreases to nearly one half of that for the non-beneficiary. The last category includes the number of months until the patient turns 70 years old and those past 70 years, ranging from one to 17. We try to capture the delaying effects such that a physician may provide less service for patients immediately before they are 70 years old and more for patients immediately after they turn 70. A physician may delay elective or non-urgent services, such as laboratory tests or diagnostic imaging, for these patients because they can receive the services with a lower fee once they become a beneficiary. That is, the shorter the months to (or past) 70 years, the greater the probability the physician may provide less (or more) services. The base case is a non-beneficiary head, female, with a less-than-5-year length of treatment.

Table 5 shows the descriptive statistics of the per-visit fee in both the claim- and individual-based data. The per-visit fee in the individual-based data is 719 points for the non-beneficiary and 809 points for the beneficiary, respectively, or 90 points higher for the beneficiary.[7] There is little difference in the per-visit fee between the head and the dependent, although the dependent visits more than the head when he/she becomes a beneficiary. Note that there is no high-cost medical care benefit or additional benefit for the beneficiary because their per-month fee is bounded below the threshold level by the health services system for the elderly, while some beneficiaries still have some public expense. Excluding the data where patients are financially supported, the per-visit fee increases about 100 to 150 points when a patient becomes the beneficiary. For the length of treatment, the results indicate that the longer the treatment length, the larger the per-visit fee. In particular, the per-visit fee of patients, except first-visit patients,

[7] The total fee is calculated based on the fee schedule, where medical services are disaggregated down to the finest detail and some points are attributed to a unit of each item, where one point is valued at 10 yen in the case of the fee-for-service schedule.

increases more than the first-visit patients when they become beneficiaries.

Table 6 presents the regression results. Let us see if the per-visit fee increases when a patient becomes the beneficiary using the median regression. The regression estimates relevant to the diagnosis dummies are omitted in the table. The estimated parameters of the cross-products show that the per-visit fee of the head and the dependent are 87 points and 164 points larger than the base case, respectively. Even if we take the estimated parameters of the diagnosis dummies into consideration, ranging from –113 to 138 points except for renal failure,[8] the per-visit fee of the head increases for many diagnoses or is unchanged for some diagnoses, while the fee for the dependent increases for all diagnoses. The 25th percentile and the 75th percentile regressions as well as OLS show the same results as the median regression. In particular, the increase in the per-visit fee of the dependent is larger than that for the head. Thus, we can conclude that a physician provides more medical services both to the dependent and to the head when they become beneficiaries, but the increase for the dependent is larger than for the head. This can be explained by the lower copayment for dependents.

The estimation results of the cross-products of the length of treatment and the beneficiary dummy show that a physician increases the per-visit fee of patients of chronic diseases when their per-visit fee is relatively lower before they turn 70. The estimates of the more-than-10-year treatment length are significantly positive in the 25th percentile and median regression but insignificant in the 75th percentile regression and in the OLS. This may indicate that a physician applies the capitation fee scheme only for patients with lower per-visit fees.

[8] The fee for renal failure increases by 2,358 points per visit. This may reflect the use of dialysis therapy by the beneficiary.

Figure 2 depicts the probability density functions of the per-visit fee for both the head and the dependent in the beneficiary and non-beneficiary periods. We can easily observe two points with the density functions: first, the peaks of the density functions around 400 points move downward for both the head and the dependent; second, there is a 'bump' around 900 points, in particular in the dependent's density function of the beneficiary. The shapes of the distribution functions suggest that the capitation fee scheme is adopted by physicians whose patients pay a lower fee when they are the non-beneficiary, and thus adoption makes the bump in the distribution in the beneficiary period.

The number of months to 70 years is significantly negative in the 75th percentile regression and in the OLS, while the number of months past 70 years is significantly positive in the 25th percentile regression and in the OLS, but the values are small so that their effect on the per-visit fee is negligible.

From the above results we can conclude as follows. First, physicians increase the per-visit fee for beneficiary patients because their copayment is lowered, which is supported by the fact that the increase in the fee of the dependent is larger than the head and that the copayment of the dependent is significantly less than that of the head. Second, physicians appear to adopt the capitation fee scheme when the average per-visit fee of their patients is lower.

3.2.2. Estimation results with the individual-based data

Using the individual-based data, we also examine if a physician provides more medical services to the patients of the beneficiary or if a physician adopts the capitation for their own benefit. As both the estimation results with the claim-based data and Figure 2 show, the increase in the per-visit fee is likely to be caused by a decrease in copayment as well as the adoption of the capitation fee scheme.

We first, however, briefly explain the capitation fee scheme. This scheme was introduced in 1996, was slightly changed in April 1997, and was ultimately abolished in 2002. Its purpose was to reduce the expenditure on medical services by elderly patients by directing patients with representative chronic diseases to receive treatment from a hospital rather than a clinic. The medical fee claimed by a hospital was, in fact, higher than by a clinic under the fee-for-service scheme. The government also aimed to discriminate between providers of medical services for acute and chronic diseases—in principle, the former being hospitals and the latter clinics—for the purpose of the socially efficient allocation of medical resources without the introduction of a gatekeeper system. Thus, the government introduced the capitation fee scheme for clinics, while slashing fees for hospitals. It was expected that clinics were willing to treat elderly patients when offered a generous capitation fee, and that this would reduce total medical fees for the elderly.

The fee scheme before the minor reform of 1997 was as follows. In principle, the per-month fee was 1,470 points for clinics without medicine prescriptions and 1,770 points for clinics with medicine prescriptions. Additional fees were allowed to be claimed, but this amount was relatively small so that the total fee per month was around 1,470 to 1,770 points. To use this fee scheme, a physician needed to see a patient at least twice a month. Thus, the per-visit fee was around 735 or 885 points and smaller if a patient visited more than twice a month. A physician then had an incentive to see a patient twice a month. After the changes in 1997, the physician could use the fee scheme even if the patient visited only once a month. The per-visit fee remained the same, 735 or 885 points, and the upper limit was set at 1,470 or 1,770 points. Thus, the change meant that a physician could easily use the fee scheme. In other words, the physician did not have to induce a patient to visit twice a month.

Our data are collected from claims made 17 months before September 1997 so include the period before and after the minor reform of the capitation fee scheme. Since the length of months after the change is not long (about four months), and the per-visit fee on which we focus is unchanged, the minor reform in April 1997 has no significant influence on the results of the supply-side studies.

Table 7 shows the estimation results of the per-visit medical fee with the individual-based data. Because there are some difficulties in identifying exactly to which patients the capitation is applied, since there is no record of the fee scheme on the claim data used, we use the information on diseases in the claims. We use three types of data set: the first includes all samples (named ALL SAMPLES), the second is a subset of the individuals who have one of the diagnoses for which the capitation is applicable described on their claims both in the non-beneficiary and in the beneficiary periods (named CAPITATION APPLICABLE,[9]) and the third is a subset of individuals who had no diagnoses under the capitation scheme (named FEE-FOR-SERVICE).

From the results with ALL SAMPLES, we find that the per-visit fee of the head and the dependent increase when they are beneficiaries. In particular, the per-visit fee of

[9] The CAPITATION APPLICABLE data set may in fact include individuals to whom the capitation fee scheme was not applied, but we do not think the portion is large. The reasons are: 1) an elderly person with a chronic diagnosis regularly seeing a physician may merely visit a hospital, and 2) most clinics adopt the capitation fee scheme because the reimbursement is so generous.

the dependent increases more than for the head. This is the same as the results with the claim-based data: a physician provides more medical services for the beneficiary, in particular for the dependent.

Next we will compare the results from the datasets of CAPITATION APPLICABLE and FEE-FOR-SERVICE. In the former, the estimates of the cross-products are significantly positive in most regressions except for the dependent in the 75th percentile regression. The values of the estimates of the cross-products of the head in CAPITATION APPLICABLE are nearly the same as the dependent in the 25th percentile regression and in the OLS, and are larger than the dependent in the median and in 25th percentile regressions. On the other hand, the estimates of the head of cross-products in the FEE-FOR-SERVICE data set are not significant, but those of the dependent are positively significant in all of the regressions. The differences in the results suggest that there must be some source raising the fee of the head with CAPITATION APPLICABLE, which is different from a reduction in the copayment. This source must be the capitation fee scheme. On the other hand, the effects of the copayment reduction on the medical service provisions are expressed in the significantly positive estimates of the dependent of the cross-product in FEE-FOR-SERVICE.

Figure 3 and 4 also support the facts derived by the regressions in Table 7. Figure 3 depicts the density functions of per-visit points of FEE-FOR-SERVICE by insurance status, namely the head or the dependent, while Figure 4 depicts those of CAPITATION APPLICABLE. In Figure 4, the peaks of the densities of the head and dependent shift to the right by around 700 points for the dependent and around 900 points for the head. On the other hand, the peaks in Figure 3 do not change as much, although the density of the dependent shifts to the right. This is consistent with the regression results in Table 7. Thus, the shifts of the densities in Figure 4 are explained mainly by the adoption of the capitation fee scheme.

In total, we can first conclude that a physician provides more medical services to patients, in particular to the dependent, since the dependent’s copayment is lowered more than is the head's when they become eligible for the health service systems for the elderly. Second, the per-visit fee of patients increases partly because a physician adopts capitation if it will increase the total reimbursement.

4. Conclusion

We examine if insured persons demand more medical services, or if a physician provides more medical services, when the insured is eligible to benefit from the health services system for the elderly. This system is characterized by a per-month fixed copayment and by a selective capitation fee scheme for patients with typical chronic diseases. We find that the beneficiary, in particular the dependent, visits a physician more frequently than before because the actual copayment decreases, mainly for the dependent and less so for the head. On the other hand, a physician provides more to the beneficiary partly because of the lowered copayment. The medical fee per visit of the beneficiary also increases because physicians adopt the capitation fee scheme, which they will select instead of the fee-for-service scheme only when capitation is more profitable than fee-for-service. As a result, physicians as well as the insured benefit from the health services system.

One criticism of our results is that a physician who adopts the capitation fee scheme increases the quantity of medical services to the patient. In other words, the patient is provided more treatment than before so that a physician does not exploit the capitation fee scheme. We cannot observe if the physician has done this since there is no record on the claims of what types of treatments the physician provided in the case of capitation. A better way to examine it would be to check whether or not the per-visit fee decreased when the capitation fee scheme was abolished and the fee-for-service revived.

The capitation fee scheme was abolished at the end of September 2002. The Japan Medical Association sent a questionnaire to its members to investigate the effects of its abolition and the change in the fee schedule (down 2.7% from April 2002) had on physicians' income. The report compared data on claims collected from October to December 2001 with data collected from October to December 2002. This showed that per-capita fees decreased from 700.6 to 564.6 points: that is, a 19.4% decline in clinics adopting the capitation, while it decreased from 650.3 to 615.5 points, that is, a 5.3% decline, in clinics adopting fee-for-service. If the physicians who adopted the capitation provided as many services as the capitation fee scheme expected, the decline of the per-capita fee should be nearly the same as physicians adopting the fee-for-service, namely 5.3%. This difference implies that the physicians have not provided as many services as the capitation fee scheme expected.

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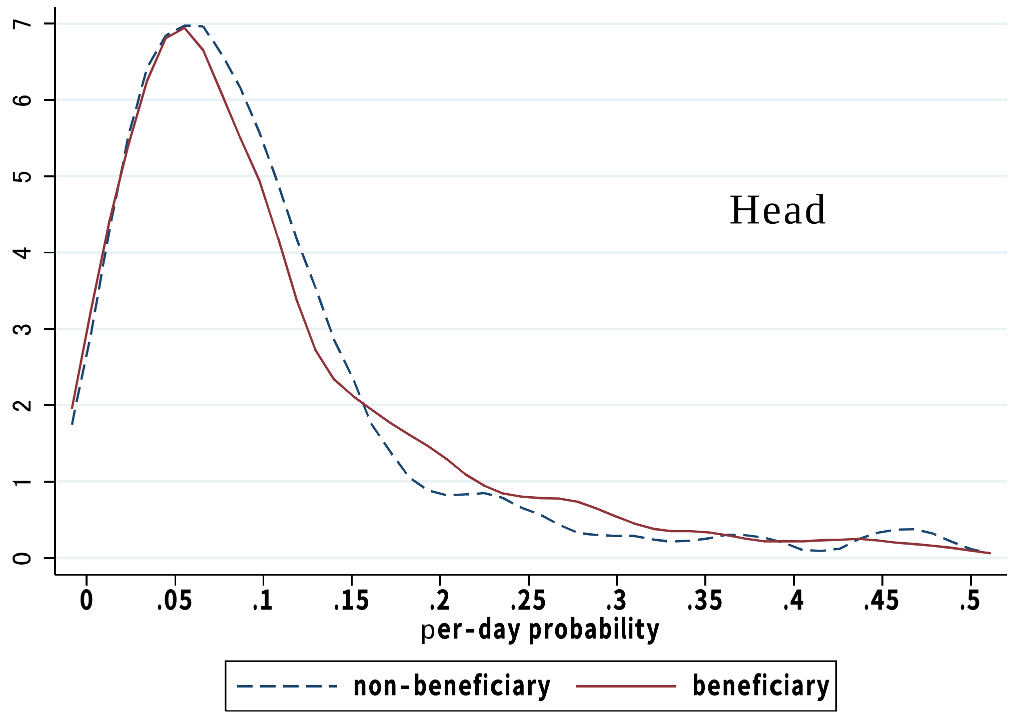
Figure 1: Density Functions of the Per-day Probability of Visit

Individual-based Data



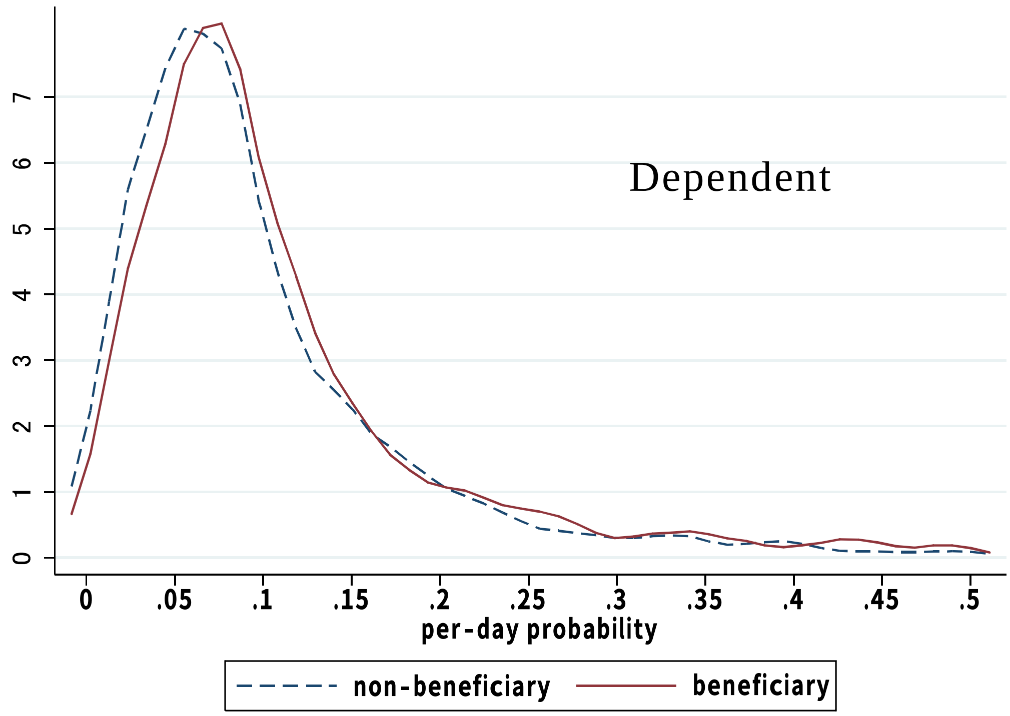
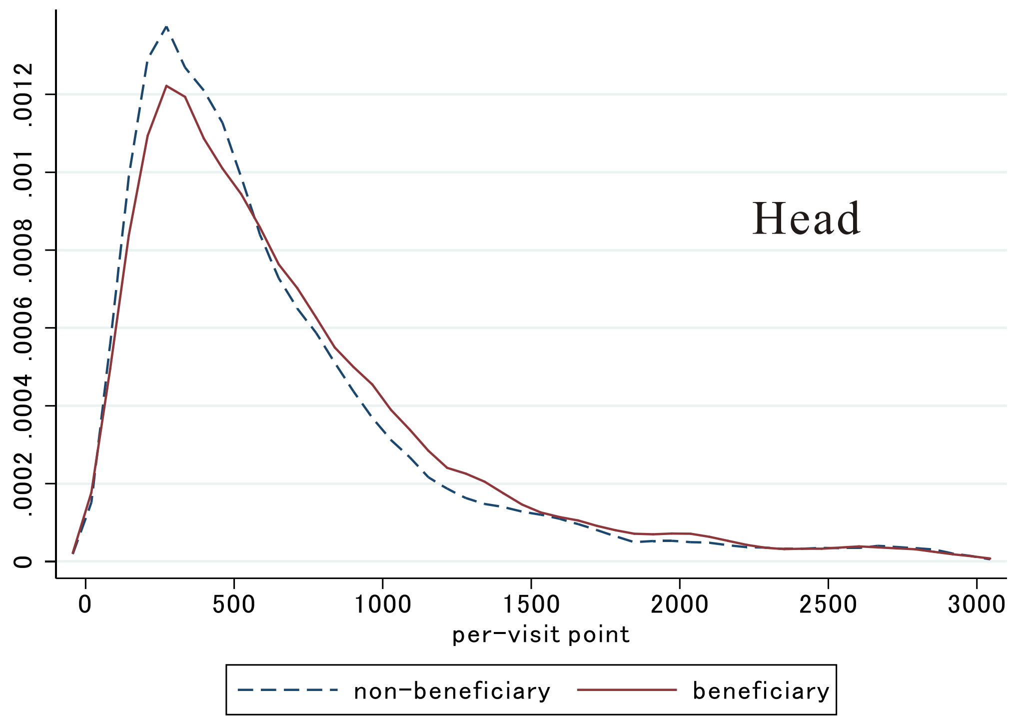


Figure 2: Density Functions of Per−visit Point

Claim−based Data



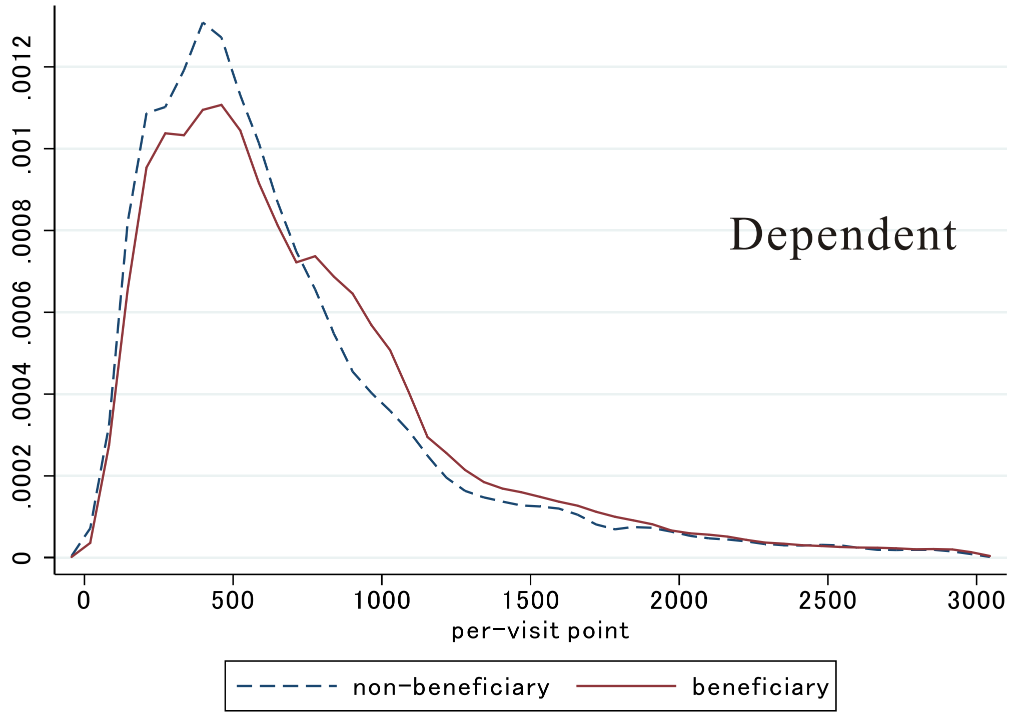
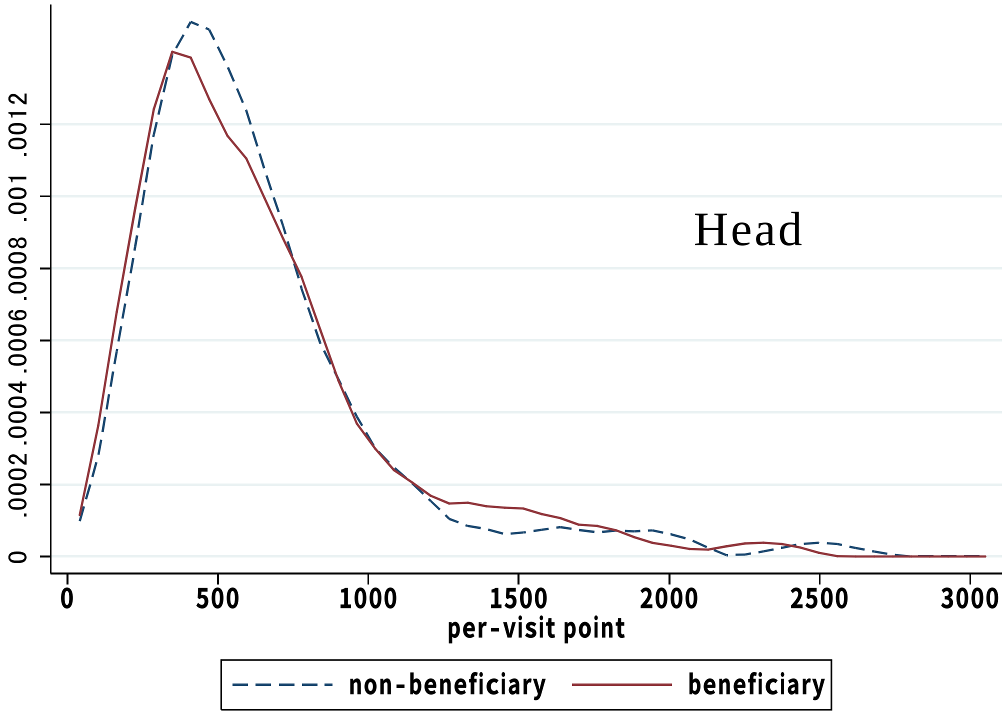


Figure 3: Density Functions of Per-visit Point:

The Case of Fee-For-Service



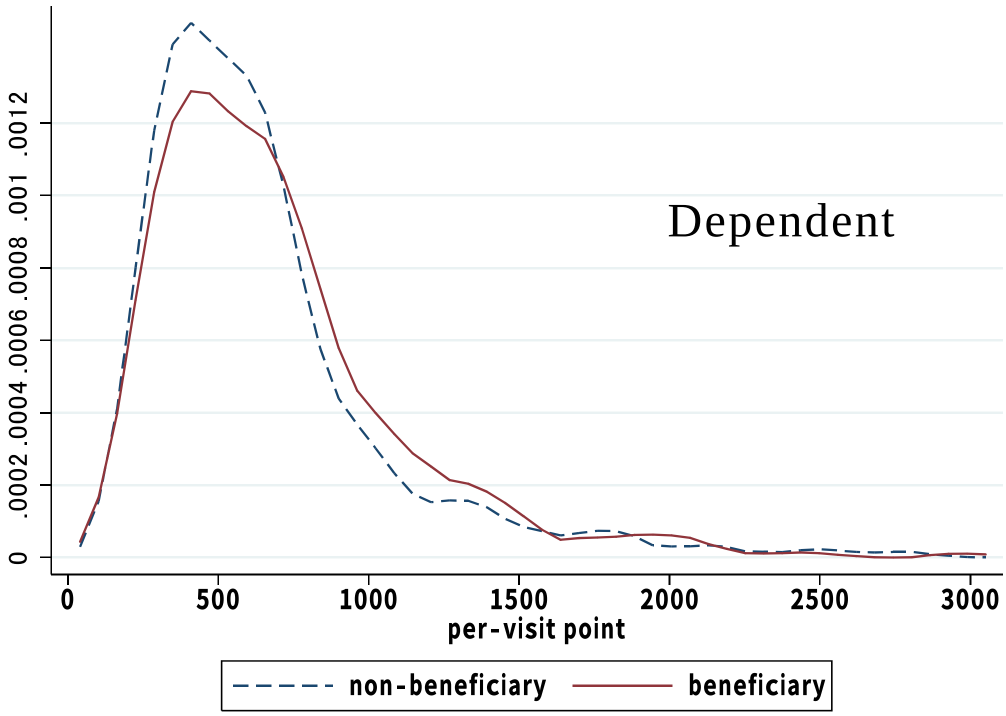
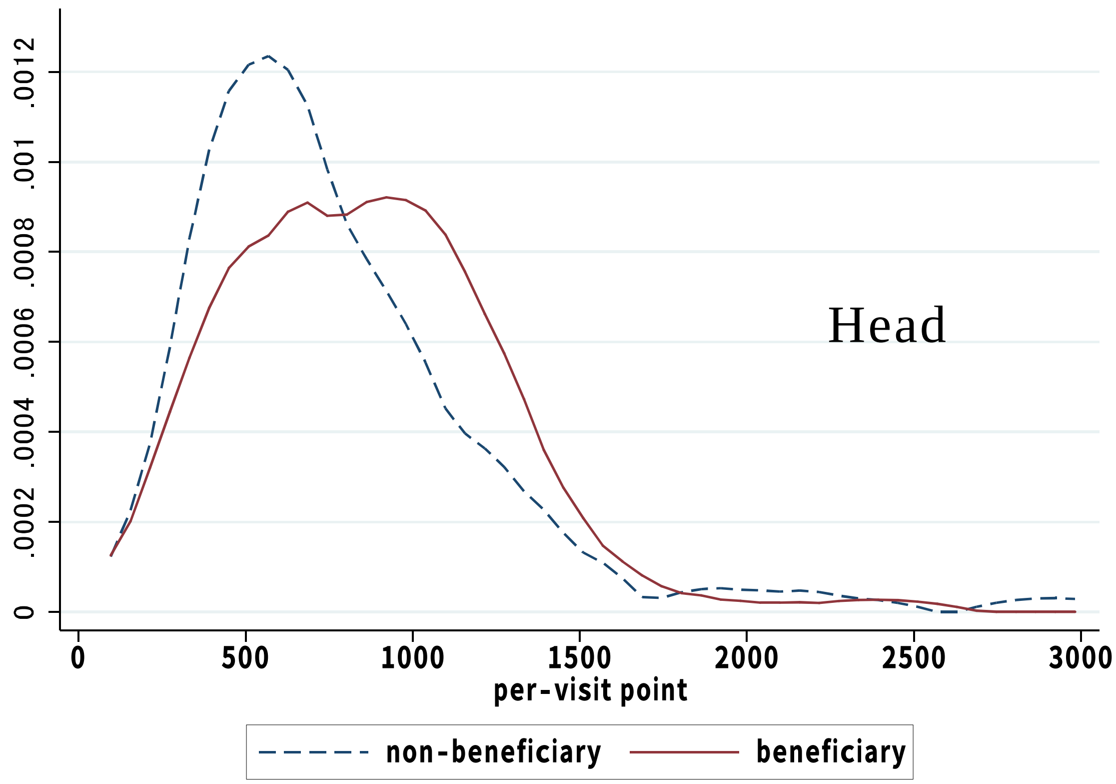


Figure 4: Density Functions of Per-visit Point:
The Case of Capitation Applicable



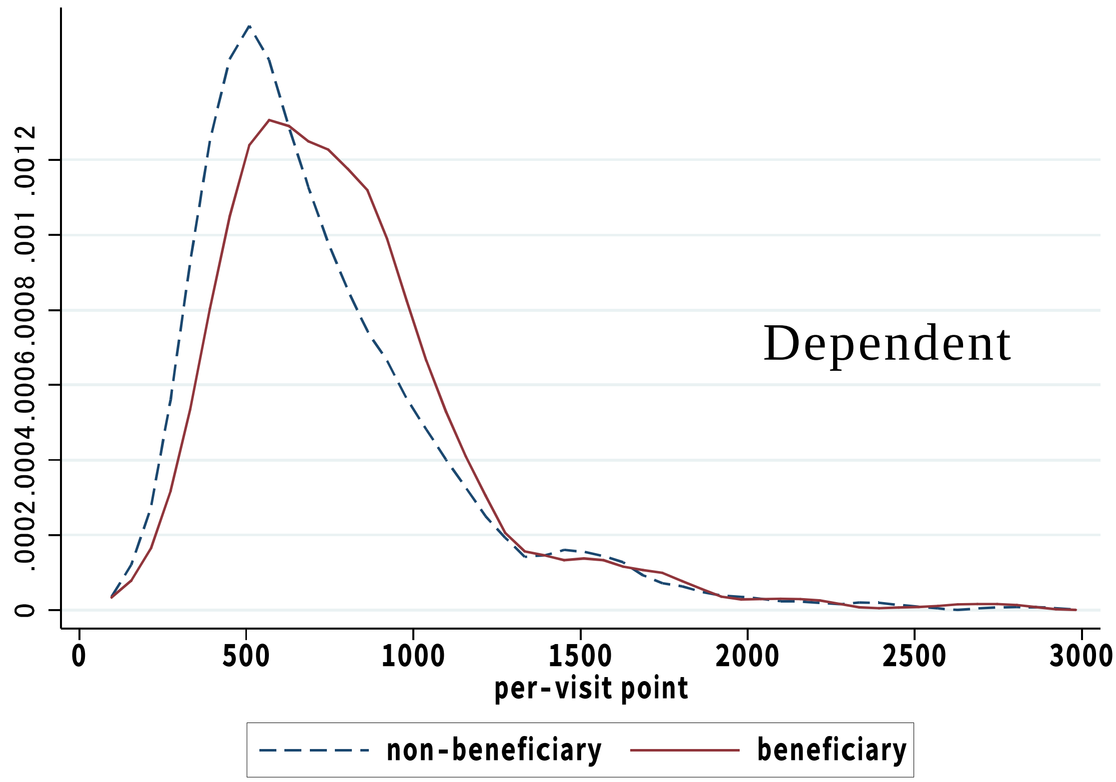


Table 1: Descriptive Statistics (individual-based data)

		non-beneficiary				beneficiary			
		Total（sample：1965）		zero-excluded（sample：1585）		Total（sample：1965）		zero-excluded（sample：1585）	
		mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.
Head dummy		0.164	0.370	0.162	0.369	0.164	0.370	0.162	0.369
	male	0.118	0.323	0.115	0.319	0.118	0.323	0.115	0.319
	female	0.046	0.209	0.047	0.212	0.046	0.209	0.047	0.212
Dependent dummy		0.836	0.370	0.838	0.369	0.836	0.370	0.838	0.369
	male	0.152	0.359	0.151	0.358	0.152	0.359	0.151	0.358
	female	0.684	0.465	0.687	0.464	0.684	0.465	0.687	0.464
Gender dummy (male=1)		0.270	0.444	0.266	0.442	0.270	0.444	0.266	0.442
Income（100 thuosand yen）		4.439	1.773	4.512	1.809	4.494	1.776	4.570	1.816
Length of the periods (months)		8.420	4.412	8.554	4.320	8.580	4.412	8.446	4.320
Per-day probability of visit		0.091	0.110	0.110	0.114	0.099	0.112	0.118	0.114
	head	0.089	0.106	0.109	0.109	0.091	0.104	0.111	0.107
	dependent	0.091	0.111	0.110	0.115	0.101	0.113	0.119	0.116
Actual copayment rate (%)		-	-	16.22	10.52	-	-	8.89	6.57
	Head	-	-	8.96	2.33	-	-	10.04	7.63
	Dependent	-	-	17.63	10.90	-	-	8.67	6.32
Per-month actual copayment		-	-	2024	1967	-	-	1014	47
(thuosand yen)	**Head**	-	-	1162	815	-	-	1018	18
	Dependent	-	-	2191	2078	-	-	1013	51
Zero-ratio		0.126	0.332	-	-	0.097	0.296	-	-
	Head	0.112	0.316	-	-	0.121	0.327	-	-
	Dependent	0.129	0.335	-	-	0.093	0.290	-	-

Note (1): The per-day probability is defined as total visits of the non-beneficiary or the beneficiary periods divided by the total calendar days respectively.

Note (2): The the actual copayment or actual copayment rate is the nominal copayment less the benefits or the actual copayment divided by the per-month total medical fee, respectively.

Note (3): The zero ratios are the proportion of the insured who never visit a doctor in the beneficiary or non-beneficiary periods.

Note (4): The‘zero-excluded’column focuses on the 1585 patients (or about 81% of the total number insured) who visit a physician at least once in each period.

Table 2: Estimation results of the demand (individual-based data)

	estimate	s.e.	estimate	s.e.	estimate	s.e.	estimate	s.e.
Random-effects probit (sample:3930)								
Dependent variable: visit=1								
			marginal effects					
Constant	0.497	0.126 ***						
Gender dummy (male=1)	-0.112	0.093	-0.011	0.00935				
Income (100 thousand yen)	0.090	0.024 ***	0.008	0.00221 ***				
Cross-products (× months of both periods)								
Head	0.099	0.016 ***	0.009	0.00153 ***				
Dependent	0.089	0.010 ***	0.008	0.00100 ***				
Cross-products (× beneficiary length)								
Head	0.027	0.021	0.002	0.00192				
Dependent	0.016	0.009 *	0.001	0.00081 *				
σ	0.864	0.053 ***						
ρ	0.427	0.030 ***						
Log Liklihood		-1254						
Qurtile, Median Regressions and OLS (sample:3170)								
Dependent variable: per-day probability of visit								
	25-% regression		**median regression**		**OLS**		**75-% regression**	
Constant	3.568	0.412 ***	7.164	0.540 ***	10.910	0.739 ***	13.318	0.948 ***
Head	0.274	0.433	0.809	0.573	1.324	0.787 *	1.895	1.018 **
Gender dummy (male=1)	-0.279	0.268	-1.074	0.363 ***	-1.924	0.497 ***	-2.827	0.642 ***
Income (100 thousand yen)	0.106	0.059 *	0.123	0.078	0.074	0.107	0.155	0.137
Cross-products (× beneficiary dummy)								
Head	-0.591	0.614	-0.249	0.815	-0.098	1.116	0.540	1.431
Dependent	0.599	0.418	0.593	0.556	0.774	0.759	0.286	0.992
						0.1025		
Pseud (or Adusted) R-squared	0.0414			0.0422		0.1025		0.0888

Note (1): The symbols, ***, ** and *, mean that the estimates are significant at 1%, 5% and 10% significance level, respectively.

Note (2): The estimated parameters of the diagnoses dummies are omitted.

Table 3: Descriptive Statistics (claim-based data)

		non-beneficiary (sample：17249)		beneficiary (sample：18236)	
		mean	s.d.	mean	s.d.
Head		0.190	0.392	0.150	0.357
	male	0.137	0.344	0.102	0.302
	female	0.053	0.223	0.049	0.215
Dependent		0.810	0.392	0.850	0.357
	male	0.123	0.329	0.132	0.339
	female	0.687	0.464	0.717	0.450
Gender dummy (male=1)		0.260	0.439	0.234	0.423
monthly income （100 thuosand yen）		4.598	1.907	4.612	1.784
Number of visits	**Total**	2.476	2.765	2.599	2.839
	Head	2.307	2.430	2.493	2.827
	Dependent	2.515	2.836	2.617	2.841
Actual copayment rate (%)	**Total**	17.25	11.21	12.82	12.96
	Head	9.21	2.45	14.58	14.38
	Dependent	19.13	11.62	12.51	12.67
Per-month actual copayment (Yen)	**Total**	1932	2047	1013	91
	Head	1189	1212	1016	55
	Dependent	2105	2161	1013	96

Note: The the actual copayment or actual copayment rate is the nominal copayment less the benefits or the actual copayment divided by the per-month total medical fee, respectively.

Table 4: Estimation results of zero-truncated Poisson regression (Claim-based data)

	estimate	s.e.		marginal effect	s.e.	
<u>All claims (37215 samples)</u>						
Constant	0.931	0.0145	***			
Income	-0.011	0.0022	***	-0.022	0.0044	***
Male dummy	-0.082	0.0104	***	-0.163	0.0203	***
Head dummy	-0.098	0.0161	***	-0.192	0.0303	***
Cross products (× beneficiary dummy)						
Head	-0.025	0.0195		-0.051	0.0389	
Dependent	0.030	0.0141	**	0.061	0.0289	**
Log Likelihood	-72108					
Pseudo R2	0.0866					
<u>Claims of the patients visiting in both periods (35485 samples)</u>						
Constant	0.941	0.0148	***			
Income	-0.010	0.0022	***	-0.020	0.0044	***
Gender dummy (Male=1)	-0.073	0.0106	***	-0.146	0.0207	***
Head dummy	-0.094	0.0164	***	-0.183	0.0308	***
Cross products (× beneficiary dummy)						
Head	-0.045	0.0199	**	-0.089	0.0389	**
Dependent	-0.003	0.0146		-0.006	0.0295	
Log Likelihood	-68565					
Pseudo R2	0.0889					

Note (1): The symbols, ***, ** and *, mean that the estimates are significant at 1%, 5% and 10% significance level, respectively.

Note (2): The estimated parameters of the diagnoses dummies are omitted.

Table 5：　Descriptive statistics of per-visit medical fee
(Claim-based data and Individual-based data)

	non-beneficiary			beneficiary		
	No. of Samples	mean	s.d.	No. of Samples	mean	s.d.
	claim-based data					
Total	17249	719	716	18236	809	839
Head dummy	3269	747	895	2742	836	1088
Male	2361	767	951	1852	914	1229
Female	908	697	728	890	673	680
Dependent	13980	712	667	15494	804	787
Male	2130	856	887	2414	956	1008
Female	11850	686	616	13080	776	736
High-cost medical care benefit						
Yes	4	8071	1548	-	-	-
No	17245	717	707	18236	809	839
Additional benefit						
Yes	1662	1328	1192	-	-	-
No	15587	654	610	18236	809	839
Public expence						
Yes	6324	746	725	120	657	410
No	10925	703	711	18116	810	841
Length of treatment						
0 (first visit)	2398	744	693	2239	787	762
no more than 5 years	10674	690	739	11079	787	885
more than 5 years to 10 years	2813	751	615	3272	835	801
more than 10 years	1364	831	757	1646	930	665
	individual-based data					
Total	1585	706	533	1585	755	519
Head dummy	257	723	635	257	765	652
Male	182	761	704	182	825	735
Female	75	630	408	75	618	344
Dependent	1328	703	510	1328	753	489
Male	239	806	550	239	897	573
Female	1089	680	499	1089	722	463
High-cost medical care benefit						
Yes	1	8071	0	-	-	-
No	1584	702	500	1585	755	519
Additional benefit						
Yes	406	896	746	-	-	-
No	1179	641	416	1585	755	519
Public expence						
Yes	627	697	482	20	749	299
No	958	712	563	1565	755	522

Note: The unit value of the fees is a point that is equal to 10 yen.

Table 6: Estimation results of per-visit medical fee (claim-based data)

Sample size: 35485

	25%-regression			median regression			OLS			75%-regression		
	estimate	s.e.		estimate	s.e.		estimate	s.e.		estimate	s.e.	
Constant	194.84	7.25	***	381.11	10.11	***	616.49	20.31	***	749.48	17.03	***
Dummies												
Gender (male＝1)	28.53	3.69	***	57.60	5.26	***	134.29	10.57	***	112.94	8.89	***
Dependent	12.74	5.82	**	8.02	8.25		-78.88	16.59	***	-53.39	14.08	***
High-cost benefit	6822.50	126.57	***	6550.46	160.36	***	6839.41	371.62	***	5911.61	299.21	***
Additional benefit	320.89	7.23	***	454.34	10.18	***	709.26	20.47	***	790.39	17.40	***
Public expence	52.89	4.58	***	107.51	6.41	***	202.52	12.88	***	176.75	10.84	***
Length of treatment												
0 (first visit)	113.37	6.19	***	96.15	8.66	***	114.99	17.39	***	129.14	14.74	***
more than 5 years to 10 years	30.89	5.73	***	15.49	8.06	*	37.34	16.20	**	23.31	13.70	*
more than 10 years	33.39	7.77	***	26.93	11.04	**	59.43	22.21	***	29.69	18.95	
number of months to 70 years	-0.16	0.54		0.07	0.76		-6.21	1.52	***	-4.08	1.28	***
Cross products (× beneficiary dummy)												
Head	49.88	9.50	***	87.29	13.17	***	153.49	26.47	***	114.06	22.26	***
Dependent	97.51	8.64	***	163.69	12.09	***	206.39	24.29	***	206.88	20.41	***
Public expence	-81.77	24.64	***	-138.61	34.39	***	-350.48	69.33	***	-273.34	58.23	***
0 (first visit)	-42.93	8.84	***	-25.25	12.33	**	-86.62	24.79	***	4.62	21.04	
more than 5 years to 10 years	-34.98	7.86	***	-11.39	11.04		-18.45	22.19		11.56	18.81	
more than 10 years	53.74	10.52	***	81.17	14.94	***	29.03	30.05		40.98	25.61	
number of months past 70 years	1.10	0.52	**	0.60	0.72		2.49	1.45	*	1.29	1.22	
Pseud (or Adusted) R-squared	0.0772			0.0775			0.1027			0.0928		

Note (1): The symbols, ***, ** and *, mean that the estimates are significant at 1%, 5% and 10% significance level, respectively.

Note (2): The estimated parameters of the diagnoses dummies are omitted.

Table 7: Estimation results of per-visit medical fee (individual-based data)

	25%-regression		median regression		OLS		75%-regression	
	estimate	**s.e.**	**estimate**	**s.e.**	**estimate**	**s.e.**	**estimate**	**s.e.**
ALL SAMPLES (N = 3170)								
Constant	332.07	19.93 ***	471.94	33.45 ***	582.82	40.22 ***	640.68	46.30 ***
Gender (male=1)	43.62	10.95 ***	80.15	18.68 ***	133.07	22.44 ***	170.60	25.98 ***
Dummies								
Dependent	5.95	18.13	7.03	31.38	-32.88	37.76	13.00	43.47
High-cost benefit	7581.99	15.44 ***	7375.11	26.97 ***	7233.16	489.80 ***	7163.05	38.43 ***
Additional benefit	150.74	15.66 ***	216.67	26.76 ***	287.65	32.17 ***	254.01	37.46 ***
Public expence	43.78	14.22 ***	60.63	24.22 **	120.19	29.19 ***	95.03	33.71 *
Cross products (× beneficiary dummy)								
Head	10.11	25.29	109.13	42.47 ***	88.30	51.02 *	152.21	58.75 ***
Dependent	91.61	22.27 ***	156.81	37.78 ***	155.86	45.37 ***	213.30	53.03 ***
Public expence	54.11	55.56	-5.84	93.27	-117.40	114.24	66.05	131.86
Pseud (or Adusted) R-squared	0.068		0.074		0.139		0.098	
THE CAPITATION APPLICABLE (N = 1236)								
Constant	450.85	32.94 ***	578.66	56.29 ***	630.24	60.15 ***	798.43	84.35 ***
Gender (male=1)	37.69	19.53 *	65.45	32.47 **	91.95	34.75 ***	104.21	48.19 **
Dummies								
Dependent	-50.85	34.53	-85.86	57.54	-60.57	61.51	-149.13	85.64 *
High-cost benefit					(dropped)			
Additional benefit	127.63	27.99 ***	249.16	46.34 ***	230.35	49.62 ***	303.79	67.82 ***
Public expence	48.39	26.33 *	114.88	43.19 ***	138.01	46.34 ***	114.53	63.66 *
Cross products (× beneficiary dummy)								
Head	78.22	42.34 *	201.85	72.50 ***	129.35	77.63 *	182.26	108.34 *
Dependent	73.08	34.92 **	131.44	59.32 **	143.20	63.38 **	96.83	88.80
Public expence	-123.29	87.97	-155.82	164.48	-264.46	188.12	-123.22	221.77
Pseud (or Adusted) R-squared	0.027		0.053		0.056		0.071	
THE FEE-FOR-SERVICE (N = 1934)								
Constant	313.86	27.65 ***	418.17	30.83 ***	497.98	44.83 ***	606.86	56.13 ***
Gender (male=1)	41.19	17.83 **	99.29	19.99 ***	179.94	29.13 ***	171.22	36.22 ***
Dummies								
Dependent	16.14	29.42	38.87	33.15	-17.30	48.31	28.81	59.75
High-cost benefit	7572.49	21.21 ***	7424.29	23.50 ***	7255.39	503.42 ***	7132.89	41.82 ***
Additional benefit	168.26	25.93 ***	189.42	29.03 ***	334.69	42.25 ***	302.19	52.28 ***
Public expence	31.81	23.35	48.74	26.18 *	108.15	38.16 ***	91.04	46.57 *
Cross products (× beneficiary dummy)								
Head	-22.05	34.54	62.40	38.59	79.50	56.12	83.14	67.94
Dependent	70.28	28.62 **	154.91	31.96 ***	166.68	46.48 ***	201.26	58.03 ***
Public expence	141.85	87.00	61.72	96.76	-43.07	145.59	130.57	172.44
Pseud (or Adusted) R-squared	0.037		0.045		0.145		0.064	

Note (1): The symbols, ***, ** and *, mean that the estimates are significant at 1%, 5% and 10% significance level, respectively.

Note (2): The CAPITATION APPLICABLE consists of individuals who have one of the diagnoses for which the capitation is applicable described on their claims both in the non-beneficiary and in the beneficiary periods, while the FEE-FOR-SERVICE consists of individuals who had no diagnoses under the capitation scheme..

Note (3): The estimated parameters of the diagnoses dummies are omitted for ALL SAMPLES.