

Such a rapid increase in the demand for LTC put strong pressure on the limited capacities of local governments. Prior to the introduction of public long-term insurance, an individual who asked for public LTC had been processed as a welfare case by the municipal government. As all the costs incurred in caring them were paid out of the general tax revenue, the budget conscious local government had maintained that their public nursing home care were reserved for the aged “who could not be cared adequately at home”. This meant that, for public LTC institutions, single elderly persons had the highest priority, followed by elderly couples living by themselves, and elderly individuals in low-income family who were getting substandard cares at home. The majority of the aged in middle-class households, or those living with family members capable of providing necessary cares, had been denied public care service.

More realistic alternatives for families with Care levels were, and still are, geriatric hospitals. Their admissions have been very liberal in most places, and, out-of-pocket costs for the elderly have been kept almost zero or at most at nominal levels²⁴. As a result, following hospitalization for some acute ailments, many elderly patients had found themselves indefinitely hospitalized when their families had asked the hospitals not to discharge them: the families did not have necessary resources to support them in their homes. Many such elderly end up staying in the hospital for the remainder of their lives. These patients have been known as “social hospitalization” cases. According to an MHW estimate based on Patient Survey, there were 270,000 such patients in 1999, costing the public health insurance system around 2 trillion yen²⁵. Starting late 1980’s, the MHW adopted various measures to reduce reimbursements to hospitals for long-term hospitalization, but more fundamental instruments to reduce the number of social hospitalization was clearly needed.

By the late 1980’s, a national consensus had emerged on the need for a public long-term care service that guarantees a general access for everyone in need of the service. After a series of recommendations and reports within the government, creation of a special public insurance for Long Term Care was formally agreed. Throughout his process, MHW argued that LTC risk is universal: prior to death, one out of three Japanese will experience a bed-ridden period, the average length of which is 8.5 months, and, one out of four Japanese over the age of 85 is in need of long-term care.

²⁴ Even today, it is only 10%, compared with 30% for the rest of population.

²⁵ Some estimates are lower than this figure: for example, Niki [1995] estimated the cost by social hospitalization to be slightly less than 1 trillion yen. Similarly, using a large health insurance claims dataset, Fukawa [1995] estimated that the cost is about 14% of the medical costs of the elderly, or 1 trillion yen.

2.2 Policy Objectives of LTCI

Prior to the introduction of LTCI, the MHW had listed the following as its policy objectives²⁶;

- (1) clearing up people's concern over the last phase of their lives
- (2) relieving the families of LTC burdens;
- (3) elimination of "social hospitalization"
- (4) encouraging female labor force participation
- (5) improving the efficiency and quality of LTC through competition
- (6) removing the inequity in the availability of public LTC services;

Together with the LTCI, we should note that "market principle" was introduced into the service market for the first time. Prior to LTCI, under the welfare system for the elderly, only the public-sector agents and "social welfare corporations" closely regulated by MHW had been approved as suppliers of the LTC services. Under LTCI, however, not only a wide range of new suppliers, from NPO to for-profit corporations, were admitted to provide the home-care services, but also the reimbursement rates for home-care services had been set substantially above the supply costs, in an attempt to induce a large number of new suppliers. Furthermore, unlike the suppliers of the welfare system, these suppliers are selected directly by the consumers. They were expected to compete each other by the quality of their services, to improve the market efficiency in the process. On the other hand, it is noteworthy that there was no such deregulation in the field of institutional services.

Under the welfare system, the quality of institutional care had been notoriously low. The shortage of funds had kept the quality of patient's life there at minimal levels, in spite of the improvements in the standard of life outside. At the same time, moreover, these institutions had little incentive to take care of the elderly who had the greatest need for their services. Using a time-study data of the special nursing homes in Tokyo and Hokkaido, Ogura and Oishi (1995) had found that 45% of the cared individuals there had no problem in ADL. Similarly, using a survey of all public LTC institutions in Tochigi prefecture, Sugihara et al(1996) had found that 22.9% of the individuals in the special nursing homes had no need for LTC²⁷. One obvious interpretation of these results is cream-skimming by the LTC institutions: namely, under the welfare system,

²⁶ MHW(1997), MHW(1998), Office of Transition to LTCI, MHW(1999), LTC Policy Headquarter, MHW (1994), Higuchi(1997), Okamoto and Tanaka(2000))

²⁷ Similarly, the proportions of such patients in long-term care hospitals and rehabilitation institutions were 37.9% and 28.5%, respectively.

admission of high care level patients not only increases the workload of the employees, it also increases the costs of the care for the management. In a bureaucracy Out of the pool of the low-income applicants, gave priorities to the ones with relatively light Care levels, rather than the other way around.

2.3 Structures of Japanese LTCI

Let us give a brief introduction of the essential features of Japanese LTCI. Roughly stated, the municipal governments act as its insurers, and collect money from every resident at age 40 or older, and, provide LTC primarily to those who are at age 65 or older who need the care. The benefits are, however, subject to 10 percent out-of-pocket costs.

The cost of the benefits of LTCI for FY 2004 was 5.73 trillion yen, half of which was actually financed by the general revenue of our national government. Hence LTCI is not an independent social insurance system. Insurance premiums are set and collected differently depending on the group of the individuals. Those individuals who are 65 years old or older form Type 1, and their premiums are withheld from their public pensions. The rest of the individuals subject to the compulsory insurance, namely those who are between age 40 and 65, form Type 2, and their premiums are collected together with their health insurance premiums.

There is one restriction on the total premiums collected from these two groups: in a given municipal program, Type 1 has to pay 17%, and the second group 33%, of the total costs of the benefits²⁸. The national average of the monthly premiums of the first group is about ¥3,300, but, because of this rule, their premiums vary widely depending on the municipalities, and elderly's incomes. The standard premiums are first set by the municipalities, but five different levels of premiums²⁹ are actually collected, according to their income level.

On the other hand, for the employees in the second group, their premiums are set at 1.0% of their standardized monthly earnings. For the public subsidies, national government bears 20%, the prefecture and municipal governments each pay 12.5%, and the remaining 5% comes from Special Adjustment Fund³⁰.

²⁸ The distribution requirement (17%) reflects the national average of the share of Type 1 population in 2004.

²⁹ The highest income group pays 1.5 times, and the lowest income group pays 0.5 times, the amount of the standard premium.

³⁰ Special Adjustment Fund was created to reduce regional imbalances of premiums elderly pay.

The benefits of LTCI are primarily reserved for the elderly (65 years old or older) who are officially approved for the need of the care (Table 2). Individuals who would like to receive benefits of LTCI have to submit an application to their insurers, who will send their own employees or care-managers to them. Based on the standardized check-list of 79 items, they compile data on the time needed to conduct daily living activities and their environments, feed them into computers to obtain the LTC need scores for them. This completes the first stage. As the PC based scores does not fully reflect the care levels of the cognitively impaired, the family doctor's statements are presented to the formal decision-making council, where final decision is made and notified to the applicants.

<<Insert Table 2>>

The individuals who have applied for LTCI benefits will be notified the final decision: if an individual is judged to be "self-supporting", he will be denied any LTCI benefit. Otherwise he will be classified either "support required", or "care level 1" through "care level 5". The amount of available services depends on the class of the individual: if fact, a person given "care level 5" can receive 6 times more benefits than a person given "support required" (Table 3).

Following the notification, a LTC Plan ("Care Plan") has to be made for the individual, identifying and scheduling the LTC services for him. Usually, Care Plans are made up not by the individuals or family members, but by the care-managers who has been selected by them from a list distributed by the municipal governments³¹. Care-managers make up the Care Plan, select the suppliers, and place orders to them³².

<<Insert Table 3>>

The available LTCI benefits are classified into two major groups, home-service group and institution service group. Home service group includes such obvious services as home-helper visits, home-bathing, nurse-visits, home-rehabilitation, day-care, and short-stay etc., but it also includes such quasi-institutional services as group-homes (for cognitively impaired individuals), care-houses and private nursing homes. On the other hand, institutional care services are available only in three institutions: in the

³¹ Care plans can be made by applicants or their families.

³² At present, most of the care managers are hired by suppliers, and the care-plans they prepare often represent the suppliers interests, rather than the real needs of the disabled individuals (Sakata[2002], Jinno and Kaneko [2002]).

increasing order of medical care components, they are special (public) nursing homes, rehabilitation institutions, and long-term care hospitals. The LTC service costs are charged by the hour according to fixed unit costs, 10% of which are paid by the users as out-of-pocket costs, and the rest by the insurers.

3. Changes in the LTC Market

3.1 Changes in the LTC Market Output Measures

After the introduction of LTCI, the expansion of LTC market has been very impressive. Looking at the expansion from the demand side, from Table 4, the number of individuals with certified Care Levels has increased from 2.56 million in 2000 to 4.16 million in 2004. The number of individuals who utilized LTC services have increased from 1.68 million (1.13 million for home-care and 0.55 million for institutional care) to 3.16 million (2.39 million for home-care and 0.76 for institutional care). At the same time, the average utilization has increased during this period, too. As a result, the benefits of LTCI increased from 3.24 billion yen from FY 2000 to 5.73 billion in FY 2004.

<<Table 4>>

3.2 Differential Growth in Home Care and Institutional Care Services

Looking at the expansion of the market from the supply side, as Table 5 shows, in almost all LTC services, the number of suppliers has jumped markedly, and, more significantly, as Table 6 shows, the total number of employees in the LTC service sector has increased from 720,000 to almost 1,000,000, a 38% increase in the period. Furthermore, it is clear that the home-care services have shown significantly faster increases than institutional services: in the period, home-care service sector has added more than 200 thousand employees, while institutional care sector has added only 70 thousand employees.

<<Insert Table 5>>

<<Insert Table 6>>

As is shown in Figure 1, most of the growth in the expenditures for LTC comes from the home-care sector, even though the expenditures on institutional care have been growing steadily.

<<Insert Figure 1>>

The cause of the differential growth rates seem to be in the very design of LTCI. While the restrictions on the entry on the home-care suppliers have been removed, the supply of institutional care service is still limited to social welfare corporations, medical corporations, and municipal government agents. In contrast to the surge in the demand for institutional care, following the introduction of LTCI, only limited increases in the supply capacity have been realized (Table 5 and Table 6). This has resulted in overwhelming excess-demand and long waiting-list for admission (Tajika-Yui [2001a, 2001b]). According to Suzuki [2004], the number of individuals in the waiting-list are estimated to be around 300,000 to 400,000³³, which translates to an average waiting period of 5 to 7 years before admission³⁴. Reflecting this severe constraint on the supply of institutional care, Tajika and Kikuchi [2003] points out, the fastest growth the in LTCI benefits is currently observed in such quasi-institutional services as group homes or care-houses³⁵, which are relatively its close substitutes in the home-care menu.

<<Insert Table 7>>

3.3 Changes in Care Levels in LTC Institutions

There seems to be, however, an improvement in the efficiency of institutional care following the introduction of LTCI. In Figure 2, the changes in Care level distribution in patients in each type of LTC institution are shown: the average care level has increased by 0.2 in the last three years in each type of institutions. Part of this increase may reflect the natural progression of care levels in institutionalized patients, and, possibly, moral-hazard of LTC institutions. From the figure, the increases in the shares of high care level patients, particularly those of level 5, are taking place at the expense of the shares of low care level patients. This probably reflects the changes in the admission policies under LTCI: among the patients in the waiting list for admission, in some municipalities, priorities in admission are determined in the order of applicant's care

³³ This estimate is obtained by integrating multiple applications by the same individual into a single application.

³⁴ According to Kawagoe [2003], the "survival" rate in a two year period in special nursing homes is 67.7%, with death as its primary risk (27.6%). Since 362 thousand individuals were cared in special nursing homes, the number of new admission is expected to be around 58 thousand individuals per year.

³⁵ These service costs are a part of the costs of "other itemized services" in Tables 5 and 6. The growth rates of the group is from 200 to 800 %, much higher than any other group.

levels, rather than the calendar dates of their applications.

<<Insert Figure 2>>

3.4 Expenditures by the Care Levels

In Table 8, we have listed the costs of LTCI benefits by the care levels of the patients. Following the introduction of LCI, at first, the costs of benefits for higher end of care levels had grown faster, but, more recently, the costs have been growing faster for lower care levels, particularly for “support” and level 1. Recent growth in lower level costs reflects primarily the faster growth in the number of recipients in these two groups (Table 9). In the present 5th year review of the LTCI, one of the major cost-cutting targets has been the benefits for these two groups, but no concrete measures have been taken yet.

<<Insert Table 8>>

<<Insert Table 9>>

3.5 Changes in the Quality of Care Service

As we have explained, with the introduction of LTCI, new suppliers were admitted into the long-term care market. Have they actually contributed to improved quality of the services in the market and improved market efficiency? Prior to the introduction of LTCI, many economists were skeptical of these claims. For example, Nanbu [2000] has argued that given the fixed service prices of LTCI, competition model will not function, and new suppliers will soon turn into rent-seekers. Most of the existing suppliers who had blocked the entry of for-profit corporations predicted that these new suppliers will simply exploit the home-care market.

After the introduction of LTCI, a number of studies have been carried out. These studies include a series of studies by Suzuki (Satake and Suzuki [2001], Suzuki [2002a], Suzuki[2003], Zao and Suzuki[2003], Shimizutani and Suzuki [2002]) on the home-visit market, where the largest number of new entries of for-profit corporations took place. According to their findings, (1) between the non-profit and for-profit private suppliers, there is no clear difference in the quality indices of their services, but those of public agents are clearly inferior, (2) the quality indices are higher in the market with more

suppliers, and (3) after controlling the quality of the service, the new suppliers have lower costs, and hence more efficient. Thus one of the policy objectives of LTCI has been achieved so far, at least as far as home-visit market is concerned.

3.6 Regional Inequalities and Supply-Induced-Demand

(To be completed)

4. Microeconomics of Long-Term Care

4.1 Incentives in LTCI and Changes in Care levels

We all agree that, from the viewpoint of the cared individuals, the changes in the quality of life are the most important measures of outcome of LTCI. Unfortunately, there are few studies yet on this subject. One exception is Ii and Okusa [2001] who presented a moral-hazard hypothesis. According to them, the care levels of institutionalized individuals will increase under LTCI, since the insurance provides no financial incentives to prevent the deterioration or to reverse the care levels. Using their own questionnaire data, they have found out that the probability of having care levels actually had increased after the introduction of LTCI.

Ii's study, however, fails to take into account the natural progression of care levels: Kawagoe [2003] compiled a panel data of all the individuals receiving LTC in Shimane prefecture and computed the complete transition matrix of individual's Care levels in 2000 and 2002 (Table 10). An individual's care level tends to increase over time, and the trend is particularly clear for grades 4 and 5. But for someone with less care level, many maintain the same levels, and some actually succeed in reversing the trend. He then selected those with Care level 2, and tabulated the 2002 grades by the types of institutions. His results are shown in Figure 3: compared with individuals receiving home-care, those in LTC institutions had significantly less proportions of improvements, and, more proportions of deteriorations. Compared with home-care, however, individuals receiving quasi-institutional care (care-houses and group-homes) have experienced significantly more improvements. Similar results have been obtained for Care levels other than 2 and same tendencies were observed for cognitive impairments or bed-ridden probabilities.

Earlier, Satake and Suzuki [2001] had looked into the economic incentives of LTC institutions from their questionnaire survey. According to their results, the revenue-to-cost ratio improves as Care level increases (Figure 4) : while the LTC institutions lose money on low level care levels, they make some money on high level care levels.

<<Insert Table 10>>

<<Insert Figure 3>>

<<Insert Figure 4>>

4.2 Changes in the Hour Distribution of Family Care

As we have seen earlier, the available aggregate output measures of LTC services, such as the number of certified individuals, the number of individuals receiving benefits, or the cost of the benefits, they have almost doubled in the last five years since the introduction of LTCI. These macro figures should imply the elderly are receiving better care, and the family burden of LTC services has been reduced by LTCI benefits; namely, the socialization of long term care has been moving ahead quite smoothly,

Curiously, if we look at the results of the surveys on family care-givers, some of them still suggest that their long-hours of care, once characterized as “LTC Hell”, have not been improved substantially. For instance, in the Cabinet Office survey (sample=1005) conducted in 2002, the proportion of families where principal care-givers provide more than 8 hours of work has barely changed from 21.7% in 1999 to 20.5% of all families giving some care. The average number of hours spent for LTC care per day was 5.2 hours, a mere 0.2 hour reduction in the same period.

Similar results have been obtained by Sugisawa [2005] who compared the 1998 hours with 2002 hours for more than 9 thousand families with care needs in Mitaka City in Tokyo. According to his results, while there is a noticeable reduction in the proportion of families “providing care (not exclusively) everyday” from 58.0% to 49.5%, the proportion of families “providing care principally everyday” stayed almost unchanged from 25.0% to 24.2%. He pointed out that there seem to be some built-in biases against some types of disabilities: for example, home-helper utilization rate is only 6% in families caring individuals with medium or severe cognitive impairments but with light physical disability and the rate has actually decreased after the introduction of LTCI.

4.3 Distribution of Changes in Subjective Burden

Has the LTCI helped reduce the burden of the family care-givers? According to a survey conducted by the Research Institute of the Alliance of Labor Unions in 2001, on the changes in the physical burdens after the introduction of LTCI, the proportions of family care-givers who selected “burden increased”, “burden stayed the same”, and “burden decreased” were 12.3%, 63.3% and 22.2%, respectively. In Sugisawa et al [2005], too, the sociological “burn-out syndrome” indices of principal care-givers have all failed to improve or have actually deteriorated after the introduction of LTCI. Thus it is clear that LTCI has not removed all, nor replaced most, of the burdens of family care-givers.

We should be very careful, however, before we conclude that the insurance has had little positive effect or even some negative effect: the panel survey involves a natural downward bias against the policy effect due to the natural progression of disabilities, and natural decline in care-giver's health. Direct comparison of "burdens" before and after the LTCI simply does not provide a reliable criterion to measure its effects³⁶.

4.4 Changes in the Female Labor Supply

Prior to the introduction of LTCI, many economists (Omori et al [1998], Okusa [1997a, 1999], Iwamoto [2000], Yashiro et al [1997], Nagase [2000]) have argued that the public LTCI will release the female labor of the family care-givers into the formal labor market. All of them assumed the changes in the female labor supply to be symmetric with respect to a given family LTC shock: if a housewife gave up her job after her mother-in-law became bed-ridden, she will get back to work after her mother-in-law is cared in a special nursing home. For example, Yashiro et al [1997] have estimated that, if a member of the household develops an LTC need, the female labor force participation of married women declines (from less than 60%) by 9.9% point, which can be recovered by the LTCI. Similarly, Omori et al [1998] and Okusa [1997a, 1999] estimated that New Gold Plan³⁷ will release about 200 thousand new workers, while Iwamoto [2000] estimated that number to be 1000 thousand, based on his estimate of 0.1 family care-givers giving up employment for every individual with LTC need.

These estimates were based on the data collected before the introduction of LTCI, and as such they were future projections. Few studies exist on the number of family care-givers who returned to the labor market. On the contrary, according to the 2002 survey of "LTC service costs study group" of the Cabinet Office, the number of employees in the family care-givers had decreased after the introduction of LTCI. More concretely, of those who have had no jobs in 1999, 5% had part-time jobs, but 90% of them remained jobless in 2001. Sugihara [2005] have also reached the conclusion that the care-givers' labor force participation rates have not been affected by LTCI. By adding observations up to 2003, however, Shimizutani, Suzuki and Noguchi [2004] have found some evidence of a small positive effect on the labor supply three years after the

³⁶ This point seems to have been missed by almost everyone: it is a case of severe sample selection and endogeneity problem. If an elderly has been receiving long-term care for more than a year, it is natural to assume that their basic health has deteriorated substantially, and the intensity of the care leveled needed has increased. One should expect to see the health of the care-givers decline as well.

³⁷ Under the New Gold Plan, by 1999, the government pronounced a set of numerical goals for the provision of long-term care such as 290 thousand beds in special nursing homes, 280 thousand beds in rehabilitation institutions, 170 thousand home-helpers, accommodation of 60 thousand individuals in short-stay facilities, and 17 thousand places for day-care services.

introduction of LTCI. Such a lack of sensitivity of employment to LTCI can be due to the fact that most of the family care-givers are rather old. Many of the first generation family care-givers may be too old to start looking for jobs in the labor market. But the future generation may be able to pursue their job-career fully without being interrupted by the family obligations.

5. Changes and Problems of the Financial Arrangement

Is Japan's long-term care insurance system financially sustainable? In this section, we attempt to show the possible scenarios for the future of our insurance system by constructing a simple financial simulation model for it. Financial stability of a social insurance seems to depend on two elements: one is the growth rate of the benefit, and the other is the growth of the tax base. If the benefit and the tax base grow at the same rate, we do not have to worry too much about the sustainability of financial stability. But if the benefit grows faster than the tax-base, eventually, the system will become unstable. As Japan is rapidly aging, the cost of the long-term insurance system is expected to increase rapidly. How fast will the cost be rising? Given the present financing mechanism, how fast the premium will be rising? These are the questions that can be answered by our simulation model.

(Literature review to be rewritten)

Ogura & Miyagawa (1996), Yashiro et. al. (1997)

Zhou & Suzuki (2000), Suzuki (2002b), Tajika & Kikuchi (2004) and Kikuchi & Suzuki (2005), the official simulation of HLWM³⁸

In our simulation model, we obtain the cost of benefits of each age-group as a product of its population size and the payment per elderly in the group. We then sum the costs of all ages-groups and obtain total cost of LTCI Benefit. We can obtain the population size of each age-group for future years from the official population projection³⁹, but the real question in our simulation is how to determine "payment per elderly". We are going to decompose this parameter into the following three factors; namely,

$$P_i = \textit{Certification_Rate}_i \times \textit{Utilization_Rate}_i \times \textit{Payment_per_user}_i \quad (2)$$

where $\textit{Certification_Rate}_i$ is the probability of an elderly in age-group(i) to be certificated, $\textit{Utilization_Rate}_i$ is the number of users per one certificated elderly in the group, and $\textit{Payment_per_user}_i$ is the average cost of LTCI benefit per user in the group. Needless to say that we must calculate two values of P_i separately, one for the

³⁸ Simulation of HLWM is cited from the "Future Outlook for the Payment and Income of Social Security System" released by HLWM on May, 2004.

³⁹ Official population projections are published by the National Institute of Population and Social Security Research (IPSSR) every five years. The most recent projection is released in January 2002.

users of in-home services, and the other for the users of at-facility services, since utilization rate and payment per user differ significantly between the two services in a given age-group.

In Table 11, we have shown the assumptions we have made on the values of these three factors, based on their values in the last five years. In short, we assume (i) both the certification rate and utilization rate of in-home service will be flat beyond year 2008, after four years of simple adjustments, (ii) payment per user for in-home services will grow at the annual rate of 3%, (iii) utilization rate of at-facility service and payment per user for at-facility services will remain constant in the future years.

To show how the results are affected by assumptions of these factors, we report two sets of simulation results. The first simulation (Case 1) uses the assumed values of Table 11, while the second simulation (Case 2) assumes FY 2004 values for these factors⁴⁰.

In <<Figure 5>>, we summarize the simulation results of the total cost of LTCI benefits until 2050. In case 1, the total cost of benefits will reach 8.9 trillion Yen in 2010, 15.8 trillion Yen in 2025 and 34.7 trillion Yen in 2050: in terms of percentages of National Income, it will increase from 1.6% (year 2004) to 7.4% (year 2050). In Case 2, the growth of the cost is much slower than that of case 1, the total cost will still reach 7.2 trillion Yen in 2010, 11.2 trillion Yen in 2025, and in Year 2050, it will reach 13.1 trillion Yen, or 2.8% of National Income. We have added the simulation results of HLWM to our Figure 6: it is an intermediate case between case 1 and case 2.

In Figure 6, we have shown the simulation results of the insurance premium for the elderly (over 65)⁴¹ under the present financing formula. At present, collectively, the elderly are to contribute the same proportion of the total costs as their share in the total insured individuals, which is 17% in 2004. Insurance premium of the elderly will also increase rapidly according the simulation results: in case 1, the premium per month will reach 5,100 Yen in 2010, 9,700 Yen in 2025, and 21,000 Yen in 2050. In Case 2, premium per month will be 4,200 Yen in 2010, 6,100 Yen in 2025, and 8,000 Yen in 2050. Simulation of HLWM shows, naturally, an intermediate amount between case 1 and case 2.

⁴⁰Statistics of certification rate, utilization rate and payment per user between 2000 and 2004 can be obtained by age groups and care levels. Hence, the real basic statistics used in the simulations is more specifically segmented than those of Table 11. In other words, the value of P_i is calculated respectively for various groups which are divided by age, care levels and type of users (in-home or at-facility).

⁴¹ Insurance premium for type II insured (citizens aged 40-64) depends on the labor income and affiliated medical insurance system of individuals. Hence, the amount of premium of type II insured could differ greatly from one to another. Insurance premium for the type I insured, however, has a unified baseline amount.

<<Insert Table 11>>

<<Insert Figure 5>>

<<Insert Figure 6>>

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