

What Has Long-Term Care Insurance Brought to Japan— A Critical Survey of the Japanese Economic Literature

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Abstract

In the 10 years since its introduction in Japan, long-term care insurance has already become an indispensable part of the Japanese social insurance system for most families. Partly for this reason, economists have actively researched how that insurance has changed the way our families and institutions care for the elderly and the economic consequences of those changes. The purpose of this paper is to provide an overview of their findings of effects in four major areas, namely, on family caregivers' burdens, on labor supply, on the service quality of providers, and on social hospitalization. At the same time, we pay close attention to the quality of the data used and to the estimation methods. Through our analyses, we hope to identify the issues that are still waiting for further research.

[**Key words**] Long-Term Care Insurance, Zarit Burden Index, Family Caregiver, Social Hospitalization. *JEL classification codes*: I11; I12; I13; I18

1. Introduction

Long-term care insurance (LTCI) was introduced in Japan in the year 2000. Since then, the insurance has become one of the most important social institutions, particularly for the elderly in the last stages of their lives. The insurance is designed to provide long-term care to those at age 65 or older who need such services. The users pay 10 percent of the cost of the services, and the rest is paid by the insurance system. The elderly themselves contribute about 20 percent of the cost of benefits to LTCI, the governments contribute 50 percent, and the working generations at or above age 40 contribute the rest (which is 30 percent or less). The day-to-day operation of the insurance is run by the municipalities and the approved providers, including the decision whether a particular elderly person needs long-term care. As the national government spent 10 years in perfecting the care-need certification system before its introduction (Tsutui and Muramatsu 2005), municipalities were able to start providing the benefits after a six-month trial period with little confusion.

LTCI services are classified as at-home services and institutional services. At-home services, which include home helpers, day care, and bathing at home, are open to the new entry of profit and nonprofit organizations. With the introduction of LTCI, the special nursing homes, elder health facilities, and hospital nursing beds were classified as providers of LTCI institutional services, and LTCI began paying their running costs; but these institutional services remain in the hands of municipalities or special nonprofit organizations.

In the at-home services, in addition to the free entry policy, reimbursement prices were set at profitable

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levels, and a large number of new businesses actually entered to meet the new demand, and the number of beneficiaries increased very fast. In the institutional services, on the other hand, capacities were limited and the increase in the number of beneficiaries were moderate. As a result, in just a few years, controlling the growth of the cost of benefits, particularly those of at-home services, became the most important policy issue for LTCI.

In the first major revision of the system, in 2005, the government tried to find the answer in lowering the reimbursements to providers, cutting off benefits to those with the lightest care need, emphasizing the prevention principle, putting the care plans for the entry-level beneficiaries under the direct control of the municipalities, and so forth. More important, in the institutional services, in order to restore proper balance between the beneficiaries of at-home services and institutional services, most residential and meal costs were removed from LTCI benefits, which increased the financial burden of beneficiaries very substantially.

The reduced reimbursements, however, soon resulted in reduced supply and a lower quality of long-term care services, even cases of systematic overcharges by a national provider. The government tried to strengthen the regulations to solve these problems, but the austere regulations simply caused providers to lose money and forced many out of the industry. Not surprisingly, the working conditions of the care workers kept deteriorating. Soon providers began to experience higher quit rates, and the industry as a whole lost a large number of trained workers. As a result, in April 2009, the government finally gave up the policies of lower costs and stringent controls, increased reimbursements by 3.0 percent, and took measures to redress the low wages of the care workers.

Undoubtedly, the most important factor leading to the introduction of LTCI in Japan is the rapid increase in the number of the elderly who need long-term care. Japan has experienced one of the fastest aging rates in modern world history; in 1970, the elderly accounted for only 7.1 percent of its population; but in 1994—that is, just 24 years—the ratio doubled to reach 14.1 percent, and in 2010, it reached 23.1 percent (Cabinet Office 2011). According to the official population projection, the proportion of elderly persons is expected to reach 28.7 percent in 2025 and 35.7 percent in 2050. The number of the bedridden, demented, or frail elderly also kept pace with the increase of the elderly population: 2.0 million in 1993, reaching 2.8 million in 2000, and expected to reach 5.4 million in 2025.

At the same time, families that had taken care of the bedridden, demented, or frail elderly members were no longer always capable of undertaking the task. In the urban areas, not only have three-generation households become less common, but also a substantial number of men and women have remained either single or childless. In rural areas, which have been depopulated and aging for decades, single elderly households or elderly couple households have become very common. When an elderly member needs long-term care, quite often, social care either must supplement the family care or is the only choice.

Before the introduction of LTCI, social care was provided as protective measures of municipal governments, funded by the general tax revenue. Since most municipalities have been running financial deficits for the last two decades or more, it was not easy for them to find funds to provide such care and what care they could provide tended to be of barely "socially acceptable" quality. In these circumstances, it was natural that the elderly who could not get sufficient family care began to concentrate in hospitals that could not compete with large hospitals in the acute-care market. They tended to be either smaller ones in urban areas or medium-size ones located in depopulated areas, almost always understaffed and with substandard buildings and equipment. Many of the elderly patients there were first admitted for acute care, in some cases to large hospitals from which they were transferred to these substandard ones, but their families refused to have them discharged because they were unable to provide proper care at home.

Their numbers grew rapidly, and so did their medical costs. By the late 1980s, reducing the social hospitalization became one of the top priorities of health policy authorities. At the same time, they were also aware of the need for long-term care service that, unlike the administrative protection available only to the low-income families, would be accessible to middle class families as well. An alternative system for providing such long-term care had to generate enough revenue to pay for the service, to be accessible to middle class families, and to allow families a choice of providers and services in order to weed out the inferior service that had

prevailed under the administrative protection scheme. That was essentially what the LTCI was intended to achieve.

Increased reliance on social care is surfacing also in other developed countries. For example, although the United States does not have public long-term care insurance as such, Medicaid still covers the services of skilled nursing homes. According to Brown and Finkelstein (2011), in 2008, long-term care costs accounted for 9 percent of health care costs, and public funds paid 60 percent of those costs, which was not very different from other OECD countries. Brown and Finkelstein warn that unless Americans starts buying more private long-term care insurance policies, the burden on the public sector will increase very substantially as its population continue to age.

In this respect, Damiani et al. (2011) conducted a principal component analysis using the comprehensive public database on long-term care of 29 European countries. They have confirmed that there are four types of long-term care in Europe as is commonly believed. The first type represents the Nordic countries, which have generous long-term care insurance. Although the financial burden is substantial, because of its generous benefits the insurance enjoys strong public support. The second type represents the Western European countries that provide less generous public benefits, but still sufficient, given the availability of family care. The third type represents the Mediterranean countries (Greece, Spain, Czech Republic, Poland) whose long-term care insurance fall short of the socially needed level. The other Central European and Mediterranean countries have sufficient resources for long-term care but suffer from serious mismatch with what the population needs. The authors note that some countries moved from one type to another between 2003 and 2007. They expect the European countries will reexamine their long-term care insurance as the number of the elderly needing the service and its cost continue to grow in the near future¹.

There are many policy questions about Japanese long-term care insurance (LTCI) that can be answered only by careful empirical analyses. In this paper, we will examine the economic literature published in various professional journals that has analyzed the effects of LTCI on the elderly who receive care services, on the family who give care and utilize the services, and on the service providers. We pay close attention to the econometric issues in each paper, particularly the quality of the data and the empirical methodologies. In reforming LTCI or in designing new research on LTCI, defining what we know for certain from these studies should be very important.

The rest of the paper is constructed as follows: in the second section, we will examine the empirical works addressing the effects of LTCI on the burden of family caregivers. In the third section, we will examine the effects on the labor supply of the family members who care for the elderly. In the fourth section, we will examine LTCI's effects on the quality of the service and the efficiency of for-profit providers. In the fifth section, we will examine whether or not the insurance has succeeded in reducing social hospitalization. In the sixth section, we will summarize our findings and outline what is left for the future research.

2. Burdens of Family Care and LTCI

2.1 Subjective Burden

Perhaps the most important criterion in evaluating the success or failure of Japanese LTCI is whether or not it has succeeded in alleviating the burdens of the family caregivers. The general public has dreaded the burdens of family caregiving as a kind of hell that resulted often in abuse of the care receivers, the depression or illnesses of caregivers, and, in extreme cases, in murders and suicides involving both the care receivers and caregivers. Even in Western countries, the negative aspects of family care seem to be a serious concern; and we found a large number of studies on this point. For example, Schneider et al. (2002), Goldstein et al. (2004), and Visser-Meily et al. (2004) have found that risk factors for heavier burdens are the caregivers who do not

have support of family members or relatives, the care receivers whose health status is poor and show frequent problem behaviors, and the young caregivers. Furthermore, Tessler and Gamache (1995) and Rose-Rego et al. (1998) state that giving care reduces the subjective happiness of the caregivers. Furthermore, as the burden of care increases the caregiver feels greater psychological stress (Joling et al. 2008), and experiences deterioration in health (Rose-Rego et al. 1998; Schulz et al. 2009). Caregiving increases social isolation (Bodnar and Kiecolt-Glaser 1994; Sherwood et al. 2005), induces depression and abusive behaviors on the part of caregivers (Sherwood et al. 2005). It also increases the probability of premature death (van Exel et al. 2004; Schulz et al. 2009). On the other hand, some point out the positive aspects of family care as well. For example, Farfan-Portet et al. (2009) and Carbonneau et al. (2010) have reported that by performing family care, caregivers feel sense of fulfillment and importance.

An overwhelming majority of existing studies, however, admit that family care imposes substantial burdens on the caregivers. In the studies of subjective burdens, as an instrument for such a burden, Zarit index (Zarit Caregiver Burden Interview, or ZCBI) is the one that is most frequently used. This index is due to professor Zarit and others (Zarit, Reever, and Bach-Peterson 1980; Zarit and Zarit 1990). Normally, the interviewer reads 22 (originally 29) questions to the caregiver, and ask her or him to choose one of the five standardized answers ranging from "never" to "nearly always." Each question is scored on a 5-point Likert scale (0 to 4) and the total scores range from 0 (low burden) to 88 (high burden). The questions are designed to capture the impacts on health, schedules, social life, and finance of family caregiving. A Japanese language version of Zarit index was published by Yumiko Arai and her associates of the National Center for Geriatrics and Gerontology (Arai et al. 1997), who later developed a shorter version (J-ZBI-8) of the index (Arai, Tamiya, and Yano 2003) too.²

How did the introduction of LTCI into Japan affect the psychological burden of family caregivers? The only study we could find that has directly addressed to this question is Arai et al. (2002a). They followed 47 pairs of elderly persons and caregivers living together in a small town in Miyagi Prefecture since 1998: 22 of the caregivers were daughters-in-law, 11 were wives, six were daughters, five were husbands, one was a son, and two were the daughters-in-law of a grandson (Arai et al. 2002b). They analyzed the change in the subjective burden of the family caregivers as the long-term care insurance was introduced in 2000. Because of deaths or placement in long-term care institutions between 1999 and 2000 in their sample, however, they could use only 18 samples for their pre- and post-LTCI comparative analyses. Using analysis of variance, they found that the number of different services the care receivers actually received have shown a statistically significant increase, while the amount of care time of primary family caregivers has shown a statistically significant decrease. Nevertheless, paradoxically, they could not find a statistically significant decrease in caregivers feeling of burden as measured by the Zarit (J-ZBIC-22) index. As possible explanations for this paradox, they point out such factors as the complicated red tape the families must go through to qualify for benefits and the new economic burden of 10 percent out-of-pocket costs. These factors indicate that the change in the burden needed to be measured sometime after the new system has been in place; their survey was conducted shortly after the insurance was introduced. Furthermore, their sample size is very small (18 individuals), and just the difference between the means of the two groups were tested with no other factors controlled.

Furthermore, in another study, Arai et al. (2004) analyzed the subjective burden of the family caregivers under LTCI using a sample of 46 families receiving home-nursing service in Kyoto. They found that family caregivers of elderly with problem behaviors reported significantly higher burden, and that family caregivers who could take more than three hours off reported significantly lower burden. They also found weaker evidence that family caregivers who find it inconvenient to use the service report a higher burden. Thus they concluded that it is important to design LTCI services that can temporarily release the caregivers totally from home care to reduce their burdens.

Following the pioneering works of Arai and her associates, Kishida and Tanigaki (2007) measured the psychological burden of family caregivers under the LTCI by Zarit index. They tried to identify the home services that should be offered to reduce the burden and to rate the patients in term of priorities for institutional services. In 2004, through personal interview by public health nurses, they collected information about the

household characteristics and characteristics of care receivers and primary caregivers of a random sample of 725 families, selected from those who had applied for institutionalization in two small cities in a prefecture in western Japan.

Kishida and Tanigaki conducted OLS regression in which the left-hand-side variable is Zarit index (J-ZBIC-22 index). They classified their explanatory variables into four groups; severity, support conditions, characteristics of the caregivers, and the factors impeding the utilization of services. To represent the care need of the receivers, they tried two instruments simultaneously, namely, an "activities of daily living" (ADL) instrument and a dementia instrument.

Through OLS regression results, they show that caregivers' psychological burden seems to be heavier when patients have few difficulties with ADL but more severe dementia, and for patients with more serious ADL deficits but lighter dementia. On the other hand, when the official care-need grades are used to control the patient's condition, the coefficient increases with the care-need grade but decreases in the highest grade. Particularly heavy burdens are found for the cases where the patient's dementia is serious but their providers do not offer sufficient short-stay services. The instability of the patient's condition increases the burden, but the availability of emergency care nearly offsets all the effect. However, when patients are receiving nighttime care, the caregiver's burden is heavy, which seems to suggest that available LTCI service is still insufficient for these elderly.

Thus, Kishida and Tanigaki (2007) have shown, on the basis of a random sample of decent size, collected by professional's interviews, that the Zarit index is a very useful tool in evaluating the quality and quantity of LTCI home benefits. There are two problems with their analyses: one with data and the other with the estimation methodology. Their data covered an extremely small area, which might have given unknown biases to their results. The other problem is the endogeneity in key variables in their regression; for example, they have used subjective health as an explanatory variable and found that poor subjective health increases the burden of care. The causality could be the other way around; namely, it may be the higher burden of care that is lowering the subjective health of the carer.

Following Kishida and Tanigaki (2007), Suzuki, Ogura, and Izumida (2008) tried to resolve their shortcomings; they applied a framework to detect the effects of the rationing in the LTCI benefits that had been quietly put into place as the insurance started to run deficits in many urban areas before the 2006 reform. Through a national internet survey, they secured a sample of 2,530 families practicing family care, and collected information about various health and behavioral problems of the elderly, socioeconomic information about the caregivers and the family, and information about the utilization of LTCI benefits. They collected answers for the short Zarit index (J-ZBIC-8 index), however, rather than the full-length version. They dealt with the endogeneity problems concerning the caregiver's subjective health and LTCI benefits wanted by TSLS estimation.

Their results shows that the rationing of short-stay, day-care, and home-helper services significantly affected the subjective burden of caregivers; if the amounts of these services fall short of what the family wants, the caregiver's subjective burden increases. When the elderly have behavioral or sleeping problems, the burden is higher, which suggests that the current LTCI benefits are insufficient to cover such risks. Moreover, the caregiver reports high burden when the receiver shows no gratitude or even explicit hostility to the caregiver, or when other relatives do not help him or her, which suggests that personal relationships existing before the start of family care are an important determinant of the subjective burden. As to the self-evaluated health of the caregivers, their two-stage least squares results show that Kishida and Tanigaki's (2007) causality is reversed; it is the higher subjective burden that is lowering self-evaluated health, rather than the other way around.

2.2 Economic Burden

Iwamoto, Kohara, and Saito (2001) have approached the economic burden of the family care, by analyzing the changes in the household consumption when one of its member starts needing long-term care. They took

advantage of the income information of more than 15 thousand households of regular employees in the Comprehensive Survey of Living Conditions of the People on Health and Welfare (hereafter simply Comprehensive Survey) for the year 1995, and estimated household income function and household expenditure function. According to the estimated income function, having a member with care need reduces household income by 11 percent. At the same time, the other household members, particularly spouses, tend to give up employment, reducing the number of income-earning individuals by 5 percent. According to the estimated consumption function, as one-percentage-point decrease in income reduces the consumption by 0.23 percent, the reduction in income reduces the household consumption by 4 percent, which the authors call "indirect effect." The cost of care reduces the consumption of the other goods and services by 22 percent, which they call "direct effect." The sum of the direct and indirect effects hence reduces the household consumption by almost a quarter. They argue that when LTCI is introduced, a substantial portion of this reduction is expected to be paid by the insurance, increasing the economic welfare of these households.

Iwamoto, Kohara, and Saito (2010) followed up on their earlier work (2001) to examine by how much the LTCI introduced in 2000 affected the consumption level of a household with a member receiving long-term care. In the later study, they used two sets of Comprehensive Surveys, one for the year 1998 (pre-LTCI) and the other for the year 2001. According to the estimated results, the sum of the direct and indirect effects amounts to 11.7 percent; that is, the consumption expenditure of a household decreases by 11.7 percent when one of its members starts consuming long-term care. Using the 2001 data, they have obtained a significant indirect effect of 9.4 percent, but no significant direct effect. The difference between 11.7 percent and 9.4 percent is found to be statistically significant, and hence the LTCI compensates some welfare loss of the household whose member start receiving long-term care. They also reported that the households utilizing institutional service in 1998 spent almost 20 percent less than the other households, but in 2001 they could not find a statistically significant negative effect.

There are two problems, one substantive and the other technical, in these two papers by the same authors. The substantive problem is the huge gap between the estimated burden of 22 percent using the 1995 data and that of 12 percent burden using the 1998 data, both years before the introduction of LTCI. In fact, the difference between 1998 data and 2001 data is very small, compared with this variation. Looking back at the chaotic Japanese labor market in the late 1990s, when the so-called Japanese lifetime employment practice came to an end in many firms, we wonder if the magnitudes of the burden obtained by these authors may reflect more these uncontrolled structural labor-market changes than the effect of the introduction of LTCI.

The technical problem mainly concerns the household disposable income functions. In both papers, household consumption expenditure functions contain the estimated value of disposable income, for which the authors needed to estimate the disposable income function through the instrumental variables method. The identification of disposable income function is characterized by the exclusion of two dummy variables—one for being a student and the other for homeownership from the consumption function—and the inclusion of squared age of household head and the number of workers in the household. These are rather problematic set of assumptions, to say the least, and yet the authors failed to provide the results of statistical tests for their assumptions. While this failure could be simple oversight, it will not look good to a growing number of econometricians who are skeptical of the results obtained by instrumental variables estimation from pooled cross-section data.

3. Effect of LTCI on Labor Supply

One of the secondary objectives of LTCI is to protect women workers of older workers from the sudden onset of family obligations and to make it possible for them to keep or return to their careers even with the onset of such obligations. Many studies in developed countries report that family care reduces the labor supply of female and elderly workers. For example, Covinsky et al. (2001) and Koerin, Harrigan, and Secret (2008) report that

almost 21 percent of Americans are practicing some kind of family care, and a majority of them are either voluntarily or involuntarily adjusting their work schedules accordingly. Negative effects are most pronounced on natural daughters when they live their parents. Thus it is necessary for the society as a whole to provide work environments for them that make work compatible with their family care.

Furthermore, Kniesner and Lo Sasso (2001) report that as more American women hold jobs and have job-related social responsibilities, they are now finding it harder to perform traditional family care and keep their jobs. Their empirical analyses suggest that women who have jobs with social responsibilities tend to provide monetary support but substantially reduce their time for family care, while women who have jobs with little social responsibility show no such reduction in family care time.

Carmichael and Charles (1998) report also that English women who spend less than 20 hours a week on family care seem to have easier time in finding jobs in labor market, but their hours at work are significantly shorter than those of women who spend no time for family care. The labor force participation of women who spend more than 20 hours for family care declines sharply, and even when they work, their hours drop substantially. Furthermore Bolin, Lindgren, and Lundborg (2008) examine the impacts of family care on labor market using a large European data set of 22,000 individuals above age 50 who care for family members. They conclude that family care tends to reduce employment and wages of both men and women. Also those who perform family care tend to occupy lower positions at work, holding their other properties or qualifications constant. The work-detering effects of family care seem to vary according to the type of social care available, with the strongest effect in the Central European and Mediterranean counties.

Given the substantial evidence of the negative effect of family care on labor supply, has the introduction of long-term care in Japan worked to increase the labor supply? Female labor is expected to play a key role in Japan's aging and diminishing labor force. From such a viewpoint, Shimizutani, Suzuki, and Noguchi (2008) argued that LTCI has actually encouraged labor market participation.

Shimizutani et al. (2008) claim that the LTCI encourages family members to seek outside employment by freeing them (at least partially) from family care. They pooled two parallel surveys in their analyses; one conducted by the Cabinet Office on the utilization of long-term care services by families needing such care, and the other conducted by Japan Center for Economic Research on families caring for a chronically ill elderly member. These surveys were conducted in 1999, 2001, and 2002, and altogether included 2,000 households. Pooling the two surveys of different care needs, the authors defined the former as a treatment group affected by the introduction of LTCI and the latter as a control group not affected by LTCI. They then carried out the difference-in-differences analysis on the labor supply of female family members. In particular, they compared the employment rate, days worked per week, and working hours per day of the principal caregivers and female spouses of the two groups. According to their estimation, in the fall of 2001, or one and a half years after the introduction of LTCI, they could find no positive effects of LTCI on female labor supply; but in the fall of 2002, or two and a half years after the introduction, they found statistically significant positive effects on female labor supply. In fact, they found quite sizable effects: probability of employment increased by 8 percent, and days worked per week and hours worked per day increased by 10-20 percent.

There are three possible problems in their framework. First is that their treatment group and control group may be heterogeneous. Long-term care may involve different kinds of work, different hours of the day, different psychological burdens, different availability of respite care, and so on, from care for the chronically ill elderly. For instance, in a family with a chronically ill elderly person, a typical caregiver may have cared for much longer time in the past and will find it more difficult to return to the labor market if someone unexpectedly offered to share a part of the care responsibility. The second problem is on the estimation methodology; their difference-in-differences analyses are based on a pooled cross-section data, without controlling for individual fixed effects. Thus their results are most likely to contain cross-section biases. The third problem is in their survey methodology: the data were obtained by internet surveys. Since those who respond to internet surveys are known to be younger and more computer literate, they are more employable in today's labor market than an average caregiver at home. This is something to think about when we compare their results with those of the

next paper.

In contrast with Shimizutani et al. (2008), Sakai and Sato (2007) analyzed the impacts of home care and LTCI on the work and retirement decisions of elderly caregivers. They compiled balanced panel data from 814 married men and women who responded to all four surveys conducted by a private research institute in 1997, 1999, 2001, and 2003. Incidentally, in this panel data, most of the care receivers are the natural mothers of the husbands, and the primary caregivers are the wives (or daughters-in-law); this fact seems to be a key in understanding their results. They have estimated logit functions for labor supply of husbands and wives separately, using the estimated reserve wage rate, health status, a mandatory retirement dummy variable, and a dummy variable for the family needing home care. They then conducted Hausman specification tests, and selected fixed effect models. According to their results, the onset of the need of home care significantly reduces the husband's employment probability, but, interestingly, it does not have a statistically significant effect on wife's employment. Using separate dummy variables of home care needs before and after the introduction LTCI (in 2000), they rejected a null hypothesis that the impact on husband's employment was reduced by LTCI at the significance level of 10 percent. Thus, unlike Shimizutani et al. (2008), Sakai and Sato claim that LTCI has not removed the negative impact of home care on employment at least for the elderly male workers.

One thing to note, however, is that, in their estimation, failure to control for the differential burden of home care or for LTCI care-need grades may have introduced omitted-variable biases. Second, their sample consists of couples who are rather old and for whom LTCI is more or less a policy shock; thus it is quite possible that the labor supply of younger generations, who have time to take full advantage of LTCI, will show a more positive response.

4. LTCI and the Quality and Efficiency of Service Providers

In Japan, for-profit firms had long been excluded from the social services and medical care on the principle that profits would be made at the expense of the welfare recipients or medical patients. From the second half of the 1990s, however, in a national movement for more efficient government, the general public wanted improvements in quality of public services at a lower cost. Realizing that competition is the only way to achieve these conflicting goals, they forced the reluctant government to end the exclusion of for-profit organizations in many fields. Home care benefits of LTCI was one of the new fields opened to for-profit firms. Has the change improved the quality and efficiency of the service providers? Let us first introduce some preceding work in the United States and then examine the work on Japan.

In the United States, where for-profit firms were permitted to participate in the health and long-term care markets much earlier, Cohen and Spector (1996); Spector, Seldon, and Cohen (1998); and Chou (2002) examined the qualities of the long-term care services using various indices of staff-quality (ratios of regular workers, registered nurses, and practical nurses) and of consumer satisfaction (among care receivers and their families). From these empirical analyses, Cohen and Spector (1996) and Spector et al. (1998) claim that not-for-profit organizations offer higher-quality services than for-profit organizations, but Chou (2002) claims that the opposite is true. Furthermore Grabowski and Hirth (2003) in effect claim that there is no difference between the two in the long-term care services. Hence there does not seem to be a consensus on the systematic difference due to ownership status.

In the Japanese market for home-helper service, Shimizutani and Suzuki (2007) were the first to investigate whether there is a systematic quality difference across different types of providers. Their data were obtained from a large survey conducted by the Cabinet Office in 2001 on LTCI home care providers. The providers were first selected randomly from a list of WAM-NET³ home service providers in Kanto Area, and questionnaires were sent.

The questionnaire asked about financial situations, characteristics of staff, nature of the organization (for-profit, nonprofit, and public), and the quality of the services. For their analyses, the sample size was 442.

According to their analyses, there is no difference in the quality of the service between for-profit and nonprofit providers, but the quality of public providers is clearly lower. Comparison of new and existing providers reveals that new providers offer higher-quality service.

They estimated cost functions taking the service quality into account, and concluded that new providers are more efficient producers of home-helper service than existing ones. This conclusion, however, needs to be taken with some reservation, because the service-quality variable they have included in the cost function most likely has introduced endogeneity biases in the coefficients of the equation. In any case, according to them, the admission of for-profit firms has worked to increase competition, improve the quality, and reduce the costs in the home-helper market. Opening more services to for-profit providers, they argue, will enable the entire long-term care market to produce services of better quality, at lower cost.⁴

An argument may be made that in the long-term care service market, as in medical care, there is an asymmetry of information between consumers and providers that makes it difficult for the market mechanism to function effectively. Kadoya (2010) examined this hypothesis in the Japanese market of group homes with care, a residential service for persons with light dementia, and found a negative answer to the question.

Kadoya collected, from the WAN-NET, such information as the finances, staff characteristics, ownership, physical environment, and service quality for providers of group-home services in the Kanto area in 2006 and 2007. The sample size of his analyses is 1,093. He found no clear difference in the third-party quality evaluations of service between the for-profit and nonprofit providers, and no statistically significant difference in the service quality between the competitive and noncompetitive areas. Furthermore, new providers offered services in the year of their entry that was inferior to the established ones; in the next year, however, they showed significant improvement in quality compared with the existing providers. Thus, Kadoya argues, in the Japanese market for long-term care services, market mechanism works effectively and improve the quality of the service.

We should note, however, that Kadoya simply divided his sample into two groups and, for each variable in question, carried out the test for the statistical significance of the difference in the two means. In other words, unlike the case in the regression analyses, he has not controlled for other relevant factors. In the editorial commentary, accordingly, Sugahara (2010) points out that Kadoya should have controlled for the difference in prices of the group-home service, as they partly account for the difference in quality. Furthermore, Sugahara argues, the market mechanism should include such market structures as the excess demand, and the oligopoly in the region, and the Herfindahl-Hirschman index should have been computed not just for the group-home market, but also for all the services competing with group-home service as well. These are important points to be resolved in proving Kadoya's claims.

5. LTCI and Social Hospitalization

When LTCI was introduced, it was presumed that it would provide long-term care as its benefit, so that hospitals could concentrate on acute care. As we have seen, with the introduction LTCI, the variety and the availability of services supporting home care, and their financial accessibility, have increased dramatically for families that undertake long-term care for their elderly. At the same time, the quality and the availability of institutional care has grown too, although more slowly than home care services.

Has LTCI contributed to reduce the social hospitalization? In this regard, we should note that social hospitalization can be affected not only changes in the long-term care system but also by changes in health care systems (both acute and chronic) (Innami 2009). With the introduction of LTCI, the patients who had been hospitalized in long-term care beds could choose one from three alternative services, depending on their care needs: namely, at-home services, LTCI hospital long-term care beds, and LTCI health facilities. Hanaoka and Suzuki (2007) analyzed how the introduction of LTCI affected the discharge behavior of elderly patients who had been hospitalized for extensive periods. They estimated hazard functions of inpatient days using individual health insurance claims records of 3,043 patients during the period May 1998-March 2003.⁵ The independent

variables are the increases in the institutional and at-home care services (e.g., the increases in the number of LTCI hospital beds, in the capacity of LTCI health facilities, and in the capacity of day-care services), disease dummies (cerebral infarction, heart diseases, dementia, and diabetes); availability of medical long-term care beds; the dummies for the revision of medical insurance reimbursement fees in 2000 and 2002; the dummy for the revision of out of pocket payments; age and sex of the patients; and the quarter dummies.

They estimated this model with and without individual hospital fixed effects, but ended by selecting the fixed effect model, when the null hypothesis of no individual fixed effect had been rejected. According to their estimated parameters, for both the 2000-2001 period and the 2002 period, the increase in the number of LTCI beds shortened the hospital stay significantly, but the magnitude of the latter period effect amounted to eight times that of the former. Other available LTCI resources did not have expected signs or statistical significance.

There are two possible problems in their results. First is the large positive sign for the dummy variables that stand for the increases in out-of-pocket costs. During the period, several measures were taken that substantially increased the out-of-pocket costs of elderly patients, but Hanaoka's result indicates that they had actually prolonged the hospitalization. This counterintuitive result needs to be explored more carefully as to both theory and empirics.⁶ The second is their year dummy for the revision of the reimbursement rules in 2003. The revision increased the elderly patient's costs but at the same time strengthened the incentive for hospitals to discharge patients by decreasing the payment in several steps as hospitalization gets longer. Clearly, handling both demand and supply sides by a single dummy variable is inappropriate.

Subsequently, Tokunaga and Hashimoto (2010) analyzed the effect of increased long-term care resources⁷ resulting from LTCI on the long-term hospitalization of the elderly patients. They point out that the data used by Hanaoka and Suzuki (2007) came from a single prefecture, contains no information about where the patients had been discharged, and does not contain much information after 2003.

Tokunaga and Hashimoto had access to the aggregated data of the discharged inpatients of Patient's Survey conducted in 1999, 2002, and 2005, aggregated specially for each of the 249 secondary medical zones in Japan. On average, each zone contained around 270 discharged patients who were no less than 65 years old at discharge and had been hospitalized for more than 30 days paid by medical insurance alone. They used the data to estimate the average number of days in hospital. Their main explanatory variables are those that stand for the increase in resources for long-term care; that is, capacity of special nursing homes, special nursing beds in hospitals, and the number of home-care service providers.

Other control variables are the proportion of the elderly in the zone, the proportion of cerebral infarction patients among the discharged inpatients, the average age, the proportion of females, the proportion of patients who had undergone surgery, and the proportion of patients who had home addresses outside the zone. They estimated the average length of stay in hospitals using OLS, and found that the number of days in hospital increases by two and a half days, for a one-percentage-point increase in the cerebral infarction proportion, but decreases by almost two days, for a one-percentage-point increase in the proportion of surgery patients. As to the long-term care resources, during the 1999-2002 period, the number of days in hospital decreased significantly in the medical zones where resources increased, but their effect disappeared during 2002-05 period.

They have estimated a similar equation using the proportion of home-discharged patients as the dependent variable. In almost all secondary medical zones that had experienced an increase in the average age of the elderly, the home discharge proportion decreased. Furthermore, as to resources of long-term care, in the zones where home service providers had increased, the home discharge proportion increased during the 1999-2002 period, but not in the period 2002-05. For both periods, in the zones where the proportion of cerebral infarction had increased, the increase in the number of home care service providers worked to increase the proportion of home-discharged patients.

From these observations, Tokunaga and Hashimoto concluded that after the introduction of LTCI, the one-shot increase in the resources was rapidly absorbed in many zones, and newly discharged patients could no longer be admitted to long-term care institutions.

For the period 2002-05, Tokunaga and Hashimoto's results seem to contradict in part some of Hanaoka and

Suzuki's, but neither do the periods in the two papers coincide completely nor are the dimensions of the critical variables involved the same. Hanaoka and Suzuki looked at the relationship between the length of hospital stay and the increase in long-term care beds: Tokunaga and Hashimoto looked at the relationship between the increase in the length of stay and the increase in long-term care beds. Tokunaga and Hashimo moreover had to work on aggregated data, and hence, unlike Hanaoka and Suzuki, they could not estimate hazard functions. One worry about Tokunaga and Hashimoto's data is their aggregation of patients who had been hospitalized for 30 days or more, which involves incidental truncation and bias the coefficients obtained. Another is the heteroschedasticity; since the secondary medical zones vary substantially in population, adjustment for sample sizes is needed in using mean values, but it is not clear from the paper whether they have done it or not.

Most recently, Noguchi and Shimizutani (2011) have examined whether the price mechanism can be used to reduce social hospitalization. The used individual patients data obtained in the provider's survey conducted in 2000 by the Ministry of Health and Welfare. The sample consists of 1,556 individuals in welfare facilities, 14,134 individuals in health facilities, and 2,828 individuals in long-term care medical institutions. These individuals had been either discharged from the institutions in the previous month or cared for in the institutions in the survey month, with known health conditions at both admission and discharge.

Using the Cox proportional hazard functions, their estimation shows that in response to a one-percentage-point increase in an inpatient's out of pocket cost, the probability of discharge from welfare facilities increases by 1.7 percent and the probability of discharge from health facilities by 1.8 percent, but the probability of discharge from hospital long-term care beds increases by only 0.2 percent. Furthermore, they have fitted a probit model to the selection of the institutions by the discharged patients. A one-percentage-point increase in the out-of-pocket cost increases the probability of coming home by 0.4 percent for welfare facilities patients and 3.7 percent for health facilities patients, but has almost no effect on hospital long-term care beds patients. Since an increase in the out-of-pocket cost induces substantially different changes in the discharge or transfer behaviors in different types of institutions, they concluded that it is possible to use it as a policy instrument to reduce the length of stay in institutions, and to reduce social hospitalization.

Given the specifications of their models, however, the conclusions by Noguchi and Shimizutani do not seem to be warranted. In the normal Cox proportional hazard functions, if the explanatory variables are measured in natural units, the coefficients stand for effect off the unit change in the variable on the log of the odds ratio of the hazard of the treatment group to the baseline hazard; that is,

$$h(x_1, x_2, \dots; t) = h_0(t) \exp(x_1 + b_2 x_2 + \dots)$$

$$\ln(h(x_1, x_2, \dots; t)) = \ln(h_0(t)) + (b_1 x_1 + b_2 x_2 + \dots)$$

$$\ln(h(x_1, x_2, \dots; t) / h_0(t)) = (b_1 x_1 + b_2 x_2 + \dots).$$

The left-hand side of the last equation is the dependent variable, and the right-hand side are the explanatory variables.

Assuming all values of the explanatory variables are zero in the baseline hazard function, and all but x_1 are set equal to zero, we have indeed

$$\partial \ln \left(\frac{h(x_1, 0, 0, \dots; t)}{h_0(t)} \right) / \partial x_1 = b_1$$

and hence

$$\left(\frac{\partial h(x_1, 0, 0, \dots; t)}{h(x_1, 0, 0, \dots; t)} \frac{1}{\partial x_1} \right)$$

However, Noguchi and Shimizutani measured the out-of-pocket cost in the natural log. Thus a unit increase in the natural log of the out-of-pocket cost equals one-percentage-point increase in the out-of-pocket cost.

$$x_1 = \ln(z)$$

$$\partial x_1 = \partial z/z$$

Hence

$$\left(\frac{\partial h(x_1, 0, 0, \dots; t)}{h(x_1, 0, 0, \dots; t)} / \frac{\partial z}{z} \right) = b_1$$

Table 1. Summary of the Articles Surveyed

Source	Data	Sample Size	Estimation Methods	Research Questions and Results
Arai et al. 2002	Own survey conducted on caregivers and impaired elderly receiving regular home-visiting nursing care in a town in Miyagi Prefecture (2000)	18 pairs	Analysis of variance between 2 groups	Examines caregiver burden by Zarit Caregiver Burden Interview index. Concludes that after introduction of LTCI there was no statistically significant improvement in Zarit index, despite reduced hours of care.
Arai, et al. 2004	Own survey conducted on impaired elderly receiving regular home-visiting nursing care in Kyoto Prefecture (2001)	46 pairs	Correlation analysis, Logit analysis	Examines determinants of caregiver burden under LTCI by ZBIC. Problem behaviors and difficulty of use of the care service are given as the causes of caregiver burden.
Kishida and Tanigaki 2007	Interview survey of families requiring care and waiting for admission to special nursing homes in two cities in the Chugoku region (2004)	725 impaired elderly	OLS Using the J-ZBIC-22 index for explained variables)	Examines determining factors of caregiver burden under LTCI. Concludes that caregiver burden is especially heavy where level of impairment is light but dementia is severe and where impairment is severe and level of dementia is light.
Suzuki, Ogura, and Izumida 2008	Data from survey conducted nationwide on caregivers in households requiring family care (2006)	2,530 caregivers	IV (Using the J-ZBIC-8 index for explained variables)	Examines determining factors of caregiver burden under LTCI. Mismatches and deficiencies in use of nursing care service is given as cause of increased caregiver burden.
Iwamoto, Kohara, and Saito 2001	Ministry of Health, Labour and Welfare Comprehensive Survey of Living Conditions (1995)	15,325 households	IV (Explained variable is the log of level of consumption)	Examines impact on consumption in households with persons requiring nursing care. Expenditures on consumption decrease by about 25 % due to direct and indirect effects.
Iwamoto, Kohara, and Saito 2010	Ministry of Health, Labour and Welfare, Comprehensive Survey of Living Conditions (1998 and 2001)	Approx.15,000 households (each year)	IV (Explained variable is the log of level of consumption)	Examines impact on consumption in household where persons require nursing care. Concludes that after introduction of LTCI statistically significant improvement is seen in such households.
Shimizutani, Suzuki, and Noguchi 2008	Data pooled from two internet surveys: (1) on use of nursing care services by households where person required nursing care, by Cabinet Office; and (2) of households with chronically ill elderly, by Japan Center for Economic Research (1999, 2001, and 2002).	Approx. 2,000 households (total for 3 years)	Difference-in-difference	Examines the effect of LTCI on female labor supply in households with a person requiring nursing. Concludes that a statistically significant positive effect was seen roughly 2.5 years after the introduction of LTCI.
Sakai and Sato 2007	Panel data from three waves of "Survey on Life Design" conducted by the NLI Research Institute (1997, 1999, 2001, and 2003).	Married men and their wives; 814 couples (balanced panel data)	Panel logit analysis	Examines impact of family care on labor supply of spouses. Concludes that introduction of LTCI has not alleviated the suppression effect of family nursing care on employment of senior citizens
Shimizutani and Suzuki 2007	Questionnaire survey on long-term care providers conducted by the Cabinet Office (2001)	442 providers of home-helper service	Test by average of two groups Estimation of a cost function.	Examines quality and efficiency of home-visiting nursing care (home-helper) market after introduction of LTCI. Comparing new and existing businesses, survey concludes that new businesses provide higher-quality services than existing businesses and provide services more efficiently
Kadoya 2010	Questionnaire survey on providers of group home service in Kanto area (2006 and 2007)	1,093 providers of group home service	Test by average of two groups	Examines quality and efficiency of group homes. Concludes that the market mechanism functioned to improve quality of services after introduction of the system.

Hanaoka and Suzuki 2007	Selected cases of the healthcare reimbursement claims of the elderly inpatients in Toyama Prefecture (May 1998-March 2003)	3,043 inpatient elderly	Log-logistic hazard model	Examines effect of LTCI on length of hospital stay of socially hospitalized elderly patients. Concludes that increase in hospital long-term care beds after introduction of LTCI reduced the length of stay.
Tokunaga and Hashimoto 2010	Special tabulation of discharged patient characteristics by secondary medical zones using Patient Survey, Ministry of Health and Welfare (1999, 2002, and 2005)	Approx. 100,000 people (per year) 1,556 elderly in special nursing homes; 14,134 in long-term care health facilities; and 2,828 elderly long-term care beds in hospitals	Panel analysis using number of days in hospital as explained variable	Examines impacts of LTCI on length of stay and choice of care after hospital discharge. Results indicate that after introduction of LTCI, local nursing care resources were quickly saturated and institutional care became unavailable.
Noguchi and Shimizutani 2011	Data from questionnaire survey on nursing care service facilities and businesses conducted by Ministry of Health, Labour and Welfare (2000)	2,828 elderly long-term care beds in hospitals	Log-logistic hazard model	Examines impact of user charges on social hospitalization. Concludes that an appropriate pricing policy allows government to reduce length of hospitalization and number of patients choosing social hospitalization.

Thus, for example, a one-percentage-point increase in the out-of-pocket cost does not increase the probability of discharge from welfare institutions by 0.04 percent, but by 1.004 percent, which is the size of the estimated coefficient. Likewise, the probability of discharge from health facilities did not increase by 3.7 percent but by 1.037 percent, and the probability of discharge from long-term care hospitals by 1.019 percent. Therefore, the elasticity of discharge regarding the out-of-pocket cost in these three institutions is one for all practical purposes.

6. Concluding Remarks

We have examined in detail the hypotheses, the data, the econometric techniques, and the conclusions in the existing studies on the effects of the Japanese LTCI introduced in 2000. The summaries of these studies are shown in Table 1.

The authors of these articles almost all had to live with the imperfection of the data. Most relied on administrative data for their analyses, which, despite offering sufficient sample sizes, are almost always cross-sectional and not ideal for controlling individual heterogeneity. Inevitably the use of these data left the authors with estimates susceptible to the criticism of endogeneity due to the omitted variables problem. Some were fortunate enough to have access to high-quality data compiled by public health professionals, but often they found the sample sizes too small to control even the minimal covariates, or found that their data might be considered too parochial to permit generalized conclusions.

The hypotheses these authors tried to prove were very natural and plausible ones, which may have been taken for granted even without rigorous, scientific proofs. As these authors discovered, however, even "natural" hypotheses are hard to prove in the absence of experimental data designed to single out the conceivable effects. They controlled the factors other than the LTCI-related changes using information available in the data sets, but typically we found that some important aspects of the relevant information was missing in the data set and hence remained uncontrolled. Frankly, we do not know how seriously these shortcomings have affected the conclusions, but today, in economics, few top journals publish empirical works that are not based on panel data, even for most plausible hypotheses. This stricture is quite understandable in the United States or in European countries where economists have access to high-quality panel data, but Japanese economists have been forced

to work mostly with cross-section data. Insisting on the same standards as these top journals in Japan is obviously not very productive.

We should then accept their conclusions as they are offered but also start accumulating stronger empirical evidence one way or the other. Several attempts are being made in academia and in government to compile panel data, and there are smaller but established household data sets maintained by private research institutions. In the next few years, as more economists gain access to these data sets, the problems we have pointed out in our paper will be resolved. In the meantime, we have some evidence for the favorable effects of LTCI, but they are far from conclusive.

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Notes

- 1 Very detailed description of the cash benefits of five European countries (Austria, England, Germany, France, and Holland) can be found in Nadash et al. (2012). In the European Union's Mutual Information System on Social Protection (MISSOC) database, the latest information on the Social Protection and Social Inclusion of 27 EU countries and four EFTA countries (Iceland, Lichtenstein, Norway, and Switzerland) are provided (http://ec.europa.eu/employment_social/missoc/db/public/compareTables.do?lang=en). For long-term care, the items are statutory basis, basic principles, field of application, conditions, organization, benefits in kind, cash benefits, combination of benefits, accumulation, benefits for the carer, user charges, and taxation.
- 2 As an index of caregiver's burden, Caregiver's Reaction Assessment (CRA) takes positive as well as negative aspects of caregiving into account. See Given et al. (2007). For a Japanese language version, see Misawa et al. (2009).
- 3 WAM-NET, run by the Welfare and Medical Service Agency of Japan, offers comprehensive information on social welfare, health, and medical services by internet for local governments, health centers, social welfare offices, in-home care support centers, and other relevant organizations. (<http://hp.wam.go.jp/english/tabid/90/Default.aspx>).
- 4 For example, Noguchi and Shimizutani (2007) claim that, in the market for home-helper services, not-for-profit providers tend to pay higher wages than for-profit providers, who lack the economic incentives to do so.
- 5 The number of days in hospital function is specified as a log-logistic hazard function.
- 6 They cite earlier work by Izumida (2004), who obtained a similar result for a dummy variable for the dummy of July 1997 increase in the out-of-pocket cost in his hospitalized-days function. Izumida raised the possibility that the increase in copayment actually increased the probability of reaching the upper-limit system in the out-of-pocket costs for many patients, who enjoyed zero-marginal cost from then on.
- 7 By long-term care resources, authors refer to the public nursing homes, health facilities, long-term care beds, and home care services.

References

- Arai, Y., K. Kudo, T. Hosokawa, M. Washio, H. Miura, and S. Hisamichi. 1997. "Reliability and Validity of the Japanese Version of the Zarit Caregiver Burden Interview." *Psychiatry and Clinical Neurosciences* 51: 281-87.
- Arai Y., K. Kumamoto, M. Washio, T. Ueda, H. Miura, and K. Kudo. 2004. "Factors related to Feelings of Burden among

- Caregivers Looking After Impaired Elderly in Japan under the Long-Term Care Insurance System., *Psychiatry and Clinical Neurosciences* 58: 396-402.
- Arai, Y., K. Masui, M. Sugiura, and M. Washio. 2002a. "Fewer Hours of Care Yet Undiminished Caregiver Burden with New Long-Term Insurance in Japan." *International Journal of Geriatric Psychiatry* 17(5): 489-91.
- Arai, Y., N. Tamiya, and E. Yano. 2003. "The Short Version of the Japanese Version of the Zarit Caregiver Burden Interview (J-ZBI_8): Its Reliability and Validity." *Japanese Journal of Geriatrics* 40(5): 471-77. In Japanese.
- Arai, Y., S. Zarit, M. Sugiura, and M. Washio. 2002b. "Patterns of Outcome of Caregiving for the Impaired Elderly: A Longitudinal Study in Rural Japan." *Ageing and Mental Health* 6: 39-46.
- Bodnar, J. C., and J. K. Kiecolt-Glaser. 1994. "Caregiver Depression after Bereavement: Chronic Stress Isn't Over When It's Over." *Psychology and Aging* 9: 372-80.
- Bolin, K., B. Lindgren, and P. Lundborg. 2008. "Your Next of Kin or Your Own Career? Caring and Working among the 50+ of Europe." *Journal of Health Economics* 27:718-38.
- Brown, J., and A. Finkelstein. 2011. "Insuring Long-Term Care in the United States." *Journal of Economic Perspectives* 25(4): 119-42.
- Cabinet Office. 2011. *Annual Report on the Aging Society: 2011*. Tokyo: Cabinet Office, Government of Japan. In Japanese.
- Carbonneau, H., C. Caron, and J. Desrosiers. 2010. "Development of a Conceptual Framework of Positive Aspects of Caregiving in Dementia." *Dementia* 9 (3): 327-53.
- Carmichael, Fiona, and Susan Charles. 1998. "The Labour Market Costs of Community Care." *Journal of Health Economics* 17(6): 747-65.
- Chou, Shin-Yi. 2002. "Asymmetric Information, Ownership and Quality of Care: An Empirical Analysis of Nursing Homes." *Journal of Health Economics* 21(2): 293-311.
- Cohen, J. W., and W. D. Spector. 1996. "The Effect of Medicaid Reimbursement on Quality of Care in Nursing Homes." *Journal of Health Economics* 15(1): 23-48.
- Covinsky, K. E., et al. 2001. "Reduced Employment in Caregivers of Frail Elders: Impact of Ethnicity, Patient Clinical Characteristics, and Caregiver Characteristics." *Journal of Gerontology* 56A(11):M707-13.
- Damiani, G., et al. 2011. "Patterns of Long Term Care in 29 European Countries: Evidence from an Exploratory Study." *BMC Health Services Research* 11:316. doi:10.1186/1472-6963-11-316.
- Farfan-Portet, Maria-Isabel, et al. 2009. "Caring, Employment and Health among Adults of Working Age: Evidence from Britain and Belgium." *European Journal of Public Health* 20(1): 52-57.
- Given, C. W., et al. 2007. "The Caregiver Reaction Assessment (CRA) for Caregivers to Persons with Chronic Physical and Mental Impairments." *Research in Nursing and Health* 15: 271-83.
- Goldstein N. E., et al. 2004. "Factors Associated with Caregiver Burden among Caregivers of Terminally Ill Patients with Cancer." *Journal of Palliative Care* 20(1): 38-43.
- Grabowski, D. C., and R. A. Hirth. 2003. "Competitive Spillovers across Nonprofit and For-Profit Nursing Homes." *Journal of Health Economics* 22(1): 1-22.
- Hanaoka, C., and W. Suzuki. 2007. "Does an Increase in the Availability of Formal Long-Term Care Affect Hospital Discharge of Elderly Patients in Japan?" *Japanese Journal of Health Economics and Policy* 19(2): 111-27. In Japanese.
- Innami, I. 2009. *On Social Hospitalization: How to Deal with the Most Serious Pathology of Medical Care for the Elderly in Japan*. Toyo: Keizai Shimpō Sha. In Japanese.
- Iwamoto, Y., M. Kohara, and M. Saito. 2001. "On the Welfare Loss of the State of Having Members in Need of Long Term Care." *Quarterly of Social Security Research* 36(4): 547-60. In Japanese.
- Iwamoto, Y., M. Kohara, and M. Saito. 2010. "On the Consumption Insurance Effects of Long-Term Care Insurance in Japan: Evidence from Micro-Level Household Data." *Journal of the Japanese and International Economies* 24(1): 99-115.
- Izumida, N. 2004. "An Analysis of the Utilization of Inpatient Care Services." *Quarterly of Social Security Research* 40(3): 214-23. In Japanese.
- Joling, K. J., et al. 2008. "(Cost)-Effectiveness of Family Meetings on Indicated Prevention of Anxiety and Depressive

- Symptoms and Disorders of Primary Family Caregivers of Patients with Dementia: Design of a Randomized Controlled Trial." *BMC Geriatrics* 8: 2. doi:10.1186/1471-2318-8-2.
- Kadoya, Y. 2010. "Managing the Long-Term Care Market: The Constraints of Service Quality Improvement." *Japanese Journal of Health Economics and Policy* 21(1): 247-64.
- Kishida, K., and S. Tanigaki. 2007. "What's Needed in At-Home Services? An Analysis of Family Care Burden." *Japanese Journal of Health Economics and Policy* 19(1): 21-35. In Japanese.
- Kniesner, Thomas J., and Anthony T. Lo Sasso. 2001. "Intergenerational Labor Market and Welfare Consequences of Poor Health." *Research in Labor Economics: Worker Wellbeing in a Changing Labor Market* 20: 1-34.
- Koerin, Beverly, Marcia P. Harrigan, and Mary Secret. 2008. "Eldercare and Employed Caregivers: A Public/Private Responsibility?" *Journal of Gerontological Social Work* 51: 43-16.
- Misawa, T., et al. 2009. "Validity and Reliability of the Japanese Version of the Caregiver Reaction Assessment Scale (CRA-J) for Community-Dwelling Cancer Patients." *American Journal of Hospice and Palliative Medicine* 26(5): 334-40.
- Nadash, P, P. Doty, K. Mahoney, and M. von Schwanenflugel 2012. European Long Term Care Programs: Lessons for CLASS? *Health Services Research* 47(1): 309-28.
- Noguchi, H., and S. Shimizutani. 2007. "Nonprofit-for-Profit Status and Earning Differentials in the Japanese At-home Elderly Care Industry: Evidence from Micro-Level Data on Home Helpers and Staff Nurses." *Journal of the Japanese and International Economies* 21(1): 106-20.
- Noguchi, H., and S. Shimizutani. 2011. "The Determinants of Exit from Institutions and the Price Elasticity of Institutional Care: Evidence from Japanese Micro-Level Data." *Journal of the Japanese and International Economies* 25(2): 131-42.
- Rose-Rego, S. K., M. E. Strauss, and K. A. Smyth. 1998. "Differences in the Perceived Well-Being of Wives and Husbands Caring for Persons with Alzheimer's Disease." *Gerontologist* 38(2): 224-30.
- Sakai, T., and K. Sato 2007. "Does Caring for Elderly Parents Affect Their Sons and Daughters' Decision on Retirement? An Analysis Using Japanese Panel Data." *Nihon Keizai Kenkyu* 56: 1-25. In Japanese.
- Schneider, J., et al. 2002. "Formal and Informal Care for People with Dementia: Factors Associated with Service Receipt." *Ageing and Mental Health* 6(3): 255-65.
- Schulz, Richard, et al. 2009. "Spousal Suffering and Partner's Depression and Cardiovascular Disease: The Cardiovascular Health Study." *American Journal of Geriatric Psychiatry* 17(3): 246-54.
- Sherwood, P., C. Given, B. Given, and A. von Eye. 2005. "Caregiver Burden and Depressive Symptoms: Analysis of Common Outcomes in Caregivers of Elderly Patients." *Journal of Aging and Health* 17(2):125-47.
- Shimizutani, S., and W. Suzuki. 2007. "Quality and Efficiency of Home Help Elderly Care in Japan: Evidence from Micro-Level Data." *Journal of the Japanese and International Economies* 21(2): 287-301.
- Shimizutani, S., W. Suzuki, and H. Noguchi. 2008. "The Socialization of At-Home Elderly Care and Female Labor Market Participation: Micro-Level Evidence from Japan." *Japan and the World Economy* 20(1): 82-96.
- Spector, W. D., T. M. Seldon and J. W. Cohen. 1998 "The Impact of Ownership Type on Nursing Home Outcomes." *Health Economics* 7(7):639-53.
- Sugahara, T. 2010. "Invited Counter Argument for Managing the Long-Term Care Market: The Constraints of Service Quality Improvement." *Japanese Journal of Health Economics and Policy* 21(1): 265.
- Suzuki, W., S. Ogura, and N. Izumida. 2008. "Burden of Family Care-Givers and the Rationing in the Long-Term Care Insurance Benefits of Japan." *Singapore Economic Review* 53(1): 121-44.
- Tessler, R. C., and G. M. Gamache. 1995. *Toolkit for Evaluating Family Experiences with Severe Mental Illness*. Cambridge, MA: Human Services Research Institute.
- Tokunaga, M., and H. Hashimoto. 2010. "The Association of Regional Long-Term Care Capacity with Hospital Length of Stay and Probability to Discharge Home among Elderly Inpatients with Long Hospital Stay." *Quarterly of Social Security Research* 46(3):192-203. In Japanese.
- Tsutui, T., and N. Muramatsu. 2005. "Care-Needs Certification in the Long-Term Care Insurance System of Japan." *Journal of the American Geriatrics Society* 53(3): 522-27.

- van Exel, N. J., et al. 2004. "Instruments for Assessing the Burden of Informal Caregiving for Stroke Patients in Clinical Practice: a Comparison of CSI, CRA, SCQ and Self-Rated Burden." *Clinical Rehabilitation* 18 (2): 203-14.
- Visser-Meily, J. M. Anne, Marcel W. M. Post, Ingrid I. Riphagen, and Eline Lindeman. 2004. "Measures Used to Assess Burden among Caregivers of Stroke Patients: A Review." *Clinical Rehabilitation* 18(6): 601-23.
- Zarit, S. H, K. Reever, and J. Bach-Peterson. 1980. "Relatives of the Impaired Elderly: Correlates of Feelings of Burden." *Gerontologist* 20: 649-55.
- Zarit, S. H, and J. M. Zarit. 1990. "The Memory and Behaviour Problems Checklist 1987R and the Burden Interview." Technical Report, Pennsylvania State University Gerontology Center, University Park, PA.