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Financial Instability and Life Insurance Demand

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Abstract

The purpose of this research is to discuss Japanese financial instability and both private life insurance and public life insurance (Kampo) demand. At the same time, we also consider Kampo's main role and what Kampo should be as an insurance service provider in the future. From empirically estimating private life insurance and Kampo demand functions using household-level data provided by the Postal Services Research Institute, the authors find that differences in income, children, pension and knowledge affect households' decisions on the purchase of life insurance products. Income and financial assets also appear to have significant effect on the purchase of private life insurance products and Kampo. However, pension and bankruptcy experience appear to have an impact only on Kampo, while age (less than 40) and occupation (public official) factors affect only private life insurance. Dummy variables representing insurer comparison, knowledge and bankruptcy experience are not found to have any significant effect on decisions concerning private life insurance. The authors also conducted simultaneous estimations to examine the reasons why households with private life insurance products additionally purchase Kampo and vice versa. The results indicate that differences in income, children and bankruptcy experience variables do not affect the decision-making process, and that a knowledge dummy has a negative impact on additional purchases.

Key Words: life insurance, Kampo, insurance demand, Japan

I. Introduction

The Japan Institute of Life Insurance reports that the total amount of insurance, in terms of premiums, held by all Japanese insurance companies reached ¥28,333 billion (about US$242 billion) in FY 2005. This amounts to ¥554,438 per household (about US$4,750).[1] Since the premium outlay represents a significant share of household total expenditure, understanding their life insurance consumption patterns in the private market is an important research and policy issue. Moreover, there is also a public life insurer, Japan Post, which is

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[1] The number of households is based on Japan's 2006 Basic Register data.

known to affect household financial planning in Japan. Thus, we conduct a study about the actual life insurance demand patterns including not only private but also public life insurance.

We find a few studies that deal with the Japanese public insurance system. Tachibanaki (1986) elaborated the Japanese public financing system including Kampo and constructed a relationship between public insurance and private life insurance schemes. He concluded that there were no distinct characteristics that separated Kampo from the private scheme. During the past 20 years or so, however, we have witnessed dramatic changes in the Japanese public and private insurance markets. For example, the markets experienced bankruptcy of several life insurers since the introduction of a Japanese version of big bang as well as the amendment of the insurance act in 1996. With the amendment of the in 2003, insurers may change their assumed interest rates when they face bankruptcy risk. Japan Post was a pure public entity but has been a semi-private organization since 2003. Thus, a research need arises to examine whether Japanese still view Kampo and private life insurance products differently.

Kohara (2001) and Purcal and Piggott (2004) estimated the Japanese insurance demand. Although both articles considered selected public insurance products, they did not investigate some other characteristics of public insurance products, including Kampo, that would affect the consumption pattern.

A number of researchers investigated the relationships between life insurance demand and factors such as household income, age, working style, and the number of children in Japan. Their findings are not consistent. For example, Tachibanaki and Shimono (1994) found that the total amount of financial assets, dual income family status and the number of dependents (except the spouse) have a positive impact on insurance expenditure and that income level and academic background have a negative impact on the expenditure.

Urata et al. (1999) suggested that household income, home ownership, the number of persons aged less than 40, and children have a positive impact on both decisions, and that the amount of financial assets (+) and spouse working full-time (–) significantly affect life insurance expenditure. However, Masui (2000) argued that risky asset and savings-oriented insurance are complements in that a household may hold both assets simultaneously. Further, the amount of savings-oriented insurance depends in part on the academic background (high school diploma), secondary income of the household, and individual annuity ownership. Finally, Komamura et al. (2000) proved that public pension and protection-oriented insurance are substitutes, while public pension and savings-oriented insurance are complements.

In this paper, we also attempt to estimate the demand for life insurance in Japan. However, there are two points of departure of this study from previous work. First, this study examines not only private life insurance products but also Kampo. We predict that households which have a greater knowledge of the financial institution, the law and the market are likely to purchase Kampo. It is known that some households purchase not only private life insurance products but also Kampo, even though both may be viewed as substitutes.[2] In this case, what cause the differences in behavior between the households that purchase Kampo only and the households that purchase private life insurance products only?

[2] In 2004, the Life Insurance Association of Japan commented that Kampo was founded to complement private life insurance products. At that time, Japanese private life insurers were not strongly capitalized (as compared the firms in today's market) and offered limited types of products, especially to low-income individuals. Kampo and private life insurance products are now substitutable because private life insurance firms sell many other kinds of life insurance products.

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Second, we add knowledge and experience proxies to estimate the life insurance demand in Japan. Fierce competition has made the operations of financial institutions sophisticated, the legal system complicated and markets complex. We predict that the knowledge of households with financial matters and their bankruptcy experience effect their decisions about life insurance consumption. No studies are known to have examined these factors. It is not known *a priori* whether the bankruptcy experience, for example, affects household asset allocations.[3]

The paper is organized as follows. Section II which follows this introduction briefly discusses the background of the Japanese life insurance market. Section III covers the data, estimation method and explanatory variables. The results are presented in Section IV. In Section V we estimate and examine simultaneous equation models for the study. Some concluding remarks are presented in the final section.

II. Background

When it comes to consumption of life insurance in Japan, individuals—thus households—tend to give a more thorough consideration to the types of insurance suppliers and their products for two reasons. First, insurers compete more fiercely then ever—especially after the amendment of the insurance act in 1996—to gain their shares in the market. As a result, they are selling a wide range of consumer-oriented products. Naturally, households need to closely examine those products before making a purchase decision. Second, since 1996 some insurers have become insolvent. By March 2007, seven life insurance and two non-life insurance firms had been dissolved. Some policyholders who purchased insurance from them were forced to receive reduced amounts of insurance. Accordingly, many individuals are interested in finding out the solvency status of their current and prospective insurance companies.

All Japanese households have the option to purchase life insurance products outside of private life insurance firms. Japan Post, a semi-private entity, sells public life insurance products named “Kampo.” In 2005 Kampo sold insurance products, the aggregate insurance premium amounts to ¥16,672 billion (about US$142 billion). Its premium revenue was rather greater than that of Nippon (¥4,842 billion (about US$41 billion)), Japan’s largest private life insurer in terms of premium revenue.

Japan Post sells insurance products that are very similar to those of private life insurers. For example, it has been selling blended life insurance products with whole life and term insurance since 2004. Private insurers put these kinds of products into their main product lines. However, there are several differences between Kampo and private products. First, Kampo’s amount of insurance is restricted to ¥10 million per policyholder. Second, the Japanese government guarantees all insurance claims if Japan Post becomes insolvent. There is no such a government guarantee for private products. Third, Kampo is sold in post offices located across Japan including the rural areas where there are only a small number of financial institutions such as city banks and insurance firms. Thus, Japan Post has advantages to sell Kampo especially in the rural areas.[4]

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[3] It was not examined in many previous studies because bankruptcy has become a key concern in conjunction with the dramatic changes in Japanese financial markets in recent years.

[4] According to Postal Services in Japan 2004 (annual report), as of March 31, 2004, there are 24,715 post offices in Japan. All Japanese prefectures (47 prefectures) have more than 200 post offices.

III. Life Insurance Demand Function in Japan

Data. This research shed light on some open questions described above. For this, we use the data generated by the Postal Services Research Institute. The data were collected by way of a questionnaire and contained very detailed individual information such as the amount of insurance and insurance premiums of private life insurance, Kampo and cooperative insurance. The number of valid responses was 4,182—a response rate of about 70 percent. There were 3,273 responses from households with two members or more, and the remaining 909 from single-person households. After handling issues related to the protection of privacy of respondents, we manage to get about 90 percent of the valid responses. In addition, we restrict the data in order to satisfy the following conditions: (1) the age of the household head is less than 60 and (2) the householder is working. The first condition is to focus our study on those households which are likely in high need of life insurance. With these restrictions, we are left with 2,004 valid responses.

Estimation Model. We can generalize households' life insurance purchasing behaviors as a two-stage process. First, they decide whether or not to purchase a life insurance product. Second, they decide the amount of insurance for the products they have already decided to purchase. It is thus assumed that the observed amount of insurance shows only the demand of households who have decided such a purchase. We express this by the following mathematical form:

$$y_i^* = \mathbf{x}_i'\boldsymbol{\beta} + u_i,\ i = 1,2,\ldots,n;\ u_i \sim N(0,\sigma^2)$$

$$\begin{cases} y_i = y_i^* & if \quad y_i^* > 0 \\ \quad = 0 & if \quad y_i^* \le 0 \end{cases}$$

where y_i^* is the total amount of insurance, $\mathbf{x}_i$ is a vector of explanatory variables with a matching coefficient vector of $\boldsymbol{\beta}$ and u_i represents the disturbance. Note that y_i^* is observed only when the households own life insurance products ($y_i > 0$).

In this situation, there exists the estimation bias ($\sigma\lambda(\mathbf{x}_i'\boldsymbol{\beta}/\sigma)$) as shown below if we apply an ordinary regression method to $y_i > 0$ observation.

$$E(y_i \mid y_i > 0) = \mathbf{x}_i'\boldsymbol{\beta} + E(u_i \mid u_i > -\mathbf{x}_i'\boldsymbol{\beta}) = \mathbf{x}_i'\boldsymbol{\beta} + \sigma\lambda(\mathbf{x}_i'\boldsymbol{\beta}/\sigma)$$

Here, σ shows standard deviation. $\lambda(\cdot)$ is often called as an "inverse Mills ratio" and is shown as:

$$\lambda(\mathbf{x}_i'\boldsymbol{\beta}/\sigma) = \phi_i(\mathbf{x}_i'\boldsymbol{\beta}/\sigma)/\Phi_i(\mathbf{x}_i'\boldsymbol{\beta}/\sigma)$$

where $\phi_i(\cdot), \Phi_i(\cdot)$ mean density function and distribution function, respectively. By defining $\alpha \equiv \boldsymbol{\beta}/\sigma$, we can apply Heckman's two-step method (Heckman, 1976; Amemiya, 1985; and Wooldridge, 2002) to estimate the two-stage procedure. That is:

- Step 1 on decision on whether to purchase life insurance products. Calculate $\hat{\alpha}$, maximum likelihood estimator of α, based on a probit model.

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Table 1: Descriptive Statistics

Variables	Mean	S.D.	Min	Max
Dependent:				
Amount of insurance (domestic private) (million of yen)	25.3114	35.4236	0	402
Holding insurance dummy (domestic private)	0.62	0.49	0	1
Amount of Insurance (Kampo) (million of yen)	2.9627	8.9102	0	199.98
Holding insurance dummy (Kampo)	0.32	0.47	0	1
Holding insurance dummy (all)	0.77	0.42	0	1
Explanatory:				
Amount of income (million of yen)	6.2675	4.5887	1	50
Amount of financial asset (million of yen)	8.0404	13.0965	1	100
Age of household head	43.54	10.32	20	59
Homeownership dummy	0.25	0.43	0	1
Public official dummy	0.09	0.29	0	1
Large firm dummy	0.18	0.38	0	1
Pension dummy	0.18	0.39	0	1
Insurer comparison dummy	0.02	0.14	0	1
Law knowledge dummy	0.47	0.50	0	1
Bankruptcy dummy	0.17	0.37	0	1
Dual income dummy	0.97	0.18	0	1
Children dummy	0.64	0.48	0	1
Metropolitan dummy	0.61	0.49	0	1

- Step 2 on decision on the amount of the insurance to purchase (provided that the household has already decided to purchase them). Using positive observations, regress y_i onto $\mathbf{x}_i$ and $\lambda(\mathbf{x}_i'\hat{\alpha})$.

In this paper, we estimate the above two stages simultaneously using the maximum likelihood method.

Explanatory Variables. Based on previous sections, we specify the following explanatory variables.

- Step 1 on decision on whether to purchase life insurance products. Amount of income, amount of financial assets, dual income dummy (1 if another family member also has a job; 0 otherwise), children dummy (1 if household has more than one child; 0 otherwise), metropolitan dummy (1 if the household is located in a metropolitan area; 0 otherwise), pension dummy (1 if the household has more than one pensioner; 0 otherwise), insurer comparison dummy (1 if the household compares more than three insurers before purchasing life insurance; 0 otherwise), law knowledge dummy (1 if the household is aware of the 1996 amendment of the insurance business act; 0 otherwise), and bankruptcy dummy (1 if the household has experienced bankruptcy of a financial institution with which they had an account or insurance policy; 0 otherwise).

- Step 2 on decision on the amount of the insurance to purchase. Amount of income, amount of financial assets, age of household head, homeownership dummy (1 if the household has its house with no mortgage loans; 0 otherwise), public official dummy (1 if the household head is a public official; 0 otherwise), large firm dummy (1 if the household head works for a firm with more than 500 employees; 0 otherwise), pension dummy, insurer comparison dummy, law knowledge dummy, and bankruptcy dummy.

Table 2: Estimation Results of Life Insurance Demand Function

	Private domestic			Kampo		
Explanatory variables	Coefficient	z-value		Coefficient	z-value	
	Dependent: amount of insurance			Dependent: amount of insurance		
Amount of income	2.225	8.698	***	0.348	2.793	***
Amount of financial asset	0.278	3.139	***	0.111	2.546	**
Age of household head	-34.709	-2.898	***	-2.018	-0.296	
Homeownership dummy	-102.531	-0.412		-124.083	-0.988	
Public official dummy	-622.381	-1.760	*	139.473	0.813	
Large firm dummy	44.168	0.174		-186.869	-1.231	
Pension dummy	209.624	0.806		328.158	2.479	**
Insurer comparison dummy	109.930	0.147		302.205	0.881	
Law knowledge dummy	-289.397	-1.350		-183.701	-1.621	
Bankruptcy dummy	46.566	0.176		-38.905	-0.289	
Constant	4606.360	8.040	***	907.473	2.283	**
	Dependent: Holding insurance			Dependent: Holding insurance		
Amount of income	0.001	5.708	***	0.000	2.329	**
Amount of financial asset	0.000	-0.267		0.000	2.780	***
Dual income dummy	-0.056	-0.349		0.067	0.386	
Children dummy	0.429	6.903	***	0.579	8.475	***
Metropolitan dummy	-0.038	-0.620		0.090	1.425	
Pension dummy	0.142	1.771	*	0.257	3.341	***
Insurer comparison dummy	-0.266	-1.342		0.163	0.803	
Law knowledge dummy	0.336	5.550	***	0.162	2.603	***
Bankruptcy dummy	0.037	0.454		0.186	2.338	**
Constant	-0.363	-2.145	***	-1.336	-7.256	***
ρ	-0.293			-0.128		
σ	3571			1342		
λ	-1047			-171		
Ratio of selected households (%)	62.03%	(=1,243/2,004)		31.64%	(=634/2,004)	
Log-likelihood	-14133			-6625		

*** : Significant at 1% level
** : Significant at 5% level
* : Significant at 10% level

Descriptive statistics are shown in Table 1. Note that the Japan Post survey used a class value alternative to the actual amount approach. To estimate the demand function, we transform class value alternatives into actual amounts using class averages. In addition, "amount of financial assets" in the survey includes some amount of savings elements of life insurance. However, separation of this element from life insurance products is not done in this research due to unavailability of the specific information for the segmentation.

IV. The Results

This section describes the empirical findings using the life insurance demand function (see Table 2). The findings in the table can be divided into those pertaining to the private sector

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and to Kampo.[5] Separately, the lower half of the table shows the findings related to the decision on whether purchasing life insurance products while the upper part shows the result for the decision on actually purchasing the amount of insurance.

The estimation results for the life insurance holding function (lower part) show that both income and children dummies have a positive sign and are statistically significant. This is consistent with our expectation that high income households and families with two or more children tend to own more life insurance policies. The pension dummy shows a significant positive sign. According to the Ministry of Health, Labor and Welfare (2004), almost all Japanese companies have adopted the age of 65 (some with a lower age) for employee retirement, so a lot of pensioners are not salaried employees who do not get constant income.[6] So it is rational to have a significant positive sign of the pension dummy because a lot of pensioners have already retired under the Japanese retirement system and there is the tendency toward greater demand for life insurance.

Knowledge of the insurance business law, which can be regarded as a proxy for financial literacy, has a significant positive sign. This seems to reflect the fact that those households owning life insurance products are likely to be aware of the legal developments in the financial services market than those without the products.

The bankruptcy experience dummy has a positive significant sign only for Kampo. This result reflects that Kampo is perceived to be safe as they are sold with government guarantee.[7] With respect to the amount of financial assets, it shows significant positive sign only for Kampo. However, it is difficult to provide a clear interpretation. As stated earlier, this variable also includes the "amount of funding saving-based insurance," and we can not separate the effect of financial assets from that of insurance.

Next, let us consider the estimation results for the demand function on the amount of insurance (the upper part in the table). Both the amount of income and financial assets have a statistically significant positive sign. This means that the households with higher incomes and more financial assets need larger amounts of insurance.[8] With respect to the demand function for the private domestic sector, the age of the head household has a significant negative sign. It is logical for people to purchase security-oriented insurance when they are young because young people have to face greater uncertainty than elderly people. Stringent health screening procedures and a rise in premiums for higher mortality risks may be

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[5] In the survey, private insurance companies are classified into two categories, domestic and foreign-financed, according to the following description. "With respect to private life insurance company, please take it as foreign-financed if all company names are expressed by *katakana* or Roman alphabet in principle. In other case, if company name is expressed by mixture of Chinese character, *hiragana* and *katakana*, please take it as domestic. Note that the following four companies are exceptions: Aoba (foreign-financed), Orix (domestic), Sony (domestic), T&D financial (domestic)." In our analysis, a "domestic company" is defined as the rest of private companies.

[6] All Japanese people, regardless of their professions, compulsorily participate in the national pension system. They can receive pension in the age of 60 to 65.

[7] A survey by the Ministry of Internal Affairs and Communications (2004) finds the two major reasons for purchasing Kampo are that they "feel safety because Kampo is sold by the Japanese government" and the "government guarantees to pay the amount of insurance."

[8] In the survey, there is a question concerning the amount of debt. After transforming the class value alternative into a yen amount, we estimate the demand function but obtain a significant positive sign. This might be because the "amount of debt" includes housing loan, so household with higher income tend to have a similar amount of debt and this leads to a positive sign. Urata et al. (1999) also pointed out this possibility. However, this type of "debt" differs from the ordinary meaning of debt, so we report the estimation result excluding the amount of debt.

another reason. Urata et al. (1999) also reported a similar result, with a significant positive sign for the "less than the age of 40" dummy.

The public official dummy has a significant negative sign, indicating that public officials do not have to buy much security-oriented insurance because of better job security.[9] Public officials also compulsorily participate in the mutual-aid pension plan. This pension plan has some advantages over other pension plans in which employees in the private sector and the self-employed participate. For example, a mutual-aid pension plan has additional payments scheme.[10] Moreover, the range of relatives that can obtain the survivor's pension from a mutual-aid pension is wider than that of other pension plans. As a result, public officials can get a greater amount of pension benefits from the government and tend to buy less insurance in the private sector. On the other hand, the pension dummy shows significant positive sign only in the case of Kampo. This might reflect the fact that aged people tend to have a greater amount of endowment insurance, whose characteristics is closer to savings than insurance. Aged people in Japan tend to cover their living expense by pension or dissaving.

The three dummy variables—insurer comparison, law knowledge and bankruptcy—are used as proxies of financial instability in the market. About a decade ago, the government introduced a large number of new regulations to promote competition in the market. Until then, the market did not witness any active level of competition based on product or price differentiation. There were a relatively small number of companies in banking, securities and insurance, and the companies were bankruptcy remote. In the market, consumers rarely compared financial institutions or their products. Neither did they have any strong incentives to study the market as well as the laws and regulations governing market operations and conduct. In today's market, we find companies attempting to differentiate their products and services from others. We also find price differentiation another key tool that financial institutions use as an attempt to enhance their market competitiveness. In a competitive market, we observe bankruptcies. This financial market today can be viewed as "instable" by some consumers. Nevertheless, the three variables seem not to affect on the decision on the amount of insurance purchased.

When it comes to deciding whether to purchase life insurance products, however, the knowledge dummy seems to affect positively—such decisions with both domestic private life insurance products and Kampo. In addition, the bankruptcy dummy shows a significant positive sign only for Kampo, thus indicating that the households that have experienced bankruptcy of their financial institution during the past 10 years are more likely to purchase insurance from Kampo. This finding can be generalized such that recent financial instability and a sense of future uncertainty affect the insurance purchasing behavior of Japanese households. In other words, the households with an actual bankruptcy experience suffered lose in the insurance benefits needed to buy additional insurance products to fill the gap caused by the bankruptcy. However, according to the survey, household heads who experienced bankruptcy are often more than 50 years in age and they may not be able to buy more insurance products. Even if they want to buy more, private insurers might refuse

[9] Generally speaking, public officials enjoy the guarantee of their job status and security. In particular, the National Civil Service Law prescribes that public officials shall not be demoted, suspended or dismissed against their intention for reasons other than those stipulated by law.

[10] According to the Nikkei Newspaper published on December 10, 2004, additional payments of mutual-aid pension plan for national public officials amount to about ¥20,000 per month by paying the additional premium about ¥2,000.

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Table 3: Combination of Life Insurance Products

	Consumption pattern	Number of households	Share of total households
1	Private (domestic) only	969	23.17%
2	Private (domestic) and Kampo	767	18.34%
3	Kampo only	295	7.05%
4	Private (domestic and foreign) and Kampo	174	4.16%
5	Private (domestic) and Kampo and JA mutual	164	3.92%
6	Private (domestic and foreign)	159	3.80%
7	Private (domestic) and Kampo and other mutual	118	2.82%
8	Private (domestic) and other mutual	97	2.32%
9	Private (domestic) and JA mutual	95	2.27%
10	Private (foreign) only	91	2.18%
11	JA mutual only	90	2.15%
12	Kampo and JA mutual	87	2.08%
13	Other mutual only	66	1.58%
14	Private (foreign) and Kampo	58	1.39%

their applications or demand very high insurance premiums. In contrast, it is relatively easy for them to buy Kampo because Japan Post does not monitor each individual through medical examination.[11]

V. Simultaneous Estimation

Portfolios of Life Insurance Products. In the previous section, we estimated the demand functions of life insurance products offered by private domestic insurers and Japan Post. However, Japanese tends to hold multiple life insurance products. In consideration of this fact, we attempt to devise an improvement for the more precise estimation using the same data.

Table 3 shows household portfolio patterns of life insurance consumption based on the entire survey sample. The patterns are ranked in a descending order of the number of households. We find that the “households with the private domestic products only” is ranked the highest and the “households with Kampo only” ranked the third highest. This finding, on the one hand, evidences that both public and private suppliers play an important role in the Japanese life insurance markets for households. On the other hand, we find the “households owning private domestic products and Kampo” is ranked as the second highest in the table. Further, there are many other combinations of consumption patterns. In this section, we estimate and examine simultaneous equations with respect to decisions on whether purchasing combination of insurance products offered by the private domestic insurer and by Japan Post.

Method for Simultaneous Estimation. Following the above consideration, there are two possible ways to estimate simultaneous equations.

[11] Kampo is selling since 1916. In this time, there were a small number of life insurance products for low income households. Japan Post targeted them. For a public policy purpose, Kampo permits people with a high occupational risk (e.g. stunt person) to purchase coverage.

Case I: Allowing correlation between two life insurance holding functions. We use a simultaneous probit model for the estimation of life insurance holding functions. In short, we use the same setting as in the previous section for the estimation, but here we allow for correlation of the error terms between two equations with respect to private domestic insurance products and Kampo. We assume the distribution of error terms is expressed by the bivariate standard normal distribution. The model can be presented as follows:

$$\begin{cases} y_1^* = \mathbf{x}_1'\boldsymbol{\beta}_1 + \varepsilon_1, \quad y_1 = 1 \quad if \quad y_1^* > 0, \text{ otherwise } 0 \\ y_2^* = \mathbf{x}_2'\boldsymbol{\beta}_2 + \varepsilon_2, \quad y_2 = 1 \quad if \quad y_2^* > 0, \text{ otherwise } 0 \end{cases}$$

where $[\varepsilon_1, \varepsilon_2] \sim BVN(0,0,1,1,\rho)$ and ρ is a correlation coefficient.

Case II: Holding two kinds of products offered simultaneously by private domestic insurers and Japan Post. The base settings are almost the same as case 1, but we employ here an additional assumption that we can observe $(y_1, \mathbf{x}_1)$ in the first equation only when household purchases life insurance product in the second equation (in other words, $y_2 = 1$). In the context of our analysis, this means that we examine the factors for holding life insurance product offered by private domestic insurance company in the first equation, and then investigate the reasons why, for example, some households that have purchased policies from a private insurer also purchase Kampo using the second equation.[12] This factor analysis is based on the largest simultaneous holding pattern in Table 3.

Estimation Results. Table 4 shows our estimation results. Case I shows the results of estimating the two holding functions in Table 3 simultaneously while allowing for correlation between the error terms. The correlation coefficient ρ is 0.172. The sign and significance of the coefficient shows almost the same tendency as the lower part in Table 2, because two equations with respect to private domestic insurance products and Kampo show a low correlation. This means that our result in section IV seems to be robust.

On the other hand, case II shows factors indicating that some households with a private life insurance product also purchase Kampo. The ratio of the households holding private life insurance product is about 62%, and the ratio of the households simultaneously holding Kampo is about 37%. The income and children dummies are not statistically significant for additional holding of Kampo although private life insurance holding function in the first stage shows almost the same tendency. In addition, the bankruptcy experience dummy shows a positive sign but is insignificant in the second equation, implying that bankruptcy experience seems not to be important factor affecting the additional holding of Kampo.

Further, the law knowledge dummy shows a rather significant negative sign in the case of additional Kampo holding. Recall that the sign of the knowledge dummy was positive in the single equation demand function. The differences in the results may be caused by the way of the question was stated in the survey—"The life insurance firms may change the assumed interest rate before bankruptcy in accordance with the amendment of the

[12] In this setting, we focus primarily on the households that purchase life insurance products first from private insurers. However, some households, especially those facing a financial constraint, may buy Kampo first and, if they need and can afford, private insurance products later. In fact, we have also estimated the simultaneous holding equation on the latter case. The results are similar to those presented in Table 2, and we do not find intriguing points of contention with respect to proxy variables of financial instability.

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insurance act on August 24, 2003. Are you aware of the policy term?"—and the period of survey being from November 29 to December 21, 2003.[13] Despite the possibility of adding

Table 4: Simultaneous Estimation Results of Life Insurance Holding Function

Case I: Simultaneous Estimation of Holding Private Domestic and Kampo

	Private Domestic			Kampo		
Explanatory Variables	Coefficient	z-value		Coefficient	z-value	
Amount of income	0.000	6.356	***	0.000	2.436	**
Amount of financial asset	0.000	-0.220		0.000	2.910	***
Dual income dummy	-0.038	-0.224		0.062	0.366	
Children dummy	0.403	6.405	***	0.580	8.420	***
Metropolitan dummy	-0.054	-0.867		0.095	1.496	
Pension dummy	0.143	1.782	*	0.256	3.400	***
Insurer comparison dummy	-0.253	-1.293		0.169	0.845	
Law knowledge dummy	0.336	5.590	***	0.164	2.617	***
Bankruptcy dummy	0.043	0.537		0.185	2.300	**
Constant	-0.337	-1.893	*	-1.337	-7.408	***
ρ	0.172	4.406	***			
Ratio of selected households	62.03% (=1,243/2,004)			31.64%(=634/2,004)		
Log-likelihood	-2396.355					

*** : Significant at 1% level; ** : Significant at 5% level; * : Significant at 10% level

Case II: Estimation for Household with Private Domestic to Purchase Kampo Additionally

	Private Domestic			Kampo		
Explanatory Variables	Coefficient	z-value		Coefficient	z-value	
Amount of income	0.000	6.175	***	0.000	-0.933	
Amount of financial asset	0.000	0.319		0.000	2.541	**
Dual income dummy	-0.045	-0.265		0.048	0.289	
Children dummy	0.403	6.420	***	0.064	0.732	
Metropolitan dummy	-0.051	-0.841		0.060	0.975	
Pension dummy	0.151	1.959	*	0.143	1.852	*
Insurer comparison dummy	-0.260	-1.346		0.138	0.662	
Law knowledge dummy	0.322	5.393	***	-0.148	-2.325	
Bankruptcy dummy	0.033	0.417		0.115	1.448	
Constant	-0.319	-1.809	*	0.152	0.784	
ρ	-0.965	-23.586	***			
Ratio of selected households	62.03% (=1,243/2,004)			37.41% (=465/1,243)		
Log-likelihood	-2010.777					

*** : Significant at 1% level; ** : Significant at 5% level; * : Significant at 10% level

such a term, no insurers were known to have actually added the condition in their policies. Thus, it is rather difficult to get that specific knowledge unless they are familiar with detailed financial information in their daily life. In other words, knowledge dummy represents not only the knowledge about amendment of insurance law, but a high standard of financial literacy.

We can obtain two reasons why some households with the knowledge about the amendment decided not to purchase Kampo additionally. First, Kampo contains more

[13] The Diet passed this amendment on July 18, 2003.

savings elements—thus fixed investments return—than their counterpart private insurance products. Thus, these households probably wanted to invest their money not in Kampo but in other financial instruments that offer variable investment returns. Second, it is reasonable to assume that these households purchased private life insurance products more properly because they have financial knowledge.[14] Thus, they may not need to purchase more insurance product to adjust to their needs.

VI. Concluding Remarks

In this paper, we estimate private life insurance and Kampo demand functions using household-level data offered by Postal Services Research Institute. The findings show that that income, the number of children, pension and law knowledge have a significant effect on the decision whether a household purchases life insurance products. The bankruptcy experience appears to have an impact only in the case of making a purchase decision of a Kampo.

Pension and bankruptcy experience appear only to have an impact on Kampo, while the age (less than 40 years of age) and occupation (public official) factors affect only private life insurance consumption. Dummy variables representing insurer comparison, law knowledge and bankruptcy experience did not have any statistically significant effect on estimated demand function on amount of insurance concerning private life insurance. Simultaneous estimations are also used to investigate the reasons why some households that already have one type of life insurance product (e.g. private life insurance) purchase the other type of life insurance product (e.g. Kampo). The results indicate that income, children and bankruptcy experience variables are not a significant factor when the households with private life insurance product decide to purchase Kampo additionally. The results also show that a law knowledge dummy has a negative impact on the additional purchase.

In relation to recent financial instability, this analysis shows the following results. First, the existence of financial instability has not impacted on demand for amount of insurance, but the knowledge factor has some impact on the purchasing decision. Second, households which experienced bankruptcy before show a tendency to purchase Kampo rather than private life insurance. These results imply that the financial instability—whether correctly observed or not—in Japan affects households' selection behavior of life insurance products.

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[14] Tanaka (1999) has investigated this point using an empirical approach.

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