Why Do Children Take Care of Their Elderly Parents? Are the Japanese Any Different?[§]

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Abstract

In this paper, we conduct a theoretical analysis of why individuals provide care and attention to their elderly parents using a two-period overlapping generations model with endogenous saving and a "contest success function" and test this model using micro data from a Japanese household survey, the Osaka University Preference Parameter Study. To summarize our main findings, we find that the Japanese are more likely to live with (or near) their elderly parents and/or to provide care and attention to them if they expect to receive a bequest from them, which constitutes strong support for the selfish bequest motive or the exchange motive (much stronger than in the United States), but we find that their caregiving behavior is also heavily influenced by the strength of their altruism toward their parents and social norms.

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1. Introduction

Why do people take care of their elderly parents? Is it because they have their eye on their parents' assets and want to maximize their share of their parents' bequest (the strategic bequest motive or the exchange motive)? Is it out of love (the altruism model)? Is it because they are adhering to the social norms of the society in which they live?

In this paper, we conduct a theoretical analysis of why individuals provide care and attention to their elderly parents and test this model using micro data from a Japanese household survey, the Osaka University Preference Parameter Study. To summarize our main findings, we find that the Japanese are more likely to live with (or near) their elderly parents and/or to provide care and attention to them if they expect to receive a bequest from them, which constitutes strong support for the selfish bequest motive or the exchange motive (much stronger than in the United States), but we find that their caregiving behavior is also heavily influenced by the strength of their altruism toward their parents and social norms.

Recent theoretical contributions to the economics of inter-family interactions highlight the importance of sibling rivalry in providing care/attention to parents with the objective of strategically influencing the latter's inheritance decision, given that parents are also strategic manipulators who, at the same time, display altruistic feelings towards their children (see Chang and Weisman, 2005; Chang, 2009; Chang, 2012; and Chang and Luo 2015). In line with this strand of the literature, we develop a two-period overlapping generations model as a two-stage Nash game that integrates parental altruism and sibling rivalry for family resources with endogenous bequest formation, strategic manipulation of children's behavior, and endogenous saving. The two-period structure of our model conveniently endogenizes the saving rate, which is important because it adds realism to the model given strong life-cycle saving motives in Japan. Further, as was noted in the one-period setting of Chang (2009), financial constraints may prevent parents from making transfers, especially with a greater number of children. Yet if everyone is allowed to save when young, the saved amount may alleviate financial constraints during old age when transfers to children are made. In addition, wealth accumulation during younger ages may also influence the need for children to receive bequests to begin with and thus their desire to provide care/attention in return. We thus attempt to model the complex interplay of these factors in a Nash game with sibling rivalry and parent-child exchanges.

Turning to the empirical analysis conducted in this paper, it makes an original contribution in at least 4 respects. First, it is one of the first studies to make use of data for Japan where informal (family) care of the elderly is much more prevalent than in the United States and other Western societies. Second, it uses multiple measures of care and attention (co-residence, living nearby, help with housework, and financial assistance from children to parents) whereas most previous studies for Japan focus primarily on parent-child co-residence. Third, it uses a direct measure of bequest expectations whereas most previous studies use parental wealth (particularly bequeathable wealth) as a proxy for expected or potential bequests because of a lack of direct data on bequest expectations. Fourth, it is one of the first studies to take explicit account of the strength of children's altruism toward their parents, social norms, and religiosity.

This is an exceedingly important research topic because it sheds light on one of the key issues in economics (whether households are motivated by selfish or altruistic considerations in their intra-family interactions) and because the roles to be played by informal (family) care of the elderly and public long-term care insurance programs are being hotly debated in many, if not most, developed economies as their life expectancies increase relentlessly and their populations age rapidly.

Moreover, whether intergenerational transfers and exchanges are altruistically or selfishly motivated has very important policy implications. If transfers and exchanges are motivated by pure altruism, households will offset the impact of government-initiated actions involving compulsory redistributions across generations via transfers in the opposite direction (Barro, 1974, and Becker, 1974).[i] For example, if government subsidies for elderly care are introduced, parents will increase their bequests to their children because they wish to compensate their children for the higher taxes they have to pay in order to finance these subsidies. By contrast, if intergenerational transfers and exchanges are selfishly motivated, public income redistribution policies will not be neutral (Cox, 1987, and Juarez, 2009). For example, government subsidies for elderly care will lead to a decline in care provided by children to their parents, which in turn will lead to a decline in bequests from parents to children and a redistribution of income from younger to older cohorts.

The remainder of the paper is organized as follows: In section 2, we present the theoretical model; in section 3, we survey previous empirical studies; in section 4, we present the estimation model; in section 5, we describe the data source and sample selection criteria; in section 6, we present descriptive statistics; in section 7, we present the estimation results; and in section 8, we summarize our results and discuss the policy implications thereof.

2. An Altruistic-Strategic Bequest Model with Endogenous Saving

In this section, we explain our theoretical model of the determinants of care/attention to elderly parents by their children. Most theoretical studies (e.g., Abel and Warshawsky, 1988, and Becker, 1991) focus exclusively on either altruistic or exchange motives for bequests, but a growing number of studies attempt to analyze the two motives in tandem (see Masson and Pestieau, 1996, and Laferrere and Wolff, 2006, for useful surveys of this literature). Further, since empirical studies of bequest motives and their effects often report results that are contradictory (see, for example, Juarez, 2009), we too integrate the two motives in a unified framework and empirically test its theoretical predictions.

Consistent with the general spirit of the seminal study by Bernheim, et al. (1985), our model posits that the parent's own utility is influenced by the actions of her children (in particular, it is an increasing function of the total amount of care/attention she receives from her children) and that the parent leaves a bequest partly to intentionally and strategically manipulate her children's behavior (i.e., to induce her children to provide care and attention). Following Chang (2009), we focus in our model on intergenerational exchanges of bequests from parents to children with care and attention from children to parents in the presence of sibling rivalry. Yet, along with sibling rivalry for bequests, we also incorporate parents' purely altruistic feelings towards their children as well as their desire to save for their own retirement. The assumption that saving is chosen endogenously is well-justified in the case of Japan where public pensions were late in being introduced and life-cycle saving motives have historically been particularly strong (see, for example, Horioka and Watanabe, 1997). We also assume that parents leave a bequest to their children partly out of altruism and partly as a way of inducing their children to provide care and attention.

We study parent-child interactions within a two-period overlapping generations setting, presented as a two-stage non-cooperative Nash game. We assume that a lifetime consists of two periods: a working period and a retirement period. Young parents have $n \geq 2$ identical children (born exogenously), who in turn enter the workforce at the start of their parents' second period of life. As in Cremer, et al. (1992), we ignore the individual's utility while a dependent child.

The individuals' time endowment is normalized to unity. Young adults inelastically devote a fixed fraction φ of their total time endowment to work, and they also supply care/attention

fraction a_{1t}^{i} of their total time endowment in a given time period, t, to their parents. (Hereafter, the first subscript of a given variable is either 1 (corresponding to a "young (working) adult") or 2 (corresponding to an "old (retired) parent"), while the second subscript indicates the respective time period. Superscript i denotes individual (child) i, where $i = 1, \ldots, n$.) In the first period of life, people work, earn wages, save, and provide care to their parents. In the second period of life, people retire and decide how much wealth to set aside for bequests to their grown up children, while expecting some care from them in return.

Similar to Chang (2009) and Chang and Luo (2015), we introduce a "contest success function" (CSF) that determines the share of the total bequest going to a particular child i. The transfer share of child i, denoted by A_{1t}^{i}, is defined as follows:

$$A_{1t}^{i} \equiv \frac{a_{1t}^{i}}{a_{1t}^{i} + \Sigma_k a_{1t}^{k}} \qquad (1)$$

where $k = 1, \ldots, n$, and $k \neq i$.

We consider a two-stage game played as follows. In the first stage, the old parent chooses the amount of her bequest, and in the second stage, her grown-up children simultaneously and non-cooperatively choose how much attention to provide to the parent and also how much to save for their own retirement. We assume that the parent credibly commits to sticking to her bequest amount and bequest share decisions. Further, the parent does not distribute her bequest until her children realize their attention and saving rate decisions.

Thus, we proceed by solving for the children's optimal level of attention and saving rate for any given bequest amount and then let the old parent plug these attention and saving functions into her utility function to determine the optimal bequest amount to leave. By specifying functional forms, our objective is to derive explicit analytic solutions for the model's choice variables so we can clearly see how they vary with respect to various parameters of interest. To strike a balance between realism and tractability and to facilitate closed-form interior solutions, we assume that leisure and total attention from all children enter everyone's utility function linearly and that utility from first and second period consumption is logarithmic. We further set the time-discount factor in the utility function to unity.

Thus, let U^{i} be the overall lifetime utility of an adult individual i, defined as follows:

$$U^{i} \equiv \ln(w\varphi(1 - s_{1t}^{i}) + B_{2t}A_{1t}^{i}) + (1 - \varphi - a_{1t}^{i}) + \ln\left((1 + r)w\varphi s_{1t}^{i} - B_{2t+1}^{i}\right) + \sum_{v=1}^{n} a_{1t+1}^{v} + \beta \sum_{v=1}^{n} U^{v} \qquad (2)$$

where parameter $0 < \beta < 1$ denotes the weight the parent places on the total welfare of her children. The first two terms on the right-hand-side of (2) represent the utilities from first-period consumption and leisure, respectively. w and r stand for the wage rate per unit of time and the interest rate, respectively, while s_{1t}^i denotes the fraction of income saved. B_{2t+1}^i is the total amount of bequest left by individual i to her children during her second period when old. B_{2t} is the total amount of bequest left by individual i 's parent. In the second period of life, leisure amounts to unity by assumption, but we can safely ignore it. Note that (2) implies that the individual does not enjoy the time/attention he provides to his parent, an assumption that is often made in this strand of the literature. Existing studies assume that such services do not have close market substitutes and that they may involve, among other things, behavioral control that may hinder the child's independence (e.g., Cox, 1987). In addition, one may conjecture that, in reality, time spent with parents is correlated with time spent away from one's own children and spouse and that the net effect is disutility to the child. However, we should note that the fact that the child derives disutility from attention to his parents does not necessarily imply that the child is "inhumanly" selfish. Oftentimes, taking care of ageing parents involves finding out about their declining health and well-being, and such stressful thoughts may lower the child's well-being.

Recalling (1), first-order conditions for the maximization of (2) are as follows:

$$\frac{\partial U^i}{\partial s_{1t}^i} = -\frac{w\varphi}{\frac{a_{1t}^i B_{2t}}{a_{1t}^i + \sum_k a_{1t}^k} + (1 - s_{1t}^i) w\varphi} + \frac{(1+r) w\varphi}{-B_{2t+1}^i + (1+r) w\varphi s_{1t}^i} = 0 \tag{3}$$

$$\frac{\partial U^i}{\partial a_{1t}^i} = -1 + \frac{-\frac{a_{1t}^i B_{2t}}{(a_{1t}^i + \sum_k a_{1t}^k)^2} + \frac{B_{2t}}{a_{1t}^i + \sum_k a_{1t}^k}}{\frac{a_{1t}^i B_{2t}}{a_{1t}^i + \sum_k a_{1t}^k} + (1 - s_{1t}^i) w\varphi} = 0 \tag{4}$$

Next, note that under the assumption of identical siblings, a symmetric Nash equilibrium would imply $a_{1t}^i = a_{1t}$, $s_{1t}^i = s_{1t}$, and thus $\sum_k a_{1t}^k = (n-1) a_{1t}$, while $B_{2t+1}^i = B_{2t+1}$, for any $i = 1, \ldots, n$. We thus make these substitutions into (3) and (4), which allows us to obtain the following expressions:

$$s_{1t} = \frac{(1+r)(B_{2t} + nw\varphi) + B_{2t+1} n}{2nw\varphi(1+r)} \tag{5}$$

$$a_{1t} = \frac{2B_{2t}(n-1)(1+r)}{n\left((1+r)(B_{2t}+nw\varphi)-B_{2t+1}n\right)} \tag{6}$$

By taking the logarithm of both sides of (6) and differentiating the resulting expression with respect to B_{2t}, it is possible to show, under the assumption of positive interest, wage income, and old-age consumption, that, ceteris paribus, the level of care and attention provided to parents responds positively to the parents' bequest amount.

A retired parent decides at time t how much to bequeath to each of her children. Note that the parent also realizes that each of her children will simultaneously choose $a_{1t}^i = a_{1t}$, $s_{1t}^i = s_{1t}$, and thus takes this into account in her maximization program. Clearly, the parent also assumes that $\sum_k a_{1t}^k = (n-1)a_{1t}$, while $B_{2t+1}^i = B_{2t+1}$. This implies that the bequest share in the parent's optimization program is simply $\frac{1}{n}$. Therefore, the retired parent's optimization problem is as follows:

$$\max_{B_{2t}} \{\ln((1+r)w\varphi s_{1t-1} - B_{2t}) + na_{1t} + \beta nU\} \tag{7}$$

where B_{2t} is the total amount of bequest left to the retired parent's children, while the saving rate (which was decided by the retired parent one period earlier when she was young) is s_{1t-1} and thus is taken as given during the parent's old-age optimization exercise. Note from (2) that we assume that the retired parent does not tire of her child's attention but that she is aware of the fact that her child's utility is negatively affected by attention. U is clearly defined in the manner of (2) as follows:

$$U \equiv \ln\left(w\varphi(1-s_{1t}) + \frac{B_{2t}}{n}\right) + (1-\varphi-a_{1t}) + \ln\left((1+r)w\varphi s_{1t} - B_{2t+1}\right) + \sum_{v=1}^{n} a_{1t+1}^v + \beta \sum_{v=1}^{n} U^v \tag{8}$$

The retired parent takes as given the attention level her grandchildren will provide to her children and also the well-being of her grandchildren. That is, decisions that are made at current time t matter. To solve for the steady-state equilibrium, we proceed according to the following steps:

Step 1. Substitute expression (8) into (7), where s_{1t} and a_{1t} are determined by (5) and (6), respectively.

Step 2. Differentiate the resulting objective function from the previous step with respect to B_{2t}.

Step 3. In the final derivative expression from Step 2, use the right-hand side of the following expression:

$$s_{1t-1} = \frac{(1+r)(B_{2t-1} + nw\varphi) + B_{2t}n}{2nw\varphi(1+r)}$$

in place of s_{1t-1} (see expression (5)).

Step 4. Noting that the steady-state first order condition from Step 3 would depend on B_{2t-1}, B_{2t}, and B_{2t+1} as well as on other model parameters, replace all of these bequest amounts with the common notation B^*.

Step 5. Set the final expression from the previous step to zero and solve for B^*.

Having found B^*, we can determine the equilibrium level of the choice variable of interest (a^*) from (6), where $B_{2t} = B_{2t+1} = B^*$:

$$a^* = \frac{2(\beta - 1 + r(n + \beta - 1))}{n(1+r)(1-\beta)} \tag{9}$$

The following comparative statics results can be straightforwardly established:

$$\frac{\partial a^*}{\partial \beta} = \frac{2r}{(1+r)(\beta-1)^2} > 0 \tag{10}$$

$$\frac{\partial a^*}{\partial n} = \frac{2}{n^2} > 0 \tag{11}$$

Expression (10) arises because greater altruism leads to a greater bequest amount, thus increasing the reward for providing care and attention to parents. Expression (11) shows that children's time contribution towards their parents increases with the number of siblings. Intuitively, an increased number of contestants intensifies the Nash equilibrium competition level.

3. Survey of Previous Empirical Studies

There have been many empirical studies of the determinants of care of, and attention to, elderly parents by their children. We will not provide an exhaustive survey of this literature because a number of excellent surveys already exist (for example, Arrondel and Masson, 2006; Laferrere and Wolff, 2006; and Horioka, 2014), but there has been a large number of studies that attempt

to test for the presence of the strategic bequest (exchange) motive by seeing whether or not the bequeathable wealth or bequest intentions of elderly parents have a significant impact on the care and attention they receive from their children. One study of this genre is Menchik, et al. (1988), which obtains a positive correlation between parents' intention to bequeath and the frequency of their children's telephone calls and visits, a result that appears to support the strategic bequest (exchange) motive. However, this study fails to distinguish between single-child families and multiple-child families, as done by later studies. The seminal paper of this genre is Bernheim, et al. (1985), which finds using U.S. data from the Longitudinal Retirement History Survey (LRHS) that the amount of attention provided by children to their elderly parents (as measured by the frequency of phone calls and visits) is an increasing function of parents' bequeathable wealth (but not of their non-bequeathable wealth) in multiple-child families but not in single-child families, even after controlling for parental characteristics. All of these results appear to support the strategic bequest (exchange) motive because only bequeathable wealth should influence the behavior of children and because parents' threat of disinheritance is truly credible only if they have multiple children. However, Perozek (1998) replicates Bernheim, et al.'s (1985) test using a richer data set (the 1987 National Survey of Families and Households (NSFH)) and finds that bequeathable wealth no longer has a significant impact on attention from one's children when additional child and family characteristics are taken into account and/or a more comprehensive measure of attention is used.

Similarly, Sloan, et al. (1997) examine the impact of various variables relating to the strategic bequest (exchange) motive on care of disabled elderly parents by their children and found little evidence of a strategic bequest motive. For example, they found that parental wealth has a negative and insignificant impact on informal care rather than the positive and significant impact predicted by the strategic bequest motive.

Moreover, Altonji, et al. (2000) analyze inter vivos time and money transfers from parents to children as well as those from children to parents using data from the 1988 wave of the Panel Study of Income Dynamics (PSID) and find little evidence that parental income or wealth increases time transfers from children or that time transfers from children to parents are exchanged for money transfers from parents to children or conversely. Similarly, Ioannides and Kan (2000) analyze two-directional inter vivos transfers of time and money between parents and children and find that they are motivated by mutual altruism rather than by selfish exchange motives (but see Cox, 1987; Cox and Rank, 1992; and Altonji, et al., 1997).

Thus, the evidence from the United States suggests that altruistic motivations are more important than selfish or strategic motivations. According to Laferrere and Wolff's (2006) more comprehensive review of this literature, about two-thirds of the studies using U.S. data find support for the altruism model or reject the selfish exchange model, whereas the results for European countries are more mixed. [ii]

Turning to studies that use Japanese data, Ohtake and Horioka (1994) analyze the determinants of financial support from children to parents and parent-child co-residence using data from the 1986 Comprehensive Survey of Living Conditions, conducted by the Ministry of Health, Labour and Welfare of the Japanese Government. They find that parents' financial net worth (a component of bequeathable wealth) has a positive and significant impact on the amount of financial support from children to parents (given that the child provides financial support to his or her parents) and that housing wealth (also a component of bequeathable wealth) has a positive and significant impact on the probability of parent-child co-residence but that non-bequeathable wealth does not have a significant impact on either (see also Ohtake, 1991).

Similarly, Komamura (1994) finds, using data from the Survey of Retirement Assets, conducted in 1990 by the former Management and Coordination Agency of the Japanese Government, that housing wealth has a positive and significant impact on the probability of parent-child co-residence, while Johar, et al. (2015) find, using data from a Nihon University survey, that parental wealth (both housing assets and financial assets) increases the probability of parent-child co-residence (see also Horioka, et al., 2000).

Furthermore, Yamada (2006) analyzes the determinants of parent-child co-residence, parent-child distance, and the frequency of parent-child contact using data from the Survey on Life Planning in the Age of Long Life, conducted in 1992 by the Japan Institute of Life Insurance, and finds that inheritance expectations have a significant impact on all three dependent variables, at least in the case of the husband's parents, and that inheritance experience has a significant impact on the second and third dependent variables in the case of all parents as well as in the case of the husband's parents.

Finally, Kohara and Ohtake (2011) find, using data from a Japanese Government survey, that children provide more time transfers (care) to parents with more wealth (proxied by parents' educational attainment).[iii]

Thus, studies that examine the impact of parental bequests or wealth on the amount of care, attention, and/or financial assistance parents receive from their children using Japanese data find

strong support for the selfish bequest (exchange) motive, unlike in the case of the United States. Moreover, attitudinal data on bequest plans provide further corroboration of the differences between U.S. and Japanese intra-family behavior. For example, Horioka, et al. (2000), Horioka (2002), and Horioka (2014) find that the proportion of respondents planning to leave a larger share of their bequest to children who provide more care is much higher in Japan than in the United States (29.2% in Japan vs. 3.1% in the United States in the case of Horioka, et al. (2000) and Horioka (2002) and 20.5% in Japan vs. 2.5% in the United States in the case of Horioka (2014)). These results also suggest that the strategic bequest (exchange) motive is much more applicable in Japan than it is in the United States (see also Horioka, 2008, 2009).

Turning next to studies that look at the impact on social norms on care behavior, Wakabayashi and Horioka (2009) analyze the determinants of parent-child co-residence behavior in Japan and find that parents are more likely to live with their eldest child if their eldest child is a son and are more likely to live with their eldest son even if he is not the eldest child. Similarly, Johar, et al. (2015) find that being the eldest son increases the probability of parent-child co-residence in Japan. All of these findings suggest that social norms (especially the social norm that it is the duty of the eldest son to live with and take care of his parents) influence care and co-residence behavior in Japan.

Turning finally to the impact of religiosity, Gans, et al. (2009) find that religious children are more likely to provide care to their aged parents, which confirms the importance of religiosity.

4. Estimation Model

In this section, we describe the estimation model we use to analyze what determines whether or not individuals provide care and attention to their parents. Our estimation model is derived from the theoretical model we presented in section 2, which showed that parents' altruism towards their children, combined with their desire to receive care and attention from their children, will induce parents to leave bequests to their children and that this, in turn, will induce their children to provide care and attention to their elderly parents. We will test our theoretical model by examining whether or not parents' bequest plans have a significant impact on their children's caregiving behavior.

Moreover, our theoretical model also predicts that the number of siblings will have a positive impact on the provision of care and attention to one's parents because an increased number of contestants intensifies the Nash equilibrium competition level of care and attention. The survey

we use collects information on the number of siblings, and thus, we can also test this implication of our theoretical model.

The survey we use collects information on several types of care and attention provided by respondents to their parents so we use the following 3 dependent variables:

CORESIDE = 1 if the respondent lives with his/her parents and 0 otherwise

NEARBY = 1 if the respondent lives near his/her parents and 0 otherwise

HOUSEWORK = 1 if the respondent assists his/her parents with housework and 0 otherwise

The survey we used also collects information on whether the respondent provides nursing care or financial assistance to his/her elderly parents, but we do not present the results for these dependent variables because of space limitations, because the results for nursing care were very similar to the results for housework, and because the results for financial assistance were not very satisfactory, with the coefficients of the key explanatory variables (BEQEXP and NSIB) and most of the other explanatory variables never being statistically significant.

The key explanatory variables are as follows:

BEQEXP = 1 if the respondent expects to receive a bequest or inter vivos transfer from his/her parents and 0 otherwise

According to the strategic bequest (exchange) motive that is one element of our theoretical model, if an individual is selfish, he/she will be more likely to provide care and attention to his/her parents, *ceteris paribus*, if he/she expects to receive a bequest or inter vivos transfer from them. Thus, the expected sign of the coefficient of BEQEXP is positive.

NSIB = the number of siblings the respondent has (included only in the samples with one or more siblings)

An individual who has more siblings would be expected to provide more care to his/her parents, according to our theoretical model, because he/she has more rivals to compete with for his/her parents' bequest. Thus, it appears at first glance that the sign of the coefficient of NSIB should be positive. On the other hand, it is possible that the sign of the coefficient of NSIB is negative if there is a fixed amount of care and attention that is required because the amount of care and attention that each child needs to provide will decline as the number of siblings increases.

In addition, we include a number of control variables, the first of which pertains to the strength of respondents' altruism toward their parents.

CHILDALTRUISM = the proportion of his/her family income that the respondent would be willing to donate to his/her parents until things get better (possibly for a few years) if his/her parents were both alive and living separately from him/her and the per capita family income of his/her parents was less than one-third of his/her own (in ratio form)

The survey used a one-third threshold to ensure that a significant proportion of respondents would indicate a positive proportion. Since we would expect a more altruistic respondent to provide more care and attention to his/her parents, *ceteris paribus*, the expected sign of the coefficient of CHILDALTRUISM is positive.

The next three control variables pertain to social norms. The social norm is Japan and many other Asian countries is for sons (especially the eldest son) to live with, and take care of, their elderly parents, and thus, it is of great interest to see the extent to which social norms rather than economic rationality can explain caregiving behavior in Japan.

ELDESTSON = 1 if the respondent is the eldest son and 0 otherwise (included only for the full sample and the male sample with one or more siblings)

Since the social norm in Japan is for the eldest son to live with, and take care of, his/her parents, *ceteris paribus*, the expected sign of the coefficient of ELDESTSON is positive.

NOBROTHERS = 1 if the respondent has no brothers and 0 otherwise (included only for the female sample with one or more siblings)

Since the social norm in Japan is for sons (especially the eldest son) to live with, and take care of, their parents, daughters should be more likely to live with and take care of their parents, *ceteris paribus*, if they have no brothers. Thus, the expected sign of the coefficient of NOBROTHERS is positive.

MALE = 1 if the respondent is male and 0 otherwise (included only for the full sample)

Since the social norm in Japan is for sons to live with and take care of their parents, *ceteris paribus*, the expected sign of MALE is positive.

We also include a control variable pertaining to religiosity as at least one previous study (Gans, et al., 2009) found it to be important.

RELIGIOSITY = the respondent's degree of religiosity, where 1 denotes the lowest degree of religiosity and 5 denotes the highest degree of religiosity

Since an individuals who is more deeply religious will presumably be more likely to provide care and attention to his/her parents, *ceteris paribus*, the expected sign of the coefficient of RELIGIOSITY is positive.

Turning to the other control variables we included,

BOTHALIVE = 1 if both of the respondent's parents are alive and 0 otherwise

Since there is less need for children to take care of their parents, *ceteris paribus*, if both parents are still alive and one parent can take care of the other, the expected sign of the coefficient of BOTHALIVE is negative.

AGEPARENT = the age of the respondent's parent if only one parent is alive and the age of the respondent's older parent if both parents are alive

Since health inevitably deteriorates with age, older parents will be more likely to require care and hence the expected sign of the coefficient of AGEPARENT is positive.

REQCARE = 1 if one or both of the respondent's parents is alive and requires physical care or help with housework and 0 otherwise

Since an individual should be more likely to provide care and attention to his/her parents, *ceteris paribus*, if his/her parents require physical care or help with housework, the expected sign of REQCARE is positive.

BOTHREQCARE = 1 if both of the respondent's parents are alive and both require physical care or help with housework and 0 otherwise

Since there is more need for children to provide care and attention, *ceteris paribus*, if both parents require care, one might think at first glance that the sign of the coefficient of BOTHREQCARE should be positive. However, if both parents require care, it may be more likely for the parents to be institutionalized, which means that the sign of the coefficient of BOTHREQCARE might be negative.

WORK = 1 if the respondent is working and 0 otherwise

Since an individual is less likely to be able to take care of his/her parents, *ceteris paribus,* if he/she is working, the expected sign of the coefficient of WORK is negative.

COLLEGE = 1 if the respondent graduated from a junior college or a 4-year university or engaged in graduate study and 0 otherwise

Since an individual who has a higher educational attainment will presumably have a higher market wage, meaning that the earnings he/she foregoes by providing care and attention to his/her parents is greater, he/she should be less likely to provide care and attention to his/her parents, *ceteris paribus*. Thus, the expected sign of the coefficient of COLLEGE is negative.

MARRIED = 1 if the respondent is currently married and 0 otherwise

The sign of MARRIED is ambiguous a priori. On one hand, a married (male) individual might be better able to provide care and attention to his parents because his spouse can provide assistance with caregiving. On the other hand, a married individual may be less able to provide care and attention to his/her parents because he/she is too busy taking care of his/her spouse and children.

Since our dependent variables are all binary variables, we use a probit model in our estimations and present marginal effects, which are average partial effects, in our estimation results. We use robust White standard errors for the marginal effects to adjust for low-level residual heteroscedasticity (White, 1982) as hinted by the normalized randomized quantile residual plots (see Dunn and Smyth, 1996) (not shown in the paper due to space limitations).

5. Data Source and Sample Selection Criteria

The data source used in this paper is the "Preference Parameters Study of Osaka University (Kurashi no Konomi to Manzokudo ni tsuite no Chousa)," a panel survey of households that was conducted concurrently in 4 countries (China, India, Japan, and the United States) by the 21st Century Center of Excellent Program "Behavioral Macrodynamics based on Surveys and Experiments" (2003-2008) and the Global Center of Excellence Program "Human Behavior and Socioeconomic Dynamics" (2008-2013) of Osaka University. The Japanese survey surveyed a nationwide random sample of individuals of both sexes aged 20 to 69 every year from 2003 until 2013. We use data from the 2011 wave of the Japanese survey (except that data on the CHILDALTRUISM variable are taken from the 2010 wave of the same survey because it was not included in the 2011 wave) because this wave collected the most extensive information on

respondents' care of, and attention to, their elderly parents. The sample size varies from year to year but was 4934 in 2011.

This survey collects extensive information on the socioeconomic characteristics of the respondent, his/her spouse, his/her parents, his/her children, and the household as a whole, on care and attention provided by children to their parents (as measured by co-residence, living nearby, providing help with housework, etc.), on intergenerational transfers (bequests as well as inter vivos transfers), on various preference parameters such as those relating to altruism, risk aversion, time preference, and externalities, etc., so it is ideally suited to the objective of this paper.

The sample selection criteria we used are as follows:

(1) We dropped all observations for which there were missing values for at least one of the variables used in the estimations.
(2) Since it is possible for children to provide care or attention to their parents only if at least one parent is alive, we dropped all observations for which neither parent is alive.
(3) Since children are unlikely to provide care to their parents if their parents are young and healthy, we dropped all observations for which both parents are less than 60 years of age.
(4) Since our theoretical model applies only to those with at least one sibling (since those with no siblings do not need to compete against their siblings for their parents' wealth), we dropped all observations for respondents who have no siblings (i.e., who are only children). However, we also did the estimations for the sample of respondents with no siblings (respondents who are only children) for comparison purposes although we had to drop explanatory variables with insignificant coefficients in this case due to the small sample size.

Since the care decision is likely to be very different for sons and daughters in Japan where the social norm is for sons (especially the eldest son) to live with, and take care of, their parents, we did the estimations not only for the full sample but also for the male sample and the female sample.

6. Descriptive Statistics

Descriptive statistics for the variables to be used in our econometric analysis for the sample with one or more siblings are shown in Table 1, and as can be seen from this table, 24.0% of respondents live with their elderly parents, 43.6% live near their elderly parents, 25.9% help

their elderly parents with housework, and (though not shown in Table 1) 18.9% provide financial assistance to their elderly parents. Thus, it can be seen that a substantial proportion of Japanese provide some form of care or attention to their elderly parents.

Table 2 shows the impact of bequest expectations on parental care and attention, and as can be seen from this table, respondents are far more likely to provide care and attention to their parents if they expect to receive bequests (or inter vivos transfers) from them, with the difference being especially large in the case of co-residence and help with housework. For example, in the case of both sexes, only 17.75% of respondents live with their elderly parents if they do not expect to receive bequests from them whereas a full 30.60% live with their elderly parents if they do expect to receive bequests from them. Similarly, only 20.47% of respondents help their elderly parents with housework if they do not expect to receive bequests from them whereas a full 31.61% help their parents with housework if they do expect to receive bequests from them. This strongly suggests that the strategic bequest (exchange) motive applies in the case of Japan and that children provide care and attention to their parents in order to increase their share of their parents' bequest.

7. Estimation Results

We present the estimation results in this section. Tables 3-5 present the results for those with one or more siblings whereas Tables 6-8 present the results for those with no siblings (only children). In both cases, the first table shows the results for the full sample (both sexes), the second table shows the results for the male sample, and the third table shows the results for the female sample.

The estimation results are highly satisfactory, in general, as the model's goodness of fit measures show that the percent correctly predicted by the model (with the classification threshold for prediction set to 0.5) ranges from 60.70 to 82.90% in Tables 3-5 and from 65.45 to 80.43% in Tables 6-8, respectively, for various regressions. Similarly, the McFadden's and maximum likelihood pseudo R-squareds range from 0.12 to 0.19 and from 0.14 to 0.16, respectively, in Tables 3-5 and from 0.12 to 0.26 and from 0.15 to 0.30, respectively, in Tables 6-8 in the case of the CORESIDE equation, which is very respectable in regressions based on cross-section micro data. Moreover, visual inspection of the randomized quantile residuals (not shown in the paper due to space limitations) show no pattern and their normal Q-Q plots (also not shown in the paper) show no deviation from normality. We also calculated vector inflation

factors (VIFs) for all variables used in the regressions (also not shown in the paper) to test for the presence of multicollinearity and found that they were less than 2 and usually close to 1 except in the case of MALE and ELDESTSON and that it was less than 3 even in this case, indicating the absence of multicollinearity.

7.1. Estimation Results for Those with One or More Siblings

We first look at the estimation results for the sample of respondents with one or more siblings, which are shown in Tables 3-5. As can be seen from these results, the coefficient of BEQEXP is positive and significant in all 3 equations (except that it is insignificant in the case of the NEARBY equation for females), indicating that those expecting to receive bequests from their elderly parents are more likely to live with or near them and to help them with housework. These results are fully consistent with the results shown in Table 2 (discussed in the previous section) and strongly suggest that the strategic bequest (exchange) motive applies in the case of Japan and that children provide care and attention to their parents in order to extract a larger bequest from them.

The coefficient of NSIB is not significant in any of the 3 equations in the sample with one or more siblings even though our theoretical model predicts a positive impact. However, this result is easily explicable if the two effects discussed in section 5 offset one another completely.

Looking next at the impact of children's altruism toward their parents, the coefficient of CHILDALTRUISM is always positive and significant in the case of the CORESIDE equation, never significant in the case of the NEARBY equation, and positive and significant in 2 out of 3 cases in the case of the HOUSEWORK equation. Thus, altruistic respondents are more likely to live with their elderly parents and to help them with housework but are not necessarily more likely to live near them. This suggests that individuals provide care and attention to their elderly parents partly because they harbor feelings of altruism towards them.

Turning to the impact of variables relating to social norms, the coefficient of ELDESTSON is positive and significant in the CORESIDE and HOUSEWORK equations and insignificant in the NEARBY equation for the full and male samples, indicating that respondents who are eldest sons are more likely to live with their elderly parents and to help their elderly parents with housework, which is consistent with Japanese social norms, as discussed in section 5, but neither more nor less likely to live near their elderly parents.

Similarly, the coefficient of NOBROTHERS is positive and significant in the CORESIDE equation and insignificant in the NEARBY and HOUSEWORK equations for the female sample, indicating that female respondents who have no brothers are more likely to live with their elderly parents, which is consistent with Japanese social norms, as discussed in section 5, but neither more nor less likely to live near their elderly parents or to help them with housework.

The coefficient of MALE is insignificant in the CORESIDE and NEARBY equations and negative and significant in the HOUSEWORK equation for the full sample, indicating that male respondents are less likely to help their elderly parents with housework. This is contrary to our a priori expectation discussed in section 5 but can be explained by the fact that females are typically more adept at housework than males.

Turning to the impact of religiosity, the coefficient of RELIGIOSITY is insignificant in the CORESIDE and HOUSEWORK equations and negative and significant in the NEARBY equation, indicating that respondents who are more religious are less likely to live near their elderly parents. The latter result is contrary to our a priori expectation discussed in section 5 for reasons that are not clear. One possibility is that the parents of religious individuals also tend to be religious and that religious parents are less likely to threaten their children with disinheritance as a way of inducing them to provide care and attention and/or that they are more likely to strive for self-sufficiency so that they do not impose a burden on their children.

Turning to the impact of the other control variables, the coefficient of BOTHALIVE is negative and significant in the CORESIDE equation, positive and significant in the NEARBY equation, and insignificant in the HOUSEWORK equation, indicating that respondents are less likely to live with their elderly parents but more likely to live near their elderly parents (and neither more nor less likely to help their elderly parents with housework) if both of their elderly parents are alive. These results are consistent with the explanation we gave in section 5.

The coefficient of AGEPARENT is negative and significant in all 3 equations for the full and female samples, indicating that respondents are less likely to live with their elderly parents, live near their elderly parents, and help their elderly parents with housework the older their parents are but is negative and significant only in the CORESIDE equation for the male sample. This result is contrary to our a priori expectation given in section 5, but it could arise because we already control for whether or not the respondent's parents require care, meaning that the coefficient of AGEPARENT is picking up the impact of parental age excluding its impact via the likelihood of requiring care.

The coefficient of REQCARE is positive and significant, as expected, in the CORESIDE equation in 2 out of 3 cases but insignificant in the NEARBY and HOUSEWORK equations, indicating that respondents are more likely to live with their elderly parents, as expected, but neither more nor less likely to live near them or to help them with housework if their elderly parents require care.

The coefficient of BOTHREQCARE is not significant in any of the 3 equations, presumably because the two effects discussed in section 5 offset one another completely.

The coefficient of WORK is not significant in any of the 3 equations, indicating that respondents who are working are not any more or less likely to live with their elderly parents, live near their elderly parents, or help their elderly parents with housework.

The coefficient of COLLEGE is negative and significant in all cases in the CORESIDE equation, negative and significant in 2 out of 3 cases in the NEARBY equation, and insignificant in all cases in the HOUSEWORK equation, indicating that respondents who are college graduates are less likely to live with or near their parents. This result is consistent with our a priori expectation discussed in section 5 since the cost of providing care to parents in the form of foregone earnings is greater in the case of better educated individuals.

The coefficient of MARRIED is always negative and significant in the CORESIDE and HOUSEWORK equations and positive and significant in 2 out of 3 cases in the NEARBY equation, indicating that married respondents are less likely to live with their elderly parents and to help their elderly parents with housework but more likely to live near their elderly parents. Since the impact of marriage is ambiguous, as discussed in section 5, it is not surprising that we obtain mixed results.

7.2. Estimation Results for Those with No Siblings

We now turn to the estimation results for the sample of respondents with no siblings (only children), which are shown in Tables 6-8. As can be seen from these results, the coefficient of BEQEXP is not significant in any of the 3 equations, unlike in the case of the sample of respondents with one or more siblings, except that it is positive and significant in the NEARBY equation for the female sample. This is not surprising because our theoretical model does not apply to those with no siblings, who have no need to compete with their siblings for a greater share of their parents' assets. To put it another way, if they are selfish, only children will not

feel the need to provide care and attention to their parents even if they expect to receive bequests from them because they know that they will be able to receive all of their parents' assets whether or not they provide care and attention to them. The fact that the coefficient of BEQEXP is dramatically different in the sample with one or more siblings and the sample with no siblings is strong evidence in favor of our theoretical model.

Looking next at the impact of children's altruism toward their parents, the coefficient of CHILDALTRUISM is positive and significant in 1 out of 3 cases in the CORESIDE equation and in all cases in the NEARBY equation but insignificant in all cases in the HOUSEWORK equation, indicating that altruistic respondents are more likely to live near their elderly parents and perhaps to live with their elderly parents but not to help their elderly parents with housework. These results contrast with the results for the sample of respondents with one or more siblings, which showed that the coefficient of CHILDALTRUISM is positive and significant in the CORESIDE and HOUSEWORK equations but not in the NEARBY equation. However, the 2 sets of results are mutually consistent in the sense that they show that individuals with a strong sense of altruism toward their parents are more likely to provide care and attention of one kind or another to their elderly parents.

We could not include the variables relating to social norms in the regression equation in the case of the sample of respondents with no siblings because they require the presence of 1 or more siblings.

Turning to the impact of religiosity, the coefficient of RELIGIOSITY was not significant in the CORESIDE and HOUSEWORK equations and was significant with the wrong sign (negative) in the NEARBY equation in the case of the sample of respondents with one or more siblings, but it is now positive and significant in 2 out of 3 cases in the CORESIDE and NEARBY equations and insignificant in all cases in the HOUSEWORK equation, indicating that religious respondents are more likely to live with or near their elderly parents, as expected.

Turning to the impact of the other control variables and focusing on the ones that have significant coefficients, the coefficient of BOTHALIVE is negative and significant in the CORESIDE equation and positive and significant in the NEARBY equation (except for the female sample), as in the case of the sample of respondents with one or more siblings.

The coefficient of WORK was never significant in the sample of respondents with one or more siblings, but it is now positive and significant in the NEARBY and HOUSEWORK equations

(except for the male sample), contrary to expectation, and always insignificant in the CORESIDE equation for reasons that are not clear.

Finally, the coefficient of MARRIED is negative and significant in 2 out of 3 cases in the CORESIDE equation, positive and significant in all cases in the NEARBY equation, and negative and significant in 2 out of 3 cases in the HOUSEWORK equation, and thus the results are broadly consistent with the results for the sample of respondents with one or more siblings.

7.3. Estimation Results for Our Analysis of Respondents' Co-residence Behavior with Their Children

Whereas we have thus far examined the determinants of whether or not respondents live with (or near) their elderly parents and/or provide care and attention to them, we also conducted an analysis of the determinants of whether or not elderly respondents live with their children and found that elderly respondents planning to leave bequests are significantly more likely to live with their children than elderly respondents not planning to leave bequests (these results are not shown due to space limitations but are available from the authors upon request). These results constitute further corroboration of our finding that care behavior in Japan is motivated by strategic considerations and that the strategic bequest (exchange) motive applies in the case of Japan.

8. Conclusions

In this paper, we test a two-period strategic-interactions overlapping generations model with endogenous saving and a "contest success function" of why individuals provide care and attention to their elderly parents using a using micro data from a Japanese household survey, the Osaka University Preference Parameter Study. To summarize our main findings, we found that the Japanese are more likely to live with (or near) their elderly parents and/or to provide care and attention to them if they expect to receive a bequest from them, which constitutes strong support for the selfish bequest (exchange) motive, but we found that their caregiving behavior is also heavily influenced by the strength of their altruism towards their parents and social norms. Our findings are broadly consistent with previous studies for Japan, which find that the strategic bequest (exchange) motive applies in Japan (much more so than in the United States) and show that the finding of previous studies holds up even if we consider a broader range of

care/attention variables, use direct data on bequest expectations, and control for other variables such as the strength of children's altruism toward their parents, social norms, and religiosity.

Turning to the implications of our findings, our finding that individuals are more likely to provide care and attention to their parents if they expect to receive bequests from them suggests that they are selfishly motivated in their interactions with their parents although this does not preclude the possibility that parents are (at least partly) altruistically motivated in their interactions with their children (as assumed in our theoretical model). Another implication of our findings is that parents who are willing and able to leave large bequests to their children can induce their children to provide care and attention, but conversely, that parents who are either unwilling or unable to leave large bequests to their children will not be able to induce their children to provide care and attention. This, in turn, implies that poor parents will require public assistance with care during old age because they will not have enough assets to hire third parties to provide care or to induce their own children to provide care. Japanese social norms will alleviate these problems to some extent because they will induce individuals to provide care and attention to their parents even if they do not expect to receive large bequests from their parents, but the need for public long-term care insurance will increase over time to the extent that social norms weaken over time.

Most societies have various obstacles that interfere with leaving bequests, making exchanges within families, providing informal (family) care of the elderly, and preserving social norms. One example of such an obstacle is Japan's public long-term care insurance system, which, unlike Germany's system, covers care provided by professional care workers but not care provided by family members (i.e., there is no provision for cash benefits for within-family care). The government should remove all such obstacles to intergenerational exchanges that facilitate elderly care since this will help societies to deal with the problems of population aging and elderly care and alleviate the strain on public resources that otherwise might be used as a substitute for private care.

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Table 1: Descriptive Statistics for Sample with 1 or More Siblings					
Variable name	Mean	Std. dev.	Minimum	Maximum	No. of obs.
CARE1	0.2400	0.4270	0	1	1639
CARE2	0.4360	0.4960	0	1	1639
CARE3	0.2590	0.4380	0	1	1639
BEQEXP	0.484	0.500	0	1	1639
NSIB	1.698	0.883	1	7	1639
CHILDALTRUISM	0.0846	0.0692	0	0.25	1639
ELDESTSON	0.328	0.469	0	1	1639
NOBROTHERS	0.353	0.478	0	1	883
MALE	0.461	0.499	0	1	1639
RELIGIOSITY	1.593	0.975	1	5	1639
BOTHALIVE	0.4750	0.5000	0	1	1639
AGEPARENT	76.23	8.74	60	99	1639
REQCARE	0.21	0.41	0	1	1639
BOTHREQCARE	0.0683	0.2524	0	1	1639
WORK	0.8170	0.3868	0	1	1639
COLLEGE	0.4910	0.5000	0	1	1639
MARRIED	0.8462	0.3608	0	1	1639
Notes: Refer to the main text for variable definitions. The NOBROTHERS variable was used only in the female sample.					
Data source: The Osaka University Preference Parameter Study for Japan, 2011 wave except that the data on CHILDALTRUISM were taken from the 2010 wave.					

Table 2: Impact of Bequest Expectations on Parental Care/Attention				
Type of care/attention	Respondents not expecting bequests	Respondents expecting bequests	Full sample	Sample size
Both sexes				
Co-reside	17.75	30.60	23.98	1639
Live nearby	40.71	46.60	43.56	1639
Help with housework	20.47	31.61	25.87	1639
Males				
Co-reside	26.40	35.94	31.88	756
Live nearby	36.34	44.47	41.01	756
Help with housework	19.25	29.03	24.87	756
Females				
Co-reside	12.43	24.17	17.21	883
Live nearby	43.40	49.17	45.75	883
Help with housework	21.22	34.72	26.73	883
Notes: The figures show the proportion of respondents providing each type of care/attention to their parents (in percent). The figures are for the sample with 1 or more siblings.				
Data source: The Osaka University Preference Parameter Study for Japan, 2011 wave.				

Table 3: Determinants of Care and Attention (Both Sexes, 1 or More Siblings)						
Explanatory variable	Dependent variable					
	CORESIDE		NEARBY		HOUSEWORK	
BEQEXP	0.0968	***	0.0675	***	0.1041	***
	(4.7131)		(2.6638)		(4.6386)	
NSIB	-0.0024		-0.0025		0.0086	
	(-0.2064)		(-0.1683)		(0.6678)	
CHILDALTRUISM	0.5976	***	-0.2865		0.4589	***
	(4.5085)		(-1.6017)		(3.0726)	
ELDESTSON	0.1460	***	-0.0528		0.0980	**
	(4.0844)		(-1.3066)		(2.5715)	
MALE	0.0175		-0.0065		-0.1033	***
	(0.5634)		(-0.1710)		(-3.1420)	
RELIGIOSITY	0.0045		-0.0335	***	0.0037	
	(0.4654)		(-2.6655)		(0.3391)	
BOTHALIVE	-0.0898	***	0.1386	***	0.0374	
	(-4.3532)		(5.0786)		(1.5970)	
AGEPARENT	-0.0054	***	-0.0035	**	-0.0031	**
	(-4.0514)		(-2.1027)		(-2.1477)	
REQCARE	0.0700	**	-0.0022		0.0532	
	(2.1821)		(-0.0574)		(1.4720)	
BOTHREQCARE	-0.0599		-0.0278		-0.0126	
	(-1.5757)		(-0.4823)		(-0.2584)	
WORK	0.0025		0.0113		-0.0036	
	(0.0947)		(0.3345)		(-0.1217)	
COLLEGE	-0.0796	***	-0.0498	**	-0.0332	
	(-3.9900)		(-2.0004)		(-1.5073)	
MARRIED	-0.3034	***	0.0557	*	-0.2160	***
	(-9.0574)		(1.7134)		(-6.4761)	
Number of observations	1639		1639		1639	
Goodness of fit measures of the fitted probit model						
Percent correctly predicted	78.22%		60.70%		75.05%	
Log likelihood value of the model	-757.03		-1082.00		-878.02	
McFadden's pseudo R-squared	0.16		0.04		0.06	
Maximum likelihood pseudo R-squared	0.16		0.05		0.07	
Notes: The regressions are estimated using probit. The upper figures denote marginal effects, which are calculated from average partial effects; the lower figures in parentheses denote z-statistics. *, **, and *** denote significance levels of 10%, 5%, and 1%, respectively. The classification threshold for prediction is set to 0.5.						
Data source: The Osaka University Preference Parameter Study for Japan, 2011 wave.						

Table 4: Determinants of Care and Attention (Males, 1 or More Siblings)						
Explanatory variable	Dependent variable					
	CORESIDE		NEARBY		HOUSEWORK	
BEQEXP	0.0819	**	0.0986	***	0.0838	***
	(2.4719)		(2.6397)		(2.5867)	
NSIB	0.0068		0.0265		0.0249	
	(0.3284)		(1.1703)		(1.3530)	
CHILDALTRUISM	0.5791	***	-0.2162		0.2022	
	(2.8524)		(-0.9076)		(1.0296)	
ELDESTSON	0.1728	***	-0.0497		0.1062	***
	(5.1615)		(-1.1783)		(3.2582)	
RELIGIOSITY	0.0138		-0.0386	**	0.0087	
	(0.8138)		(-1.9845)		(0.5159)	
BOTHALIVE	-0.0978	***	0.1058	***	0.0286	
	(-2.7597)		(2.6122)		(0.7995)	
AGEPARENT	-0.0041	*	-0.0032		-0.0011	
	(-1.8289)		(-1.2927)		(-0.5117)	
REQCARE	0.0496		0.0014		0.0491	
	(0.9996)		(0.0243)		(0.9841)	
BOTHREQCARE	-0.0503		-0.0223		-0.0174	
	(-0.7006)		(-0.2548)		(-0.2420)	
WORK	-0.0351		-0.1116		-0.0079	
	(-0.5256)		(-1.3642)		(-0.1135)	
COLLEGE	-0.1261	***	-0.0183		-0.0407	
	(-3.7901)		(-0.4905)		(-1.2277)	
MARRIED	-0.2877	***	0.0431		-0.2700	***
	(-5.3421)		(0.8745)		(-5.0065)	
Number of observations	756		756		756	
Goodness of fit measures of the fitted probit model						
Percent correctly predicted	71.69%		61.24%		74.07%	
Log likelihood value of the model	-416.23		-497.36		-393.10	
McFadden's pseudo R-squared	0.12		0.03		0.07	
Maximum likelihood pseudo R-squared	0.14		0.04		0.08	
Notes: The regressions are estimated using probit. The upper figures denote marginal effects, which are calculated from average partial effects; the lower figures in parentheses denote z-statistics. *, **, and *** denote significance levels of 10%, 5%, and 1%, respectively. The classification threshold for prediction is set to 0.5.						
Data source: The Osaka University Preference Parameter Study for Japan, 2011 wave.						

Table 5: Determinants of Care and Attention (Females, 1 or More Siblings)						
Explanatory variable	Dependent variable					
	CORESIDE		NEARBY		HOUSEWORK	
BEQEXP	0.0957	***	0.0459		0.1168	***
	(3.9270)		(1.3266)		(3.7659)	
NSIB	-0.0036		-0.0298		-0.0051	
	(-0.2522)		(-1.4897)		(-0.2590)	
CHILDALTRUISM	0.6009	***	-0.4092		0.7259	***
	(3.5284)		(-1.4831)		(3.2288)	
NOBROTHERS	0.0599	**	0.0047		0.0136	
	(2.3372)		(0.1312)		(0.4300)	
RELIGIOSITY	-0.0005		-0.0291	*	0.0020	
	(-0.0455)		(-1.7731)		(0.1380)	
BOTHALIVE	-0.0777	***	0.1681	***	0.0495	
	(-3.2792)		(4.5590)		(1.6001)	
AGEPARENT	-0.0065	***	-0.0045	**	-0.0045	**
	(-4.0321)		(-1.9912)		(-2.2652)	
REQCARE	0.0804	*	-0.0079		0.0474	
	(1.9095)		(-0.1538)		(0.9201)	
BOTHREQCARE	-0.0614		-0.0260		-0.0035	
	(-1.5516)		(-0.3418)		(-0.0535)	
WORK	0.0061		0.0369		0.0034	
	(0.2306)		(0.9968)		(0.1022)	
COLLEGE	-0.0461	*	-0.0793	**	-0.0291	
	(-1.9129)		(-2.3636)		(-0.9838)	
MARRIED	-0.3113	***	0.0802	*	-0.1747	***
	(-7.2623)		(1.8518)		(-4.1144)	
Number of observations	883		883		883	
Goodness of fit measures of the fitted probit model						
Percent correctly predicted	82.90%		61.27%		75.20%	
Log likelihood value of the model	-330.15		-578.05		-479.09	
McFadden's pseudo R-squared	0.19		0.05		0.07	
Maximum likelihood pseudo R-squared	0.16		0.07		0.07	
Notes: The regressions are estimated using probit. The upper figures denote marginal effects, which are calculated from average partial effects; the lower figures in parentheses denote z-statistics. *, **, and *** denote significance levels of 10%, 5%, and 1%, respectively. The classification threshold for prediction is set to 0.5.						
Data source: The Osaka University Preference Parameter Study for Japan, 2011 wave.						

Table 6: Determinants of Care and Attention (Both Sexes, No Siblings)						
Explanatory variable	Dependent variable					
	CORESIDE		NEARBY		HOUSEWORK	
BEQEXP	0.0150		0.0204		0.0567	
	(0.1729)		(0.2043)		(0.5926)	
CHILDALTRUISM	0.8213		2.1800	***	0.9211	
	(1.2916)		(3.2046)		(1.2356)	
MALE	-0.0006		-0.0866		-0.1229	
	(-0.0061)		(-0.9237)		(-1.2504)	
RELIGIOSITY	0.0645	*	0.0763	*	0.0075	
	(1.8337)		(1.9215)		(0.1629)	
BOTHALIVE	-0.1984	**	0.2275	**	0.1686	
	(-2.0661)		(2.3281)		(1.5864)	
AGEPARENT	0.0047		0.0029		0.0055	
	(0.7181)		(0.4140)		(0.7833)	
REQCARE	-0.0711		-0.1217		0.0024	
	(-0.7440)		(-0.9623)		(0.0191)	
BOTHREQCARE	0.3978	**	0.2199		0.0639	
	(2.1764)		(1.3179)		(0.2694)	
WORK	0.1558		0.2537	**	0.2727	***
	(1.6134)		(2.2099)		(2.8877)	
COLLEGE	-0.0237		-0.1212		-0.1275	
	(-0.2763)		(-1.3494)		(-1.4825)	
MARRIED	-0.4593	***	0.2292	**	-0.2572	*
	(-3.9391)		(2.2977)		(-1.9112)	
Number of observations	101		101		101	
Goodness of fit measures of the fitted probit model						
Percent correctly predicted	68.32%		72.28%		68.32%	
Log likelihood value of the model	-53.83		-56.46		-58.12	
McFadden's pseudo R-squared	0.20		0.18		0.14	
Maximum likelihood pseudo R-squared	0.24		0.22		0.17	
Notes: The regressions are estimated using probit. The upper figures denote marginal effects, which are calculated from average partial effects; the lower figures in parentheses denote z-statistics. *, **, and *** denote significance levels of 10%, 5%, and 1%, respectively. The classification threshold for prediction is set to 0.5.						
Data source: The Osaka University Preference Parameter Study for Japan, 2011 wave.						

Table 7: Determinants of Care and Attention (Males, No Siblings)						
Explanatory variable	Dependent variable					
	CORESIDE		NEARBY		HOUSEWORK	
BEQEXP	0.1309		-0.1599		0.0905	
	(0.9706)		(-1.4369)		(0.6568)	
CHILDALTRUISM	0.6946		1.4808	**	0.8456	
	(0.7351)		(2.4018)		(0.7372)	
RELIGIOSITY	0.0340		0.1284	**	0.0135	
	(0.7609)		(2.5457)		(0.2449)	
BOTHALIVE	-0.2743	**	0.3373	***	0.2702	*
	(-2.1013)		(2.8878)		(1.9212)	
WORK	-0.0758		-0.0026		0.0266	
	(-0.3481)		(-0.0118)		(0.1589)	
MARRIED	-0.2661		0.4632	***	-0.0177	
	(-0.8720)		(7.3696)		(-0.0823)	
Number of observations	46		46		46	
Goodness of fit measures of the fitted probit model						
Percent correctly predicted	73.91%		80.43%		73.91%	
Log likelihood value of the model	-26.09		-21.41		-26.49	
McFadden's pseudo R-squared	0.12		0.32		0.09	
Maximum likelihood pseudo R-squared	0.15		0.35		0.11	
Notes: The regressions are estimated using probit. The upper figures denote marginal effects, which are calculated from average partial effects; the lower figures in parentheses denote z-statistics. *, **, and *** denote significance levels of 10%, 5%, and 1%, respectively. The classification threshold for prediction is set to 0.5.						
Data source: The Osaka University Preference Parameter Study for Japan, 2011 wave.						

Table 8: Determinants of Care and Attention (Females, No Siblings)						
Explanatory variable	Dependent variable					
	CORESIDE		NEARBY		HOUSEWORK	
BEQEXP	-0.1027		0.2561	**	0.0510	
	(-0.7796)		(2.1255)		(0.3911)	
CHILDALTRUISM	2.0044	**	1.9199	*	0.8202	
	(2.2827)		(1.9507)		(0.9033)	
RELIGIOSITY	0.1067	**	0.0265		-0.0057	
	(2.1325)		(0.3778)		(-0.0768)	
BOTHALIVE	-0.1080		0.0651		-0.0470	
	(-0.8801)		(0.5100)		(-0.4018)	
WORK	0.1317		0.3354	***	0.3401	**
	(0.8862)		(2.8863)		(2.3997)	
MARRIED	-0.4508	***	0.2191	*	-0.2994	**
	(-3.6695)		(1.8403)		(-2.0157)	
Number of observations	55		55		55	
Goodness of fit measures of the fitted probit model						
Percent correctly predicted	74.55%		65.45%		69.09%	
Log likelihood value of the model	-27.65		-31.61		-30.98	
McFadden's pseudo R-squared	0.26		0.15		0.18	
Maximum likelihood pseudo R-squared	0.30		0.19		0.22	
Notes: The regressions are estimated using probit. The upper figures denote marginal effects, which are calculated from average partial effects; the lower figures in parentheses denote z-statistics. *, **, and *** denote significance levels of 10%, 5%, and 1%, respectively. The classification threshold for prediction is set to 0.5.						
Data source: The Osaka University Preference Parameter Study for Japan, 2011 wave.						

Endnotes

[i] The implications of this result are far-reaching and can be extended to obtain neutrality with respect to public redistributions, distortionary taxes, and market prices (Bernheim and Bagwell, 1988).

[ii] Angelini (2009) replicates Bernheim, et al.'s (1985) study for eleven European countries using data from the Survey of Health, Ageing and Retirement in Europe (SHARE) and finds that parental wealth (total wealth and real wealth but not financial wealth) has a positive and significant impact on the frequency of contact, which is consistent with the strategic bequest (exchange) motive.

[iii] Niimi (2015) finds empirical support for the strategic bequest (exchange) motive using an entirely different approach. She finds that having to provide care to their parents lowers the subjective well-being of unmarried children in Japan but that the negative impact of parental care on their subjective well-being is significantly reduced if they receive inter vivos transfers from their parents.