ECONSTOR
Make Your Publications Visible.

A Service of
ZBW
Leibniz-Informationszentrum Wirtschaft
Leibniz Information Centre for Economics

Horioka, Charles; Gahramanov, Emin; Hayat, Aziz; Tang, Xueli

Working Paper

Why do children take care of their elderly parents? Are the Japanese any different?

ADBI Working Paper, No. 739

Provided in Cooperation with:
Asian Development Bank Institute (ADBI), Tokyo

Suggested Citation: Horioka, Charles; Gahramanov, Emin; Hayat, Aziz; Tang, Xueli (2017) : Why do children take care of their elderly parents? Are the Japanese any different?, ADBI Working Paper, No. 739, Asian Development Bank Institute (ADBI), Tokyo

This Version is available at:
https://hdl.handle.net/10419/163238

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

https://creativecommons.org/licenses/by-nc-nd/3.0/igo/

WWW.ECONSTOR.EU

Mitglied der Leibniz-Gemeinschaft

ADBI Working Paper Series

WHY DO CHILDREN TAKE CARE OF THEIR ELDERLY PARENTS? ARE THE JAPANESE ANY DIFFERENT?

Charles Yuji Horioka,
Emin Gahramanov,
Aziz Hayat, and Xueli Tang

No. 739
May 2017

Asian Development Bank Institute

Charles Yuji Horioka is vice president and research professor at the Asian Growth Research Institute, Kitakyushu, Japan. Emin Gahramanov is associate professor at the American University of Sharjah, Sharjah, United Arab Emirates. Aziz Hayat and Xueli Tang are senior lecturers at Deakin University, Melbourne Burwood Campus, Burwood, Australia.

The views expressed in this paper are the views of the author and do not necessarily reflect the views or policies of ADBI, ADB, its Board of Directors, or the governments they represent. ADBI does not guarantee the accuracy of the data included in this paper and accepts no responsibility for any consequences of their use. Terminology used may not necessarily be consistent with ADB official terms.

Working papers are subject to formal revision and correction before they are finalized and considered published.

The Working Paper series is a continuation of the formerly named Discussion Paper series; the numbering of the papers continued without interruption or change. ADBI's working papers reflect initial ideas on a topic and are posted online for discussion. ADBI encourages readers to post their comments on the main page for each working paper (given in the citation below). Some working papers may develop into other forms of publication.

Suggested citation:

Horioka, C. Y., E. Gahramanov, A. Hayat, and X. Tang. 2017. Why Do Children Take Care of Their Elderly Parents? Are the Japanese Any Different?. ADBI Working Paper 739. Tokyo: Asian Development Bank Institute. Available: https://www.adb.org/publications/why-do-children-take-care-their-elderly-parents-japanese-any-different

Please contact the authors for information about this paper.

Email: horioka@agi.or.jp

This research uses microdata from the Preference Parameters Study of Osaka University's 21st Century Center of Excellence (COE) Program "Behavioral Macrodynamics Based on Surveys and Experiments" and its Global Center of Excellence (COE) project "Human Behavior and Socioeconomic Dynamics." We acknowledge the program's contributors, Yoshiro Tsutsui, Fumio Ohtake, and Shinsuke Ikeda. The authors are indebted to the Editor Harold L. Cole, Axel Börsch-Supan, Chantal Herberholz, Christine Ho, Colin McKenzie, Oleksandr Movshuk, Edward Norton, Ching-jen Sun, two anonymous referees, participants of a seminar held at the American University of Sharjah, the 57th Annual Conference of the Italian Economic Association, the 15th International Convention of the East Asian Economic Association, and the Asian Development Bank Institute-Asian Growth Research Institute Joint Workshop on Aging in Asia, and especially Yoko Niimi, for their helpful comments and discussions. This work was financially supported by Japan Society for the Promotion of Science (JSPS) KAKENHI Grant Number 15H01950, an Asian Growth Research Institute project grant, and a grant from the MEXT Joint Usage/Research Center of the Institute of Social and Economic Research, Osaka University. Any remaining errors are the authors'.

Forthcoming in *International Economic Review* (manuscript received May 2016; revised October 2016).

Asian Development Bank Institute
Kasumigaseki Building, 8th Floor
3-2-5 Kasumigaseki, Chiyoda-ku
Tokyo 100-6008, Japan

Tel: +81-3-3593-5500
Fax: +81-3-3593-5571
URL: www.adbi.org
E-mail: info@adbi.org

© 2017 Asian Development Bank Institute

Abstract

We conduct a theoretical and empirical analysis of why children live with (or near) their parents and provide care and assistance to them using microdata from a Japanese household survey, the Osaka University Preference Parameter Study. 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 strategic bequest motive, but that their caregiving behavior is also heavily influenced by the strength of their altruism toward their parents and social norms.

Keywords: bequests, caregiving, co-residence, elderly care, exchange motive, intergenerational transfers, Japan, parental care, parent-child relations, selfish bequest motive, strategic bequest motive

JEL Classification: D12, D64, D91, E21, J14

Contents

1. INTRODUCTION 1

2. AN ALTRUISTIC-STRATEGIC BEQUEST MODEL WITH SIBLING RIVALRY AND ENDOGENOUS SAVING 2

3. SURVEY OF PREVIOUS EMPIRICAL STUDIES 7

4. ESTIMATION MODEL 9

5. DATA SOURCE AND SAMPLE SELECTION CRITERIA 12

6. DESCRIPTIVE STATISTICS 13

7. ESTIMATION RESULTS 15

7.1 Estimation Results for Those with One or More Siblings 18
7.2 Estimation Results for Those with No Siblings 21
7.3 Estimation Results for Our Analysis of Respondents' Co-residence Behavior with Their Children 25

8. CONCLUSIONS 25

REFERENCES 27

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 selfish/strategic bequest motive or the exchange motive)? Is it out of love (the altruism model)? Or is it because they are adhering to the social norms of the society in which they live? In this paper, we conduct a theoretical and empirical analysis of why children live with (or near) their parents and provide care and assistance to them using microdata from a Japanese household survey, the Osaka University Preference Parameter Study.

This is an exceedingly important research topic because it sheds light on one of the key issues in economics (whether individuals 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, their populations age, and the burden of elderly care increases relentlessly.

We start by constructing a theoretical model of intra-family (intergenerational) interactions between parents who use bequests to manipulate their children into providing care and attention during old age and children who use care and attention to strategically influence their parents' bequest decisions. Our model builds on recent theoretical contributions but is unique and improves upon existing models by endogenizing saving and using a contest success function to model the rivalry among siblings for parental bequests. It shows, among other things, that a greater number of siblings will lead to a more intense competition among siblings and thereby to a higher level of care and attention per child, and that a higher degree of parental altruism will, not surprisingly, lead to larger bequests and a higher level of care and attention from children.

Turning to the empirical analysis conducted in this paper, it makes an original contribution in at least four 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, etc.) 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 the first study to take explicit account of the strength of children's altruism toward their parents, social norms, and religiosity in the context of our research setting.

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/strategic 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.

Turning to the policy implications of our analysis, whether intra-family interactions 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; Becker 1974).[1] 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 because there will not be an offsetting increase in bequests (Cox 1987; Juarez 2009). In fact, 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 SIBLING RIVALRY AND ENDOGENOUS SAVING

In this section, we construct a theoretical model of intra-family (intergenerational) interactions between parents who use bequests to manipulate their children into providing care and attention during old age and children who use care and attention to strategically influence their parents' bequest decisions. Our model is a two-period overlapping-generations model with 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. It builds on recent theoretical contributions but improves upon existing models by being the first to endogenize saving and the first after Chang and Weisman (2005), Chang (2009, 2012), and Chang and Luo (2015) to use a contest success function to model the rivalry among siblings for parental bequests.

Most theoretical studies (for example, Abel and Warshawsky 1988; Becker 1991) focus exclusively on either altruistic or selfish/strategic 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.

Consistently with the general spirit of the seminal study by Bernheim, Shleifer, and Summers (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. 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. However, along with sibling rivalry for bequests, we also incorporate

[1] 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).

parents' purely altruistic feelings towards their children as well as their desire to save for their own retirement.

One of the unique features of our model is the assumption that saving is chosen endogenously. An abundance of literature on the determinants of household saving has not resulted in a conclusive agreement as to why people save. Many notable studies highlight the role of the bequest motive (see, for example, Kotlikoff and Summers 1981; Ameriks et al. 2011; Kopczuk and Lupton 2007) as a driving force behind saving behavior. Bernheim (1991), for example, argues that "a significant fraction of total saving is motivated by the desire to leave bequests." Although a multitude of other factors can (and perhaps do) contribute to our understanding of household saving, it is clearly the case that in an environment where the bequest motive is central to the analysis (like ours), endogenous saving is a reasonable and strong mechanism for realizing parents' transfer decisions. It is further justified given the traditionally strong life cycle saving motives observed in Japan in recent decades (see, for example, Horioka and Watanabe 1997). Combining the endogenous saving decision with endogenously determined strategic interactions is also important given the multitude of evidence that altruistic motives alone do not fully explain parental transfers (see, for example, Wilhelm 1996; Horioka 2014). This is why we 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 an overlapping-generations setting, presented as a two-stage noncooperative 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, Kessler, and Pestieau (1992), we ignore the individual's utility while a dependent child.

The individual's 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. The superscript i denotes individual (child) i, where $i = 1, \dots, n$.) 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.

Similarly 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. We would like to emphasize that, despite considerable evidence of intergenerational conflict and rivalry among children, the literature on family transfers mostly ignores the issue of sibling rivalry for parental transfers (see, for example, Buchanan 1983; Chang 2009; and the many excellent references therein). As developed in Chang and Weisman (2005) and Chang (2009), in close parallel to the traditional literature on rent seeking (Tullock 1980; Skaperdas 1996), the CSF is a convenient and straightforward way of modeling children as "transfer seekers" within a strategic intergenerational and intragenerational interactions setting.[2] That is, given parents' wish to allocate financial

[2] Note that our paper differs from Chang and Weisman (2005) and Chang (2009) in that it makes a more realistic assumption about the behavior of children (it assumes that both parents and children maximize lifetime utility whereas Chang and Weisman (2005) and Chang (2009) assume that parents maximize lifetime utility while children maximize income). This difference in assumptions makes a significant

wealth within their families while also enjoying some care and attention from their offspring, a CSF enables us to model children's desire to engage in sibling rivalry for parental transfers.

Thus, the transfer share of child i, denoted by A_{1t}^{i}, is defined as follows:

$$A_{1t}^{i} \equiv \frac{a_{1t}^{i}}{a_{1t}^{i} + \sum_{k} a_{1t}^{k}} \tag{1}$$

where $k = 1, \dots, n$, 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 noncooperatively 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 equal to unity.

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

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

where parameter $0 < \beta < 1$ denotes the weight the parent places on the total welfare of her children and thus can be interpreted as the parent's degree of altruism toward 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

difference in the results, with Chang and Weisman (2005) and Chang (2009) and us obtaining diametrically opposed results regarding the impact of the number of siblings on the equilibrium amount of care and attention and on the equilibrium bequest level.

that they may involve, among other things, behavioral control that may hinder the child's independence (for example, 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 aging parents can be very stressful and can lower the subjective well-being of children, as found by Niimi (2016) using Japanese data.

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

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

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

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 $i = 1, \dots, n$. We thus make these substitutions into (3) and (4), which allows us to obtain the following expressions:

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

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

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 problem. 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 problem is simply $1/n$. Therefore, the retired parent's optimization problem is as follows:

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

where B_{2t} is the total amount of bequests 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:

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

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, only 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 equation (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:

$$s_{1t-1} = \frac{(1+r)(B_{2t-1}+nw\varphi)+B_{2t}n}{2nw\varphi(1+r)} \tag{9}$$

in place of s_{1t-1} (see equation (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 equal 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 $B_{2t} = B_{2t+1} = B^*$:

$$a^* = \frac{2\big(\beta - 1 + r(n+\beta-1)\big)}{n(1+r)(1-\beta)} \tag{10}$$

The following comparative statics results can be straightforwardly established:

$$\frac{\partial a^*}{\partial \beta} = \frac{2r}{(1+r)(\beta-1)^2} > 0 \tag{11}$$

$$\frac{\partial a^*}{\partial n} = \frac{2}{n^2} > 0 \tag{12}$$

Equation (11) arises because greater altruism leads to a greater bequest amount, thereby increasing the reward for providing care and attention to parents. Equation (12) shows that children's time contribution towards their parents increases with the number of siblings because an increased number of contestants intensifies the Nash equilibrium competition level.

To summarize, the main implications of our theoretical model are that an increase in the amount of expected bequests as well as an increase in the number of siblings will increase the amount of care/attention that elderly parents receive from their children (see equations (6) and (12)).

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, but the evidence is mixed, with some studies finding that children are motivated by selfish or strategic considerations (i.e., they care for their parents with the expectation of receiving a larger bequest) and some finding that they are motivated by altruistic considerations (i.e., they care for their parents out of love) (see Arrondel and Masson 2006, Laferrere and Wolff 2006, Horioka 2014, and Norton 2017 for useful surveys of this literature).

Looking first at studies that use data for the United States, many studies 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, Irvine, and Vandevelde (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, Shleifer, and Summers (1985), which finds, using data for the United States 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 nonbequeathable 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, Shleifer, and Summers'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, and Sloan, Picone, and Hoerger (1997), Altonji, Hayashi, and Kotlikoff (2000), and Ioannides and Kan (2000) obtain similar results (but see Cox 1987, Cox and Rank 1992, Altonji, Hayashi, and Kotlikoff 1997, Norton and Taylor 2005, and Norton and Van Houtven 2006).

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 data for the United States find support for the altruism model or reject the selfish exchange model, whereas the results for European countries are more mixed.[3]

Turning to studies that use Japanese data, Ohtake (1991), Ohtake and Horioka (1994), Komamura (1994), and Johar, Maruyama, and Nakamura (2015) find that parental wealth has a positive and significant impact on financial support from children to parents and/or parent-child co-residence. Similarly, Yamada (2006) finds that bequest expectations and experience have a positive and significant impact on parent-child co-residence, parent-child distance, and the frequency of parent-child contact, and Kohara and Ohtake (2011) find that children provide more time transfers (care) to parents with more wealth (proxied by parents' educational attainment).[4]

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 the United States and Japan in 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 of 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, Maruyama, and Nakamura (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, Silverstein, and Lowenstein (2009) find that religious children are more likely to provide care to their aged parents, which confirms the importance of religiosity.

To summarize, past studies on the impact of bequests on the care of elderly parents by their children have been inconclusive with respect to whether altruistic or selfish/strategic motives are more important. Much of the literature has focused on the United States, and few studies have analyzed the impact of social norms and religiosity

[3] Angelini (2009) replicates Bernheim, Shleifer, and Summer's (1985) study for 11 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.

[4] Niimi (2016) 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.

on the care of elderly parents by their children. The empirical analysis in this paper fills these gaps by focusing on Japan and examining the impact of social norms and religiosity on the care of elderly parents by their children.

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 and/or their spouses to their parents, so we use the following three dependent variables:

> CORESIDE = 1 if the respondent and/or his/her spouse lives with his/her parents and 0 otherwise
>
> NEARBY = 1 if the respondent and/or his/her spouse lives near his/her parents and 0 otherwise
>
> HOUSEWORK = 1 if the respondent and/or his/her spouse assists his/her parents with housework and 0 otherwise

The survey we used also collects information on whether the respondent and/or his/her spouse 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 explanatory variables deriving from our theoretical model 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, which 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 (see equation (6)). 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)

According to our theoretical model, an individual who has more siblings would be expected to provide more care to his/her parents because he/she has more rivals to compete with for his/her parents' bequest (see equation (12)). Thus, the expected sign of the coefficient of NSIB is positive.

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 got 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 in 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.[5]

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.

[5] Note, however, that social norms and economic forces are inextricably linked. For example, sons, especially eldest sons, may live with, and provide care to, their parents because that is the social norm in Japan, but another social norm in Japan is that sons, especially eldest sons, receive a larger share of their parents' bequest, and thus they get something out of adhering to social norms and may choose to adhere to social norms for selfish economic reasons (see also Horioka 2016). We are grateful to an anonymous referee for this important point.

We also include a control variable pertaining to religiosity as at least one previous study (Gans, Silverstein, and Lowenstein 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 individual 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 are alive and require 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 the 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.

It is important to control for the wealth of parents because selfishly motivated children will obviously be more eager to provide care to their parents if their parents are wealthier, which means a larger potential bequest. Unfortunately, the data source we used does not contain any direct information on parental wealth, so following Kohara and Ohtake (2011) and Niimi and Horioka (2016), we tried using the educational attainment of the respondent's father as a proxy for parental wealth. However, the coefficient of this variable was never significant and including it did not cause any appreciable changes in any of the other coefficients. Therefore, we dropped this variable from our final specification.

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 Japanese survey of 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 four countries (the People's Republic of China, India, Japan, and the United States) by the 21st Century Center of Excellence 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.

We chose to use data from this survey because it contains detailed information on the variables we need for our analysis including whether or not respondents live with or near their parents, whether or not respondents provide help with housework or nursing care or provide financial assistance to their parents, the number of siblings respondents have, whether or not respondents expect to receive bequests or *inter vivos* transfers from their parents, whether or not respondents' parents are alive, whether or not respondents' parents require care, the degree of altruism of respondents, and other attributes of respondents, their spouses, their children, and their parents. It is thus ideally suited to the objective of this paper.

The Japanese survey surveyed a nationwide random sample of individuals of both sexes aged 20 to 69 every year from 2003 until 2013. We used data from the 2011 wave of this survey (except that data on the CHILDALTRUISM variable were taken from the 2010 wave of the same survey because data on this variable were not collected in the 2011 wave) because this wave collected the most extensive information on respondents' care of their elderly parents. The sample size varies from year to year but was 4934 in 2011.

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 was 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 were 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 had no siblings (i.e., who were only children). However, we also did our estimations for the sample of respondents with no siblings (respondents who were 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 and female samples separately. We also did the estimations separately for married and unmarried samples (for both sexes as well as for the male and female samples separately). The results are not shown due to space limitations but were very similar to the results not broken down by marital status.

6. DESCRIPTIVE STATISTICS

Descriptive statistics for the variables to be used in our econometric analysis for the sample with one or more siblings (the sample with no siblings) are shown in Table 1, and as can be seen from this table, 24.0% (38.6%) of respondents live with their elderly parents, 43.6% (42.6%) live near their elderly parents, 25.9% (39.6%) help their elderly parents with housework, and (though not shown in Table 1) 21.0% (26.7%) provide nursing care for their elderly parents and 18.0% (21.8%) 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. Moreover, those with no siblings are more likely to provide care or attention to their elderly parents than those with one or more siblings (except in the case of living nearby), with the gap between the two groups being largest for co-residence (and help with housework). This pattern is inconsistent with our theoretical model, which predicts that care and attention will increase with the number of siblings, but one possible explanation is that there is a fixed amount of care and attention that is required, as a result of which the probability that a given child needs to provide care and attention to his or her parents will decline as the number of siblings increases. Moreover, this effect can be expected to be especially acute in the case of co-residence because since only one child typically lives with the parents, the more siblings there are, the lower will be the probability that a given child lives with his/her parents. Thus, our finding that the co-residence gap between those with one or more siblings and those with no siblings is so large is not surprising.

Table 1: Descriptive Statistics

Variable Name	Mean	Std. Dev.	Minimum	Maximum	No. of Obs.
Both sexes, one or more siblings					
CARE1	0.2398	0.4270	0	1	1,639
CARE2	0.4356	0.4960	0	1	1,639
CARE3	0.2587	0.4380	0	1	1,639
BEQEXP	0.484	0.500	0	1	1,639
NSIB	1.698	0.883	1	7	1,639
CHILDALTRUISM	0.0846	0.0692	0	0.25	1,639
ELDESTSON	0.328	0.469	0	1	1,639
NOBROTHERS	0.353	0.478	0	1	883
MALE	0.461	0.499	0	1	1,639
RELIGIOSITY	1.593	0.975	1	5	1,639
BOTHALIVE	0.4750	0.5000	0	1	1,639
AGEPARENT	76.23	8.74	60	99	1,639
REQCARE	0.21	0.41	0	1	1,639
BOTHREQCARE	0.0683	0.2524	0	1	1,639
WORK	0.8170	0.3868	0	1	1,639
COLLEGE	0.4910	0.5000	0	1	1,639
MARRIED	0.8462	0.3608	0	1	1,639
Both sexes, no siblings					
CARE1	0.3861	0.489	0	1	101
CARE2	0.4257	0.497	0	1	101
CARE3	0.3960	0.492	0	1	101
BEQEXP	0.663	0.475	0	1	101
CHILDALTRUISM	0.0857	0.0607	0	0.25	101
MALE	0.455	0.5	0	1	101
RELIGIOSITY	1.72	1.13	1	5	101
BOTHALIVE	0.446	0.5	0	1	101
AGEPARENT	77.554	7.371	63	94	101
REQCARE	0.277	0.45	0	1	101
BOTHREQCARE	0.05	0.218	0	1	101
WORK	0.822	0.385	0	1	101
COLLEGE	0.485	0.502	0	1	101
MARRIED	0.812	0.393	0	1	101

Notes: Refer to the main text for variable definitions. The NOBROTHERS variable was used only in the female sample.

Date 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 shows the impact of bequest expectations on parental care and attention, and as can be seen from this table, respondents with one or more siblings 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. By contrast, respondents with no siblings are roughly equally likely to provide care and attention to their parents regardless of whether or not they expect to receive bequests (or *inter vivos* transfers) from them. These findings suggest that the strategic bequest (exchange) motive applies in the case of Japan, that children with one or more siblings provide care and attention to their parents in order to increase their share of their parents' bequest, and that children with no siblings provide care and attention to their parents for other reasons because there are no other credible heirs in the case of such children (Bernheim, Shleifer, and Summers 1985 also make this point). However, we should not make any inferences before conducting a rigorous econometric analysis because we need to see whether or not our conclusions hold even after controlling for other factors. It is to precisely this type of analysis that we turn in the next section.

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, one or more siblings				
Co-reside	17.75	30.60	23.98	1,639
Live nearby	40.71	46.60	43.56	1,639
Help with housework	20.47	31.61	25.87	1,639
Males, one or more siblings				
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, one or more siblings				
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
Both sexes, no siblings				
Co-reside	38.24	38.81	38.61	101
Live nearby	41.18	43.28	42.57	101
Help with housework	35.29	41.79	39.60	101

Notes: The figures show the proportion of respondents providing each type of care/attention to their parents (%).
Data source: The Osaka University Preference Parameter Study for Japan, 2011 wave.

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.

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	1,639	1,639	1,639
Goodness-of-fit measures of the fitted probit model			
Percentage correctly predicted	78.22%	60.70%	75.05%
Log likelihood value of the model	–757.03	–1,082.00	–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			
Percentage 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)
ELDESTSON	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	–0.3133***	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			
Percentage 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	0.18	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.

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. Looking first at the impact of the variables deriving from our theoretical model, the coefficient of BEQEXP is positive and significant in all three 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 three equations in the sample with one or more siblings even though our theoretical model predicts a positive impact because a larger number of siblings should intensify inter-sibling competition and lead to a higher level of care and attention. However, there is another route through which the number of siblings might affect the probability that respondents provide care and attention to their parents: If there is a fixed amount of care and attention that is required, the probability that a given child needs to provide care and attention to his or her parents will decline as the number of siblings increases, and thus it is possible that the sign of the coefficient of NSIB will be negative. Moreover, this effect would be expected to be especially pronounced in the case of co-residence because since only one child typically lives with the parents, the more siblings there are, the lower will be the probability that a given child lives with his/her parents. Thus, the insignificant coefficient of NSIB may simply reflect the fact that the two opposing effects offset one another.[6]

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 two out of three 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.

---

[6] One possible reason for the insignificant impact of the number of siblings is that it is serving as a proxy for parental wealth. Since relatively wealthy individuals will have relatively few children, parental wealth and the number of siblings will be negatively correlated, and since we would expect the impact of parental wealth to be positive because selfishly motivated children will obviously be more eager to provide care to their parents if their parents are wealthier, which means a larger potential bequest, we would expect the impact of the number of siblings to be negative if it is serving as a proxy for parental wealth. Thus, this effect might be offsetting the positive impact of the number of siblings predicted by our theoretical model, leading to an insignificant coefficient. However, the fact that the impact of the number of siblings was insignificant even when we included a proxy for parental wealth (namely, the educational attainment of the respondent's father) suggests that the insignificant impact of the number of siblings is not due to the lack of controls for parental wealth. We are grateful to the Editor for this important point.

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, and the reasons for this are not clear.

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 three 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 it 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 two out of three 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 three 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 three 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 two out of three 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 two out of three 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.

The estimation results are highly satisfactory, in general, as the model's goodness-of-fit measures show that the percentage correctly predicted by the model (with the classification threshold for prediction set to 0.5) ranges from 60.70 to 82.90 %. 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 the case of the CORESIDE equation, which is very respectable for regressions based on cross-section microdata. Moreover, visual inspection of the randomized quantile residuals (not shown in the paper due to space limitations) shows 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 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.

7.2 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.[7] 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, and Bernheim, Shleifer, and Summers (1985) make a similar point based on their analysis of data for the United States.[8]

[7] There is the possibility that parents of only children will threaten to consume all of their wealth themselves and/or give it to relatives, friends, and/or charity if their child does not provide enough care and attention and therefore that such parents will also be able to manipulate their children into providing care and attention, but their threat of disinheritance will not be as credible as in the case of parents with multiple children who are competing with each other for their parents' bequest.

[8] It could be that the coefficient of BEQEXP is not significant in the no-sibling sample because there is insufficient variation in this variable due to the fact that only children are highly likely to receive bequests as long as their parents have positive net worth. It is true that the proportion of respondents with no siblings who expect to receive bequests is considerably higher than the corresponding proportion for respondents with one or more siblings (66.3% vs. 48.4%), but it is not inordinately high. We are grateful to an anonymous referee for this important point.

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	0.0648*	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			
Percentage 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			
Percentage 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.

Looking next at the impact of children's altruism toward their parents, the coefficient of CHILDALTRUISM is positive and significant in one out of three 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 two 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 one or more siblings.

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			
Percentage 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.

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 two out of three 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 two out of three cases in the CORESIDE equation, positive and significant in all cases in the NEARBY equation, and negative and significant in two out of three 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.

As in the case of the results for the sample with one or more siblings, the estimation results are highly satisfactory, in general, as the model's goodness-of-fit measures show that the percentage correctly predicted by the model (with the classification threshold for prediction set to 0.5) ranges from 65.45 to 80.43 %. Similarly, the McFadden's and maximum likelihood pseudo R-squareds range from 0.12 to 0.26 and from 0.15 to 0.30, respectively, in the case of the CORESIDE equation, which is very respectable for regressions based on cross-section microdata.

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

While 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 to their children are significantly more likely to live with them than elderly respondents not planning to leave bequests to their children (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 constructed and tested 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 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 findings of previous studies hold 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.

However, we should note that our analysis is not without its defects, and we hope to remedy these defects in our future research. First, we have implicitly assumed that bequest expectations are exogenous, but it is clear that parents' bequest decisions and children's care and co-residence decisions are made simultaneously and that we have not proven causality by showing that bequest expectations have a positive impact on care and co-residence decisions because we have not taken account of the endogeneity of bequest expectations.

Second, the work decision is also endogenous because respondents may choose to quit their jobs in order to provide care to their parents or parents-in-law (see, for example, Niimi 2017 for an analysis of this issue using Japanese data). This is relatively common in Japan in the case of women, and thus it is especially important to take account of this problem in the case of the female sample.

Third, our analysis assumes that children provide in-kind and financial transfers to their parents (viz., care, attention, and financial assistance during old age) in exchange for financial transfers (viz., inter vivos transfers and bequests), but parents may also provide in-kind transfers to their children such as childcare services and help with housework. Moreover, children may choose to live with their parents partly for selfish reasons—namely, to facilitate such in-kind transfers. Thus, our results may be biased due to our failure to take account of in-kind transfers from parents to children.[9]

Fourth, endogenous saving plays an important role in our theoretical model, which predicts that the saving rate will be an increasing function of the number of siblings and of parents' degree of altruism. Thus, we could conduct a further test of our theoretical model if data on saving were available, but unfortunately, we were not able to do such an analysis due to the unavailability of data on saving in the data source we used for our analysis.

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 them, 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 have to be used as a substitute for private care.

[9] Note, however, that our unreported results for unmarried respondents (both sexes, males, as well as females) do not suffer from this bias (because almost none of them have children), and the fact that we obtain very similar results regarding bequest expectations for these samples suggests that our results are not unduly biased by failing to take account of such transfers.

REFERENCES

Abel, A. B., and M. Warshawsky, "Specification of the Joy of Giving: Insights from Altruism," *Review of Economics and Statistics*, 70 (1988), 145–149.

Altonji, J. G., F. Hayashi, and L. J. Kotlikoff, "Parental Altruism and Inter Vivos Transfers: Theory and Evidence," *Journal of Political Economy*, 105 (1997), 1121–1166.

———, "The Effects of Income and Wealth on Time and Money Transfers between Parents and Children," in A. Mason and G. Tapinos, eds., *Sharing the Wealth: Demographic Change and Economic Transfers between Generations* (Oxford: Oxford University Press, 2000), 306–357.

Ameriks, J., A. Caplin, S. Laufer, and S. Van Nieuwerburgh, "The Joy of Giving or Assisted Living? Using Strategic Surveys to Separate Public Care Aversion from Bequest Motives," *Journal of Finance*, 66 (2011), 519–561.

Angelini, V., "The Strategic Bequest Motive: Evidence from SHARE," mimeo, University of Padua, 2009.

Arrondel, L., and A. Masson, "Altruism, Exchange or Indirect Reciprocity: What Do the Data on Family Transfers Show?" in S.-C. Kolm and J. M. Ythier, eds., *Handbook of the Economics of Giving*, *Altruism and Reciprocity*, volume 2 (Amsterdam: Elsevier B.V., 2006), 971–1053.

Barro, R. J., "Are Government Bonds Net Wealth?" *Journal of Political Economy*, 82 (1974), 1095–1117.

Becker, G. S., "A Theory of Social Interactions," *Journal of Political Economy*, 82 (1974), pp. 1063–1093.

———, *A Treatise on the Family*, enlarged ed. (Cambridge, Massachusetts, U.S.A: Harvard University Press, 1991).

Bernheim, B. D., "How Strong Are Bequest Motives? Evidence Based on the Estimates of the Demand for Life Insurance and Annuities," *Journal of Political Economy*, 99 (1991), 889–927.

Bernheim, B. D., A. Shleifer, and L. H. Summers, "The Strategic Bequest Motive," *Journal of Political Economy*, 93 (1985), 1045–1076.

Bernheim, B. D., and K. Bagwell, "Is Everything Neutral?" *Journal of Political Economy*, 96 (1988), 308–338.

Buchanan, J. M., "Rent Seeking, Noncompensated Transfers, and Laws of Succession," *Journal of Law and Economics*, 26 (1983), 71–85.

Chang, Y.-M., "Strategic Altruistic Transfers and Rent Seeking within the Family," *Journal of Population Economics*, 22 (2009), 1081–1098.

———, "Strategic Transfers, Redistributive Fiscal Policies, and Family Bonds: A Micro-economic Analysis," *Journal of Population Economics*, 25 (2012), 1481–1502.

Chang, Y.-M., and D. L. Weisman, "Sibling Rivalry and Strategic Parental Transfers," *Southern Economic Journal*, 71 (2005), 821–836.

Chang, Y.-M., and Z. Luo, "Endogenous Division Rules as a Family Constitution: Strategic Altruistic Transfers and Sibling Competition," *Journal of Population Economics*, 28 (2015), 173–194.

Cox, D., "Motives for Private Income Transfers," *Journal of Political Economy*, 95 (1987), 508–546.

Cox, D., and Rank, M. R., "Inter-Vivos Transfers and Intergenerational Exchange," *Review of Economics and Statistics*, 74 (1992), 305–314.

Cremer, H., D. Kessler, and P. Pestieau, "Intergenerational Transfers within the Family," *European Economic Review*, 36 (1992), 1–16.

Dunn, P. K., and G. K. Smyth, "Randomized Quantile Residuals," *Journal of Computational and Graphical Statistics*, 5 (1996), 236–244.

Gans, D., M. Silverstein, and A. Lowenstein, "Do Religious Children Care More and Provide More Care for Older Parents? A Study of Filial Norms and Behaviors across Five Nations," *Journal of Comparative Family Studies*, 40 (2009), 187–201.

Horioka, C. Y., "Are Americans and Indians More Altruistic than the Japanese and Chinese? Evidence from a New International Survey of Bequest Plans," *Review of Economics of the Household*, 12 (2014), 411–437.

———, "Are the Japanese Selfish, Altruistic, or Dynastic?" *Japanese Economic Review*, 53 (2002), 26–54.

———, "Are the Japanese Unique? Evidence from Saving and Bequest Behavior," *Singapore Economic Review* (2016), forthcoming.

———, "Do Bequests Increase or Decrease Wealth Inequalities?" *Economics Letters*, 103 (2009), 23–25.

———, "Nihon ni okeru Isan to Oyako-kankei: Nihonjin ha Rikoteki ka, Ritateki kia, Ouchouteki ka?" in C. Y. Horioka and Institute for Research on Household Economics, eds., *Setai-nai Bunpai/Sedai-kan Iten no Keizai Bunseki (An Economic Analysis of Intra-Household Distribution and Intergenerational Transfers)* (Tokyo: Minerva Shobou, 2008), 118–135 (in Japanese).

Horioka, C. Y., and W. Watanabe, "Why Do People Save? A Micro-Analysis of Motives for Household Saving in Japan," *Economic Journal*, 107 (1997), 537–552.

Horioka, C. Y., H. Fujisaki, W. Watanabe, and T. Kouno, "Are Americans More Altruistic than the Japanese? A U.S.-Japan Comparison of Saving and Bequest Motives," *International Economic Journal*, 14 (2000), 1–31.

Ioannides, Y. M., and K. Kan, "The Nature of Two-Directional Intergenerational Transfers of Money and Time: An Empirical Analysis," in J. M. Ythier, S.-C. Kolm, and L.-A. Gerard-Varet, eds., *The Economics of Reciprocity, Giving and Altruism* (Houndmills and London: Palgrave Macmillan, 2000), 314–331.

Johar, M., S. Maruyama, and S. Nakamura, "Reciprocity in the Formation of Intergenerational Coresidence," *Journal of Family and Economic Issues*, 36 (2015), 192–209.

Juarez, L., "Crowding out of Private Support to the Elderly: Evidence from a Demogrant in Mexico," *Journal of Public Economics*, 93 (2009), 454–463.

Kohara, M., and F. Ohtake, "Altruism and the Care of Elderly Parents: Evidence from Japanese Families," *Japanese Economy*, 38 (2011), 3–18.

Komamura, K., "Koureisha Kakei ni okeru Isan Koudou no Keizai Bunseki (Economic Analysis of the Bequest Behavior of Aged Households)," *Kikan Shakai Hoshou*

Kenkyuu (Quarterly of Social Security Research), 30 (1994), 62–74 (in Japanese).

Kopczuk, W., and J. P. Lupton, "To Leave or Not to Leave: The Distribution of Bequest Motives," *Review of Economic Studies*, 74 (2007), 207–235.

Kotlikoff, L. J., and L. H. Summers, "The Role of Intergenerational Transfers in Aggregate Capital Accumulation," *Journal of Political Economy*, 89 (1981), 706–732.

Laferrere, A., and F.-C. Wolff, "Microeconomic Models of Family Transfers," in S.-C. Kolm and J. M. Ythier, eds., *Handbook of the Economics of Giving, Altruism and Reciprocity*, volume 2 (Amsterdam: Elsevier B.V., 2006), 889–969.

Masson, A., and P. Pestieau, "Bequest Motives and Models of Inheritance: A Survey of the Literature," in G. Erreygers and T. Vandevelde, eds., *Is Inheritance Legitimate? Ethical and Economic Aspects of Wealth Transfers* (Berlin: Springer Verlag, 1996).

Menchik, P. L., O. Irvine, and N. Jianakoplos, "Determinants of Intended Bequests," Discussion Paper Series A, No. 197, University of Bonn, 1988.

Niimi, Y., "The 'Costs' of Informal Care: An Analysis of the Impact of Elderly Care on Caregivers' Subjective Well-being in Japan," *Review of Economics of the Household*, 14 (2016), 779–810.

_____, "Does Providing Informal Elderly Care Hasten Retirement? Evidence from Japan," AGI Working Paper No. 2017-07, Asian Growth Research Institute, 2017.

Niimi, Y., and C. Y. Horioka, "The Impact of Intergenerational Transfers on Household Wealth Inequality in Japan and the United States," Discussion Paper No. 980, Institute of Social and Economic Research, Osaka University, September 2016.

Norton, E. C., "Health and Long-term Care," in J. Piggott and A. Woodland, eds., *Handbook of the Economics of Population Aging* (Amsterdam: Elsevier B. V., 2017).

Norton, E. C., and C. H. Van Houtven, "Inter-Vivos Transfers and Exchange," *Southern Economic Journal*, 73 (2006), 157–172.

Norton, E. C., and D. H. Taylor, Jr., "Equal Division of Estates and the Exchange Motive," *Journal of Aging and Social Policy*, 17 (2005), 63–82.

Ohtake, F., "Bequest Motives of Aged Households in Japan," *Ricerche Economiche*, 45 (1991), 283–306.

Ohtake, F., and C. Y. Horioka, "Chochiku Douki (Saving Motives)," in Tsuneo Ishikawa, ed., *Nihon no Shotoku to Tomi no Bunpai (The Distribution of Income and Wealth in Japan)* (Tokyo: University of Tokyo Press, 1994), 211–244 (in Japanese).

Perozek, M. G., "A Reexamination of the Strategic Bequest Motive," *Journal of Political Economy*, 106 (1998), 423–445.

Skaperdas, S., "Contest Success Functions," *Economic Theory*, 7 (1996), 283–290.

Sloan, F. A., G. Picone, and T. J. Hoerger, "The Supply of Children's Time to Disabled Elderly Parents," *Economic Inquiry*, 35 (1997), 295–308.

Tullock, G., “Efficient Rent Seeking” in J. Buchanan, R. Tollison, and G. Tullock, eds., *Toward a Theory of the Rent-seeking Society* (College Station: Texas A&M University Press, 1980), 97–112.

Wakabayashi, M., and C. Y. Horioka, “Is the Eldest Son Different? The Residential Choice of Siblings in Japan,” *Japan and the World Economy*, 21 (2009), 337–348.

White, H., “Maximum Likelihood Estimation of Misspecified Models,” *Econometrica*, 50 (1982), 1–25.

Wilhelm, M. O., “Bequest Behavior and the Effect of Heirs’ Earnings: Testing the Altruistic Model of Bequests,” *American Economic Review*, 86 (1996), 874–892.

Yamada, K., “Intra-family Transfers in Japan: Intergenerational Co-residence, Distance, and Contact,” *Applied Economics*, 38 (2006), 1839–1861.