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IS THE ELDEST SON DIFFERENT?
THE RESIDENTIAL CHOICE OF
SIBLINGS IN JAPAN

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Is the Eldest Son Different?   The Residential Choice of Siblings in Japan[**]

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Abstract: In this paper, we analyze the determinants of the living arrangements of elderly parents and their children (whether elderly parents live with their children, and if so, with which child) in Japan using micro data from a household survey.   We find that the proportion of elderly parents living with their eldest sons is much higher than that of elderly parents living with children other than the eldest son, even if the eldest son is not the eldest child. Moreover, we find that elderly parents are more likely to live with their eldest sons if the father was a self-employed worker before retirement, whereas they are more likely to live with a child other than the eldest son if the father was an executive before retirement.   In addition, daughters whose husbands adopt the daughter's surname are more likely to live with the daughter's parents.   All of these findings are consistent with the dynasty and/or strategic bequest (selfish life cycle) models.   We also find that the living arrangements of elderly parents are still very much based on Japanese social norms and traditions.   Thus, we find support for all models of household behavior other than the altruism model.

Keywords: Aged, Altruism Model, Bequest Motive, Bequests, Care of the Elderly, Children, Consumer Economics, Co-residence, Culture, Dynasty Model, Economics of the Elderly, Elderly, Eldest Son, Family Business, Family Economics, Family Line, Household Behavior, Japan, Life Cycle Model, Living Arrangements, Parents, Primogeniture, Residential Choice, Siblings, Social Norms, Strategic Bequest Model, Strategic Bequest Motive, and Traditions

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1. Introduction

Children, especially eldest sons, are much more likely to live with their elderly parents in Japan than in the West.   Why is that?   What motivates elderly parents and their children to live with each other in Japan?   Which child tends to live with the parents in Japan and why? Is it possible to explain the living arrangements of elderly parents and their children in Japan using existing theoretical models of household behavior or do we have to resort to social norms and traditions?   The social norm in Japan has been for the eldest son to live with his elderly parents, to take care of them, to carry on the family line, and to receive the parents' entire bequest including the family home, and it is possible that the eldest son lives with his elderly parents not because it is economically rational for him to do so but simply because he is adhering to the aforementioned social norm.

In this paper, we analyze the determinants of the living arrangements of elderly parents and their children (whether elderly parents live with their children, and if so, with which child) in Japan using micro data from the 1998 "National Survey on Families (in Japanese, *Kazoku ni tsuiteno Zenkoku Chousa*)," which was conducted in January 1999 and provided by National Family Research of Japan and the Information Center for Social Science Research on Japan, Institute of Social Science, University of Tokyo (SSJ Data Archive).   In so doing, we try to shed light on which theoretical model of household behavior applies in Japan and the extent to which Japanese households adhere to social norms and traditions.

The contributions of this paper are as follows: first, our paper is the first to analyze the living arrangements of elderly parents and their adult children focusing on the number of children and the composition of children's siblings in Japan.   We believe that it is important to take account of information on the number of children and on the composition of children's siblings when analyzing the living arrangements of parents and their children because many models regarding living arrangements predict that these factors will be important (for example, the strategic bequest model of Bernheim et al. (1985) and social norms and traditions; see section 2 for more details).[1]   Many previous studies, especially Japanese studies, had no choice but to ignore children who are not living with their parents because of data limitations.

In this paper, by contrast, the survey we use contains various information not only on the elderly parents but also on every child, including the distance between the residence of the parents and that of every child, which will enable us to analyze the living arrangements of elderly parents and their children rigorously.

The second contribution of this paper is to analyze the impact of social norms and traditions on the living arrangements of parents and their children. The survey we use asks respondents about their attitudes towards their children, and since these questions capture whether or not respondents adhere to Japanese social norms and traditions, we can use them to analyze the impact of social norms and traditions on the living arrangements of parents and their children.

To preview our main findings, the proportion of elderly parents living with their eldest sons is much higher than that of elderly parents living with children other than the eldest son, even if the eldest son is not the eldest child. However, if parents live independently, it is not necessarily the case that the eldest son lives closest to his parents. In addition, we find that elderly parents are more likely to live with their eldest sons if the father was a self-employed worker before retirement, whereas they are more likely to live with a child other than the eldest son if the father was an executive before retirement. In addition, daughters whose husbands adopt the daughter's surname are more likely to live with the daughter's parents. All of these findings are consistent with the dynasty and/or strategic bequest (selfish life cycle) models. We also find that the living arrangements of elderly parents are still very much based on Japanese social norms and traditions. Thus, we find support for all theoretical models of household behavior other than the altruism model.

This paper is organized as follows. In Section 2 we discuss four theoretical models of household behavior and survey previous studies, in Section 3 we describe the data source and sample selection, in Section 4 we describe the estimation model and estimation method, in Section 5 we present some descriptive statistics, in Section 6 we present our estimation results, and Section 7 concludes.

2. Theoretical Models of Household Behavior and Previous Studies

In this section, we describe four theoretical models of household behavior and survey some previous studies that try to shed light on the applicability of these models (this exposition is based on Horioka (2002a and 2002b); see these papers for a more comprehensive exposition of the theoretical models and a more comprehensive survey of the evidence concerning their applicability to the case of Japan).[2]

(I) The Dynasty Model

The dynasty or lineal model of Chu (1991) assumes that individuals are motivated by a desire to perpetuate the family line, the family home, and/or the family business and hence that they will behave so as to minimize the probability of lineal or dynastic extinction. Thus, if individuals behave according to this model, one child will carry on the family line, the family home and/or the family business in exchange for receiving a bequest from his or her parents, and it makes sense for that child to live with the parents because he or she will inherit the family home and/or the family business (which is often located in, or adjacent to, the family home).

(II) The Strategic Bequest Model

The strategic bequest model of Bernheim, et al. (1985), which is consistent with the selfish life cycle model, assumes that parents influence the decisions of their children by holding wealth in bequeathable forms and by conditioning the division of their bequest on their childrens' actions. Put differently, the strategic bequest model predicts that children will take care of their parents by living with them, taking care of them, supporting them financially, visiting them, and calling them in exchange for receiving a bequest from them. One implication of this model is that children with one or more siblings will be more like to live with, and take care of, their parents than only children because the parents' threat to disinherit a child is not credible if the child is an only child. In their seminal paper, Bernheim, et al. (1985) analyze the impact of bequeathable assets on childrens' attention to their parents using the 1969, 1971,

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1973, and 1975 waves of the Longitudinal Retirement History Survey and find, as expected, that children, especially those in multiple-child families, behave according to the strategic bequest model, with the children of wealthier parents visiting and calling their parents more frequently.[3]

Ohtake (1991) and Ohtake and Horioka (1994) are the seminal studies that analyze whether individuals behave according to the strategic bequest model in Japan. They examine the determinants of the co-residence behavior of parents and their children using data from the 1986 "National Livelihood Survey (*Kokumin Seikatsu Kiso Chousa*)," conducted by the Ministry of Health, Labor and Welfare of the Government of Japan, and find that the likelihood of coresidence increases as the bequeathable wealth of elderly parents increases, which is consistent with the strategic bequest model (see also Horioka, et al. (2000)).

(III) The Altruism Model

The altruism model of Barro (1974) and Becker (1974, 1981, 1991) assumes that parents harbor intergenerational altruism towards their children and that they derive utility not only from their own consumption but also from the utility of their children. In this case, parents will leave a bequest to their children regardless of whether or not they receive financial support and/or care from their children during old age and regardless of whether or not their children live with them. By the same token, if children are altruistic toward their parents, they will live with, and take care of, their parents even if their parents do not leave a bequest to them. Thus, if individuals behave according to the altruism model, there should be no relationship between living arrangements and bequest motives.

Hayashi (1995) tries to shed light on whether the Japanese behave according to the altruism model by testing whether demand neutrality---the invariance of consumption demand to the division of resources within families---holds for families choosing co-residence using the 1979 and 1984 administrations of the "National Survey of Family Income and Expenditure (*Zenkoku Shouhi Jittai Chousa*)," conducted by the Ministry of Internal Affairs and Communications. He finds that this neutrality implication does not apply in Japan because

expenditures on precisely the food items favored by the older generation are found to be an increasing function of the older generation's share of resources and concludes that the altruism model does not apply in Japan.

(IV) Social Norms and Traditions

In Japan, it is customary for children, especially eldest sons, to live with, and take care of, their parents even if their parents do not leave a bequest to them.   This custom arises not from economic considerations but from social norms and traditions—in particular, from the Confucian teaching that, when children grow up, they should respect, and take care of, their parents even if their parents do not leave a bequest to them.   The observed behavior—that children live with, and take care of, their parents even if their parents do not leave a bequest to them--is identical to the case in which children are altruistic toward their parents (model III above), but the mechanism is totally different.   Note, however, that social norms also dictate that parents leave a bequest to their children, especially to their eldest son, and thus, even in the case of social norms, we could observe children, especially the eldest son, living with their elderly parents and, at the same time, receiving a bequest from their parents, a pattern that is identical to the case of the strategic bequest model (model II above), even though the mechanism is totally different.[4]

3. The Data Source and Sample Selection

3.1. The Data Source

The data source we use is micro data from the 1998 "National Survey of Families (in Japanese, *Kazoku ni tsuiteno Zenkoku Chousa*)" which was conducted in January 1999 and provided by National Family Research of Japan and the Information Center for Social Science Research on Japan, Institute of Social Science, University of Tokyo (SSJ Data Archive).

This survey collects a variety of detailed information on respondents and their family members--for example, on the structure of respondents' families, the socioeconomic characteristics of both parents and children, respondents' attitudes towards their children, etc.

In this survey, a stratified multistage random sample of 10,500 respondents aged between 28 and 77 (born between January 1, 1921 and December 31, 1970) from throughout Japan was surveyed by the drop-off, pick-up method, resulting in 6,985 responses (a response rate of 66.5%).

3.2. Sample Selection

In this subsection, we discuss the sample we used in our analysis. Of the 6,985 respondents (hereafter called parents (fathers and mothers) or households), 1070 have no living children, 952 have one living child, 3067 have two living children, 1515 have three living children, 372 have four or more living children, and 9 did not indicate how many living children they have. First, we used only the subsample of respondents who have one, two, or three living children. Respondents who have four or more living children provide information only on the three oldest children, so we were forced to drop these respondents. Second, we used only the subsample of respondents whose children have been married at least once because we wanted to focus on adult children and because there are many young unmarried children in Japan who live with their parents temporarily before marriage and are supported by their parents (in Japan, they are called "parasite singles"). Third, we are interested in the living arrangements of "elderly" parents and their adult children, so we confined the sample to parents who have already retired.[5] Finally, we dropped all observations for which all of the necessary information is not available. Restricting the sample to parents who have one, two and three living children reduced the number of observations from 6,985 to 5,367, restricting the sample to parents whose children are all married reduced the number of observations further to 1,383, restricting the sample to parents who are retired reduced the number of observations further to 759, and restricting the sample to parents for whom all of the necessary information is available reduced the number of observations further to 530. This is the sample we use to compute the descriptive statistics in Tables 1-3.

However, we need to restrict the sample further to respondents with multiple children including at least one son in the regression analysis because only those fitting this description

will be able to choose between living with their eldest son, living with a child other than the eldest son, and living independently. Thus, the sample we use in the regression analysis has only 336 observations. Of the 194 observations that had to be dropped, 132 had only daughters and 62 had one son and no daughters (see Table 1 for data on the number of children and the composition of siblings).

4. The Estimation Model and Estimation Method

4.1. The Estimation Model

We use the following estimation model to test what variables affect the living arrangements of parents and their children:

$$LIVING_{ij}^* = x_i^{p'} \alpha_j + x_i^{e'} \beta_j + x_i^{k'} \gamma_j + \varepsilon_{ij} \tag{1}$$

$$j = 1, 2, 3, \quad [\varepsilon_1, \varepsilon_2, \varepsilon_3 | x^p, x^e, x^k] \sim N[0, \Sigma]$$

$LIVING_{ij}^* =$ the level of indirect utility of the ith individual from making the j th choice on living arrangements

$LIVING_{ij} = 1$ if the ith individual makes the jth choice on living arrangements

$LIVING_{ij} = 0$ otherwise

The dependent variable (*LIVING*) measures three alternative living arrangements of elderly parents: parents live with the eldest son; parents live with a child other than the eldest son;[6] and parents live independently. We define "parents live with their children" as "the child lives in the same house as his/her parents or in a separate house on the same property."

The explanatory variables are x_i^p, x_i^e and x_i^k where x_i^p is a vector of characteristics pertaining to parents' preferences and economic background, x_i^e is a vector of characteristics pertaining to the eldest son's preferences and economic background, and x_i^k is a vector of characteristics pertaining to the preferences and economic background of children other than the eldest son. Our main interest is to shed light on which model(s) of household behavior apply

in Japan by analyzing the determinants of the living arrangements of parents and their children in the case of those with multiple children. In what follows, we explain the impact of each explanatory variable on the living arrangements of parents and their children using on the theoretical models introduced in Section 2.

(I)   The Dynasty Model

To examine whether individuals behave according to the dynasty model, we use *hselfemployed* (a dummy variable that equals one if the father was a self-employed worker before retirement (the base category is fathers who were salaried workers before retirement)), *ewifefamily1* (a dummy variable that equals one if the eldest son adopts his wife's surname)), *kwifefamily1* (a dummy variable that equals one if at least one son other than the eldest son adopts his wife's surname), *kwifefamily2* (a dummy variable that equals one if at least one daughter married a man who adopted her surname).

Self-employed households are different from salaried worker households because the former have a family business that they would presumably like to pass on to their children. If the dynasty model applies, the children of self-employed parents will take over the family business in exchange for receiving a bequest (especially the family business), and since family businesses are often located in, or adjacent to, the parents' home, the child who takes over the family business is more likely to live with his/her parents. Thus, if individuals behave according to the dynasty model, we would expect *hselfemployed* to increase the probability of the parents living with the eldest son or with a child other than the eldest son.

Another variant of the dynasty model is that a son (usually the eldest son) carries on the family line in return for receiving a bequest (especially the family home) or (if there are no sons) a daughter (usually the eldest daughter) marries a man who is willing to adopt her surname and carries on the family line in return for receiving a bequest (especially the family home). Moreover, the child who carries on the family line usually lives with the parents since they will usually inherit the family home. Thus, if individuals behave according to the dynasty model, we would expect *ewifefamily1* to reduce the probability of the parents living with the

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eldest son, *kwifefamily1* to reduce the probability of the parents living with a child other than the eldest son, and *kwifefamily2* to increase the probability of the parents living with a child other than the eldest son.

(II)   The Strategic Bequest Model

To examine whether individuals behave according to the strategic bequest model, we include *hexecutive* (a dummy variable that equals one if the father was an executive before retirement (where executive includes management executive, executive board member, and management-level employee (including government workers)) (the base category is fathers who were salaried workers before retirement)), *peduc* (the average educational attainment (in years) of the parents (if there is only one parent, the educational attainment of that parent)), *pincome* (the income of the father and mother combined), and *phouse* (a dummy variable that equals one if the parents live in an owner-occupied home).   If the father was an executive before retirement, if the parents are highly educated, and/or if the combined income of the parents is high, the parents are presumably relatively wealthy and should have more wealth to leave behind to their children, and thus the children should be more likely to live with their parents if the strategic bequest motive applies.   By the same token, the children of parents who are homeowners should also be more likely to live with their parents if the strategic bequest motive applies because they can expect to receive the family home as a bequest.   Thus, if the strategic bequest model applies, we would expect *hexecutive, peduc, pincome*, and *phouse* to increase the probability of the parents living with their eldest son or with a child other than the eldest son.

(III) The Altruism Model

If individuals behave according to the altruism model, we would expect the coefficients of the aforementioned variables (*hselfemployed*, *ewifefamily1*, *kwifefamily1*, *kwifefamily2*, *hexecutive*, *peduc, pincome*, and *phouse*) to be insignificant because the residential choice decision of parents and their children should not depend on any dynastic or strategic considerations. Moreover, we included *eeduc* (the educational attainment of the eldest son (in years)) and *keduc*

(the educational attainment of child (ren) other than the eldest son (if the number of children is two, the average educational attainment of children other than the eldest son is used) as a way of testing the altruism model more directly. As Horioka (2002) points out, altruistic parents should leave larger bequests to poorer children, and since education is a good proxy for earning capacity, altruistic parents should leave larger bequests to less educated children. Moreover, since the family home is often the largest component of parental wealth, it is plausible to assume that altruistic parents will choose to live with the least educated (poorest) child and bequeath the family home to him or her. Thus, we would expect *eeduc* to reduce the probability of the parents living with the eldest son and *keduc* to reduce the probability of the parents living with a child other than the eldest son.

We also include a variable pertaining to parental attitudes towards their children to enable us to conduct a further test of the altruism model. In the survey we use in our analysis, respondents were asked if they agree with a number of views concerning their attitudes towards their children, one of which is: "Parents should sacrifice themselves for their children." Respondents were asked to pick from among the following four choices.

(1) I think so.

(2) I tend to think so.

(3) I tend not to think so.

(4) I do not think so.

We created the variable *psacrifice* (a dummy variable that equals one if parents think (or tend to think) that parents should sacrifice themselves for their children) and added it to equation (1). This variable is presumably a good proxy for parents who behave according to the altruism model because those who agree with this view are willing to put the interests of their children before their own. However, since it is not obvious whether altruistic parents will be more or less likely to live with their children, it is not possible to predict a priori whether the coefficient of *psacrifice* will be positive or negative.

Finally, another way to test the altruism model is to see if variables relating to the dynasty and strategic bequest models have the expected impact on the likelihood of parents

living with their children. If they do, this constitutes evidence unfavorable to the altruism model because the altruism model predicts that the behavior of parents and children will be motivated by altruism rather than by some sort of *quid pro quo*.

(IV) Social Norms and Traditions

We tested for the importance of Japanese social norms and traditions using two variables created from the same question on parental attitudes towards their children discussed in (III) above. Two other views that are asked about are as follows:

(a) Children should live with their parents when the parents become old and cannot take care of themselves.

(b) It is an eldest son's duty to take care of his parents.

View (a) is consistent with the Japanese social norm or tradition (based on Confucian teachings) that children should live with, and take care of, their parents when their parents become old, while view (b) is consistent with the Japanese social norm or tradition that more is expected of the eldest son. Thus, we created the variables *pchildduty* and *pesonduty* (dummy variables that equal one if the respondent agrees (or tends to agree) with views (a) and (b), respectively), and added them to equation (1). If individuals behave according to Japanese social norms and traditions, we would expect *pchildduty* to increase the probability of the parents living with the eldest son or with a child other than the eldest son and *pesonduty* to increase the probability of the parents living with the eldest son.[7]

Control Variables

Finally, we also include the variables *psingle* (a dummy variable that equals one if there is only one parent), *hparttimer* (a dummy variable that equals one if the father was a part-time worker or had an occupation not listed elsewhere before retirement), *phealth* (a dummy variable that equals one if one or both parents are unhealthy), *esingle* (a dummy variable that equals one if the eldest son is single), *emarriagefirst* (a dummy variable that equals one if the eldest son got married first), *ksingle* (a dummy variable that equals one if at least one child other than the

eldest son is single), *seniorsister* (a dummy variable that equals one if the eldest son has an elder sister), and *three* (a dummy variable that equals one if the eldest son has two siblings) to control for the preferences and economic backgrounds of parents and children.

4.2. The Estimation Method

In our analysis, we estimate equation (1) using a multinomial probit model because the dependent variable *LIVING* has three unordered response outcomes. One advantage of this model is that it allows us to relax the independence of irrelevant alternatives (IIA) property that is characteristic of the multinomial logistic model. As we stated earlier, the dependent variable (*LIVING*) measures three alternative living arrangements of elderly parents: parents live with their eldest son; parents live with a child other than the eldest son; and parents live independently, so the term in the log-likelihood that corresponds to alternative 1 (that is, parents live with their eldest son) is

$$\Pr ob[\text{choice 1}] = \Pr ob\left[U_1 > U_j, \; j{=}2, \; 3 \middle| x^p, x^e, x^k\right],$$

and the probability of this alternative is

$$\Pr ob[\text{choice 1}] = \Pr ob\left[\varepsilon_2 - \varepsilon_1 > (x_2 - x_1)'\beta, \; \varepsilon_3 - \varepsilon_1 > (x_3 - x_1)'\beta \middle| x^p, x^e, x^k\right],$$

which is the cumulative probability from the bivariate normal distribution.[8]

5. Descriptive Statistics

5.1. Data on Who Lives With or Near the Parents

Before discussing the estimation results, we present some descriptive statistics to give the reader a general idea of the living arrangements of elderly parents and their children in Japan. First, Table 2-1 shows with which child elderly parents live, and as can be seen from this table, 44 percent of elderly parents with at least one child live with their children, which is much higher than in Western countries. Looking at the breakdown by number of children, 40 percent of elderly parents with only one child live with their children, 39 percent of elderly parents with two children live with their children, and 62 percent of elderly parents with three children live

with their children.

Looking more specifically at with which child elderly parents live, two interesting patterns emerge. First, if elderly parents have an eldest son, they are much more likely to live with their eldest sons than to live with children other than the eldest son, even if the eldest son is not the eldest child (see the boldfaced figures in Table 2-1). Second, if parents have only daughters, they are more likely to live with their eldest daughter. These results are consistent with the Japanese social norm that the eldest son (or eldest child) should live with, and take care of, the parents.

We look next at which child lives closest to his/her elderly parents. The survey we use in our analysis collects information on the distance between the parents' residence and each child's residence using the following categories: (1) the child lives in the same house as his/her parents, (2) the child lives in a separate house on the same property, (3) the parents' residence and the child's residence are within walking distance, (4) the travel time between the parents' residence and the child's residence is less than one hour, (5) the travel time between the parents' residence and the child's residence is less than three hours, and (6) the travel time between the parents' residence and the child's residence is equal to, or more than, three hours. Since we define "parents live with their children" as "the child lives in the same house as his/her parents or in a separate house on the same property (alternatives (1) or (2))," there are four categories for parents and children who live apart. Data on which child lives closest to the parents in the case of parents who live independently are shown in Table 2-2, and as can be seen from this table, if parents live independently, it is not necessarily the case that the eldest son lives closest to his parents.

We look next at data on sons who adopt their wives' surname and daughters whose husbands adopt their surname. Such data shed light on the importance of the dynasty model because a son who adopts his wife's surname cannot carry on his parents' family line, and conversely, a daughter whose husband adopts her surname *can* carry on her parents' family line. If the dynasty model applies and parents care about perpetuating the family line, we would not expect parents with only one son and no daughters (hereafter referred to as "single

sons") to allow their sons to adopt their wives' surname, and conversely, we would expect parents with only daughters to encourage at least one of their daughters to marry a man who is willing to adopt their surname.

Looking at the results, only 1.6 percent (1/62) of single sons adopt their wives' surname, whereas 3.6 percent (12/336) of eldest sons who have siblings and 10.2 percent (17/166) of second-born sons and third-born sons do so, which suggests that eldest son are far less likely to adopt their wives' surname. On the other hand, 18.2 percent (8/44) of single daughters marry a man who adopts her surname, and 13.8 percent (26/196) of daughters who have only sisters marry a man who adopts her surname, whereas only 4.8 percent (13/273) of daughters who have at least one brother marry such a man. Furthermore, 20.5 percent (18/88) of eldest daughters marry a man who adopts her surname, whereas only 7.4 percent (8/108) of daughters other than eldest daughters marry such a man. Thus, households that have at least one son rarely have daughters who marry men who adopt their surname (because if there is at least one son, the son can carry on the family line), whereas some daughters (especially eldest daughters) who have only sisters marry men who adopt their surname in order to perpetuate the family line. These results are consistent with the dynasty model because they underscore the eagerness of parents and their children to perpetuate the family line.

Next, we focus on the relationship between perpetuating one's family line and the living arrangements of elderly parents and their children. Whereas only 0.6 percent (1/167) of sons who adopt their wife's surname live with their own parents, 66.7 percent (32/48) of daughters who married a man who adopted their surname live with their own parents. In addition, only 15.2 percent (56/368) of all eldest daughters live with their own parents, whereas 76.5 percent (26/34) of eldest daughters who married a man who adopted their surname live with their own parents. Thus, there is a strong relationship between perpetuating one's family line and the living arrangements of elderly parents and their children, with the child who carries on the family line tending to live with the parents. This result is also consistent with the dynasty model for the reason explained in section 4.1.

To summarize our findings in this section, we find first that a substantial proportion (44 percent) of elderly parents with children live with their children in Japan, with this proportion reaching 62 percent in the case of those with three children.   Second, parents are more likely to live with their eldest son even if the eldest son is not the eldest child.   Third, if parents live independently, it is not necessarily the case that the eldest son lives closest to his parents.   Fourth, the daughters (especially the eldest daughters) of those with only daughters often marry men who adopt their surname in order to perpetuate the family line.   Fourth, there is a strong relationship between perpetuating one's family line and the living arrangements of elderly parents and their children, with the child who carries on the family line tending to live with the parents.   And, as discussed above, many of these results are consistent with the dynasty model and/or social norms and traditions.

5.2. Descriptive Statistics for the Variables Used in the Regression Analysis

Next, we present descriptive statistics for the variables we use in our regression analysis for the full sample, the sample of parents living with their eldest son, the sample of parents living with a child other than the eldest son, and the sample of parents living independently. The results are shown in Tables 3-1 and 3-2, with Table 3-1 showing the descriptive statistics for parents and Table 3-2 showing the descriptive statistics for children, and as can be seen from this table, the socioeconomic characteristics of parents differ considerably by living arrangements (except for the ages of the farther and mother).   In what follows, we organize our discussion of the descriptive statistics by theoretical model.

Looking first at variables relating to the dynasty model, as discussed in section 4.1, if the dynasty model applies, one would expect households in which the father was a self-employed worker before retirement to be more likely to live with their children, and as can be seen from Table 3-1, they are in fact much more likely to live with their eldest son and also slightly more likely to live with a child other than the eldest son than are other households.   Looking at other variables relating to the dynasty model, as discussed in section 4.1, if the dynasty model applies, we would expect parents whose sons adopt their wives' surname to be less likely to live with

their children and parents whose daughter marries a man who adopts her surname to be more likely to live with children other than the eldest son, and as can be seen from Table 3-2, the former are indeed far less likely to live with the son who adopts his wife's surname and the latter are indeed far more likely to live with the daughter who marries a man who adopts her surname.   All of these results constitute strong evidence in favor of the dynasty model.

Looking next at variables relating to the strategic bequest model, as explained in section 4.1, if the strategic bequest model applies, we would expect parents who have high incomes and/or high educational attainments to be more likely to live with their children, but as can be seen from Table 3-1, parents with high incomes and/or high educational attainments are *less* likely to live with their children than are other households, contrary to expectation.   Turning to other variables relating to the strategic bequest model, as discussed in section 4.1, if the strategic bequest model applies, we would expect households in which the father was an executive before retirement and/or that own their own homes to be more likely to live with their children, and as Table 2-1 shows, households in which the father was an executive before retirement are more likely to live with a child other than the eldest son but less likely to live with their eldest son than are other households, while households that own their own homes are much more likely to live with their eldest son as well as with a child other than the eldest son than other households.   Thus, the results are mixed but provide some support for the strategic bequest model.

Looking next at variables relating to the altruism model, as explained in section 4.1, if the altruism model applies, one would expect parents to live with children with relatively low educational attainments, and as can be seen from Table 3-2, parents are more likely to live with sons and (to a lesser extent) daughters with low educational attainments than are other households.   Another test of the altruism model is to see if whether or not parents feel that they should sacrifice themselves for their children affects their likelihood of living with their children, and as can be seen from Table 3-1, parents holding this view are much more likely to live with their eldest son as well as with a child other than the eldest son than are other households. Finally, as discussed in section 4.1, the fact that several variables relating to the dynasty and

strategic bequest models appear to have the expected impact on parents' likelihood of living with their children constitutes evidence unfavorable to the altruism model. Thus, the results are mixed with some being favorable to the altruism model and some being unfavorable to it.

Looking finally at variables relating to social norms and traditions, as explained in section 4.1, if social norms and traditions are important, one would expect parents who feel that "children should live with their parents when their parents become old and cannot take care of themselves" to be more likely to live with their children and parents who feel that "it is the eldest son's duty to take care of his parents" to be more likely to live with their eldest sons. As can be seen from Table 3-1, the former are much more likely to live with a child other than the eldest son and with their eldest son than are other households, while the latter are much more likely to live with their eldest son than are other households. These results provide strong support for the importance of social norms and traditions.

Thus, we find support for all theoretical models (the dynasty model, the strategic bequest model, the altruism model, and social norms and traditions). However, it is risky to draw inferences from descriptive statistics alone because they do not control for other factors. Thus, more weight should be given to the regression results presented in the next section.

6. Estimation Results

In this section, we present our estimation results concerning the determinants of the living arrangements of parents and their children. Table 4-1 shows the coefficient estimates and standard errors, while Table 4-2 shows the marginal effects. We organize our discussion by theoretical model.

First, we discuss our estimation results pertaining to the dynasty model. The coefficient of *hselfemployed* is positive and significant in equations (1-a) and (1-b), whereas it is not significant in equations (2-a) and (2-b), which suggests that elderly parents are more likely to live with their eldest sons if the father was self-employed before retirement than if the father was a salaried worker before retirement. We calculate the marginal effect of *hselfemployed* and find that the probability of the parents living with their eldest son is 0.15

percentage points higher in case (a) and 0.17 percentage points higher in case (b) for households in which the father was a self-employed worker before retirement (see Table 4-2). This result is presumably due to the fact that self-employed households are different from salaried worker households in that the former have a family business that they would like to pass on their children, especially their eldest son, and the child who carries on the family business is more likely to live with his or her parents because he or she will inherit the family business (which is often located in, or adjacent to, the family home). Thus, our result is consistent with the dynasty model. Moreover, the coefficient of *kwifefamily*2 is positive and significant in equations (2-a) and (2-b), and the marginal effect of *kwifefamily*2 suggests that having a daughter who marries a man who adopts her surname raises the probability of living with a child other than the eldest son by 0.26 percentage points in case (a) and 0.35 percentage points in case (b). These results suggest that daughters who marry a man who adopts her surname are more likely to live with the daughter's parents, a result that is also consistent with the dynasty model.

Next, we discuss our estimation results pertaining to the strategic bequest model. Although the coefficients of *phouse* and *peduc* are not significant in any case, the coefficient of *hexecutive* is positive and significant in equations (2-a) and (2-b), and the marginal effect of *hexecutive* suggests that the probability of the parents living with a child other than the eldest son is 0.21 percentage points higher for households in which the father was a executive before retirement. Since executives are presumably wealthier than those in other occupations, our finding that children other than eldest sons are more likely to live with their parents if their father was an executive before retirement is consistent with the strategic bequest model.

Third, we discuss our estimation results pertaining to the altruism model. The coefficient of *eeduc* is negative and marginally significant in equation (1-a) but insignificant in equation (1-b) and the coefficient of *keduc* is also not significant. That is, parents do not necessarily live with less educated children, a result that is at variance with the altruism model because education is a good proxy for earning capacity and altruistic parents should show a tendency to leave a larger bequest to (and live with) less educated (poorer) children (see section

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4.1 for more details). Moreover, the coefficient of *psacrifice* is not significant in any case, which constitutes further evidence against the altruism model. According to Tables 3-1 and 3-2, the educational attainment of children and *psacrifice* have the expected impact on the living arrangements of parent and their children, but if the impact of other variables is controlled for via regression analysis, these variables no longer have a statistically significant impact on the living arrangements of parents and their children. Finally, the fact that the impact of a number of variables relating to the dynasty and strategic bequest models were found to be significant and consistent with these models constitutes further evidence against the altruism model.

Fourth, we discuss our estimation results pertaining to Japanese social norms and traditions. Let us look at the coefficients of variables pertaining to parental attitudes towards their children. First, the coefficient of *pchildduty* is positive and significant in case (2-b), suggesting that parents who think that children should live with their parents when the parents become old and cannot take care of themselves are more likely to live with a child other than the eldest son. Second, the coefficient of *pesonduty* is positive and significant in case (2-a) and negative and significant in case (2-b), suggesting that parents who think that it is the duty of the eldest son to take care of his parents. Looking at the marginal effects of *pesonduty* and *pchildduty,* the probability of living with their eldest son is 0.05 percentage points higher for parents who think that children should live with their parents, and the probability of living with a child other than the eldest son is 0.07 percentage points higher for such parents. By contrast, the probability of living with the eldest son is 0.13 percentage points higher for parents who think that it is the duty of the eldest son to take care of his parents, and the probability of living with a child other than the eldest son is 0.11 percentage points lower for such parents. As we discussed in Section 4, these results are consistent with Japanese social norms and traditions.

Finally, we discuss the control variables. The coefficient of *psingle* is positive and significant in all cases, which suggests that single parents are more likely to live with their children than two-parent households. We calculate the marginal effect of *psingle* and find that the probability of living with their eldest son is 0.23 percentage points higher in case (a) and 0.27 percentage points higher in case (b) for single parents, whereas the probability of living

with a child other than the eldest son is 0.15 percentage points higher in case (a) and 0.12 percentage points higher in case (b) for single parents. These are plausible results because, in two-parent households, the parents can take care of one other, whereas a single parent does not have this option and hence will be more likely to live with his/her children. In addition, the coefficient of *ksingle* is positive and significant in cases (1-b) and (2-b), suggesting that parents are more likely to live with children who are not eldest sons and who are divorced. This result suggests that parents live with, and give assistance to, their divorced children because divorced children are more likely to need assistance from their parents than married children.

To summarize our findings in this section, elderly parents are more likely to live with their eldest sons if the father was a self-employed worker before retirement, a result that is consistent with the dynasty model, whereas they are more likely to live with a child other than the eldest son if the father was an executive before retirement, a result that is consistent with the strategic bequest model. In addition, daughters whose husbands adopt the daughter's surname are more likely to live with the daughter's parents, a result that is consistent with the dynasty model. As for parental attitudes towards their children, parents who think that children should take care of their parents are more likely to live with a child other than the eldest son, whereas parents who think that it is the duty of the eldest son to take care of his parents are more likely to live with their eldest son. Thus, many of our results are broadly consistent with the dynasty model, the strategic bequest model (which is consistent with the selfish life cycle model), and Japanese social norms and traditions, whereas we cannot find any results that are consistent with the altruism model.

7. Conclusion

In this paper, we analyzed the determinants of the living arrangements of elderly parents and their children (whether elderly parents live with their children, and if so, with which child) in Japan using micro data from the 1998 "National Survey of Families (in Japanese, *Kazoku ni tsuiteno Zenkoku Chousa*)," which was conducted in January 1999 and provided by the National Family Research of Japan and the Information Center for Social Science Research on

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Japan, Institute of Social Science, University of Tokyo (SSJ Data Archive).

Our results show that the proportion of elderly parents living with their eldest sons is much higher than that of elderly parents living with children other than the eldest son, even if the eldest son is not the eldest child. However, if parents live independently, it is not necessarily the case that the eldest son lives closest to his parents. In addition, we find that elderly parents are more likely to live with their eldest sons if the father was a self-employed worker before retirement, whereas they are more likely to live with a child other than the eldest son if the father was an executive before retirement. Furthermore, we find that daughters whose husbands adopt the daughter's surname are more likely to live with the daughter's parents. All of these findings are consistent with the dynasty and/or strategic bequest (selfish life cycle) models. We also find that the living arrangements of elderly parents are still very much based on Japanese social norms and traditions. Thus, we find support for all models of household behavior other than the altruism model.

Turning to a comparison of our results with those of previous studies, our results are consistent with the results of Ohtake (1991), Ohtake and Horioka (1994), and Horioka, et al. (2000) in that we both find support for the strategic bequest model. However, as far as we know, our study is the first to find support for the dynasty model and for social norms and traditions based on an analysis of the living arrangements of elderly parents and their children, and this was made possible by our richer data set, which includes detailed information on siblings and parental attitudes towards their children.

We turn finally to directions for further research. The survey we use in our analysis collects information on family structure and sibling composition, making it ideal for the purposes of the analysis here, but information on many socioeconomic characteristics (for example, the financial assets of parents and children, the income of each child, transfers from parents to each child and vice versa, etc.) is not available. One direction for further research is to find a data source that includes information on these variables so that we can do a more rigorous analysis, especially of the strategic bequest model.

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Table 1: Composition of Children's Siblings

Composition of siblings	Number of households	Percentage (%)
Son (only child)	62	11.70
Daughter (only child)	44	8.30
One child	106	20.00
Eldest son-second son	86	16.23
Eldest son-eldest daughter	68	12.83
Eldest daughter-eldest son	79	14.91
Eldest daughter-second daughter	68	12.83
Two children	301	56.79
Eldest son-second son-third son	14	2.64
Eldest son-second son-eldest daughter	17	3.21
Eldest son-eldest daughter-second son	17	3.21
Eldest son-eldest daughter-second daughter	10	1.89
Eldest daughter-eldest son-second son	18	3.40
Eldest daughter-eldest son-second daughter	15	2.83
Eldest daughter-second daughter-eldest son	12	2.26
Eldest daughter-second daughter-third daughter	20	3.77
Three children	123	23.21
Total	530	100.00

Sibling's birth order	Number of observations
First-born	530
Second-born	423
Third-born	124
Total	1077

Table 2-1: Who Lives with His/Her Parents?

Composition of siblings	Number of households	Birth order			Cohabiting children
		1st	2nd	3rd	
Son (only child)	62	26 (0.42)			26
Daughter (only child)	44	16 (0.36)			16
One child	106	42 (0.40)			42
Eldest son-second son	86	**33 (0.38)**	6 (0.07)		39
Eldest son-eldest daughter	68	**23 (0.34)**	5 (0.07)		28
Eldest daughter-eldest son	79	4 (0.05)	**28 (0.35)**		32
Eldest daughter-second daughter	68	16 (0.24)	3 (0.04)		19
Two children	301	76 (0.25)	42 (0.14)		118
Eldest son-second son-third son	14	**5 (0.36)**	1 (0.07)	1 (0.07)	7
Eldest son-second son-eldest daughter	17	**9 (0.53)**	0 (0.00)	3 (0.18)	12
Eldest son-eldest daughter-second son	17	**10 (0.59)**	2 (0.12)	1 (0.06)	13
Eldest son-eldest daughter-second daughter	10	**5 (0.50)**	0 (0.00)	1 (0.10)	6
Eldest daughter-eldest son-second son	18	3 (0.17)	**6 (0.33)**	1 (0.06)	10
Eldest daughter-eldest son-second daughter	15	2 (0.13)	**7 (0.47)**	4 (0.27)	13
Eldest daughter-second daughter-eldest son	12	0 (0.000)	2 (0.17)	**5 (0.42)**	7
Eldest daughter-second daughter-third daughter	20	5 (0.25)	4 (0.20)	2 (0.10)	11
Three children	123	39 (0.32)	22 (0.18)	18 (0.15)	79
Total	530	157	64	18	239

Table 2-2: Who Lives Closest to His/Her Parents?

Composition of siblings	Number of parents living independently	Birth order			Closest children
		1st	2nd	3rd	
Son (only child)	36	36 (1.00)			36
Daughter (old child)	28	28 (1.00)			28
One child	64	64 (1.00)			64
Eldest son-second son	48	**38 (0.79)**	36 (0.75)		74
Eldest son-eldest daughter	40	**28 (0.70)**	29 (0.73)		57
Eldest daughter-eldest son	47	36 (0.77)	**38 (0.81)**		74
Eldest daughter-second daughter	49	38 (0.78)	35 (0.71)		73
Two children	184	140 (0.76)	138 (0.75)		278
Eldest son-second son-third son	7	**2 (0.29)**	5 (0.71)	5 (0.71)	12
Eldest son-second son-eldest daughter	5	**1 (0.20)**	3 (0.60)	4 (0.80)	8
Eldest son-eldest daughter-second son	4	**2 (0.50)**	3 (0.80)	3 (0.75)	8
Eldest son-eldest daughter-second daughter	4	**1 (0.25)**	3 (0.75)	2 (0.50)	6
Eldest daughter-eldest son-second son	8	3 (0.38)	**5 (0.63)**	**5 (0.63)**	13
Eldest daughter-eldest son-second daughter	5	4 (0.80)	**3 (0.60)**	4 (0.80)	11
Eldest daughter-second daughter-eldest son	5	3 (0.60)	5 (1.00)	**3 (0.60)**	11
Eldest daughter-second daughter-third daughter	9	5 (0.56)	5 (0.56)	5 (0.56)	15
Three children	47	21 (0.45)	32 (0.68)	31 (0.66)	84
Total	295	222 (0.75)	170 (0.58)	31 (0.11)	423

Note: The totals do not necessarily add because, in some cases, more than one child lives with the parents or lives closest to the parents.

Data source: The same as Table 1.

Table 3-1: Descriptive Statistics for Parents

Parents	All households (530)	Parents who live with their eldest son (157)	Parents who live with children other than the eldest son (78)	Parents who live independently (295)
Mean (Standard deviation)				
Father's age	70.36	70.37	72.08	70.01
	(5.00)	(5.16)	(4.63)	(4.95)
Mother's age	67.97	67.75	67.82	68.63
	(4.95)	(4.93)	(5.00)	(9.00)
Father's educational attainment (years)	10.89	10.58	10.60	11.08
	(2.20)	(2.10)	(2.27)	(2.22)
Mother's educational attainment (years)	10.48	10.05	10.25	10.76
	(1.55)	(1.44)	(1.49)	(1.58)
Father's income	222.69	167.45	188.33	261.17
	(211.63)	(183.33)	(240.48)	(86.46)
Mother's income	101.73	121.47	119.74	86.46
	(147.46)	(208.11)	(177.99)	(85.57)
Parents' income	324.42	288.92	308.08	347.63
	(249.64)	(247.97)	(357.02)	(211.75)
Number of observations (percentage)				
Divorced or widowed	134 (25.28)	55 (35.03)	29 (37.18)	50 (16.95)
Male	12	4	1	7
Homeownership rate	485 (91.51)	155 (98.73)	75 (96.15)	255 (86.44)
Health condition (good)				
Father	242 (59.31)	66 (62.26)	27 (54.00)	149 (59.13)
Mother	311 (60.04)	86 (56.21)	41 (53.25)	184 (63.89)
Education				
High School Graduate				
Father	164 (40.20)	37 (23.57)	15 (19.23)	112 (37.97)
Mother	246 (47.49)	53 (35.10)	32 (41.56)	161 (56.29)
College Graduate				
Father	40 (9.80)	8 (5.10)	5 (6.41)	27 (9.15)
Mother	3 (0.58)	0 (0.00)	0 (0.00)	3 (1.05)
Occupation before retirement (Father[*])				
Executive	46 (8.68)	9 (5.73)	9 (11.54)	28 (9.49)
Salaried worker	249 (46.98)	64 (40.76)	32 (41.03)	153 (51.86)
Self-employed worker	145 (27.36)	56 (35.67)	20 (25.64)	69 (23.39)
Parents' attititudes towards their children				
Parents should sacrifice themselves for their children	353 (66.60)	113 (71.97)	58 (74.36)	182 (61.69)
Children should live with their parents when the parents become old and cannot take care of themselves	356 (67.16)	120 (76.43)	63 (80.77)	173 (58.64)
It is an eldest son's duty to take care of his parents	252 (47.55)	99 (63.06)	28 (35.90)	125 (42.37)

Notes: *In the case of widows, the occupation before retirement is that of the widow herself.

Data source: The same as Table 1.

Table 3-2: Descriptive Statistics for Children

Children	All households (530) All children (1077)	Parents who live with their eldest son (157)		Parents who live with a child other than the eldest son (78)		Parents who live independently (295)
		Eldest sons who live with their parents (157)	Other children who do not live with their parents (178)	Children who are not eldest sons who live with their parents (78)	Children who do not live with their parents (91)	Children who do not live with their parents (573)
Mean (Standard deviation)						
Age	42.73	44.25	43.66	44.06	44.23	41.61
	(5.91)	(5.88)	(5.32)	(5.72)	(5.24)	(6.01)
Son's educational attainment (years)	14.02	13.64	13.91	11.89	13.52	14.39
	(2.01)	(1.95)	(1.91)	(2.71)	(2.10)	(1.94)
Daughter's educational attainment (years)	13.15	-	12.73	12.90	12.90	13.42
	(1.63)	(-)	(1.46)	(1.87)	(1.52)	(1.60)
Number of observations (percentage)						
Daughter	513 (47.63)	0 (0.00)	110 (61.80)	69 (88.46)	49 (53.85)	285 (49.74)
Divorced or widowed	47 (4.36)	8 (5.10)	6 (3.37)	13 (16.67)	6 (6.59)	14 (2.44)
Education						
Son--High school graduate	289 (51.24)	98 (62.42)	39 (57.35)	4 (44.44)	25 (59.52)	123 (42.71)
College graduate	261 (46.28)	55 (35.03)	29 (42.65)	2 (22.22)	15 (35.71)	160 (55.55)
Daughter--High school graduate	420 (81.87)	0 (0.00)	97 (54.45)	53 (76.82)	43 (87.76)	227 (79.65)
College graduate	77 (15.01)	0 (0.00)	9 (8.18)	10 (14.49)	4 (8.16)	54 (18.95)
The son adopts his wife's surname	30 (5.32)	1 (0.64)	10 (14.71)	0 (0.00)	4 (9.52)	15 (5.21)
The daughter marries a man who adopts her surname	48 (9.36)	0 (0.00)	6 (5.45)	31 (44.93)	1 (2.04)	10 (3.51)

Data source: The same as Table 1.

Table 4-1: Estimation Results

Dependent variable: LIVING

(parents live with the eldest son; parents live with a child other than the eldest son, and parents live independently)

	Parents live with their eldest son (=1) or live independently (=0)	Parents live with a child other than the eldest son (=1) or live independently (=0)	Parents live with their eldest son (=1) or live independently (=0)	Parents live with a child other than the eldest son (=1) or live independently (=0)
	(1-a)	(2-a)	(1-b)	(2-b)
Explanatory variables				
hselfemployed	0.639 **	0.318	0.690 **	0.527
the father was a self-employed worker before retirement	(0.288)	(0.531)	(0.296)	(0.553)
ewifefamily1	-7.684	0.545	-7.481	1.592 *
the eldest son adopts his wife's surname	(1144.273)	(1.253)	(244.764)	(0.854)
kwifefamily1	0.701	-0.122	0.712	-0.167
at least one son other than the eldest son adopts his wife's surname	(0.575)	(1.051)	(0.568)	(1.091)
kwifefamily2	0.955	1.844 **	0.697	2.687 **
at least one daughter marries a man who adopts her surname	(0.783)	(0.668)	(0.619)	(0.721)
hexecutive	0.138	1.294 *	0.081	1.509 **
the father was an executive before retirement	(0.484)	(0.669)	(0.460)	(0.733)
phouse	7.922	1.433	7.735	1.284
the parents are homeowners	(260.263)	(1.206)	(110.484)	(0.979)
eeduc	-0.163 *	-0.165	-0.133	-0.107
the educational attainment of the eldest son (in years)	(0.081)	(0.128)	(0.084)	(0.139)
psacrifice			0.040	0.092
parents feel that they should sacrifice themselves for their children			(0.270)	(0.481)
pchildduty			0.245	2.117 ***
parents feel that children should live with their parents when the parents become old and cannot take care of themselves			(0.297)	(0.633)
pesonduty			0.485 *	-1.879 ***
parents feel that it is the eldest son's duty to take care of his parents			(0.271)	(0.516)
psingle	1.223 ***	1.599 ***	1.191 ***	1.784 ***
single parent	(0.364)	(0.431)	(0.327)	(0.513)
phealth	-0.084	-0.148	-0.039	0.217
one or both parents are unhealthy	(0.236)	(0.356)	(0.237)	(0.446)
efirstmarriage	0.340	0.976 *	0.273	1.189 *
the eldest son married first	(0.335)	(0.569)	(0.327)	(0.623)
ksingle	1.081	1.575 **	0.164	1.410 *
at least one child other than the eldest son is single	(0.749)	(0.876)	(0.622)	(0.759)
seniorsister	0.430	0.375	0.418	-0.009
the eldest son has an older sister	(0.356)	(0.584)	(0.362)	(0.698)
alternative 1/alternative 0	131/173	32/173	131/173	32/173
Log simulated-likelihood	-217.765	-217.765	-217.765	-217.765
Chi 2	0.000	0.000	0.000	0.000
sigma1-2	-0.082	-0.082	-0.990	-0.990
sigma1-3				

Notes: Standard errors are in parentheses.

***Significant at the 1 percent level. **significant at the 5 percent level, *significant at the 1 percent level.

pincome, peduc, page, hparttimer, esingle, eage, keduc, three, and a constant are included in all specifications, but their coefficients are suppressed.

Data source: The same as Table 1.

Table 4-2: Marginal Effects

Dependent variable: LIVING

(parents live with their eldest son; parents live with a child other than the eldest son, and parents live independently)

	Parents who live with the eldest son	Parents who live with a child other than the eldest son	Parents live independently
		Case (a)	
Explanatory variables			
hselfemployed	0.152	0.009	-0.161
the father was a self-employed worker before retirement			
ewifefamily1	-0.342	0.144	0.199
the eldest son adopts his wife's surname			
kwifefamily1	0.193	-0.033	-0.160
at least one son other than the eldest son adopts his wife's surname			
kwifefamily2	0.111	0.264	-0.376
at least one daughter marries a man who adopts her surname			
hexecutive	-0.041	0.212	-0.171
the father was an executive before retirement			
phouse	0.393	0.044	-0.437
the parents are homeowners			
eeduc	-0.034	-0.011	0.045
the educational attainment of the eldest son (in years)			
psingle	0.232	0.151	-0.384
single parent			

	Parents who live with their eldest son	Parents who live with a child other than the eldest son	Parents live independently
		Case (b)	
Explanatory variables			
hselfemployed	0.166	0.021	-0.187
the father was a self-employed worker before retirement			
ewifefamily1	-0.341	0.204	0.137
the eldest son adopts his wife's surname			
kwifefamily1	0.187	-0.011	-0.176
at least one son other than the eldest son adopts his wife's surname			
kwifefamily2	0.074	0.353	-0.427
at least one daughter marries a man who adopts her surname			
hexecutive	0.081	1.509	0.138
the father was an executive before retirement			
phouse	7.735	1.284	7.922
the parents were homeowners			
eeduc	-0.031	-0.004	0.034
the educational attainment of the eldest son (in years)			
psacrifice	0.009	0.004	-0.013
parents feel that they should sacrifice themselves for their children			
pchildduty	0.047	0.068	-0.115
parents feel that children should live with their parents when the parents become old and cannot take care of themselves			
pesonduty	0.126	-0.111	-0.015
parents feel that it is the eldest son's duty to take care of his parents			
psingle	0.270	0.115	-0.385
single parent			

Note: Marginal effects are evaluated at the sample means.

Data source: The same as Table 1.

Endnotes

[1] A large number of detailed studies have analyzed living arrangements and residential choice, but studies that focus on the case of multiple children are limited in spite of its importance. There are some studies for countries other than Japan that analyze living arrangements in the case of multiple children (e.g., Hoerger et al. (1996), Hiedmann and Stern (1999), Engers and Stern (2002), and Konrad et al. (2002)), but there are few studies that focus on the relationship between living arrangements and bequest motives.

[2] A large number of detailed studies have analyzed living arrangements (e.g., Kotlikoff and Morris (1990), Ohtake (1991), Ohtake and Horioka (1994), Hayashi (1995), Yashiro et al. (1997), Funaoka et al. (1999), and Iwamoto and Fukui (2001)) (see Iwamoto and Fukui (2001) for more details on living arrangements in Japan), but in this section, we introduce only previous studies that focus on the relationship between living arrangements and bequest motives.

[3] Most previous studies assume that the amount of care a child gives to his or her parents and the distance between the residences of the parent and child are negatively correlated, but Hirdmann and Stern (1999) find that family members' valuation of care provided by a child depends positively on the distance between the residences of the parent and child. In this paper, we test the strategic bequest model on the assumption that the amount of care a child provides to his or her parents is a negative function of the distance between the residences of the parent and child, with children living with the parents providing the most care.

[4] This social norm was codified in the Meiji Civil Code (promulgated in 1898), which specifies that the eldest son will receive the parents' entire estate, but the new civil code (promulgated in 1947) specifies equal division of the bequest among one's children as the default (although it is possible to divide one's estate differently if one leaves a will).

[5] We defined retired households as households in which the father's current age is 60 or older and neither the father nor the mother is working.

[6] Parents who live with both the eldest son and a child other than the eldest son were classified as living with the eldest son only because our estimation method did not allow us to classify them in both categories (there were two such observations). Thus, strictly speaking, this category should be called "parents who do not live with the eldest son but live with another child."

[7] Because of the possibility that there is multicollinearity among the proportions of respondents adhering to the three views, we checked for this possibility and obtained the following results: the correlation between the proportions of respondents adhering to views (a) and (b) is 0.195, that between the proportions of respondents adhering to views (a) and (c) is 0.266, and that between the proportions of respondents adhering to views (b) and (c) is 0.384. Thus, the correlation between the proportions of respondents adhering to views (b) and (c) is the highest, but even this correlation is not overwhelmingly high.

[8] We use the asmprobit command in STATA to estimate multinomial probit models (MNP) using maximum simulated likelihood. In the case of this command, the quasi-Monte Carlo integration (Hammersley sequence) is implemented using the Geweke-Hajivassiliou-Keane (GHK) algorithm.