# Bargaining Power Within the Family in South Korea: Transfers to Parents from Adult Children and Vice-versa*

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## Abstract

In this paper we consider net transfers to parents from adult children and net transfers from other parents to adult children in Korea. In doing so, we extend the literature on interfamily transfers in several ways. First, for a given couple, both sets of parents enter the optimization problem. Second, we develop and estimate nonlinear econometric models where the amount of transfers to the husband's (wife's) parents is assumed to depend on the couple's income, the income of the husband's parents, the income of the wife's parents , and the bargaining power of the husband (wife) within the family. Further, we argue that it is plausible that each spouse cares more about their parents than their in-laws, and thus such transfers are a form of semi-private consumption. Thus, we also extend the literature by investigating bargaining over semi-private consumption that is an important component in family expenditure. We consider two models for these two-way intergenerational transfers. The first model we consider allows for bargaining between the husband and the wife, and between each spouse and their parents. We first assume that the couple is myopic in the sense that they do not consider potential transfers from parents when dividing their household income. The second model is a dynastic collective model involving the couple and both sets of parents where the couple considers potential transfers from parents when dividing their household income. We estimate these models on panel data from South Korea (2001–2005) and find that the data supports the first model but not the second. Further, we obtain relatively precise estimates of bargaining power parameters and find that we cannot reject the null hypothesis that the husband and wife have equal bargaining power.

## 1. Introduction

Private intergenerational transfers have been extensively studied by economists. The altruism model made famous by Barro (1974) and Becker (1974, 1991), and the exchange model introduced by Cox (1987), are examples of theoretical models that explain intergenerational transfer behavior. In more recent work this behavior has been analyzed in a vast body of literature including a series of papers by Altonji et al (1997), Lundberg et al (1996), Duflo (2003) and Thomas (1994). In the U.S. and other developed European countries, market institutions and government pensions supplement or entirely substitute for the support that younger family members would provide to older ones. As a result, most work on transfers has focused on transfers from parents to children. At the same time, there have been a series of papers by Chiappori (1988, 1992) and by Mazzocco (2006, 2007) on bargaining within the family.

This paper uses models of family bargaining to extend the literature on intergenerational transfers between adult married children and their parents in two ways. First, for a given couple, both sets of parents enter the optimization problem. Second, we develop and estimate models where the amount of transfers to the husband's (wife's) parents is assumed to depend on the couple's income, the income of the husband's parents, the income of the wife's parents, and the bargaining power of each spouse within the family. The motivation for our work is threefold. First, in developing countries transfers from children to parents constitute a significant portion of the parents' income. Second, we argue that it is plausible that each spouse cares more about their parents than their in-laws, and thus such transfers are a form of semi-private consumption that is an important component of the couples'

budget constraint; Behrman and Rosenzweig (2006) have argued that observable semi-private consumption is essential in looking at bargaining power within the family. Third, understanding upstream intergenerational transfers is important as it helps policy makers in developing countries design better policies toward the low income elderly who are not covered by recently introduced pension systems.

We consider two static collective models to explain the couple's joint decision on the transfers to both sets of parents (and vice-versa) and estimate these models on panel data from Korea (2001–2005). The first model allows for bargaining not only between husband and wife but also between each spouse and their parents.; here we assume that the couple is myopic in the sense that they do not consider potential transfers from parents when dividing their household income. The second model is a dynastic collective model involving the couple and both sets of parents where the couple considers potential transfers from parents when dividing their household income. We find that the first model of transfers fits the data while the second does not, and that we cannot reject null the hypothesis of equal bargaining power between spouses.

The paper is organized as follows. In section 2 we present some basic stylized facts on intergenerational transfers in South Korea. In section 3, we review the existing literature on intergenerational transfers with a focus on developing countries, and we also review some of the large and growing literature on family bargaining. In section 4 we present two theoretical models of intergenerational transfers. In section 5 we discuss our estimation strategy for the models and how our econometric approach compares to recent work by Kazianga (2006). We then discuss how our approach relates to earlier work on transfers to parents by Lee, Parish, and Willis (1994), Lillard and Willis (1997) and Khemani (1999).

Section 6 discusses the institutional features in Korea and our data. In section 7 we present estimation results. Section 8 concludes the paper.

## 2. Basic Facts on Within-Family Transfers in South Korea

In this section we provide some basic stylized facts on intergenerational transfers in South Korea.[1] To see the importance of transfers from children to parents in Korea as compared to many Western economies consider Figure 1, which shows how inter-vivo transfers involving the elderly in South Korea are different from those in ten Western countries. Interestingly, from Figure 1 one sees that Korean parents are 50% more likely to receive a net transfer from their children than to provide their children with a net transfer. On the other hand, in nine of the ten Western countries, children are five times more likely to receive a net transfer from their parents than to give one to their parents. In the remaining country, Spain, children are twice more likely to receive a net transfer from their parents than vice-versa. Furthermore, on average, children in the ten developed countries are five times more likely to receive a net transfer from their parents than to give one.

*[Figure 1 here.]*

Figure 2 presents the overall pattern of transfers between elderly people in the U.S. and their children in 2002, that is, whether there are any exchanges and, if so, in which direction they flow. It demonstrates that downstream transfers dominate the direction of the flow. For example, 38% of those ages 65-79 give to their children but do not receive anything from them, while only 3% of them report that they do not give to the children but receive transfers from them.

*[Figure 2 here.]*

Table 1 shows the contribution of transfers from children to the total income of elderly parents in Korea relative to Japan, the US, and Germany. The difference between Korea and these other countries is dramatic: transfers from children make up over half the total income of elderly Koreans, while these transfers constitute less than ten percent of the income of the elderly in the other three countries.

*[Table 1 here.]*

Table 2 shows the percentage distribution of adult children across different transfer behaviors towards the parents for the years 2001-2005 in the Korea Labor and Income Panel Study (KLIPS). From this we see that approximately 55%-60% of families make net transfers to at least one parent, while only approximately 20%-25% receive a net transfer from their parents. Further, approximately 13% of the households give only to the husband's parents while only 3% give only to the wife's parents.

*[Table 2 here.]*

Table 3 indicates that when a couple makes a transfer to both sets of parents, the transfer to the husband's parents is 50% more than the transfer to the wife's parents. In the last column of Table 3 we calculate that approximately 6% of a couple's household income is allocated toward financial transfers to both sets of parents. The stake is high enough to consider the transfer decision to each set of parents as a bargaining outcome between husband and wife. While these results cannot be considered to be definitive, they certainly support the possibility that husbands have greater bargaining power, thus motivating the derivation and estimation of the models below. Further, as shown in the last column of the Table 2 the fact that 20%-25% of couples receive a net transfer from their parents suggests the need to also consider models that allow transfers from parents to children as well.

*[Table 3 here.]*

## 3. Literature Review

### *3.1 Intergenerational Transfers*

Cox and Fafchamps (2008) present a thorough review of the literature on intergenerational transfers. Intergenerational transfers in developing countries are likely to focus on old age support because social security is often inadequate and parents rely on private support from adult children. Ravallion and Deardon (1988) estimated transfer equations with Indonesian data and found significant targeting towards elderly people. More recently Cox, Galasso, and Jimenez (2006) studied private inter-household transfers in a diverse cross section of developing countries based on nationally representative surveys for Albania, Bulgaria, Jamaica, Kazakhstan, the Kyrgyz Republic, Nepal, Nicaragua, Panama, Peru, Russia and Vietnam. They find that transfers from young to old are greater than those going from old to young in the Latin American countries in their sample as well as in Vietnam and Nepal, whereas the opposite is true for Russia and Bulgaria.

Since Cox (1987) introduced an exchange model there has been an issue on the motives behind upstream intergenerational transfers as to whether these transfers are altruistically motivated or whether the elderly receive reward for the service they provided to the children. Raut and Tran (2005) proposed two alternative models of intergenerational transfers linking parental investment in children's human capital and old-age support. The first model formulates these transfers as a pure loan contract and the second model views them as based on self-enforcing two-sided altruism. They found that parents and children are altruistic in a manner consistent with the second model (??).

Another empirical issue is the "crowd out" effect of upstream intergenerational transfers. The altruism model predicts that government income redistribution programs will be ineffective due to adjustments in private intergenerational transfers. On the other hand, the exchange model can prevent crowd out. According to Cox and Fafchamps (2008) numerous studies do suggest partial crowd out, on the order of a 20 to 30 cent reduction in private transfers per dollar increase in public transfers. However, the range of estimated effects is exceedingly wide, with many studies suggesting little private transfer response at all. Kazianga (2006) thoroughly investigates possible explanations for the weak transfer response found in numerous empirical studies by taking a careful econometric approach that addresses a variety of estimation issues, such as potential endogeneity of income, non-linearities in income effects, and selection bias.

These papers, as well as the work on the United States by Altonji et al (1997), focus on testing the implications of altruism in estimating equations which are based on theory but they do not directly allow for recovering structural parameters. They also do not allow for bargaining within the family, although Altonji et al (1993) suggested that a bargaining model could be useful in analyzing these transfers. Finally, none of these studies considers transfers between an adult couple and both sets of parents. We address all three of these issues below.

### *3.2 Intrahousehold Bargaining*

In this section we give a brief overview of some of the papers in the large and growing literature on intrahousehold bargaining. Manser and Brown (1980), and McElroy and Horney (1981) characterize the household as a group of agents making joint decisions. In these papers the household decision process is modeled as a Nash bargaining problem. Chiappori (1988, 1992) extends this analysis to allow for any type of efficient decision

process by developing the static collective model. This model has been extensively studied, tested, and estimated in the literature, and numerous empirical papers have shown that the distribution of bargaining power between parents is important for their investment decisions. in children's human capital (See, e.g., Thomas, Contreras, and Frankenberg 2002 and Rubalcava and Thomas 2000). Furthemore, Blundell, Chiappori and Meghir (2005) extend this collective model to allow for the existence of public consumption (which is interpreted as children's consumption). Mazzocco (2006) extends the Blundell, Chiappori and Meghir (2005) approach by developing a dynamic collective model. He uses this model to recover parents' preferences for expenditure on when at least one parent works.[2] However, there have been relatively few studies (discussed below) that consider bargaining over upstream intergenerational transfers. This study extends the collective model to this area.

## 4. Economic Models of Transfers from Adult Children to Parents and Vice-versa

### *4. 1 Basic Structure*

Here we consider two models of transfers between a couple and their parents. For simplicity we assume that the couple has only one adult child and there is no difference in the expected role of sons and daughters towards their parents. Further we assume that both of the husband's parents and both of the wife's parents are alive and live together. Finally, we consider the altruistic motive and assume that parents do not provide any services to their adult children in exchange for the transfers. Consideration of the exchange motive is left for future research.

[2] Two other papers in this literature are Brown (2008), who studied the positive relationship between dowries and women's welfare, and Schoeni (2000) who examined the case where altruistic parents and parents-in-law make transfers to their adult children.

Each spouse has their own consumption (not observed in our data) and is assumed to care about only their own parents' utility.[1] Each spouse treats their parents collectively. That is, only total consumption of own parents matters and how surviving parents allocate the transfers from their child does not affect the couple's transfer decisions to parents. Given these assumptions, the parents of each spouse are treated hereafter as one entity. Further, we assume that children's joint utility function does not contain a public good. [3]

To make this problem more tractable, we employ an additively separable logarithmic utility function for each spouse's utility and introduce an altruism parameter $\alpha_i \quad (i = h, w)$ for the strength of each child's altruistic feelings toward their parents' consumption. Further, we assume that husband and wife care about their respective parents equally ($\alpha_h = \alpha_w$).[4] Thus we can write the utility of each adult child as

$$U^l(C^l, C^{lp}) = \ln C^l + \alpha \ln C^{lp}, \quad l = h, w.$$

Each parent's altruism toward their child is given by $\beta_i \quad (i = hp, wp)$, where for simplicity we assume that $\beta$ is the same for sons and daughters.

$$U^{kp}(C^{kp}, C^k) = \ln C^{kp} + \beta \ln C^k, \quad k = h, w.$$

Note that one may want to adjust the adult children's respective consumption by an equivalence scale reflecting the number of children they have, or adjust their parents' consumption by an equivalence scale reflecting the number of surviving parents. However, this will not affect the optimization problem given the choice of logarithmic utility.[5]

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[3] Adding a public consumption which is separable to transfer to parents (for example, couple's own children's consumption) does not change the result.

[4] Since we will assume that the parameter determining altruism from the wife to her parents and the parameter determining altruism from the husband to his parents are equal, allowing for caring in the sense of Becker (1981) will not change our results.

[5] In future we will consider other functional forms for the utility function that will not have this

From section 2 and Table 2, it is clear that a non-trivial fraction of adult children receive net transfers from their parents. Therefore, we need to allow for two-way transfers (transfers to/from parents). Once we introduce transfers from parents, it is unreasonable to assume that the children always control the decision making. For example, if the couple receives net transfers from their parents, it is more plausible to assume that altruistic parents play a role in determining such transfers. We propose two models which allow for transfers in both directions.

### *4.2 A Myopic Model of Bargaining between Adult Children and their Parents*

In our first model we allow for bargaining between the adult children and their parents as Altonji et al (1993) suggest, where the final transfers depend on each child's intra-household bargaining power as well as on the child's inter-household bargaining power. To do this, we use a two-step transfer collective model. At the first step, the husband and wife bargain only over the division of household income between them, and their shares are determined by their respective bargaining power. In the second step each spouse bargains with their parents, and after this consumption takes place.

The first step for the children is to solve for $\rho^i \ (i = h, w)$ which denotes each spouse's monetary share of the family's joint income $Y$. They do this through the optimization problem

$$\begin{aligned} &\underset{\rho^h, \rho^w}{Max}\ \mu^h \ln \rho^h + \left(1-\mu^h\right)\ln \rho^w \\ &s.t. \quad \rho^h + \rho^w = Y, \end{aligned} \tag{1}$$

property.

where $\mu^h$ is the husband's bargaining power. The solution for $\rho^i \ (i = h, w)$ is not surprisingly

$$\begin{aligned} \rho^h &= \mu^h Y, \\ \rho^w &= \left(1-\mu^h\right) Y. \end{aligned} \tag{2}$$

Note that the children are myopic in the sense that they do not take into account transfers from the parents in determining their sharing rule.

At the second step, each spouse and their parents bargain over all available resources (the parents' income and the spouse's share of the couple's income). It is further assumed that the husband and his parents pool their income, as do the wife and her parents. With this assumption we can write the problem between the husband and his parents as

$$\begin{aligned} &\underset{C^h, C^{hp}}{Max}\ \mu^{hp}\left(\ln C^{hp} + \beta \ln C^h\right) + \left(1-\mu^{hp}\right)\left(\ln C^h + \alpha \ln C^{hp}\right) \\ &s.t. \quad C^{hp} + C^h = Y^{hp} + \mu^h Y, \\ &\qquad T^{hp} = C^{hp} - Y^{hp}, \end{aligned} \tag{3}$$

where $\mu^{hp}$ is the parents' bargaining power over their son, $C^h$ is the husband's private consumption, $C^{hp}$ is the total consumption of the husband's parents, $Y^{hp}$ denotes the before-transfer income of the parents and $T^{hp}$ denotes the transfer from the husband to his parents. Note that $T^{hp}$ can be greater than zero (the net transfer to the parents is positive) or less than or equal to zero (the net transfer to the parents is zero or negative). The final transfer is determined by the respective bargaining power between the husband and his parents and their respective altruism towards each other. It is straight forward to show that

$$T^{hp} = \frac{\left(\left(1-\alpha\right)\mu^{hp} + \alpha\right)\mu^h}{\left(\beta-\alpha\right)\mu^{hp} + 1 + \alpha} Y - \frac{1-\left(1-\beta\right)\mu^{hp}}{\left(\beta-\alpha\right)\mu^{hp} + 1 + \alpha} Y^{hp}. \tag{4}$$

Note that the transfer to/from the husband's parents does not depend on the income of the wife's parents in this model. The same analysis applies to the wife and her parents, who carry out the following optimization

$$\begin{aligned} &\underset{C^w, C^{wp}}{Max}\ \mu^{wp}\left(\ln C^{wp} + \beta \ln C^{w}\right) + \left(1-\mu^{wp}\right)\left(\ln C^{w} + \alpha \ln C^{wp}\right) \\ &s.t.\quad C^{wp} + C^{w} = Y^{wp} + \left(1-\mu^{h}\right)Y, \\ &\qquad T^{wp} = C^{wp} - Y^{wp}, \end{aligned} \tag{5}$$

where $\mu^{wp}$ is the bargaining power of the wife's parents over their daughter, $C^w$ is the wife's private consumption, $C^{wp}$ is the total consumption of the wife's parents, $Y^{wp}$ denotes the before-transfer income of the wife's parents and $T^{wp}$ denotes the transfers made to the wife's parents. Again the transfer can be negative or positive, and is equal to

$$T^{wp} = \frac{\left(\left(1-\alpha\right)\mu^{wp} + \alpha\right)\left(1-\mu^{h}\right)}{\left(\beta-\alpha\right)\mu^{wp} + 1 + \alpha} Y - \frac{1-\left(1-\beta\right)\mu^{wp}}{\left(\beta-\alpha\right)\mu^{wp} + 1 + \alpha} Y^{wp}. \tag{6}$$

As in the case of (4), the transfer to/from the wife's parents does not depend on the income of the husband's parents. The exclusion restrictions for (4) and (6) will be used to test the model. Finally, since this is a collective model, the outcome will be Pareto efficient (see Chiappori 1992).

### *4.3 A Dynastic Collective Model of Transfers Between Adult Children and Their Parents*

We now consider collective bargaining among the adult couple, the husband's parents and the wife's parents, over the total resources available ($Y + Y^{hp} + Y^{wp}$). Each pair of married child and his/her parents care about each other, but children do not care about their in-laws and parents do not care about their children's spouses. In this model $\mu^h$ denotes the

husband's bargaining power with regard to his wife, $\mu^{hp}$ denotes the relative bargaining power of the husband's parents over the married couple and the wife's parents, and $\mu^{c}$ denotes the couple's bargaining power over both sets of parents. Thus the bargaining power of the wife's parents over the couple and the husband's parents is $1-\mu^{hp}-\mu^{c}$. The couple and two sets of parents solve

$$\begin{aligned}
&\underset{C^h,C^w,C^{hp},C^{wp}}{Max}\ \mu^{hp}\left(\ln C^{hp}+\beta\ln C^{h}\right)+\mu^{c}\left(\mu^{h}\left(\ln C^{h}+\alpha\ln C^{hp}\right)+\left(1-\mu^{h}\right)\left(\ln C^{w}+\alpha\ln C^{wp}\right)\right)\\
&\qquad+\left(1-\mu^{hp}-\mu^{c}\right)\left(\ln C^{wp}+\beta\ln C^{w}\right)\\
&s.t.\quad C^{h}+C^{w}+C^{hp}+C^{wp}=Y+Y^{hp}+Y^{wp},\\
&\qquad T^{hp}=C^{hp}-Y^{hp},\\
&\qquad T^{wp}=C^{wp}-Y^{wp}.
\end{aligned}\tag{7}$$

The optimal transfers are given by

$$T^{hp}=\frac{\mu^{hp}+\alpha\mu^{c}\mu^{h}}{\beta+\left(\alpha-\beta\right)\mu^{c}+1}\left(Y+Y^{hp}+Y^{wp}\right)-Y^{hp},\tag{8}$$

$$T^{wp}=\frac{\left(1-\mu^{hp}-\mu^{c}\right)+\alpha\mu^{c}\left(1-\mu^{h}\right)}{\beta+\left(\alpha-\beta\right)\mu^{c}+1}\left(Y+Y^{hp}+Y^{wp}\right)-Y^{wp}.\tag{9}$$

Equations (8) and (9) show that in the dynastic collective model the income of the wife's parents affects the transfer to the husband's parents and vice-versa. Recall that in the myopic collective model described in section 4.2 the income of the wife's parents does not affect the transfer to the husband's parents (and vice-versa). Thus if the in-law's income has no effect on the transfer to own parents, this would cast doubt on the dynastic collective model, while if there is an effect this will cast doubt on the model in 4.2

## 5. Estimation Strategy and Comparison to Previous Work

### *5.1 Estimation Strategy*

A number of approaches can be used to estimate the transfer function in both of these models. First, one can employ least squares approach, interpreting the transfer equation as a projection and ignoring the fact that there is considerable bunching of transfers at zero that is difficult for a regression model to handle. Recall that in Table 2 from section 2, 22% of couples report that they neither make nor receive transfers to/from either set of parents. Transaction costs associated with transfers are introduced to explain these non-participant households. It would imply that positive transfers are observed only when latent transfers exceed the transaction costs. Following Udry (1994) and Kazianga (2006), we use a Rosett's friction model (Rosett, 1959) to take this bunching into account

$$T_{it}^{j} = \begin{cases} T_{it}^{j}* - K_1^j & \text{if } T_{it}^{j}* < K_1^j, \\ 0 & \text{if } K_1^j < T_{it}^{j}* < K_2^j, \quad (j = hp, wp) \\ T_{it}^{j}* + K_2^j & \text{if } T_{it}^{j}* > K_2^j, \end{cases} \tag{10}$$

where $T_{it}^{j}*$ is latent transfer, $K_1^j$ and $K_2^j$ are unobserved transaction costs, and $T_{it}^{j}$ denotes the actual transfer functions as defined in (4), (6), (8) and (9). The latent transfers must be greater than the transaction costs for one to observe any transfer.

A natural starting point is to consistently estimate the following equations describing transfers between the couple and the husband's parents, and the transfers between the couple and the wife's parents

$$\begin{aligned} T_{it}^{hp} &= \pi_{11} Y_{it} + \pi_{12} Y_{it}^{hp} + \pi_{13} Y_{it}^{wp} + e_{1it}, \\ T_{it}^{wp} &= \pi_{21} Y_{it} + \pi_{22} Y_{it}^{hp} + \pi_{23} Y_{it}^{wp} + e_{2it}, \\ (e_{1it}, e_{1it}) &\sim iid \quad N(0, V). \end{aligned} \tag{11}$$

The models in sections 4.2 and 4.3 place restrictions on these reduced-form equations. The parameter restrictions for the myopic model in section 4.2 are

$$\pi_{11} = \frac{\left((1-\alpha)\mu^{hp} + \alpha\right)\mu^{h}}{(\beta-\alpha)\mu^{hp} + 1 + \alpha} Y; \quad \pi_{12} = -\frac{1-(1-\beta)\mu^{hp}}{(\beta-\alpha)\mu^{hp} + 1 + \alpha} Y^{hp}; \quad \pi_{13} = 0;$$

$$\pi_{21} = \frac{\left((1-\alpha)\mu^{wp} + \alpha\right)(1-\mu^{h})}{(\beta-\alpha)\mu^{wp} + 1 + \alpha}; \quad \pi_{21} = 0; \quad \pi_{23} = -\frac{1-(1-\beta)\mu^{wp}}{(\beta-\alpha)\mu^{wp} + 1 + \alpha}. \qquad (12)$$

In considering this model, we first test $H_0 : \pi_{13} = 0, \pi_{22} = 0.$ If we do not reject this null hypothesis, we then solve for the structural parameters from the reduced form parameters. However, there are only four reduced form parameters while there are five structural parameters in this model: children's altruism parameter ($\alpha$), parent's altruism parameter ($\beta$), husband's relative power over wife ($\mu^{h}$), husband's parents' relative power over son ($\mu^{hp}$), wife's parents' relative power over daughter ($\mu^{wp}$). Therefore, the structural parameters are not identified without additional assumptions. To address this, we assume $\mu^{hp} = \mu^{wp}$, which means the parents have same degree of bargaining power over male and female children in this model.[6] Given this parameter restriction, only $\mu^{h}$ is identified and it is straightforward to show that

$$\mu^{h} = \frac{\pi_{11}}{(\pi_{11} + \pi_{21})}.$$

The parameter restrictions for the model in section 4.3 are

[6] This assumption implies $\pi_{12} = \pi_{23}$.

$$\pi_{11} = \frac{\mu^{hp} + \alpha\mu^{c}\mu^{h}}{\beta + (\alpha - \beta)\mu^{c} + 1}; \quad \pi_{12} = \frac{\mu^{hp} + \alpha\mu^{c}\mu^{h}}{\beta + (\alpha - \beta)\mu^{c} + 1} - 1;$$

$$\pi_{13} = \frac{\mu^{hp} + \alpha\mu^{c}\mu^{h}}{\beta + (\alpha - \beta)\mu^{c} + 1}; \quad \pi_{21} = \frac{\left(1 - \mu^{hp} - \mu^{c}\right) + \alpha\mu^{c}\left(1 - \mu^{h}\right)}{\beta + (\alpha - \beta)\mu^{c} + 1};$$

$$\pi_{22} = \frac{\left(1 - \mu^{hp} - \mu^{c}\right) + \alpha\mu^{c}\left(1 - \mu^{h}\right)}{\beta + (\alpha - \beta)\mu^{c} + 1}; \quad \pi_{23} = \frac{\left(1 - \mu^{hp} - \mu^{c}\right) + \alpha\mu^{c}\left(1 - \mu^{h}\right)}{\beta + (\alpha - \beta)\mu^{c} + 1} - 1. \tag{13}$$

Note that this model implies $\pi_{13} \neq 0$ and $\pi_{22} \neq 0$. Thus, if we cannot reject the null hypothesis $H_1: \ \pi_{13} = \pi_{22} = 0$, we will no longer consider the dynastic model from section 4.3. If we do reject $H_1$, we then test a second implication of the dynastic model, namely $H_2 : \pi_{11} = \pi_{13}, \pi_{21} = \pi_{22}$.

However, estimating the reduced form transfer functions in (11) and obtaining standard errors for these estimates is not trivial, since the parents' incomes are not observed. Instead we run the following imputation regressions in (16) from another data set, KLoSA[8], based on explanatory variables that we observe in both data sets

$$\begin{aligned} Y_{it}^{hp} &= \delta_{hp} Z_{it} + u_{hpit}, \\ Y_{it}^{wp} &= \delta_{wp} Z_{it} + u_{wpit}, \\ (u_{hpit}, u_{wpit}) &\sim iid \quad N(0, \Omega), \end{aligned} \tag{14}$$

where $Z_{it}$ is a vector of exogenous variables. Note that there must be at least two variables in $Z_{it}$ for (11) to be identified.

[7] See Cox and Fafchamps (2008) for a discussion on inter-family t ransfers in other developing countries.

[8] See Xu (2007) for a more thorough review.

Further, one may worry that the family's income is endogenous, since if there is a shock to their desired transfers to their parents, the husband and wife may work harder. In this case transfers are causing income while we want the casual effect of family income on transfers. Thus, we run a reduced form equation for family income

$$Y_{it} = \varphi_1 X_{it} + \varphi_2 \hat{Y}_{it}^{hp} + \varphi_3 \hat{Y}_{it}^{wp} + \varepsilon_{it}, \quad \varepsilon_{it} \sim iid \quad N(0, \sigma_e^2), \tag{15}$$

where either $X_{it}$ contains a variable not included in $Z_{it}$ or $X_{it} = Z_{it}$ and $Z_{it}$ contains at least three variables. Following Kazianga we use the family's net assets as the excluded instrument. This is not an ideal exclusion restriction since one could argue that assets could also affect transfers, hence we also use the spouses' education levels as excluded instruments.[9] We plug predicted values from (14) into the transfer functions given by (11)

$$\begin{aligned} T_{it}^{hp*} &= \pi_{11}\hat{Y}_{it} + \pi_{12}\hat{Y}_{it}^{hp} + \pi_{13}\hat{Y}_{it}^{wp} + \tilde{e}_{1it}, \\ T_{it}^{wp*} &= \pi_{21}\hat{Y}_{it} + \pi_{22}\hat{Y}_{it}^{hp} + \pi_{23}\hat{Y}_{it}^{wp} + \tilde{e}_{2it}. \end{aligned} \tag{16}$$

We then maximize the period by period likelihood function for (16) conditional on the predicted values $\hat{Y}_{it}$, $\hat{Y}_{it}^{hp}$ and $\hat{Y}_{it}^{wp}$. These estimates can be shown to be consistent using arguments from Amemiya (1979). However, obtaining the standard errors analytically is difficult, so we use the bootstrap with 500 replications (where the resampling is done by family) to obtain standard errors. Each bootstrap replication involves:

1. Choose a new bootstrap cross-section sample in KLoSA;
2. Estimate both parents' income equations from the KLoSA replication sample; 3. Choose a new bootstrap sample of family histories from KLIPS, i.e. resample by families, not by family-year observations;
4. Estimate a first stage equation for family income using the new KLIPS replication sample pooling the data by family and year;

[9] In future work we will make $\hat{Y}_{it}, \hat{Y}_{it}^{hp}$ *and* $\hat{Y}_{it}^{wp}$ all a function of $Z_{it}$ and $X_{it}$.

5. Estimate (16) for both the transfers to the husband's parents and the transfers to the wife's parents by forming a quasi-likelihood consisting of family-year contributions. Store the reduced form parameters in a vector;

6. Repeat steps 1-5 500 times so that each parameter has 500 bootstrap observations. Get standard errors by taking the standard deviation of the bootstrap observations for each parameter. Obtain covariance between any two parameters by taking the covariance in the 500 bootstrap replications for both parameters.

### *5.2 Comparison to Kazianga's (2006) Approach*

Numerous empirical studies have estimated income-transfer patterns but because they use a variety of approaches the results are quite broad. Kazianga (2006), in a very careful empirical study on income transfers, addresses a number of estimation issues in this context. First, as noted above, he uses Rosset's friction model to explain zero transfers. Second, he allows family income to be endogenous, using family assets as an instrument for permanent income and rainfall as an instrument for transitory income. We also use this procedure with family assets as the excluded instrument; however we also correct the standard errors for this imputation procedure.[11] Kazianga also allows for a very flexible response of transfers to income by considering a spline function in income in the transfer equation. Using a spline function, or a polynomial, in income is straight forward if income can be considered exogenous. If one treats income as endogenous, it is better to use the actual values of income in the polynomial and then exploit normality to deal with the endogeneity, analogous to the procedure in Blundell and Smith (1986). We will consider this in future work.

Finally, Kazianga allows transfers to be non-separable functions of income and the unobservables, using the approach in Altonji, Ichimura and Otsu (2008) when he analyzes

[11] Kazianga appears to have substituted a predicted value of income in, which will produce consistent parameter estimates but inconsistent standard errors.

one-way transfers (allowing only for positive transfers). The Altonji et al procedure cannot be used for two-way transfers (allowing both for positive and negative transfers). While Kazinga thus covers a number of areas that we do not, we would note that the reverse is also true. First, we deal with missing parents' income, while Kazianga simply considers biases from omitting it. Second we would argue that our approach has a closer link to theory than his. Third, and perhaps most importantly, we also allow for a role of both sets of parents while he does not do this. Fourth, we use the bootstrap to obtain consistent standard errors. In summary, this paper deals with different issues and thus is a complement, rather than a substitute, for his important paper.

### *5.3 Comparison to Lee, Parish, Willis (1994), Lillard & Willis (1997) and Khemani (1999)*

There have been three important papers on transfers from children to parents with bargaining approach in developing countries. Lee, Parish, and Willis (1994, hereafter LPW) were the first to address bargaining power in the adult children's families when analyzing upstream transfers. Using data from the 1989 Taiwan Family and Women Survey, they found that wives who earned more income provided more support to their own parents. Lillard & Willis (1997, hereafter LW) also found that the amount being transferred to the wife's parents depends more strongly on the wife's income than on the husband's income, and vice-versa for the size of transfers to the husband's parents. However, these papers did not focus on family bargaining nor did they consider formal models or estimate structural parameters for the process determining transfers from adult children to parents.

Khemai (1999) focuses on a bargaining model and found that the distribution of assets between husbands and wives affects the likelihood of transfers to their respective

families using Indonesia Data. From the bargaining model she derives latent variables that determine whether transfers are made to the parents of the husband and the wife, respectively, and reports reduced-form probit estimates. However, she does not consider the actual amounts to be transferred to each set of parents in the estimation and hus she cannot identify the effect of assets on transfers.[12]

We extend these papers in several directions. First, we use formal bargaining models to derive our estimating equations and estimate structural parameters. Second, we use the parents' characteristics and a second data set to impute the parents' income, while LPW and Khemani only use parents' characteristics as control variables. Third, in LPW and Khemani, positive (net) transfers from parents to children are treated as zero transfers, while we also develop and estimate a model of two-way transfers which allows transfers from parents at the same time. Finally, LPW, LW and Khemai ignore the role of tradition in upstream transfers, while we allow for first-born sons to differ in their transfer behavior, since they have traditional duties to take care of the parents. We also allow older adult couples to have different structural parameters since they may be more affected by tradition than their younger counterparts.

## 6. Data and Institutional Background of South Korea

### *6.1 Data Description*

This paper uses data from the "Korea Labor and Income Panel Study" (KLIPS), which is administrated by the Korea Labor Institute (KLI). We briefly introduce the data and emphasize the unique features of KLIPS exploited in this paper. The KLIPS is a longitudinal

[12] Formally she can identify the coefficient of assets divided by the standard deviation of the transfer equation.

study of a representative sample of Korean households and individuals living in urban areas. Starting from year 1998, it is conducted annually to track the characteristics of households as well as the economic activities, labor movement, income, expenditures, education, job training, and social activities of individuals. Especially important is the fact that this panel dataset contains information on financial exchanges with parents from 4th wave (2001) on. Specifically, a household is asked whether the household head has surviving parents who do not co-reside with the couple, who they are, and how much financial support to and from the household head's parents was made last year. The same questions are asked about the spouse's parents. This financial exchange with parents is, of course, our focus of interest. Summary statistics are presented in Table 4.

*[Table 4 here.]*

Parents' income is crucial information in our models. Unfortunately, KLIPS does not have data on parents' income. However, we can obtain the level of parents' education of both spouses, as well as the children's birth order, and use these in a regression for parents' income in a second data set. Specifically, the KLI has created another panel survey on the middle-aged/elderly population (45 or older) in South Korea: "Korean Longitudinal Study of Ageing" (KLoSA) starting in 2006. The KLoSA contains elderly people's detailed demographic information such as education, marital status as well as income. We impute parents' income by using parents' education and widowed status, as well as children's age, education and birth order, which are common in both KLIPS and KLoSA, and use the procedure described in section 5.1, i.e. use the coefficients from KLoSA to impute parents' income in our KLIPS data. [15] We pool the waves (2001-2005) and scale all transfer amounts

[15] We use those in KLoSA who have at least one married child who does not live with them.

and income levels to real (2004) values. Note that KLoSA cannot be used to analyze these two way transfers since it does not have information on the income of the adult couple or on the income of the in-laws.

### *6.2 Tradition and Support for Parents*

Greenhalgh (1985, p.265) states that "Traditional Confucian China and its cultural offshoots, Japan and Korea, evolved some of the most patriarchal family systems that ever existed." It is fair to say that elderly persons depend on their adult sons (especially first son) for old-age support in the East Asian traditional family system affected by Confucianism. On the other hand, it is also fair to say that the Confucian patriarchal family system is no longer valid to all families in modern Korean society; many changes have occurred to the Korean family structure partly as a result of the increasing employment of women and the decreasing gender inequality in socioeconomic status – see Xie and Zhu (2006).

For example, gender difference has been substantially reduced in years of schooling over time. However, it is probably safe to say that i) patriarchal family systems still work in older generations and ii) the first son usually has greater responsibility to support the parents. we will deal with this by allowing different behavior from first sons and from families over 40. For this version of the paper we only include younger households whose head's age is less than or equal to 40 years and where the husband is not a first son. Table 4 presents some summary statistics of the sample used in estimation.[18] It shows that the wife's parents are richer than the husband's parents. This arises because husbands are older than

[18] When estimating upstream transfer model, if total transfers made by household is greater than household income, those observations are excluded from the estimation. Further, if transfer made by either set of parents is greater than the parents' imputed income, those households are deleted.

their wives on average, so the husband's parents are older than the wife's parents and less educated.

### *6.3 Institutional Background: Public Support for the Elderly in Korea*

As we show in section 2 and Table 1, in South Korea adult children play a major role in their parents' financial welfare because public pension plans are very recent phenomena. The compulsory coverage of the social security system had not been extended to all residents until 1999. [20] In addition to the National Pension Program various types of assistance under the National Basic Livelihood Security System are currently provided to low-income citizens who meet the criteria in South Korea. To be eligible for government support citizens should show that their imputed total income is lower than the minimum cost of living as defined by government guidelines. A certain level of financial support from children is assumed to exist and is included in the imputed value of total income. That is, under Korean law there is a legal family responsibility that obligates adult children to support their parents, and the government assumes that children provide a certain level of such support regardless of the amount actually transferred by the children. Hence, even though children do not provide any transfers, low income elderly citizens can be excluded from the public assistance program if their children are presumed to be capable of support. Those responsible for financial support include the married daughter and her husband. Daughters have the same degree of responsibility towards their parents as their male siblings under Korean law. Note that if

[20] The National Pension Act came into effect in January 1988 in Korea. It covered only those who were working in firms with more than 10 full-time employees. The National Pension has extended coverage to workplaces with more than 5 full-time employees (January 1992), and farmers and fishermen (July 1995) and April 1999, the National Pension Program extended compulsory coverage to all residents aged 18 to 60 in Korea. The number of insured persons increased from about 6.5 million in 1998 to about 16 million in 1999.

men have considerable bargaining power and limit the families' contribution to the wives' parents, the public safety net may be inadequate for the this group of parents.

## 7. Estimation Results

We estimate the reduced form (conditional on the predicted values in 16), which underlies the models in sections 4.2 and 4.3. We use a sample of non-first sons under 40 years old. Instead of estimating $K_1^j$ and $K_2^j$ $(j = hp, wp)$, which are unobserved transaction costs in the Rosett's Friction Model in (10) in section 5.1, we assume that there is a fixed minimum transaction cost of □100,000 in any transfers. That is, we assume $\left|K_i^j\right| = $□100,000 $(i = 1, 2 \;\; j = hp, wp)$.[21]

Columns 1 and 2 of Table 5.1 reports estimation results for the Rosett's friction model under this fixed cost assumption. First, note that both the coefficient on the income of the wife's parents in the transfer equation for the husband's parents, and the coefficient on the income of the husband's parents in the transfer equation for the wife's parents, are very insignificant, casting serious doubt on the dynastic model in section 4.3. The myopic model in section 4.2 predicts i) both the coefficient on the wife's parents' income in the transfer equation to the husband's parents and the coefficient on the husband's parents income in the transfers equation to the wife's parents are zero, and ii) the coefficient on the husband's parent's income in their transfer function should equal that on the wife's income in their transfer equation. As noted above i) is clearly satisfied by the data. Thus, we have re-estimated the transfer equations with this constraint imposed, and placed the results in

[21] □100,000 is approximately U$100 in 2004. If reported transfers are less than □100,000, we recoded those as 0's and estimated the transfer equations.

columns 3 and 4 of Table 5.1. In both columns 1 and 2, and in columns 3 and 4, prediction ii) is satisfied. For either set of results the coefficient estimates are very close and, not surprisingly, we cannot reject their equality at standard confidence levels.

*[Table 5.1 here.]*

We then solve for the measure of the husband's bargaining power. Focusing on the estimates in columns 3 and 4, we estimate this to be .60 with a standard error of .0707 as in Table 6. Note that this parameter estimate that we cannot reject the null hypothesis that the husband's bargaining power is 0.5, i.e. we cannot reject equal bargaining power between husband and wife.

*[Table 6 here.]*

We reestimate the reduced form model in (16) for $\left|K_i^j\right| = \square\, 50{,}000$ $(i = 1, 2 \;\; j = hp, wp),$ as a robustness check. Table 5.2 shows the results which are very similar to those in Table 5.1.

*[Table 5.2 here.]*

Again we estimate $\mu^h$ at .60 with a standard error of .0729, and thus we cannot reject the null hypothesis of equal bargaining power between husbands and wives.

Next, we investigate whether husband's bargaining power varies across education groups. We divided the sample into 4 groups of households according to the relationship between the husband's and wife's education. Group 1 includes households, in which both the husband's and wife's levels of education are greater than high school. In Group 2 households husbands' education is greater than high school while wives' education is less than or equal to high school. The opposite case is included in Group 3. The last group of households (Group 4) consists of households where both spouses have education levels

below or equal to high school. The results for the reduced form model (16) for $\left|K_i^j\right| = \square\ 100{,}000$ $(i = 1, 2\ \ j = hp, wp)$ are in Table 7.1, while the results for the reduced form model for $\left|K_i^j\right| = \square\ 100{,}000$ $(i = 1, 2\ \ j = hp, wp)$ are in Table 7.2.

*[Table 7.1 here.]*

*[Table 7.2 here.]*

Table 8 shows the structural results for each education group, which are calculated from Table 7.1 and Table 7.2. We tested whether husbands' bargaining power vary across groups and we found that we cannot reject equality of $\mu^h$ across groups.[22]

*[Table 8 here.]*

## 8. Conclusion and Future Research

In this paper, two models of intergenerational transfers between adult children and their parents are derived assuming a formal collective model framework. We find that we can distinguish between the models, and a simple myopic collective model appears to fit the data. We can use this model to investigate the respective bargaining power between husbands and wives. Our work differs from previous work in that we include both sets of parents, focus on bargaining over an important form of semi-private consumption, use the bootstrap to obtain consistent standard errors, and estimate a structural bargaining parameter. Overall the results suggest that the husband's preferences and the wife's preferences have equal weight.

[22]The last row of Tables 7.1 and 7.2 show the test results for $H_0 : \mu_1^h = \mu_2^h = \mu_3^h = \mu_4^h$.

For our future research we can consider the following extensions. First, we will consider structural models where the husband's weight depends positively on his yers of education, and negatively on the wife's years of education.[23] Second, we will consider alternative specifications of preferences where equivalence scales play a role in transfers. Third, Mazzocco (2007) found that household members cannot commit to future plans and the individual participation constraints bind frequently, which implies that households must renegotiate their decisions over time. Mazzocco's paper uses pooled cross section data spanning 5 years. While the current version of KLIPS may not allow us to precisely estimate his model, it should be possible to do so as future waves of KLIPS become available.

[23] If the model of Raut and Tran (2005) is correct, the education coefficients will also reflect the son's and daughter's obligation to their parents varying positively with the child's obligations.

## References


Altonji, J.G., Hayashi, F. and Kotlikoff, L.J. (1993). "Is the extended family altruistically linked? Direct tests using micro data." *American Economic Review*, **82**, 1177–1198.

Altonji, J.G., Hayashi, F. and Kotlikoff, L.J. (1997). "Parental altruism and inter-vivos transfers: Theory and evidence." *Journal of Political Economy*,. **105**, 1121–1166.

Altonji, J.G., Ichimura, H. and Otsu, T. **(**2008). "Estimating Derivatives in Nonseparable Models with Limited Dependent Variables." Cowles Foundation Discussion Paper No. 1668.

Amemiya, Takeshi. (1979). "The Estimation of a Simultaneous-Equation Tobit Model." *International Economic Review*, **20**,169-181.

Barro, Robert J. (1974). "Are government bonds net wealth?" *Journal of Political ,Economy*, **82**, 1095-1117.

Becker, Gary S. (1974). "A theory of Social Interactions." *Journal of Political Economy*, **82**, 1063-1093.

Becker, Gary S. (1991). A Treatise on The Family. Harvard University Press, Cambridge.

Behrman, Jere R. and Mark R. Rosenzweig. (2006). "Parental Wealth and Adult Children's Welfare in Marriage." *The Review of Economics and Statistics*,. **88**,. 496-509.

Blundell, Richard, Pierre-Andre Chiappori and Costas Meghir. (2005). "Collective Labor Supply With Children." *Journal of Political Economy*, **113**, 1277-1306.

Blundell, Richard and Richard Smith. (1986). "An Exogeneity Test for the Simultaneous Equation Tobit Model." *Econometrica*, **54**, 679-685.

Brown, Philip H. (2008). "Dowry and Intrahousehold Bargaining: Evidence from China." *The Journal of Human Resources* (Forthcoming).

Chiappori, Pierre-Andre. (1988). "Rational Household Labor Supply." *Econometrica*, **56**,. 63–90.

Chiappori,. Pierre-Andre. (1992). "Collective Labor Supply and Welfare." *Journal of Political Econom,y* Vol. 100, No. 3, pp. 437–467.

Cox, Donald. (1987). "Motives for private income transfers." *Journal of Political Economy*, **95**, 508-46.

Cox, D., E. Galasso, and E., Jimenez. (2006). "Private transfers in a cross section of developing countries." WP 2006-2. Center for Retirement Research, Boston College, Chestnut Hill, MA.

Cox, Donald and Marcel Fafchamps. (2008). "Extended Family and Kinship Networks: Economics Insights and Evolutionary Direction." *Handbook of Development Economics*, Vol. 4, Chapter 58, pp. 3711-3784.

Duflo, Esther. (2003). "Grandmothers and Granddaughters: Old Age Pension and Intra-household Allocation in South Africa." *World Bank Economic Review*, **17**, 1-25.

Greenhalgh, Susan. (1985). "Sexual Stratification: The Other Side of 'Growth with Equity' in East Asia." *Population and Development Review*, **11**, 265–314.

Kazianga, H. (2006). "Motives for household private transfers in Burkina Faso." *Journal of Development Economics*, **79**, 73–117.

Khemani, Stuti. (1999). "Inter-generational Transfers and Intra-household bargaining: evidence from Indonesia." mimeo, World Bank.

Lee, Yean-Ju, William L. Parish and Robert J. Willis. (1994). "Sons, Daughters, and Intergenerational Support in Taiwan." *American Journal of Sociology*, **99,** 1010-1041.

Lillard, Lee A. and Robert J. Willis. (1997). "Motives for Intergenerational Transfers: Evidence from Malaysia." *Demography*, **34**, 115-134.

Lundberg, Shelly J., Robert A. Pollak and Terence J. Wales. (1996). "Do Husbands and Wives Pool their Resources? Evidence from the United Kingdom Child Benefit." *The Journal of Human Resources*, **32**, 463–480.

Manser, M. and Brown, M. (1980). "Marriage and Household Decision-Making: A Bargaining Analysis." *International Economic Review*, **21**, 31–44.

Mazzocco, Maurizio. (2006). "Parents' Preferences for Expenditure on Children When At Least One Parent Works and Preferences are Non-separable." Mimeo, Department of Economics, UCLA.

Mazzocco, Maurizio. (2007). "Household Intertemporal Behaviour: A Collective Characterization and a Test of Commitment." *Review of Economic Studies*, **74**, 857-895.

McElroy, M. B. and M. J. Horney (1981). "Nash-Bargained Household Decisions: Toward a Generalization of the Theory of Demand." *International Economic Review*, **22**, 333-349.

Raut, L.K. and L.H. Tran (2005). "Parental Human Capital Investment and Old-age Transfers from Children: Is it a Loan Contract or Reciprocity for Indonesian Families?" *Journal of Development Economics*, **77**, 389–414.

Ravallion, M. and L. Dearden, (1988). "Social Security in a Moral Economy: An Empirical Analysis for Java." *The Review of Economics and Statistics*, **70**, 36–44.

Rosett, R., (1959). "A Statistical Model of Friction in Economics." *Econometrica,* **27,** 263–267.

Schoeni, Robert F. (2000). "Support Networks Within the Family as a Public Good Problem." Mimeo, Rand Labor and Population Program.

Seok, J. and T. Kim (2000). "The Reality of Elderly Income and Policies for the Improvement of Income Security System." (in Korean) Korea Institute for Health and Social Affairs.

Thomas, Duncan. (1994). "Like Father, Like Son: Like Mother, Like Daughter: Parental Resources and Child Height." *The Journal of Human Resources*, **24**, 950-88.

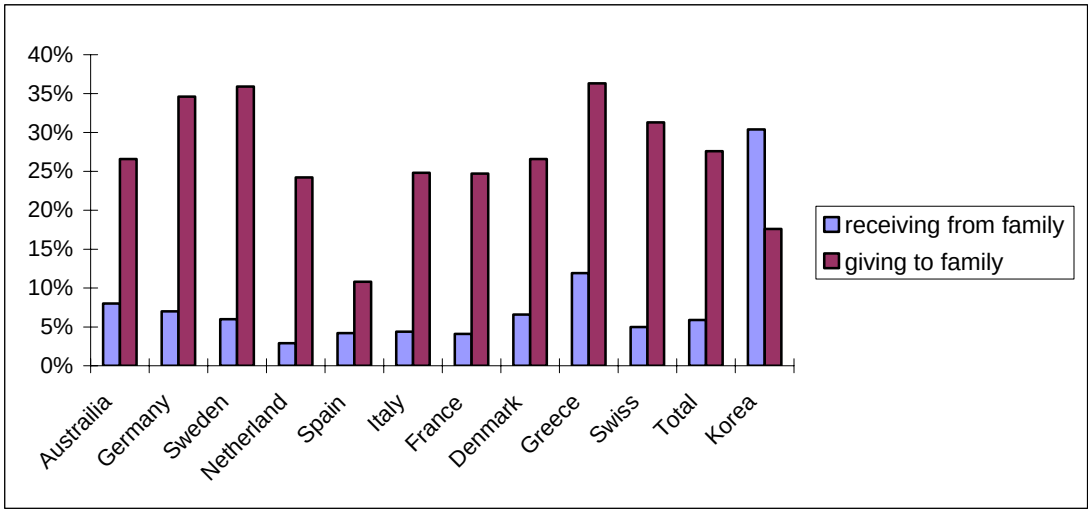
Thomas, D., D. Contreras, and E. Frankenberg. (2002). "Distribution of Power Within the Household and Child Health." Mimeo, Department of Economics, UCLA.

Udry, C. (1996). "Gender, Agricultural Production and the Theory of the Household.." *Journal of Political Economy,* **104**, 1010– 1046.

Xie, Yu and Haiyan Zhu. (2006). "Do Sons or Daughters Give More Money to Parents? Gender and Intergenerational Support in Contemporary Urban China." Population Studies Center Research Report No. 06-607, University of Michigan.

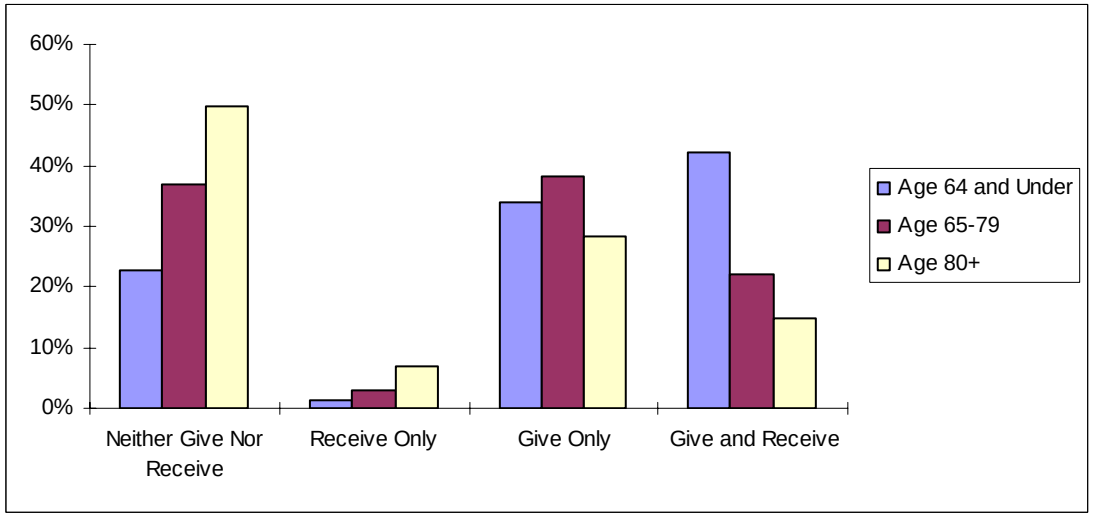
Zeyu, Xu. (2007). "A Survey on Intra-household Models and Evidence." Munich Personal RePEc Archive, Paper No. 3763, University Library of Munich, Germany.

Figure 1: Inter-Vivos Transfers to and from the Elderly (Age≥50)




*Source: Study of Health, Ageing and Retirement in Europe (SHARE 2004) and Korean Longitudinal Study of Ageing (KLoSA 2006).*

Figure 2: Transfers to and from Married Parents and Their Children by Age in the U.S. (Transfers include time, money, and co-residence.)




*Source: The Health and Retirement Study (HRS 2002).*

Table 1: Income Source for the elderly in 1995 (Age≥60) (%)

| Income source | Korea | Japan | U.S. | Germany |
|---|---|---|---|---|
| Labor income | 26.6 | 21.6 | 15.5 | 4.6 |
| Financial income | 9.9 | 6.6 | 23.3 | 13.7 |
| Private transfer | 56.6 | 6.6 | 1.6 | 1.9 |
| Public pension | 6.6 | 57.4 | 55.8 | 77.6 |

*Source: Seok & Kim (2000). Korea Institute for Health and Social Affairs*

Table 2: Percentage Distribution of Household by Type of Net Transfers (%)

| Year | To Both sets of parents | Only to Husband's parents | Only to Wife's parents | To Neither parents | Receive Net Transfer from parents |
|---|---|---|---|---|---|
| 2001 | 37 | 16 | 3 | 24 | 20 |
| 2002 | 38 | 18 | 4 | 20 | 19 |
| 2003 | 37 | 12 | 3 | 24 | 25 |
| 2004 | 45 | 14 | 2 | 18 | 20 |
| 2005 | 44 | 11 | 3 | 22 | 20 |
| 2001 | 37 | 16 | 3 | 24 | 20 |

*Source: Calculated by the author using KLIPS (2001-2005).*

Note: First-born sons and head's age over 40 excluded.

Table 3: Transfer Amounts for the Households with Transfers to Both Parents

| (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|
| Year | N | Transfer to Husband's parents | Transfer to Wife's parents | Couple's Household income | Ratio* |
| 2001 | 127 | 102.66 | 61.67 | 3025.53 | 6.39% |
| | | (10.88) | (5.69) | (127.26) | (0.0074) |
| 2002 | 131 | 130.99 | 86.94 | 3581.42 | 6.29% |
| | | (14.79) | (12.86) | (180.53) | (0.0054) |
| 2003 | 147 | 117.17 | 71.67 | 3518.00 | 6.14% |
| | | (9.56) | (6.10) | (153.15) | (0.0049) |
| 2004 | 166 | 118.45 | 66.14 | 3859.79 | 5.04% |
| | | (11.40) | (5.30) | (168.22) | (0.0033) |
| 2005 | 158 | 124.44 | 87.47 | 3685.18 | 5.65% |
| | | (13.02) | (13.58) | (146.23) | (0.0042) |
| Total | 729 | 118.99 | 74.84 | 3557.66 | 5.85% |
| | | (7.06) | (5.07) | (105.11) | (0.0022) |

*Source: Calculated by the author using KLIPS (2001-2005).*
Notes:
(1) First-born sons and head's age over 40 excluded.
(2) Robust Standard errors are in parentheses.
(3) Transfer amount is measured in tens of thousands of Korean Won (□). □10,000 is approximately U$10 in 2004.is approximately U$10 in 2004
* Ratio: (Column 3 + Column 4) / Column 5.

Table 4: Summary Statistics

| Variables | Mean | Robust Standard Error |
|---|---|---|
| Transfer to husband's parents | 73.18 | (4.16) |
| Transfer to wife's parents | 40.33 | (4.27) |
| Transfer from husband's parents | 16.66 | (2.07) |
| Transfer from wife's parents | 16.13 | (2.12) |
| Couple's household income | 3136 | (68.55) |
| Husband's parents' imputed income | 1321 | (33.53) |
| Wife's parents' imputed income | 1621 | (36.36) |
| Husband's education | 13.68 | (.0996) |
| Wife's education | 13.12 | (.0850) |
| Observation | 1800 | |

Notes:
(1) First-born sons and head's age over 40 excluded.
(2) Zero transfers are included.
(3) Transfer amount is measured in tens of thousands of Korean Won (□). □10,000 is approximately U$10 in 2004.

Table 5.1: Regression Estimation of the Rosett's Friction Model in Sections 4.2 and 4.3 with Fixed Costs ($\left|K_i^j\right| = 100{,}000$ $(i = 1,2 \;\; j = hp, wp)$)

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Variables | Transfer to husband's parents | Transfer to wife's parents | Transfer to husband's parents | Transfer to wife's parents |
| Couple's predicted income | .0274*** | .0179*** | .0269*** | . 0180*** |
| | (.0048) | (.0055) | (.0040) | (.0054) |
| Husband's parents' income | -.0158 | .0004 | -.0172* | |
| | (.0101) | (.0088) | (.0093) | |
| Wife's parents' income | -.0021 | -.0166* | | -.0164* |
| | (.0089) | (.0097) | | (.0086) |
| Observations | 1800 | 1800 | 1800 | 1800 |

Notes:
(1) Bootstrapped Standard errors are in parentheses. Resampling is by household.and 500 replications are used.
(2) Couple's income is predicted from couple's net assets, husband's education and wife's education.
(3) *** p<0.01, ** p<0.05, * p<0.1

Table 5.2: Regression Estimation of the Rosett's Friction Model in Sections 4.2 and 4.3 with fixed costs ($\left|K_i^j\right| = \square\ 50{,}000$ $(i = 1,2\ j = hp, wp)$)

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Variables | Transfer to husband's parents | Transfer to wife's parents | Transfer to husband's parents | Transfer to wife's parents |
| Couple's predicted income | .0266*** | .0173*** | .0261*** | .0173*** |
| | (.0047) | (.0055) | (.0039) | (.0052) |
| Husband's parents' income | -.0156 | .0002 | -.0171* | |
| | (.0100) | (.0087) | (.0089) | |
| Wife's parents' income | -.0022 | -.0161* | | -.0160** |
| | (.0088) | (.0096) | | (.0082) |
| Observations | 1800 | 1800 | 1800 | 1800 |

Table 6: Structural Results for Two-Way Transfers (Model from Section 4.2)

| Parameter | $\left\|K\right\| = \square\ 100{,}000$ | $\left\|K\right\| = \square\ 50{,}000$ |
|---|---|---|
| $\mu^h$ | .5992 | .6020 |
| | (.0707) | (.0729) |

Notes: Based on results from Tables 5.1 and 5.2 See notes to Table 5.1.

Table 7.1: Regression Estimation of the Rosett's Friction Model in Sections 4.2 and 4.3 with fixed costs ($\left|K_i^j\right| = 100{,}000$ $(i = 1,2 \;\; j = hp, wp)$)

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Variables | Transfer to husband's parents | Transfer to wife's parents | Transfer to husband's parents | Transfer to wife's parents |
| Group1's predicted income | .0288*** | .0193*** | .0276*** | .0195*** |
| | (.0048) | (.0068) | (.0042) | (.0068) |
| Group2's predicted income | .0257*** | .0150*** | .0247*** | .0153*** |
| | (.0060) | (.0045) | (.0053) | (.0041) |
| Group3's predicted income | .0419*** | .0168** | .0400*** | .0170** |
| | (.0077) | (.0072) | (.0068) | (.0072) |
| Group4's predicted income | .0255*** | .0135*** | .0240*** | .0138*** |
| | (.0055) | (.0049) | (.0048) | (.0044) |
| Husband's parents' income | -.0131 | .0016 | -.0166* | |
| | (.0103) | (.0092) | (.0094) | |
| Wife's parents' income | -.0055 | -.0152 | | -.0144* |
| | (.0089) | (.0095) | | (.0082) |
| Observations | 1800 | 1800 | 1800 | 1800 |

Notes:
See notes to Table 5.1.
Group1: Husband's education > 12 and Wife's education > 12.
Group2: Husband's education > 12 and Wife's education ≤ 12.
Group3: Husband's education ≤ 12 and Wife's education > 12.
Group4: Husband's education ≤ 12 and Wife's education ≤ 12.

Table 7.2: Regression Estimation of the Rosett's Friction Model in Sections 4.2 and 4.3 with fixed costs ($\left|K_i^j\right| = \square\ 50{,}000\ \ (i = 1,2\ \ j = hp, wp)$)

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Variables | Transfer to husband's parents | Transfer to wife's parents | Transfer to husband's parents | Transfer to wife's parents |
| Group1's predicted income | .0280*** | .0186*** | .0268*** | .0189*** |
| | (.0048) | (.0067) | (.0042) | (.0068) |
| Group2's predicted income | .0249*** | .0142*** | .0238*** | .0145*** |
| | (.0059) | (.0045) | (.0053) | (.0041) |
| Group3's predicted income | .0409*** | .0162** | .0388*** | .0164** |
| | (.0076) | (.0071) | (.0067) | (.0071) |
| Group4's predicted income | .0246*** | .0127*** | .0231*** | .0130*** |
| | (.0054) | (.0048) | (.0047) | (.0044) |
| Husband's parents' income | -.0129 | .0015 | -.0163* | |
| | (.0102) | (.0091) | (.0093) | |
| Wife's parents' income | -.0055 | -.0147 | | -.0140* |
| | (.0088) | (.0094) | | (.0082) |
| Observations | 1800 | 1800 | 1800 | 1800 |

Notes: See notes to Table 7.1.

Table 8: Structural Results for Two-Way Transfers by Education Group (Model from Section 4.2)

| Parameter | $\|K\| =$ □ 100,000 | $\|K\| =$ □ 50,000 |
|---|---|---|
| Group1 ($\mu_1^h$) | .5857 | .5873 |
| 33%* | (.0814) | (.0837) |
| Group2 ($\mu_2^h$) | .6171 | .6213 |
| 18%* | (.0686) | (.0707) |
| Group3 ($\mu_3^h$) | .7016 | .7032 |
| 6%* | (.0907) | (.0927) |
| Group4 ($\mu_4^h$) | .6353 | .6398 |
| 42%* | (.0770) | (.0782) |
| Prob > chi2(3) | (.5983) | (.6145) |

Notes:
Based on estimates from Tables 7.1 and 7.2 .See Notes to Table 5.1.
*Percentage of each group in the sample is shown under each group.