

**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 husband's parents' income, the wife's parent's income, and the bargaining power of 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. Moreover, such transfers are economically important. Thus we also extend the literature by being able to observe bargaining over semi-private consumption that is important economically. We consider two models for these two-way transfers. The first model allows for bargaining between husband and wife, and between each spouse and their parents. We first assume that the couple is our topic 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 is forward looking. 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 equal bargaining power between husbands and wives.

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 behaviors. In more recent work they have been analyzed in a vast literature that included a series of papers by, for example, 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 substitute for, and supplement, support for older family members by younger 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 amount of transfers to the husband's (wife's) parents is assumed to depend on the couple's income, the husband's parents' income, the wife's parents' income, and the bargaining power of husband (wife) within the family. The motivation for our work is threefold. First, transfers from children to parents are very important in determining the parents' income in developing countries. 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, and Behrman and Rosenzweig (2006) have argued that observable semi-private consumption is very useful

for looking at bargaining power within the family. Third, understanding upstream intergenerational transfers are important to help 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 couple's joint decision on these 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. 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 is forward looking. We find that the first model of transfers fits the data while the second does not, and that we cannot reject equal bargaining power hypothesis between husbands and wives.

The paper is organized as follows. In section 2 we present some basic stylized facts on intergenerational transfers in South Korea. In section 3, the existing literature on the intergenerational transfers is reviewed, focusing on developing countries and the some of the large and growing literature on family bargaining. In section 4 we present two theoretical models of transfers. In section 5 we discuss the respective estimation strategies for the models and how our econometric approach compares to recent work by Kazianga (2006). We then discuss early work on transfers to parents by Lee, Parish, and Willis (1994), Lillard and Willis (1997) and Khemani (1999). Section 6 discusses institutional features in Korea and our data. In section 7 we present estimation results for each model. Section 8 concludes the paper.

2. Basic Facts on Within-Family Transfers for South Korea

In this section we provide some basic stylized facts for South Korea on transfers between adult children and their parents; see Cox and Fafchamps (2008) for a discussion about these transfers in other developing countries. To show the importance of transfers from children to parents in Korea as compared to many Western economies consider Figure 1, which shows how inter-vivos transfers involving the elderly in South Korea are different from 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 likely as twice as to receive a net transfer from their parents than vice-versa. Further, on average children in the ten developed countries are likely as five times as 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 down stream transfers dominates the direction of the flow. For example, 38% of those ages 65-79 give to their children but do not receive anything from the children, 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 importance of transfers from their children in the total income of parents in Korea, as compared to the experience in 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 transfer constitute less than ten percent of this 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 how much of couple's household income is allocated toward financial transfers to both sets of parents is calculated. It is approximately 6%. The stake is high enough to consider decision of transfers to each set of parents as bargaining outcome between husband and wife. While these results cannot be considered definitive, these certainly raise 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 to allow transfers from parents.

[Table 3 here.]

3. Literature Review

3.1 Intergenerational Transfers

Cox and Fafchamps (2008) made a thorough review of the literature on the intergenerational transfers. The intergenerational transfers in developing countries are likely to focus on old age support because social security consists of private old-age support from adult children. Ravallion and Deardon (1988) estimated transfer equations with Indonesian data and found significant targeting on the elderly people. More recently Cox, Galasso, and Jimenez (2006) studied private inter-household transfers in a diverse cross section of developing countries for which 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 both the Latin American countries in their sample and in Vietnam and Nepal as well, whereas the opposite is true for Russia and Bulgaria.

Since Cox (1987) introduced exchange model, there has been an issue on the motives on the upstream intergenerational transfers 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 human capital of children to old-age support. The first model formulates these transfers as a pure loan contract and the

second model as self-enforcing two sided altruism. Interestingly in the second model they developed a Nash equilibrium concept and found that parents and children are altruistic in a manner consistent with the second model.

Another empirical issue is the test of “crowding out” effect. Altruism model predicts that government income redistribute program will be ineffective by adjustments in private intergenerational transfers. On the other hand, exchange model can prevent the crowding out. Cox and Fafchamps (2008) said numerous studies do suggest partial crowding 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 studies possible explanations for the weak transfer response found in numerous empirical studies after taking a careful econometric approach that inquires about a variety of estimation issues at once, including selection bias by making use of the Altonji–Ichimura-Otsu estimator, potential endogeneity of income, and non-linearities in income effects.

These papers, as well as the work for the United States by Altonji et al (1997), focus on testing the implications of altruism in estimating equations which are based on theory but do not directly allow for recovering structural parameters. They 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 consider 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 household bargaining; see Xu (2007) for a more thorough review. Manser and Brown (1980), and McElroy and Horney (1981) characterized 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) extended their 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 among parents is important to their children's human capital investment decisions. (See, e.g., Thomas, Contreras, and Frankenberg 2002 and Rubalcava and Thomas 2000). Further, Blundell, Chiappori and Meghir (2005) extended this collective model to allow for the existence of public consumption (which is interpreted as children's consumption). Mazzocco (2006) extended the Blundell, Chiappori and Meghir (2005) approach by developing a dynamic collective model. He used this model to recover parents' preferences for expenditure on children using variables available in commonly used datasets when at least one parent works.¹ There have been relatively few studies to consider bargaining with respect to upstream intergenerational transfers. This study is to extend the collective model to this area.

¹ 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.

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 here that the parents have only one adult child and there is no difference in the expected role of sons and daughters towards their parent. Further we assume that both of the husband's parents and both of the wife's parents are alive and live together. Finally we assume that old parents do not provide any services to their adult children in exchange for the transfers. The exchange motive is left for the future research.

Each spouse has his/her own consumption (not observed in our data) and is assumed to care about only his or her own parents' utility.² Each spouse treats their parents collectively. That is, only total consumption of his/her parents matters and how surviving parents allocate the transfers from their child does not affect the couple's transfer decisions to their parents. Given these assumptions, each partner's parent(s) is 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 α_i ($i = h, w$) for the strength of each child's altruistic feelings toward their parents' consumption. Further we assume that husband and wife care about their respective

² 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.

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.

parents equally ($\alpha_h = \alpha_w$).⁴ Each parent's altruism toward their child is given by β_i ($i = hp, wp$), where for simplicity we assume that β is the same for sons and daughters. 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

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 the 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 both directions of transfers to/from parents.

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 inter-household bargaining power. To do this, we use a two-step transfer collective model. At the first step, the husband and wife bargain

⁴ This assumption can be supported by the assortive mating hypothesis which predicts that prospective spouses are sorted by similar characteristics in the marriage market. We will explore relaxing it in future work.

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

only over the division of household income between them, and their shares are determined by their respective bargaining power. In the second step each child bargains with his parents and after this consumption takes place.

The first step for the children is to solve for ρ^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

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

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

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

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 his/her parents bargain over total all available resources (each parents' income and each 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 husband and his parents' problem as

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

where μ^{hp} is husband's 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 husband's parents' before-transfer income and T^{hp} denotes the transfers made to the husband's 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 husband and his parents and their respective altruism towards each other. It is straight forward to show that

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

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

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

where μ^{wp} is wife's parents' bargaining power 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 wife's parents' before-transfer income and T^{wp} denotes the transfers made to the wife's parents. Again the transfer can be negative or positive, and is equal to

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

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 μ^h denotes the husband's bargaining power with regard to his wife, μ^{hp} denotes the husband's parents' relative bargaining power over the married couple and the wife's parents, and μ^c denotes the couple's bargaining power over the 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

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

The optimal transfers are given by

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

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

Equations (8) and (9) show that the income of the wife's parents affects the transfer to the husband's parents and Vice-versa; recall that the income of the wife's parents does not affect the transfer to the husband's parents (and vice-versa) in the model immediately above in section 4.2. Thus if there is no effect of the in-law's income 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 in section 2 22% of couple's households report that they neither make nor receive transfers to/from neither 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

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

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 husband's parents

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

The models in sections 4.2 and 4.3 place restrictions on these reduced-form equations.

The parameter restrictions for the model in section 4.2 are

$$\begin{aligned} \pi_{11} &= \frac{((1-\alpha)\mu^{hp} + \alpha)\mu^h}{(\beta-\alpha)\mu^{hp} + 1 + \alpha}; & \pi_{12} &= -\frac{1-(1-\beta)\mu^{hp}}{(\beta-\alpha)\mu^{hp} + 1 + \alpha}; & \pi_{13} &= 0; \\ \pi_{21} &= \frac{((1-\alpha)\mu^{wp} + \alpha)(1-\mu^h)}{(\beta-\alpha)\mu^{wp} + 1 + \alpha}; & \pi_{22} &= 0; & \pi_{23} &= -\frac{1-(1-\beta)\mu^{wp}}{(\beta-\alpha)\mu^{wp} + 1 + \alpha}. \end{aligned} \quad (12)$$

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 (α), parent's altruism parameter

(β), husband's relative power over wife (μ^h), husband's parents' relative power over son (μ^{hp}), wife's parents' relative power over daughter (μ^{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 which is imposed in this model, only μ^h is identified and it is straight forward to show that

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

The parameter restrictions for the model in section 4.3 are

$$\begin{aligned} \pi_{11} &= \frac{\mu^{hp} + \alpha\mu^c \mu^h}{\beta + (\alpha - \beta)\mu^c + 1}; & \pi_{12} &= \frac{\mu^{hp} + \alpha\mu^c \mu^h}{\beta + (\alpha - \beta)\mu^c + 1} - 1; \\ \pi_{13} &= \frac{\mu^{hp} + \alpha\mu^c \mu^h}{\beta + (\alpha - \beta)\mu^c + 1}; & \pi_{21} &= \frac{(1 - \mu^{hp} - \mu^c) + \alpha\mu^c (1 - \mu^h)}{\beta + (\alpha - \beta)\mu^c + 1}; \\ \pi_{22} &= \frac{(1 - \mu^{hp} - \mu^c) + \alpha\mu^c (1 - \mu^h)}{\beta + (\alpha - \beta)\mu^c + 1}; & \pi_{23} &= \frac{(1 - \mu^{hp} - \mu^c) + \alpha\mu^c (1 - \mu^h)}{\beta + (\alpha - \beta)\mu^c + 1} - 1. \end{aligned} \quad (13)$$

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 model from section 4.3.

If we do reject H_1 , we then test a second implication of this model

$$H_2: \pi_{11} = \pi_{13}, \pi_{21} = \pi_{22}.$$

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

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

observed. Instead we run following imputation regressions in (16) from another data set KLoSA⁷ 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.

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 family net assets as the excluded instrument; this is not an ideal exclusion restriction since one could argue that assets should also affect transfers, hence we also use husband and wife's education as excluded instruments. We then plug predicted values from (14) into the transfer functions given by (11)

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

⁷ A detailed description of the data used in this paper is presented in section 6.

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 (by where the resampling is 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. sample 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.;
5. Estimate (16) for both the transfers to the husband's parents and 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 1-5 500 times so that each parameter has 500 bootstrap observations. Get standard errors by taking the standard deviation for the bootstrap observations for each parameter. Obtain covariance between 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, addressed a number of estimation issues in this

context. First, as noted above, he used Rosset's friction model. Second, he allows family income to be endogenous, using family assets as an instrument for permanent income and rainfall 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.⁸ 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 incomes 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 for nonseparable functions for transfers between incomes and the unobservables using the approach in Altonji, Ichimura and Otsu when he analyzes 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 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 for 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 compliment, rather than a substitute, for his important paper.

⁸ Kazianga appears to have substituted a predicted value of income in, which will produce consistent parameter estimates but inconsistent standard errors.

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 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) focused on bargaining model and found that the distribution of assets between husbands and wives affects the likelihood of transfers to their origin families using Indonesia Data. She derived latent variables that determine whether transfers are made to the parents of the husband and the wife respectively from the bargaining model and reported reduced form probit estimates. However, she did not consider the actual amounts to be transferred to the each set of parents in estimation. The respective bargaining power of each spouse is likely to affect not only the probability of transfers made to the parents of the husband and the wife respectively but also the actual amounts transferred. Hence, her findings from the probit analysis may not be sufficient to support her argument.

We extend these papers in several directions. First, we use formal bargaining models

to derive our estimating equations. Second, we used 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 husbands to differ in their transfer behavior, since they have traditional duties to take care of the parents. We also allow older husbands and wives 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 of 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 feature of KLIPS to be exploited in this paper. The KLIPS is a longitudinal study of a representative sample of Korean households and individuals living in urban areas and 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 starting from year of 1998. Especially important is the fact that this panel data contains information on financial exchange with parent(s) from 4th wave (2001) on. Specifically a household is asked whether head's parents who do not co-reside still survive and who they are, and how much of financial support to and from

the head's parents was made last year. The same questions are asked about spouse's parents. These financial exchanges with parents are, of course, the focus of interest here. Summary statistics are presented in Table 4.

[Table 4 here.]

The parents' income is crucial information in our models. Unfortunately, KLIPS does not have parents' income. Instead, we can obtain the level of parents' education of both spouses, as well as the children's birth order. The KLI has created another panel survey on the middle/elderly population (45 or older) in South Korea: "Korean Longitudinal Study of Ageing" (KLoSA)⁹ 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, and children's age, education and birth order which are common in both KLIPS and KLoSA, and use the procedure described in section 5.1.¹⁰ We pool the waves (2001-2005) and all transfer amounts and incomes are in real (2004) values. Note that KLoSA is not superior to KLIPS for our problem since KLoSA does not have information on the income of the adult couple or on the income of the in-laws. In future work we could consider dynamic models by exploiting the panel nature of KLIPS.

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

⁹ KLoSA is designed to provide basic data on population ageing in Korea for policy making and cross disciplinary studies. The survey deals with social, economic, physical, and mental aspects of life. See <http://klosa.kli.re.kr> for more detail.

¹⁰ To be eligible to be included in the imputation regression, elderly persons in KLoSA should have at least one married child who dose not live together.

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 societies; 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.¹¹

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 has usually 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 and where the husband is not a first son. Table 4 presents some summary statistics of the samples which are used in estimation.¹² It shows that the wife’s parents are richer than the husband’s parents. This arises because husbands are older than their wives on average, so the husband’s parents are older than the wife’s parents and less educated.

6.2 Institutional Background: Public Support for the Elderly in Korea

As we show in section 2 and Table 1, adult children play a major role in their parents’ financial welfare in South Korea because public pension plans are very recent phenomena.

¹¹ We rely on Xie and Zhu (2006) for this characterization.

¹² 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 additionally ruled out from the estimation of two-way model.

The compulsory coverage of social security system had not been extended to all residents until 1999.¹³ 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 to be a recipient of government support citizens should show that their imputed total income¹⁴ is lower than the minimum living cost as defined by the government guideline. A certain level of financial support from children is assumed to take place and is included in imputed total income. That is, under Korean law there is a legal family responsibility that obligates adult children to support for 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 same degree of responsibility as their male siblings under Korean law. Note that if men have considerable bargaining power and limit the families' contribution to their wives' parents, the public safety net may be inadequate for the wives' parents.

¹³ 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.

¹⁴ Imputed total income consists of actual income and appraised income from assets.

7. Estimation Results

We estimated consistent parameters and standard errors for 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. 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 $|K_i^j| = ₩100,000$ ($i = 1, 2$ $j = hp, wp$).¹⁵

Columns 1 and 2 of Table 5.1 reports estimation results for the Rosett's friction model under this fixed cost assumption. First, note 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 very insignificant, casting serious doubt on the model in section 4.3 The 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 columns 3 and 4 of Table 5.1. In both columns 1 and 2, and in columns 3 and 4, prediction ii) is satisfied.

¹⁵ ₩100,000 is approximately U\$100 in 2004. The choice of benchmark cost K is arbitrary but it reflects a social sanction in South Korea. Koreans have some standard expenses for congratulations and condolences. U\$100 works as widely acceptable amount. If reported transfers are less than ₩100,000, we recoded those as 0's and estimated the transfer equations.

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. We then test the null hypothesis that this parameter equals .5, i.e. equal bargaining power between the husband and wife. We find that the null hypothesis that husbands and wives have equal bargaining power is not rejected at the standard size of test.

We reestimate the reduced form model in (16) for $|K_i^j| = \text{W}50,000$ ($i = 1, 2$ $j = hp, wp$), 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 μ^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.

[Table 6 here.]

Next, we investigated 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. The Group1 includes households that both levels of husband and wife's education are greater than high school. In Group2

households husband's education is greater than high school while wife's education is less than or equal to high school. The opposite case of households is included in Group3. The last group of households (Group4) consists of households where both spouses' education level is below or equal to high school. The results for the reduced form model (16) for $|K_i^j| = \mathbb{W}100,000$ ($i = 1, 2$ $j = hp, wp$) are in Table 7.1, while the results for the reduced form model for $|K_i^j| = \mathbb{W}100,000$ ($i = 1, 2$ $j = hp, wp$) 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 husband's bargaining power vary across groups and we found that we cannot reject equality of μ^h across groups.¹⁶

[Table 8 here.]

8. Conclusions and Future Research

In this paper, two models of intergenerational transfers between adult children and old 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

¹⁶ The last row of Tables 7.1 and 7.2 show the test results for $H_0 : \mu_1^h = \mu_2^h = \mu_3^h = \mu_4^h$.

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.

For our future research we can consider the following extensions. First, we will consider more structural models where the husband's weight depends positively on his education, and negatively on the wife's education.¹⁷ 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. This paper use pooled cross section data for 5 years. This time period may not be long enough to detect the variation in individual decision power. However, it may be possible to apply dynamic collective model in the long run as we have more time periods in the panel data set. If we incorporate the dynamic features of the collective model, we may be able to allow for bargaining power between husband and wife to be affected by transfers made by each set of parents.

¹⁷ 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.

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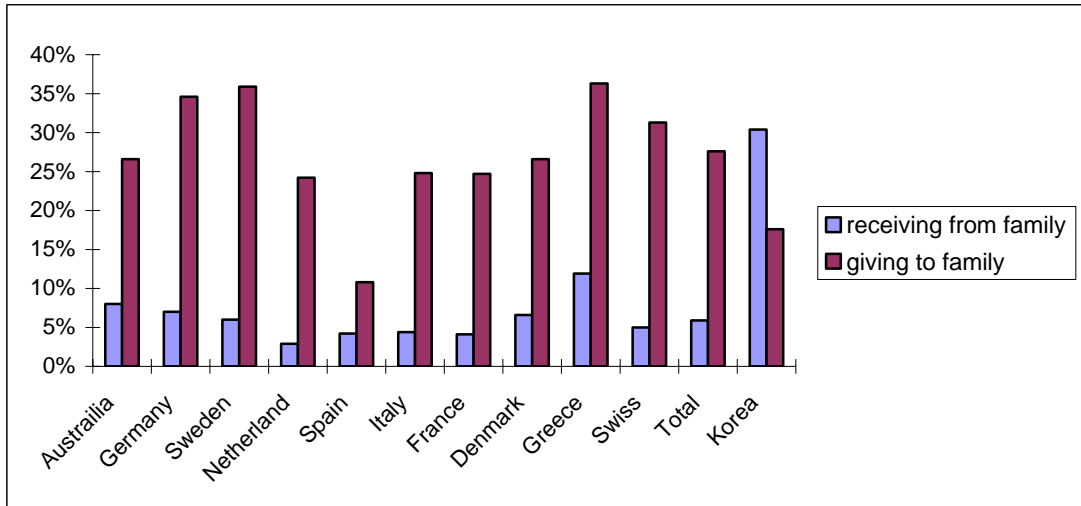
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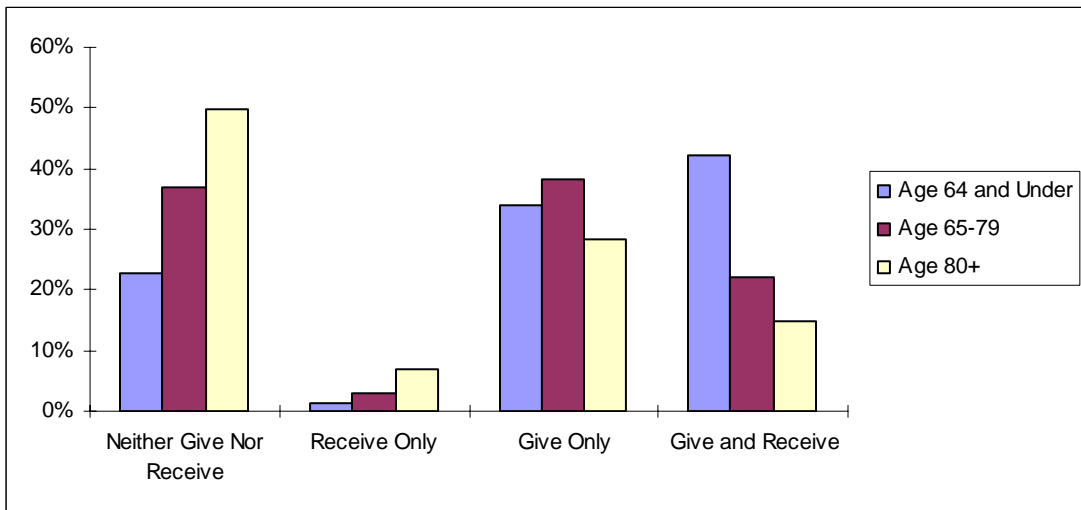
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Figure 1: Inter-Vivos Transfers to and from The Elderly (Age ≥ 50)



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	3	20	19
2003	37	12	3	24	24
2004	45	15	2	18	20
2005	44	11	3	22	20
Total	40	14	3	22	21

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 (10.88)	61.67 (5.69)	3025.53 (127.26)	6.39% (0.0074)
2002	131	130.99 (14.79)	86.94 (12.86)	3581.42 (180.53)	6.29% (0.0054)
2003	147	117.17 (9.56)	71.67 (6.10)	3518.00 (153.15)	6.14% (0.0049)
2004	166	118.45 (11.40)	66.14 (5.30)	3859.79 (168.22)	5.04% (0.0033)
2005	158	124.44 (13.02)	87.47 (13.58)	3685.18 (146.23)	5.65% (0.0042)
Total	729	118.99 (7.06)	74.84 (5.07)	3557.66 (105.11)	5.85% (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 US\$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 ($|K_i^j| = \text{€}100,000$ ($i = 1, 2$ $j = hp, wp$))

	(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*** (.0048)	.0179*** (.0055)	.0269*** (.0040)	.0180*** (.0054)
Husband's parents' income	-.0158 (.0101)	.0004 (.0088)	-.0172* (.0093)	
Wife's parents' income	-.0021 (.0089)	-.0166* (.0097)		-.0164* (.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 ($|K_i^j| = \text{W}50,000$ ($i = 1, 2$ $j = hp, wp$))

	(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*** (.0047)	.0173*** (.0055)	.0261*** (.0039)	.0173*** (.0052)
Husband's parents' income	-.0156 (.0100)	.0002 (.0087)	-.0171* (.0089)	
Wife's parents' income	-.0022 (.0088)	-.0161* (.0096)		-.0160** (.0082)
Observations	1800	1800	1800	1800

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

Parameter	$ K = \text{W}100,000$	$ K = \text{W}50,000$
μ^h	.5992 (.0707)	.6020 (.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 ($|K_i^j| = \text{W}100,000$ ($i = 1, 2$ $j = hp, wp$))

	(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*** (.0048)	.0193*** (.0068)	.0276*** (.0042)	.0195*** (.0068)
Group2's predicted income	.0257*** (.0060)	.0150*** (.0045)	.0247*** (.0053)	.0153*** (.0041)
Group3's predicted income	.0419*** (.0077)	.0168** (.0072)	.0400*** (.0068)	.0170** (.0072)
Group4's predicted income	.0255*** (.0055)	.0135*** (.0049)	.0240*** (.0048)	.0138*** (.0044)
Husband's parents' income	-.0131 (.0103)	.0016 (.0092)	-.0166* (.0094)	
Wife's parents' income	-.0055 (.0089)	-.0152 (.0095)		-.0144* (.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 ($|K_i^j| = \text{W}50,000$ ($i = 1, 2$ $j = hp, wp$))

	(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*** (.0048)	.0186*** (.0067)	.0268*** (.0042)	.0189*** (.0068)
Group2's predicted income	.0249*** (.0059)	.0142*** (.0045)	.0238*** (.0053)	.0145*** (.0041)
Group3's predicted income	.0409*** (.0076)	.0162** (.0071)	.0388*** (.0067)	.0164** (.0071)
Group4's predicted income	.0246*** (.0054)	.0127*** (.0048)	.0231*** (.0047)	.0130*** (.0044)
Husband's parents' income	-.0129 (.0102)	.0015 (.0091)	-.0163* (.0093)	
Wife's parents' income	-.0055 (.0088)	-.0147 (.0094)		-.0140* (.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 = \text{W}100,000$	$ K = \text{W}50,000$
Group1 (μ_1^h)	.5857	.5873
33%*	(.0814)	(.0837)
Group2 (μ_2^h)	.6171	.6213
18%*	(.0686)	(.0707)
Group3 (μ_3^h)	.7016	.7032
6%*	(.0907)	(.0927)
Group4 (μ_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