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Parents as Public Goods:
Theory and Evidence from Rural China

Alan de Brauw
Williams College
Department of Economics
Williamstown, MA 01267
e-mail: alan.d.debrauw@williams.edu

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In rural areas of developing countries, people tend to live in extended family groups. These groups vary from society to society, but in general, the elderly tend to live with their children. As economic development occurs, the population of a country becomes urbanized, people tend to move to urban areas and have less children, which leads to a demographic transition. Simultaneously, extended family living arrangements begin to change. In the United States and other developed countries, the breakdown of the extended family has been well documented (e.g. Kotlikoff and Morris, 1990; Costa, 1998).

The process of changes in living arrangements has been more recently documented in the fast growing economies of Asia (e.g. Hermalin, 2002). The process has also been documented in some of the rapidly developing economies of Asia (Lee, Parish and Willis, 1994; Lillard and Willis, 1997). As these economies have become wealthier, the elderly have begun to live on their own. Research on Taiwan (Martin, 1991; Knodel and Ofstedal, 2002), Thailand, and China (Benjamin, Brandt, and Rozelle, 2000) has found that cohabitation by the elderly with children has declined with rapid economic growth. It seems likely that as economic growth continues and family sizes decline, as theories of the family predict that this trend will continue (Becker, 1974).

In this paper, I will focus on exploring the effects of family size on cohabitation with and transfers to the elderly. Most theoretical models that explore intergenerational links effectively focus on one parent and one child (Becker and Tomes, 1979; Bernheim and Stark, 1988) or focus on transfers from parents to several children (Becker and Tomes, 1976; Behrman, Pollak, and Taubman, 1995). However, if rapid economic growth leads to higher incomes among children than the elderly, understanding the way that children decide to transfer some of their wealth to parents is important. In this paper, I will model transfers in a static setting from children to parents. The model generalizes to a situation in which older parents have comparable incomes to their children, as in those cases children will not give their parents money.

I will use the model to generate empirical hypotheses about transfer behavior among children and cohabitation. I will then test these hypotheses using data collected in rural China in late 2000. Rural China makes a good case in which to test the theory, for several reasons. First, other authors have found that the elderly are beginning to live on their own in rural China (Benjamin et al., 2000). Since migration out of China's villages accelerated throughout the 1990s (de Brauw et

al., 2002), the elderly are likely to continue to live alone in rural China. Finally, living standards in elderly households in the data set I will use are much lower on average than those in other households in which the elderly live, whether measured by expenditures per capita, income per capita, or asset holdings (Table **??**). The model and the empirical work will shed some light on these differences.

This paper is organized as follows. The first section will briefly review some of the literature on elderly living arrangements both in the United States and among Asian cultures. The next section will develop the theoretical model in the paper, and I will discuss hypotheses that are suggested by the model. In the third section, I will describe the data set, the variables I will use to test the model, and I will present my results. The fourth section concludes.

1 Extended Family in the West and Asia

Prior to industrial development in the West, the elderly most often lived in extended family arrangements with one or more of their kids. Economists and other social scientists have several theories regarding the reason that the elderly most often live with some of their children. Perhaps the best known is the Caldwell (1978) hypothesis. Caldwell believed that there are two types of societies. In pre-transitional societies, birth rates are high and stable. Wealth in pre-transitional societies in general flows from younger to older generations, because children are able to work in the fields at early ages to help produce crops. According to Caldwell, an important transition occurs in which children become relatively costly. As a result, parents have less children as they will be a net loss, and capital or resources begin to flow in net terms from parents to children.

There is no empirical evidence that the Caldwell hypothesis is true, as researchers who have tried to estimate positive net flows from children to parents in less developed countries have not found them (Bergstrom, 1996). Another broad set of theories that have been posed to explain parent-child interactions are what Lee et al. (1994) call "mutual aid models." Parents and children might decide to cohabit because sharing certain consumer durable goods can create economies of scale, and other in-kind exchanges might be preferred. Certainly, parents who live with their children may work on the farm, cook meals, or provide child care for their grandchildren. Kotlikoff and Spivak (1981) and Cox (1987) believe that families may pool resources in order to provide implicit insurance for one another by reducing the variance of total income. However, this concept does not apply as well to rural economies in general, because households that either farm or run

small businesses are likely to share the same income risks across members.

There is strong evidence that family arrangements change in nature as societies develop. Costa (1998) reports that in the late 19th century, over three quarters of the elderly in the United States lived in extended family arrangements. A significant proportion of the elderly only began to live on their own in the United States during the middle of the 20th century. Costa finds that part of this change can be attributed to an income effect; as incomes among the elderly increased through social security and pensions, they could choose to live on their own if they preferred. Since Costa finds the income effect to be somewhat important, as incomes rise elsewhere one would expect to see living arrangements and transfers to the elderly change as well.

In Asia, this transition is particularly acute, because children are much wealthier than parents in several countries. Becker (1993) theorizes that in such societies, parents might raise their children to feel guilt if they do not conform to altruistic norms (Becker, 1993). Several authors have asserted this is the case in several different settings. Davis-Friedmann (1983) discusses Confucian orthodoxy, which stresses filial piety and the "rights of the old" over the young, which permeates culture in China. Taiwanese textbooks stress that abandoning one's parents is the most shameful thing one can do (Lee et al., 1994). In Malaysia, the government has created incentives for conforming to Confucian ideals; it gives tax credits to adult children who coreside with their parents (DaVanzo and Chan, 1994).

Although China shares cultural attributes with other Asian countries that have begun to undergo this transition, China's experience will be different for several reasons. First, China is much more rural than other countries; as of 2001, China's National Bureau of Statistics still contends that more than half of China's population resides in rural areas. Moreover, China's family planning policies which began in the early 1970s will force a demographic transition which will primarily occur at lower income levels than the transitions in the West and other East Asian countries. The UN projects that 19% of China's population will be aged over 60 by 2025, almost on par with the United States (23%) and Japan (24%), though the latter two will still undoubtedly have much higher income levels.

Since Asian economies, including China, have both recently gone through rapid economic growth and the beginnings of the demographic transition, one can characterize these economies with the following attributes. First, adult children often have much higher incomes than their parents, as their human capital has been relatively richly rewarded in the new economy. Second, children feel either altruism towards their parents or some level of obligation towards their well-being. In the next section, I further explore the interaction between these two observa-

tions theoretically.

2 A Theory of Intergenerational Transfers

Several authors have focused on understanding the decision regarding whether families live as extended units or in separate units. The decision is sometimes modeled as being made jointly by children and parents, and is sometimes modeled as purely the parents' decision (e.g.). Here, I build a static model of the interaction between children and parents, the important feature being that the children are altruistic towards their parents. The model is similar to that of Laitner (1997), but it abstracts from the dynamic setting in which many models of intrafamily altruism are based. However, it also extends previous models to include multiple children.

I justify the assumption that I can model altruism in this setting as follows. I assume that a shock has occurred that affects incomes for the younger generation, but has not affected incomes for the parents in the model. This assumption is consistent with findings regarding household incomes and wages during China's economic transition, and is broadly consistent with earlier periods of rapid growth in Asian countries such as Taiwan (e.g. Lee, Parish, and Willis, 1994). Authors have both found that the returns to schooling to have increased dramatically over the 1990s (e.g. Zhang and Zhao, 2002) and that they have increased even more among younger people (e.g. de Brauw and Rozelle, 2004). Since the young are well educated relative to older generations, their incomes will be higher than the elderly in most cases, particularly in the absence of a pension program. As a result, the model assumes that parents are no longer making monetary transfers to children, either because they have either already occurred, or because parents have significantly lower incomes than children.

Consider an elderly parent with a utility function $U(c_p) = \ln(c_p) + \gamma_{p1} \ln(c_1) + \ldots + \gamma_{pn} \ln(c_n)$, where c_p represents the parent consumption, c_i represents consumption by person i, and γ_{pi} are a set of weights that define the level that the parents care for each child. The index i represents each of the n children. Finally, the parents will consume all of their income, which consists of their income w_p plus any transfers T_i they receive from their children. I further assume that the children all have higher incomes than the parents, so $T_i \geq 0$. Therefore the parental consumption is completely determined by the decisions of their children regarding transfers, and so $c_p \equiv w_p + \sum_i T_i$.

Each of the n children of the elderly have utility functions $U(c_i) = \ln(c_i) +$

$\gamma_i \ln(c_p)$, for $i = 1, \ldots, n$. Note that the children care about their own consumption as well as the consumption of their parents. Each child also has an income of w_i, and they make a decision about a transfer to make to their parents, T_i. So child i's total income is $w_i - T_i$, where $T_i \geq 0$. Since the parents consumption is completely determined by the sum of the transfers they receive from the children plus their income, I can rewrite child i's utility function as $U(c_i) = \ln(c_i) + \gamma_i \ln(w_p + T_i + \sum T_{-i})$, where $\sum T_{-i}$ represents the transfers from all of the other children.

2.1 A Benchmark Case: One Child

If the parents have only one child, then the child simply maximizes her utility function subject to the constraint that $c_1 \leq w_1 - T_i$. The optimal transfer in this case is:

$$T_1^* = \frac{\gamma_1 w_1 - w_p}{1 + \gamma_1} \tag{1}$$

which is subject to the constraint that $T_1 \geq 0$; the child will not give the parent a transfer if the marginal utility of that transfer is less than the marginal utility of her own consumption. The parent's consumption is then deterministic, and it is easy to show that the parents consumption is $c_p^1 = \frac{\gamma_1(w_1 + w_p)}{1+\gamma_1}$ given that a transfer occurs.

Note that from a social planner's perspective, unless the parent and child are perfectly altruistic, the transfer amount leads to inefficient allocations between the child and the parent. The social planner will seek to maximize the function:

$$(1 + \gamma_1)c_p + (1 + \gamma_p)c_1 \tag{2}$$

subject to the constraint that $c_p + c_1 \leq w_1 + w_p$, which is essentially the intra-household bargaining problem posed by Chiappori (1992). The optimal amount of parental consumption is:

$$c_p^* = \frac{(1 + \gamma_1)(w_1 + w_p)}{2 + \gamma_1 + \gamma_p} \tag{3}$$

The optimal amount of parental consumption c_p^* is larger than c_p^1, because the child does not take into account the parent's marginal utility of consumption when determining an amount to give. Rather, they only account for the utility gained by themselves for the transfer. I define the relative difference between the optimal

amount of parental consumption and the actual amount as η_1, which can be written:

$$\eta_1 = \frac{c_p^* - c_p^1}{w_1 + w_p} = \frac{1 - \gamma_1\gamma_p}{(2 + \gamma_1 + \gamma_p)(1 + \gamma_1)} \tag{4}$$

As both the child and the parent care more about each other's consumption (as γ_1 and γ_p approach 1), actual parental consumption approaches c_p^*.

2.2 Transfers with Two Children

When more than one child is potentially giving to their parents, each child makes a strategic decision about how much to give to their parents, based on the parents' wealth and the transfer made by the other child. Each child assumes that the other gives an optimal response, so a Nash equilibrium results between the two children. Writing the optimal transfer for child 1 as a function of child 2's transfer gives:

$$T_1 = \frac{\gamma_1 w_1 - w_p - T_2^*}{\gamma_1 + 1} \tag{5}$$

The optimal transfer for child 2 is the same, with the opposite subscripts. There is only one difference between equation (5) and equation (1), which is that child 1's transfer will drop as soon as child 2 will give a transfer. Furthermore, if $T_2^* = 0$, equation (5) is exactly the same as equation (1). Intuitively, if child 2 either does not feel much altruism towards the parent, or has a relatively low income, then child 1 gives a transfer as if there is no second child. This result is true no matter how many children the parents have.

If both children give a positive transfer (e.g. $T_1^* > 0$, $T_2^* > 0$), then each child takes the other's best response into account when choosing an amount to give. The equilibrium transfers are:

$$(T_1^*, T_2^*) = \left(\frac{\gamma_1(1 + \gamma_2)w_1 - \gamma_2(w_2 + w_p)}{\gamma_1 + \gamma_2 + \gamma_1\gamma_2}, \frac{\gamma_2(1 + \gamma_1)w_2 - \gamma_1(w_1 + w_p)}{\gamma_1 + \gamma_2 + \gamma_1\gamma_2} \right) \tag{6}$$

When both children transfer money to their parents, each child's transfer depends upon characteristics of the other child, scilicet, the other child's income and feelings of altruism for the parent. Both variables have a negative effect on transfer amounts. Although it is not surprising that the less wealthy child will give parents less, *ceteris paribus*, equation (6) also implies that if the altruism rises in the first (second) child, the second (first) will give less to the parent, because he/she knows that the other will give more.

Before discussing overall parental consumption in this case, it is worthwhile exploring the condition that must hold for a child to make a transfer. The numerator in either expression in equation (6) must be greater than zero, or the optimal transfer is zero. It is useful to rewrite the condition for child 1 as:

$$\gamma_1(1+\gamma_2)\frac{w_1}{w_p} \geq \gamma_2\left(\frac{w_2}{w_p}+1\right) \tag{7}$$

Equation (7) lends insight as to what conditions must take place for both children to transfer. Child 1 will be more likely to give a transfer if her income is higher relative to the parents' income. However, the transfer is decreasing with child 2's relative income. The combination implies that if income is particularly unequally distributed among children, then the poorer child is less likely to make transfers. A condition, then, for calculations regarding the inefficiency of transfers from two children is that the incomes of the children must be relatively equally distributed.

Given that both children give a transfer, the parental consumption would be:

$$c_p^2 = \frac{\gamma_1\gamma_2}{\gamma_1+\gamma_2+\gamma_1\gamma_2}(w_1+w_2+w_p) \tag{8}$$

Parental consumption, then, depends upon the aggregate income of the two children and the parents, weighted by a function of the altruism parameters of the children. At this point, we are interested in the distance from the efficient outcome, that would occur if all three pooled income and allocated each consumption based upon their altruism weights. If that were the case, then parental consumption would be:

$$c_p^* = \frac{1+\gamma_1+\gamma_2}{3+\gamma_1+\gamma_2+\gamma_{p1}+\gamma_{p2}}(w_1+w_2+w_p) \tag{9}$$

The numerator in equation (9 represents the aggregate weight that the pooled household would put on parental consumption; the parent's weight is 1, the first child γ_1, and the second child γ_2. The denominator includes all of the weights, including the two parental weights that parents put on their children's consumption.

Since the Pareto optimal consumption for parents with one child was larger than the actual consumption, it is not surprising that the parent again consumes less than is Pareto optimal when both children are giving transfers. I again define the inefficiency η_2, and η_2 can be written:

$$\eta_2 = \frac{c_p^* - c_p^2}{w_1+w_2+w_p} = \frac{1+\gamma_1+\gamma_2}{3+\gamma_1+\gamma_2+\gamma_{p1}+\gamma_{p2}} - \frac{\gamma_1\gamma_2}{\gamma_1+\gamma_2+\gamma_1\gamma_2} \tag{10}$$

Equation (10) can be rewritten as:

$$\eta_2 = \frac{\gamma_1(1+\gamma_1) + \gamma_2(1+\gamma_2) - \gamma_1\gamma_2(\gamma_{p1}+\gamma_{p2})}{(3+\gamma_1+\gamma_2+\gamma_{p1}+\gamma_{p2})(\gamma_1+\gamma_2+\gamma_1\gamma_2)} \tag{11}$$

I then compare η_2, which is the fraction of overall consumption less than the efficient amount that the parents consumes when they receive transfers from two children, to η_1, which is the fraction of overall consumption less than the efficient amount consumed when receiving transfers from one child. I find that for a large range of values of γ_i, $i = 1, 2, p1, p2$, that $\eta_2 > \eta_1$.[1] Generally, so long as γ_1 and γ_2 are greater than $\frac{1}{3}$, parents become public goods. Because of the strategic behavior of their children, they consume a smaller fraction of the pooled income than they would if they only had one child.[2]

The theoretical model therefore suggests conditions under which parents become public goods for their adult children. First, it must be that children are both somewhat altruistic or care somewhat about their parents' consumption. With Asian cultures and the concept of filial piety in mind, the presence of altruism parameters greater than $\frac{1}{3}$ seems quite reasonable. Second, transfers will not occur from several children unless the children have higher incomes than the parents, and furthermore the inequality between the incomes of the children cannot be too high. After an introduction to the data set I will use in this paper, I will attempt to test some of these hypotheses.

3 Data

To describe the living arrangements of the elderly in rural China, I will use the China National Rural Survey (CNRS).[3] The CNRS was a household survey completed in six provinces of rural China (Hebei, Liaoning, Shaanxi, Zhejiang, Hubei, and Sichuan). To attempt to accurately reflect varying income distributions within each province, one county was randomly selected from within each income quintile for the province, as measured by the gross value of industrial output. Two villages were then randomly selected within each county, and twenty randomly

[1] I am still working on the proof right now.

[2] A generalization to N children is also planned.

[3] The data were collected by a team led by Loren Brandt of the University of Toronto, Scott Rozelle of the University of California at Davis, and Linxiu Zhang of the Center for Chinese Agricultural Policy.

selected households per village, both those with their residency permits (or *hukous*) in the village and those without, were surveyed. A total of 1199 households were surveyed.

The survey gathered detailed information on household demographic characteristics, wealth, agricultural production, non-farm activities and investment. Several parts of the household survey were targeted to learn specific information about older residents of the household. Although the term "elderly" is a loaded one, I will define the "elderly" to mean all residents of households that are older than 50 years old, for one practical and one demographic reason. From a practical standpoint, the survey included two specific modules designed to learn about the elderly. Besides the standard data on individuals, such as age, education and marriage status, for all individuals over the age of 50 the survey included a special section on health status. In one question, we ask each near elderly and elderly to report if they were: "not ill," "slightly ill," or "seriously ill." After determining whether or not each person was ill, we then asked each member of the household that was over 50 years old a set of questions designed to create an ADL (Activities of Daily Living) index in order to assess the severity of the illness. Enumerators asked each person if it was difficult or not to walk, stand, bend at the waist or lift a 5-kilogram weight. Respondents also told enumerators if they could bathe, dress, eat or go to the toilet by themselves. Since several authors find that the health status of the elderly is an important determinant of their living arrangements, I can use these data to test the effects of health status on their living arrangement. The second module asked for basic information, including the gender, age, education level, and place of residence, of all children of of elderly members of the household that did not reside there.

Although considering household members over 50 as elderly might seem questionable, it makes a great deal of sense from the perspective of the life cycle. In China, people tend to get married and have children when they are between 20 and 30 years of age. Children in rural China start school between the ages of 5 and 7, and modally go to school for the required 9 years. Therefore, at age 16 or so they begin to either look for employment or begin to help on the farm full time. As a result, by the time the parents have turned 50, their children have reached the age at which they look to get married and have children. Therefore, they face the choice modeled in this paper, whether to live alone or to live with one of their children.

Several indicators of household well-being can be calculated using the CNRS. Using the sections of the survey on employment, farming, non-farming businesses, and other income, a measure of household income was calculated. An-

other section of the survey was focused on collecting data on household expenditures, although it was collected in only one half of the sample. Finally, the sections of the survey focused on learning about investment allow for the calculation of the value of household assets. Therefore, relative household welfare can be measured in three different ways.

Not all households in the sample include a member over 50 years old, whereas others have elderly couples or even elderly couple and their parents living in them. I find 509 households that have an elderly resident. To do my analysis at the household level, I followed Cameron's (2000) reasoning regarding the attributes of the elderly to include in my regressions. I categorize the elderly by the oldest member of the household, whether male or female. If the oldest person's spouse also lives in the household, I include the male's education, because the male's education level is likely to have the largest effect on the household income. The health variable reflects the oldest member of the household as well.

3.1 Empirical Strategy

The model in section 2 implies that although the *aggregate* amount of transfers received by parents increases as the number of children they have increases, the average transfer given per child decreases, and the inefficiency of the transfer decreases. However, the theoretical results do not lead directly to predictions about cohabitation. For the remainder of the paper, I will assume that allowing one's parents to cohabit represents a large transfer. Although parents may provide either housework or hours on the farm in exchange for cohabitation, in general they live in households that have much higher living standards (Table **??**). Furthermore, in the sample parents who cohabit with children actually do *less* housework and childcare than those who live alone; parents who live with their children work X hours on the farm, relative to Y hours among parents who do not cohabit.

If cohabitation is like a large transfer, then one would expect the number of children to *decrease* the probability that a parent (or married couple) cohabits with their children, because any one child would be less likely to want to provide a large transfer.[4] As explained above, this hypothesis is conditional on the income distribution of children. To illustrate, assume that all of the γ parameters are equal. If the income distribution is relatively equal, then if transfers are positive, according to the model no child would take in the parent. If one child was relatively rich,

[4]Note that in this paper, I will not test any empirical hypotheses about transfers themselves. I will reserve those tests for a later version of the paper.

they would be more likely to take in the parent or parents. Unfortunately, the data set does not include information about the incomes of the parents' children. As a result, I use age and education as proxies for the incomes of the children of the elderly. Therefore, any significant coefficients on the coefficients for the effects of characteristics of children of the elderly would imply that two sided bargaining is taking place, at least over the possibility of cohabitation.[5]

I use a logit model to estimate the effects of human capital characteristics, health, and the demographics of the elderly on whether or not they live with adult children (Table 3). The main results are robust to specification and the use of different sub-samples of the data. When I include village level random effects to improve the efficiency of the estimator, I test the hypothesis that the correlation between the village error term and the household error term is zero, and reject it, implying the random effects model is more appropriate.

I find results that are generally consistent with other papers that have studied cohabitation in China and in other countries in Asia (e.g. Benjamin et al., 2000; Lee et al., 1994). When the oldest member of the household is a male, he is much more likely to live by himself or with his wife than with one or more of his children. The elderly with living spouses are also more likely to live by themselves, as found by sociologists and anthropologists studying China (e.g. Davis-Friedmann, 1983). The older the oldest resident, the more likely he or she is to cohabit, and consistent with the findings of Benjamin, Brandt, and Fan (2003), I find that illness has a weak, but positive, relationship with cohabitation.

Consistent with the theory presented in section 2, I find that as the elderly have more children, they are less likely to live with them, *ceteris paribus* (Table3, rows 6-7). I find roughly the same coefficient among male and female children, and the coefficients are statistically significant. Although one might expect for reasons of "filial piety" the male children to take care of their elderly parents, I find the opposite is the case. If children indeed place a large value on the transfer that cohabitation represents, they become less likely to make that large transfer if other children exist, because they also expect those children to give to their parents, a behavior that seemingly does not take place nearly as often when one child takes care of the elderly (Table 2). Although this result is different than that found in other countries, such as Malaysia by Lee et al. (1994), recall that Malaysia gives a tax credit for caring for an elderly parent (or both), which would

[5]Cameron (2000) models the residence decision of the elderly as nested logit decision, to account for the possibility that parents first choose the child that gives them the highest utility, then decide whether to live with that child or not. Due to data limitations, I use a reduced form approach.

decrease the size of the net transfer represented by cohabitation.

Second, I add a number of characteristics of the adult children to the regression (Table 3, columns 3-4). I include the age and education level of the eldest son, as well as the average age and education levels of the children of the eldest member of the household. The human capital attributes of the eldest son that are measurable have no discernible effect on the likelihood that cohabitation takes place.[6] Although the average age of the children of the elderly has no statistical effect on the probability of cohabitation, I find that as the average schooling level of the children increases, the probability of cohabitation decreases. This coefficient is likely due to cohort effects rather than anything in the model. Educational attainment is much higher among younger cohorts than among older cohorts, and it is likely that older, less educated children are more likely to live with their parents. The inequality hypothesis would be best tested by including the standard deviation of education in the model. When it is included, it has a negative coefficient (-0.11; full results not reported) but it is not significantly different from zero. It could be that more data would confirm this hypothesis.

In summary, I find several attributes to the CNRS data that are consistent with the theoretical model. I find that transfers are slightly larger and far more frequent to elderly who live by themselves rather than to elderly who live with one of their adult children. I also find that as the number of children that the elderly have increases, the probability they live with those children decreases, holding attributes of the elderly and the children constant. This result is consistent with the idea that children treat the elderly like public goods under certain conditions, in this case when incomes are higher and when altruism parameters are reasonably high.

4 Conclusion

In this paper, I have explored the idea that parents can be treated like public goods by their children. There are several conditions that are necessary for this to take place. Perhaps most importantly, it must be that the children's incomes are significantly higher than the parents' incomes. Second, it must be that the children's incomes are relatively similar, or else they will depend upon the richest of the chil-

[6]Of course, some of the elderly have no sons. In the few households that fit this category, the age and education level of the eldest daughter were used instead. I find that the results are qualitatively the same, whether I remove the households from the regression or use the female children's traits, or remove the variables from the regression entirely.

dren to provide transfers, because each child takes into account the best response of the other children when deciding how much to give. Finally, at least in the two child case I find that the children must feel some altruism towards their parents (e.g. $\gamma \geq \frac{1}{3}$) for the relative inefficiency to be worse than in the one child case.

I examine a data set collected in rural China in late 2000 and find they are broadly consistent with these hypotheses. I find that the elderly who live alone have much lower living standards than are found in households the elderly live in with adult children. The multivariate findings are broadly consistent with other work on intergenerational living arrangements found in the literature. I find that holding other factors constant, having additional children decreases the chance that the elderly live with their children. If the children consider having their parents living with them as a large transfer, then these results are totally consistent with the model. Further research is necessary to understand what type of value can be placed on cohabitation in terms of the transfer.

These results have a quite interesting interpretation for China. China's notorious one-child policy and other family planning policies dramatically decreased birth rates in a great deal of the country beginning in the early 1970s. If the theory presented in this paper is correct, then the one child policy has actually helped the elderly in places where it was enforced vigorously, because one child will look after their parents' welfare better than several. In other areas, where the policy has not been enforced as vigorously and birth rates are still high, the elderly may need more governmental support. These areas are typically in the rural West, so if the government begins to allocate more resources for the elderly in the near term, this theory suggests they begin in the rural interior.

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Table 1: Selected Indicators of Well-Being in Per-Capita Terms, Rural China, 2000

Gener-ations	N	Average Age, Household Head	Average Income	Average Expenditures	Average Value of Assets
1	127	59.4	1259	1454	7455
2	772	42.8	2805	2631	12473
3	284	45.4	2256	2162	10483
4	16	52.4	1670	1564	6453

Source: CNRS.

Table 2: Transfers Received by Elderly Households, Rural China, 2000

Living Arrangement	Share Receiving Transfers	Average Transfer	Average Share, Household Income
Living Alone	69	1464.5	53.2
In Extended Family	25	1129.6	14.0

Notes: Sample size is 399. Columns 2 and 3 are conditional on a transfer being made.
Source: CNRS.

Table 3: Determinants of Cohabitation among the Elderly, Rural China, 2000

Explanatory Variable	(1)	(2)	(3)	(4)
Characteristics of the Elderly				
Gender (1=male)	−2.82**	−2.75**	−2.85**	−2.89**
	(0.63)	(0.66)	(0.64)	(0.66)
Age	0.04**	0.05**	0.07**	0.08**
	(0.02)	(0.02)	(0.03)	(0.03)
Years of	−0.08**	−0.10	−0.06	−0.08
Education	(0.04)	(0.04)	(0.04)	(0.04)
Married?	−0.85*	−0.90**	−0.86**	−0.90**
(1=yes)	(0.40)	(0.43)	(0.41)	(0.44)
ADL Index	0.44*	0.45*	0.45*	0.44
	(0.25)	(0.26)	(0.26)	(0.27)
Family Characteristics				
Number of	−0.37**	−0.47**	−0.35**	−0.44
male Children	(0.11)	(0.13)	(0.12)	(0.14)
Number of	−0.35**	−0.38**	−0.42**	−0.43
female Children	(0.09)	(0.10)	(0.10)	(0.11)
Eldest Son, Age			−0.02	−0.02
			(0.01)	(0.02)
Eldest Son, Years			0.01	−0.0004
of Education			(0.05)	(0.06)
Mean Age,			−0.05	−0.05
Children			(0.03)	(0.03)
Mean Education,			−0.14**	−0.13**
Children			(0.06)	(0.06)
Random Effects	none	village	none	village
LR Test Statistic, $\rho = 0$		8.51**		7.00**

Notes: Standard errors in parentheses. * indicates significance at the 10 percent level; ** indicates significance at the 5 percent level. Sample size is 509. The likelihood ratio test statistic for the signficance of the random effects is distributed χ^2 with 1 degree of freedom.

Source: CNRS.