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Socioeconomic Resources, and Parental Needs

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The Role of Filial Piety, Reciprocity, Socioeconomic Resources, and Parental Needs**

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**ABSTRACT**

This paper examines how adult children's expressed filial piety, receipt of help from parents, socioeconomic resources, and parents' needs are associated with the likelihood of parent-child coresidence in contemporary China. Drawing on the 2002 wave of the Chinese Survey of Family Dynamics and the 2002 wave of the Chinese Longitudinal Healthy Longevity Survey, we used logistic regression to analyze correlates of coresidence with parents of 3,938 married adult children, aged 35 to 65. Results show that the stronger the filial piety expressed by adult children, the higher their likelihood of coresiding with their parents. Married adult children are also more likely to coreside with elderly parents who have provided intensive grandchild care and financial support or with those who need financial, physical, and emotional support. However, adult children who own homes are significantly less likely to live with their parents than are those who do not. These findings suggest that coresidence in contemporary China is influenced not only by parents' needs but also by children's values, socioeconomic resources, and past receipt of parental help.

## INTRODUCTION

China is aging at an unprecedented speed and on an extraordinary scale due to its fertility control program, in place since the early 1980s, its significant improvement in life expectancy, and its large population base. In 2013, the average life expectancy at birth for the Chinese reached 75 years and the total fertility rate dropped to 1.5, well below the replacement level (United Nations Population Division, 2013). Whereas in 1990 China had 67 million people aged 65 and older, that number climbed to 88 million in 2000, then to 114 million in 2010, and is projected to reach 235 million (about 16.2% of China's entire population) by 2030 (United Nations Population Division, 2013). Given the low levels of fertility and the increasing number of older people who need support and care, China will face big challenges in terms of old-age support in the 21st century.

Traditionally, family has played a central role in elder care in China. In addition, China's constitution and a series of laws passed in the late 1990s stipulate that family members have the primary responsibility for taking care of their elderly parents, including arranging for suitable housing (Li & Tracy, 1999). The strong intergenerational solidarity in China is indicated by a high rate of coresidence between aging parents and their adult children— a living arrangement most commonly used by family members to meet aging parents' material, physical, and emotional needs (Zimmer, 2005). Despite rapid economic development since the 1980s, data from the 1982 and 1990 Chinese censuses show little change over that period in the proportion of elderly parents (age 65-plus) living with children – remaining at about 68% for elderly men and 74% for elderly women. However, between 1990 and 2000, the proportions of elderly people living with their children declined to 59.9% and 68.7% for men and women respectively, a decline of 11.4% for men and 7.2% for women (Zeng & Wang, 2003). Nevertheless, the majority of older adults in China still lived with their children; currently, an 80-year-old resident of mainland China will spend two thirds of his or her remaining lifespan in coresidence with adult children and their offspring (Gu, Vlosky, & Zeng, 2009).

Most research on coresidence in China is largely based on data collected in the early 1990s in a few large cities (e.g., Treas & Chen, 2000; Whyte, 2004). Relatively little is known about whether the determinants of coresidence have changed after decades of rapid economic development and urbanization, housing reform, and declining fertility. This study looks at the determinants of parent-child coresidence from the perspective of adult children, using data on a

subsample of elderly parents in the 2002 wave of the Chinese Longitudinal Healthy Longevity Survey and data from a companion survey of those parents' adult children, the 2002 Chinese Survey of Family Dynamics.

Our study contributes to the literature on living arrangements in China in three major ways. First, most prior studies focused on how elderly parents' sociodemographic and health characteristics influenced their living arrangements (e.g., Cooney & Shi, 1999; Korinek, Zimmer, & Gu, 2011; Logan & Bian, 1999, Sereny, 2011; Zimmer, 2005), but little is known about the characteristics of the adult children with whom they lived except that they were more likely to be married sons. Since coresidence involves two parties (adult children and their parents) and is often a joint decision, we argue that adult children's characteristics and relationships with their parents may have significant influence in the likelihood of coresidence. Incorporating children's characteristics into the study will not only enrich our understanding of the determinants of parent-child coresidence, it may also provide clues about future trends in living arrangements. A small but growing literature has already shown that children's characteristics can influence the probability of parent-child coresidence. For example, recent studies found that adult sons with greater economic resources have a significantly lower likelihood of coresidence with their elderly parents compared to their less well-off counterparts (Zhang, 2004; Xie & Zhu, 2009).

Second, we examine a rich and rarely examined set of adult children's characteristics, including adult children's reports of filial piety and their parents' investment in them over their lifetimes (e.g., by providing financial support and taking care of grandchildren). Lastly, unlike previous research—which relied on samples collected in one or a few large cities (Logan & Bian, 1999; Xie & Zhu, 2009)—our sample includes both rural and urban areas in nine Chinese provinces and municipalities and is thus more representative of the general population of China.

#### Determinants of Coresidence in China

As a form of intergenerational solidarity, parent-child coresidence is influenced by the interplay of multiple normative, relational, behavioral, and structural factors (Bengtson & Roberts, 1991; Bengtson & Oyama, 2010). Our framework for examining coresidence in contemporary China draws heavily from four major theoretical perspectives that are commonly used to account for intergenerational living arrangements and support: ideology, altruism, parental investment, and modernization (Chu, Xie, & Yu, 2011; Logan, Bian, & Bian, 1998; Logan & Bian, 1999; Treas & Chen, 2000). The four are not mutually exclusive, and none of

them alone can fully explain parent-child coresidence in contemporary China. We think that each perspective helps to fill in the puzzle and assists us in understanding the complex processes that influence coresidence. Below we briefly discuss these four perspectives as well as the hypotheses suggested by each.

*The Ideology Perspective.* It is generally agreed that coresidence in China is influenced to some significant degree by cultural traditions and values derived from Confucian ideologies (Whyte, 2004; Xie & Zhu, 2009; Zimmer, Kwong, Fang, Kaneda, & Tang, 2007). The Confucian virtue of filial piety, which obligates adult children to respect, support, and obey their parents, has been the cornerstone of traditional Chinese family values (Ikels, 2004), and adult children who live with and provide daily care to their elderly parents are often considered to embody filial piety (Chappell & Kusch, 2007; Lin et al., 2003; Mao & Chi, 2011). Although modernization and urbanization may have weakened filial piety in contemporary China, researchers generally find that it still exerts a powerful influence on parent-child relationships (Mao & Chi, 2011; Whyte, 2004; Zhan, 2004). In terms of coresidence, Chu and colleagues (2011) found that children's filial attitude had a positive association with patrilocal coresidence in Taiwan but not in Zhejiang, Fujian or Shanghai. In our paper, we test the following hypothesis: *(H1) Adult children who express greater filial piety are more likely to coreside with their elderly parents.*

*The Altruism Perspective.* Although tradition and cultural values do matter for coresidence, the ideology perspective tends to ignore the dynamic nature of coresidence. The altruism perspective can be used to examine the conditional nature of parent-child coresidence, looking at what kinds of life transitions are more likely to trigger coresidence in later life. Introduced by Becker (1974) and expanded by other researchers (Lee, Parish, & Willis, 1994; Hermalin, 2002; Zimmer & Kwong, 2003), the altruism perspective assumes that all members of the family care about their own and each family member's welfare. As a collective, the family acts to maximize resources and then distribute them efficiently and equitably to best ensure each family member's well-being (Zimmer, 2005). Based on this perspective, adult children and older parents are more likely to coreside when the parents have the greatest need of companionship, physical care, and financial support due to loss of their spouse (widowhood, divorce, or separation), disability, or poverty.

We find empirical evidence in China consistent with the altruism perspective. For example, Treas and Chen (2000) found that adult children with single parents were three times more likely to coreside than adult children whose parents were still married. A three-year follow-up study revealed that elderly Chinese who had not coresided with their children at baseline were nearly three times more likely to do so after becoming widowed than those who were still married (Korinek et al., 2011). Chen (2005) found that disability also played a role: if one of the parents needed help with activities of daily living (ADL), the likelihood of living with adult children increased significantly. Similarly, Korinek and colleagues (2011) found that the odds of coresidence increased by 50% if an older Chinese experienced ADL limitations. Cognitive impairment in parents also increased their likelihood of coresidence with children (Gu et al., 2009). Other studies found that parents who relied on children and other relatives for financial support were more likely to coreside with children than were those with pensions (Cooney & Shi, 1999). Based on the altruism perspective and these findings, we derive the following hypothesis: *(H2) Adult children are more likely to coreside with their parents if the parents are unmarried, disabled, or poor.*

*The Parental Investment Perspective.* While altruism may prompt adult children to live with parents who are lonely, sick, or poor, the parental investment perspective suggests that adult children may have motivations for coresidence beyond providing support for vulnerable older parents. Children who have received greater investments from their parents throughout their lives in time, money, affection may be more likely than others “to reciprocate in kind when the parent experiences challenges in later life” (Silverstein, Gans, & Yang 2006, p. 1069), in this case, via coresidence. Although the specific association between parental investment and later life coresidence has not been studied, broader research on intergenerational transfer in China and other Asian countries lends credence to this perspective. For example, studies have found that elderly Chinese parents are more likely to receive personal care and monetary support from their adult children if they have maintained strong bonds with them by taking care of grandchildren, doing household chores, and providing financial help (Chen, 2003; Lin et al., 2003; Silverstein, Cong, & Li, 2007). Other studies found that in several Asian countries, elderly parents who had provided schooling opportunities and grandchild care or contributed in other ways to their children’s household were more likely to receive money from their children than parents who had not done so (e.g., Lillard & Willis, 1997; Lee et al., 1994). We thus develop the following

hypothesis: (H3) *Adult children and elderly parents are more likely to coreside when the parents have provided grandchild care and financial support, and the emotional bond between adult children and parents is strong.*

*The Modernization Perspective.* The modernization perspective suggests that attitudes toward coresidence may shift when societies experience rapid economic development. Industrialization and modernization have led to a decline in the importance of the family as a production unit, causing an increase in paid work outside the family network and a concomitant increase in preference for independent living arrangements (Aboderin, 2004; Logan & Brian, 1999). The modernization perspective suggests that adult children with higher levels of education and economic resources will be more likely to realize their preference for independent living than their counterparts. Similarly, more educated elderly parents are also more likely to prefer living independently from their adult children (Sereny, 2011).

Studies examining the relationship between adult children's socioeconomic resources and their living arrangements have found mixed results. For example, Treas and Chen (2000) found that in Baoding, China, adult children with higher income were significantly less likely to live with their parents than those with lower income, though their educational level had no effect on living arrangements. In another study, however, Logan and colleagues (1998) found that adult children's socioeconomic status was not a strong predictor of coresidence. More recently, Xie and Zhu (2009) found that in urban China, married sons with higher income were less likely to live with their parents than those with lower income, while married daughters with more education were significantly more likely to live with their parents, and they interpreted these results as representing different entrances into coresidence in urban China. A son who still lived with his parents after marriage was usually unsuccessful and, therefore, not able to live independently. A married daughter who entered into coresidence, in contrast, was more likely to be successful and thus able to bring her husband to live with her parents. The mixed findings across these three regional studies in China, two of which used data in the early 1990s, demonstrated the critical needs to examine the relationship between children's economic status and coresidence in the early 21<sup>st</sup> century — a period when adult children are more educated and have higher income and wealth than their counterparts in the 1990s due to the rapid growth of the Chinese economy and the government's continuing efforts to expand primary, secondary, vocational, and higher education in the past three decades (Hannum, Behrman, Wang, & Liu,



2008). The modernization perspective leads us to the following hypothesis: *(H4) Adult children with greater socioeconomic resources are less likely to coreside with their parents.*

*The Role of Gender.* Gender is strongly associated with coresidence in China. Traditionally, married sons and their wives have been responsible for taking care of the sons' parents, while married daughters have served their husbands' families (Deutsch, 2006; Li, Feldman, & Jin, 2004). Numerous studies have shown that despite decades of rapid economic development, the patrilocal tradition remains strong in China: Married sons are much more likely to coreside with their parents than are married daughters (Chu et al., 2011; Logan et al., 1998; Logan & Bian, 1999; Xie & Zhu, 2009; Q.F. Zhang, 2004). For example, a study that examined married couples' living arrangements in southeastern coastal China (Zhejiang, Fujian, and Shanghai) found that 33.2% of the couples lived with the husband's parent(s) and only 4.8% lived with the wife's parent(s). (Chu et al., 2011).

Some research suggests that while sons are normatively obligated to take care of parents in China, daughters may be more likely to reciprocate for parental investment because parent-daughter relationships are governed more by equitable reciprocity and less by traditional cultural norms (Silverstein et al., 2007). For example, empirical evidence has shown that the likelihood of economic reciprocation for parental help with childcare or housework is stronger among daughters than among sons (Silverstein et al., 2007; Yang, 1996). Because coresidence can be regarded as a form of reciprocation for parental investment, and the relationship between parents and married daughters are governed more by reciprocation than by obligation, we have the following hypothesis: *(H5) The relationship between parental investment, in the form of grandchild care or financial support, and coresidence is stronger among daughters than sons.*

## **DATA AND METHODS**

### **Data**

We used data from the 2002 wave of the Chinese Longitudinal Healthy Longevity Survey (CLHLS) and the 2002 wave of the Chinese Survey of Family Dynamics (CSFD). Respondents to the CSFD are the adult children of a subsample of participants in the 2002 CLHLS. The CLHLS has a panel design, with baseline data collected in 1998 and follow-up surveys conducted in 2000, 2002, 2005, 2008, and 2011. The CLHLS, which was conducted in randomly

selected counties and cities in China's 22 provinces, focused on the determinants of healthy longevity for the oldest old (80 years and above). In terms of sampling, for each centenarian with a predesignated random code, one nearby octogenarian and one nearby nonagenarian of predesignated ages and sex were also randomly selected and interviewed. "Nearby" means living in the same village or street, or, when applicable, the same town, county, or city. This sampling strategy was chosen to ensure comparable numbers of randomly selected male and female octogenarians and nonagenarians at each age from 80 to 99. From the 2002 wave on, the survey was expanded to include adults between 65 and 79 years of age. A more detailed description of the sampling design of the CLHLS can be found on the website of the Duke University Center for the Study of Aging and Human Development (see [http://www.geri.duke.edu/china\\_study](http://www.geri.duke.edu/china_study)).

With support from Academia Sinica in Taiwan and the Chinese Academy of Social Sciences in mainland China, the CSFD interviewed a subsample of adult children of the 4,478 CLHLS respondents to examine intergenerational transfer patterns from the children's perspective (Zeng, 2008). Both the parents and their adult children lived in nine provinces/municipalities in China's eastern coastal areas (i.e., Beijing, Shanghai, Zhejiang, Jiangsu, Fujian, Shandong, Guangdong, Guangxi, and Liaoning). Previous research documented the high quality of both the CLHLS data (Gu, 2008) and the CSFD data on adult children (Z. Zhang, 2004).

Our analytic sample focused on married adult children aged 35-65 and their parents aged 65-105. After 28 adult children were deleted from the sample because of missing key information on either them or their parents, we were left with 3,938 married adult children.

## Measures

The dependent variable for the study is the living arrangement of the adult children from the CSFD, coded 1 if the respondent was coresiding with his or her own parents, and 0 if not. The independent variables are derived from both surveys and correspond to our four perspectives and related hypotheses.

*Ideology.* We used measures of adult children's expressed filial piety to test the ideology hypothesis. In the CSFD, adult children were asked to evaluate the importance of 10 statements about filial values on a scale from 1 (not at all important) to 5 (very important) : (1)

Children should be grateful to parents for their upbringing; (2) Children should treat parents well, regardless of how badly they have been treated by them; (3) Children should give up their own plans for the future to comply with parents' wishes and expectations; (4) Married sons should live with their parents; (5) Children should be responsible for making their parents' lives more comfortable; (6) Children should compliment their parents when it is necessary to save face on their part; (7) Children should have at least one son for the succession of the family name; (8) Children should do something to glorify the family; (9) Married daughters should go home from time to time to visit their parents; (10) Daughters should take the same responsibility as sons to support their older parents.

The 10-item filial piety index came from the original 52-item filial piety scale (FPS; Yang, Yeh, & Hwang, 1989), and various shorter versions of the FPS have been used extensively in other surveys in China and Taiwan (Chu et al., 2011; Yeh & Bedford, 2004). As in previous studies (Chu et al., 2011), we totaled responses to the 10 items to measure filial piety, with total scores ranging from 10 to 50. The Cronbach's alpha reliability coefficient is 0.73, above the minimum requirement for group-level analyses (Nunnally, 1994; Stewart, Hays, & Ware, 1992).

*Altruism.* To test the altruism hypothesis, we used three variables—elder's financial dependency, ADL limitations, and marital status—to capture elderly parents' economic, physical, and emotional needs. Financial dependency was a dummy variable, with a parent coded as 1 if he or she depended on children and relatives for financial support and 0 otherwise. The level of parents' daily physical needs was indexed on a scale from 0 to 6 by summing the number of ADLs that could not be performed independently, including bathing, dressing, eating, indoor transferring, toileting, and continence. Parental marital status was measured with a dummy variable (unmarried=1). We combined parents who were divorced, separated, or never married with those who were widowed, given the few older adults in the former group.

*Parental Investment.* We used three variables to capture parental investment in terms of time, money, and affection. Parental caregiving to grandchildren was captured with a dummy variable, coded 1 if parents had been primary caregivers for one or more of the adult child's children under the age of three years, and 0 otherwise. The measure of parental financial support to children was based on adult children's answers to questions about their parents' monetary transfers to them during the past ten years, including funds to buy an

apartment, run a business, or carry out other projects. Financial support was coded 1 for any transfers, 0 otherwise. Emotional closeness with parents was based on the average score of adult children's self-rating of their closeness with each parent (even if one had died), ranging from 1 (very distant) to 5 (very close).

*Modernization.* We included three indicators to capture the socioeconomic resources of adult children in our modernization hypothesis. Child's education was measured as the number of years of schooling completed, ranging from 0 to 16. Annual income was the adult child's 2001 income from his or her primary job, secondary job, and bonuses; values were logged to adjust for skewness. Ownership of current residence was dummy-coded, with 1 indicating ownership. We also included the parent's level of education, using three categories: 0 (reference), 1-6, and 7 or more years of schooling.

*Control Variables.* In addition to variables directly related to our hypotheses, we included the following control variables. Age of adult child was measured in years, ranging from 35 to 65. Previous studies have shown a negative relationship between the age of an adult child and the likelihood of coresidence with parents in urban China (Xie & Zhu, 2009). Gender of adult child was dummy-coded (female=1). We included two indicators of the adult child's sibling structure: number of siblings and existence of any living brothers (1=having at least one brother). Number of the adult child's own children was coded as a categorical variable (0, 1 or 2, 3 or more). The adult child's self-reported health was measured using a categorical variable: poor health, fair health, and good health (reference). Early marital coresidence was dummy-coded, with 1 indicating that the adult children had lived with their parents when they were married for the first time. Previous research has shown that current living arrangements were often associated with living arrangements earlier in the life course (Chen, 2005; Zimmer et al., 2007). The adult child's current residence was dummy-coded for urban or rural (urban=1). We also included dummies indicating which province the adult child lived in. The elderly parent's age was measured in years, ranging from 65 to 105. Dummy codes were used for the parent's ethnicity (Han=1) and gender (female=1).

All measures for adult children's characteristics and reports of their parents' investment came from the 2002 wave of CSFD; measures used for parents' characteristics came from the 2002 wave of the CLHLS.

## Analytic Strategy

We calculated descriptive statistics first for the whole sample and then by coresidence status. Means are reported for continuous variables, and percentages are reported for categorical variables. We then ran a series of multivariate logistic regression models to analyze the correlates of coresidence with elderly parents. As shown, hypothesis-related variables were entered in blocks, and control variables were included in all models. Models 1 to 4 include variables measuring, respectively, adult children's filial piety, parents' needs, parental investment, and adult children's socioeconomic resources. Model 5 included all four sets of these variables to examine the relationship between each set of variables and coresidence after taking into account the effects of other correlates. Model 6 added two variables to Model 5: adult child's gender interacted with parents' caregiving to grandchildren and with parents' financial support of adult child. We estimated models using SAS 9.3. All analyses were unweighted.

## RESULTS

### Descriptive Statistics

Approximately 45% of the adult children in our sample coresided with their parents (Table 1). As for our key independent variables, the mean for the adult children filial piety scale (FPS) was 36.4. The majority (65.0%) of parents reported that their major sources of income were their adult children, grandchildren, and other relatives; 63.8% of them were unmarried; and their mean number of ADL disabilities was 0.5. Roughly one third of parents had been the primary caregiver for one or more of their adult children's young children (<3 years old). Adult children reported a high average score for emotional closeness with their parent(s) (4.2 out of 5). Only about 10% of adult children reported receiving any money from their parents in the prior decade. The mean level of adult children's education was about 7 years of schooling; more than 7 out of 10 owned their housing units, and their average income in 2001 was 8,388 *yuan*. More than half of the parents did not receive any schooling, roughly one third had 1 to 6 years, and about 11% had 7 or more years of schooling.

The mean age of the adult children was about 50 years, and roughly one third were daughters. About two thirds of adult children had 1 or 2 children, one third had 3 or more children, and only 1% were childless. On average, adult children had 3 siblings; about 25% had no brothers. About 41% of the adult children lived in urban areas, and 82% reported good health.

Approximately 53% lived with their parents when they first married. As for the elderly parents, the mean age was 83 years, about 53% were female, and 91% were Han.

We also compared the characteristics of adult children who lived with their parents with those of children who did not (Table 1). Compared to adult children who did not live with their parents, those who did live with their parents had slightly higher filial piety scores, and their parents were more likely to be unmarried, to be dependent on them and other relatives for financial support, to have more disabilities. The coresiding parents were also more likely to have low levels of education. In addition, coresident parents were more likely to have been primary caregivers to their young grandchildren. Compared to non-coresident adult children, coresident children were more likely to have received money from their parents, had a higher average level of education, had about the same average yearly income, were less likely to own their homes, were more likely to be sons, were less likely to have brothers, and were more likely to have lived with their parents when initially married.

### **Factors Predicting Coresidence with Elderly Parents**

Table 2 presents the results from multivariate logistic regression analyses. Consistent with the ideology hypothesis, Model 1 shows that the stronger the filial piety expressed by married sons and daughters, the more likely they were to live with their parents, with the odds of coresidence increasing by 3% with each one-point increase in the FPS. In other words, the odds of coresidence were about 3 times higher for adult children with the highest than with the lowest scores of FPS (50 vs. 10), net of control variables.

We also find support for the altruism hypothesis. Results from Model 2 of Table 2 show that parents' financial, physical, and emotional needs were strongly associated with coresidence, net of control variables. As expected, coresidence was higher among adult children whose parents relied on them and other relatives for financial support. Parental disability was another strong predictor of coresidence: with each additional ADL limitation, the odds of coresidence increased by 8%. Finally, the odds of coresidence were 2.56 times higher for adult children whose parents were unmarried.

Model 3 tested the parental investment hypothesis. The results show that the odds of adult children coresiding with their parents increased by 75% when the parents had been primary caregivers for grandchildren under the age of three. Because less than 1% of the adult children in

our sample had children younger than 3 years old at the time of the survey, the most intensive grandchild care activities had been carried out by parents in the past. However, we acknowledge that the reverse causality may still be possible, that is, while being primary caregiver of grandchildren earlier in the life course may lead to higher likelihood of coresidence with adult children in later life, grandparents (grandmothers in particular) who coreside with adult children are more likely to take care of grandchildren. The results also show that those adult children who reported receiving money from their parents in the past 10 years were more likely to live with their parents than those who had not received any money. Emotional closeness with parents was also associated with coresidence: the better the parent-child relationship reported by adult children, the higher the odds of coresidence.

We observe only mixed support for the modernization hypothesis in Model 4. Net of control variables, two SES indicators—educational achievement and home ownership—were significantly associated with coresidence. There is a strong negative association between home ownership and coresidence: The odds of coresidence were 34% lower for adult children who owned their current apartments or houses than for those who did not. Education had the opposite effect: Each one-year increase in adult children's education was associated with a 4% increase in the odds of coresiding. Income and parent's education had no significant effects on the odds of coresidence. All significant effects found in Models 1-4 were also found in Model 5, which incorporated all variables.

### **Interactions with Gender**

In Model 6, we added two interaction terms with gender for parental caregiving to grandchildren and for parental financial support to children. We found that a parent's primary care for grandchildren younger than 3 years had more effect on coresidence for daughters than for sons. For married sons, having a parent serve as a primary caregiver for children under the age of three increased the odds of coresidence with the parent by 63%, all else being equal, while for married daughters it increased the odds by almost three times ( $1.63 * 1.78 = 2.90$ ). The interaction term between gender and receiving money from parents was not statistically significant. In additional analyses (results not shown), we tested the interactions of gender with variables measuring filial piety, parental needs, and socioeconomic resources, and these interactions were not statistically significant.

## DISCUSSION

With the rapid social and economic development, declining fertility, and the aging of society in China, concerns have risen about elder care and, relatedly, “the death of filial piety” (Liu, 2008). This paper looks at one aspect of this issue – coresidence of adult children with aging parents – examining which adult child and parent characteristics are associated with the likelihood of coresidence in contemporary China. Our analysis is guided by four theoretical perspectives on intergenerational coresidence, and the ideological, altruism, and parental investment hypotheses were supported by the data, but the results on modernization hypothesis were mixed.

We find support for the ideology hypothesis that filial piety is significantly associated with the odds of coresidence. This finding is different from the results that Chu and colleagues (2011) obtained from their survey in Zhejiang, Fujian, and Shanghai. One possible reason for the inconsistency is that the two studies focused on different cohorts of adult children. The adult children in our sample were generally older (35-65) than those in Chu’s (28-40), and it is possible that the effect of filial piety on coresidence is stronger for older than for younger cohorts of Chinese. Another possible explanation is that our sample represents the adult population in nine provinces/municipalities while their sample came from three economically more developed cities where the filial piety norm may have declined more.

Consistent with the altruism hypothesis, we find that parental needs, as indicated by being unmarried, having physical disabilities, and being financially dependent, are strong predictors of coresidence. We also find support for the parental investment hypothesis: In our analysis, adult children, regardless of gender, are more likely to coreside with parents who have provided primary care for grandchildren, who have given them monetary support, and with whom they feel close. Our finding on childcare is largely consistent with that of Silverstein and colleagues (2007), who found that in China’s Anhui province, elderly parents’ provision of childcare for their adult children is often compensated for through financial transfers or economically productive labor by the adult children. Studies in other Asian societies such as Indonesia and Malaysia have also found that adult children are more likely to support older parents who have previously provided childcare and other kinds of assistance to their household (Frankenberg et al., 2002; Lillard & Willis, 1997). Our finding on the effects of grandparenting very young children suggests that one way elderly parents’ provision of childcare is reciprocated is through coresidence with adult children in later life.



Although the research on intergenerational transfers often uses adult children's education level as a measure of parental investment in children (Frankenberg et al., 2002), we did not conceptualize it as a parental investment for our sample because of the complexity and transformation of China's educational system in the last century, including the large-scale adult education programs in the 1950s that aimed at eliminating illiteracy (Hannum, 1999). While education level may have reflected parental investment for some of the adult children in our sample, for others, it reflected governmental efforts to reduce adult illiteracy.

With regard to the modernization hypothesis, which predicts that higher SES among adult children will have a negative effect on their coresidence with parents, our results are mixed. While we find some support in home ownership, which is negatively associated with coresidence, we also find that contrary to the modernization hypothesis, income is not a significant predictor for coresidence and that education is positively associated with coresidence. This finding is somewhat different from that of Xie and Zhu's (2009) recent study in three large cities, in which the effect of adult children's SES on coresidence differed by gender. In our sample, which included children from both rural and urban areas, we find that the SES of adult children has *similar* effects for sons and daughters. The different conclusions may be partly explained by the different sampling frames and controls used in the two studies. For example, Xie and Zhu's study did not control for home ownership, which may be a better indicator of socioeconomic status than income because it reflects savings, investments, family inheritance, and wealth in contemporary China.

Finally, we only find partial support for our hypothesis that the association between parental investment and coresidence is stronger among daughters than sons. While married daughters are more likely than married sons to coreside with parents who have been primary caregivers for their grandchildren under the age of three, they are no more likely than married sons to coreside with parents who have helped them out financially.

Our study has several limitations. First, like many previous studies, it is based on a cross-sectional survey, and therefore causal links cannot be established between some of the independent variables (e.g., grandparents caring for grandchildren) and the odds of coresidence. Although in our models we use grandparenting as a predictor of late-life coresidence, it is important to acknowledge that intergenerational coresidence can facilitate grandparents taking care of grandchildren, making it difficult to sort out causality. Second, due to the CLHLS

sampling strategy, parents 80 years and older are overrepresented in our analyses. Also, because the CSFD is conducted in 9 coastal cities and provinces that are relatively richer and more developed than other places in China, our findings cannot be generalized to people in poor Chinese provinces. In addition, female adult children seem to be underrepresented in the CSFD data; roughly one third of our sample were married daughters. This disproportion likely results from a combination of CSFD sampling only those adult children living in their parents' CLHLS sampling areas and patrilocal coresidence tradition favoring married sons over married daughters in proximity to parents (Liu, Guo, Bern-Klug, 2013; Ma, 2009; Zeng, 2008). Ideally, future family surveys in China should aim at interviewing all adult children of the elderly. Third, our measures of parental investment in adult children capture only a few indicators. Future surveys should collect more data on parents' financial contributions made over the life course such as for school expenses, tutoring, wedding gifts, and grandchildren's education fees, and more.

Despite these limitations, our study makes important contributions to the literature on intergenerational relationships in China. Previous research has often emphasized that parent characteristics such as marital status, health, and economic status are important determinants of coresidence. Our findings show clearly that it is inadequate to only consider parents' needs. Children's characteristics such as their filial attitudes, socioeconomic status, and relationship quality with their parents can play major roles in decisions on coresidence. We find that filial piety varies across adult children, and it exerts positive influences on parent-child coresidence. More importantly, our findings suggest that in contemporary China, intergenerational relationships are not entirely governed by traditional values, obligations, and altruism of children. Adult children may coreside with their parents out of reciprocation for their parents' prior investments such as grandchild care and financial help. One caveat is that the Chinese Survey of Family Dynamics was carried out in the early 2000s, a period when formal home-care services and long-term care services were still spotty in urban areas and almost nonexistent in rural areas, and coresidence was the only viable way for adult children, rich or poor, to provide care for aging parents (Feng et al.; Zhan, Feng, & Luo, 2008). The past decade has seen a rapid growth of elder homes (institutional elder care), spurred by Chinese government policies and private sector investments (Feng et al., 2014). These new developments in elder care provisions coupled with increased geographic mobility and wealth in China may lead adult children and parents to regard coresidence as one of several competing options for elder care. It is possible that children's

economic status will play a more important role in arranging for elder care (e.g., coresidence vs. institutional care) because those who have more financial resources can afford to pay the high cost of institutional care for their parents (Zhan et al., 2008).

In this study, we provide a snapshot of correlates of coresidence by adult children and parents. As Chen (2005) has argued, living arrangements for married children and their parents are not static; rather, they change with both parties' needs over the life course. Therefore, future research should collect longitudinal data and examine the dynamic nature of the living arrangements of adult children and their parents. Previous research also finds a substantial discrepancy between older Chinese adults' preferred living arrangements and their actual living arrangements, a discrepancy with negative consequences for their health and well-being (Sereny, 2011; Sereny & Gu, 2011). Future research that assesses the living arrangement preferences of both adult children and their parents may provide additional insights on coresidence. In addition, China's massive rural-to-urban migrations over recent decades, fostered by employment availability, have left many rural households without nearby adult children (Silverstein et al., 2007). Over the last 20 years, this population dynamic has created 'skipped-generation' households, consisting of grandparents and grandchildren only. Given findings from a recent study using newly released national survey data (the 2010 wave of the Chinese Family Panel Studies) that about 8% of elderly Chinese aged 60-plus lived in such households (Ren & Treiman, 2014), the correlates and characteristics of skipped-generation households deserve more research attention. Furthermore, what is the role of grandchildren in the provision of care to their grandparents when adult children have migrated to cities? As grandparents get older and their grandchildren become young adults, will they continue to coreside? Or do grandchildren also anticipate migrating to cities to seek jobs? More broadly, future research on urban-rural differences in the determinants of living arrangements of older adults in China will be helpful in understanding and addressing the different challenges faced by urban and rural older adults and their families.

## REFERENCES

- Aboderin, I. (2004). Modernisation and ageing theory revisited: Current explanations of recent developing world and historical Western shifts in material family support for older people. *Ageing and Society*, 24, 29–50.
- Becker, G. S. (1974). A theory of social interactions. *Journal of Political Economy*, 82, 1063-1093.
- Bengtson, V. L., & Oyama, P. S. (2010). Intergenerational solidarity and conflict: What does it mean and what are the big issues? In M. A. Cruz-Saco & S. Zelenev (Eds.), *Intergenerational solidarity: Strengthening economic and social ties* (pp. 35-52). New York, NY: Palgrave Macmillan.
- Bengtson, V. L., & Roberts, R. E. L. (1991). Intergenerational solidarity in aging families: An example of formal theory construction. *Journal of Marriage and Family*, 53, 856-870.
- Chappell, N. L., & Kusch, K. (2007). The gendered nature of filial piety: A study among Chinese Canadians. *Journal of Cross-Cultural Gerontology*, 22, 29-45.
- Chen, J. (2003). The effect of parental investment on old age support in urban China. In M. K. Whyte (Ed.), *China's revolutions and parent-child relations* (pp. 197-221). Ann Arbor, MI: University of Michigan Press.
- Chen, F. (2005). Residential patterns of parents and their married children in contemporary China: A life course approach. *Population Research and Policy Review*, 24, 125-148.
- Chu, C. Y. C., Xie, Y., & Yu, R. R. (2011). Coresidence with elderly parents: A comparative study of southeast China and Taiwan. *Journal of Marriage and Family*, 73(1), 120-135.
- Cooney, R. S., & Shi, J. (1999). Household extension of the elderly in China, 1987. *Population Research and Policy Review*, 18, 451-471.
- Deutsch, F. M. (2006). Filial piety, patrilineality, and China's one-child policy. *Journal of Family Issues*, 27, 366-389.
- Feng, Z., Guan, X., Feng, X., Liu, C., Zhan, H., & Mor, V. (2014). Long-term care in China: Reining in market forces through regulatory oversight. In V. Mor, T. Leone & A. Maresso (Eds.), *Regulating long term care quality: An international comparison* (pp. 409–443). Cambridge, UK: Cambridge University Press.
- Frankenberg, E., Lillard, L., & Willis, R. (2002). Patterns of intergenerational transfers in Southeast Asia. *Journal of Marriage and Family*, 64, 627-641.
- Gu, D. (2008). General data quality assessment of the CLHLS. In Y. Zeng, D. L. Poston, D.A. Vlosky, & D. Gu. (Eds.), *Healthy longevity in China: Demographic, socioeconomic, and psychological dimensions* (pp.39-59). Dordrecht, Netherlands: Springer.
- Gu, D., Vlosky, A.D., & Zeng, Y. (2009). Gender differentials in transitions and expected years spending in seven living arrangements among the oldest-old in China: A population-based decrement-increment life table analysis. In H. T. Benninghouse & A. G. Rosset (Eds.), *Women and aging: New research* (pp. 539-575). New York: Nova Publisher.
- Hannum, E. (1999). Political change and the urban-rural gap in basic education in China, 1949-1990. *Comparative Education Review*, 43(2), 193-211.
- Hannum, E., Behrman, J., Wang, M., & Liu, J. (2008). Education in the Reform Era. In L. Brandt & T. G. Rawski (Eds.), *China's Great Economic Transformation*. New York: Cambridge University Press.
- Hermalin, A. I. (2002). Theoretical perspectives, measurement issues, and related research. In A. I. Hermalin (Ed.), *The well-being of the elderly in Asia* (pp. 101-141). Ann Arbor: University of Michigan Press.

- Ikels, C. (2004). *Filial piety: practice and discourse in contemporary East Asia*. Stanford, CA: Stanford University Press.
- Korinek, K., Zimmer, Z., & Gu, D. (2011). Transitions in marital status and functional health and patterns of intergenerational coresidence among China's elderly population. *Journal of Gerontology: Social Sciences*, 66B, 260–270.
- Lee, Y.-J., Parish, W. L., & Willis, R. J. (1994). Sons, daughters and intergenerational support in Taiwan. *American Journal of Sociology*, 99, 1010-1041.
- Li, S., Feldman, M. W., & Jin, X. (2004). Children, marriage form, and family support for the elderly in contemporary rural China. *Research on Aging*, 26, 352-384.
- Li, H., & Tracy, M. B. (1999). Family support, financial needs, and health care needs of rural elderly in China: A field study. *Journal of Cross-Cultural Gerontology*, 15(4), 357-371.
- Lillard, L. A., & Willis, R. (1997). Motives for intergenerational transfers: Evidence from Malaysia. *Demography*, 34, 115-134.
- Lin, I.-F., Goldman, N., Weinstein, M., Lin, Y.-H., Gorrindo, T., & Seeman, T. (2003). Gender differences in adult children's support of their parents in Taiwan. *Journal of Marriage and Family*, 65, 184-200.
- Liu, M. (2008, March 8). Playing with the old blood rules. *Newsweek* [on-line]. Available: <http://www.newsweek.com/2008/03/08/playing-with-the-old-blood-rules.html>.
- Liu, J. Y., Guo, M., & Bern-Klug, M. (2013). Economic stress among adult-children caregivers of the oldest old in China: The importance of contextual factors. *Journal of Cross-Cultural Gerontology*, 28, 465-479.
- Logan, J. R., & Bian, F. Q. (1999). Family values and coresidence with married children in urban China. *Social Forces*, 77, 1253-1282.
- Logan, J. R., Bian, F. Q., & Bian, Y. J. (1998). Tradition and change in the urban Chinese family: The case of living arrangements. *Social Forces*, 76, 851-882.
- Ma, Q. (2009). Financial resources, living arrangements and private transfers (Doctoral dissertation. Pardee RAND Graduate School). Retrieved from [http://www.rand.org/pubs/rgs\\_dissertations/RGSD241.html/](http://www.rand.org/pubs/rgs_dissertations/RGSD241.html/).
- Mao, W., & Chi, I. (2011). Filial piety of children as perceived by aging parents in China. *International Journal of Social Welfare*, 20, S99–S108.
- Nunnally, J.C. (1994). *Psychological theory*. New York: McGraw-Hill.
- Ren, X., & Treiman, D. J. (2014). Living arrangements of the elderly in China and consequences for their emotional well-being. PSC Research Report No. 14-814. University of Michigan.
- Sereny, M., & Gu, D. (2011). Living arrangement concordance and its association with self-rated health among institutionalized and community-residing elderly people in China. *Journal of Cross-Cultural Gerontology*, 26, 239-259.
- Sereny, M. (2011). Living arrangements of older adults in China: The interplay among preferences, realities, and health. *Research on Aging*, 33(2), 172-204.
- Silverstein, M., Gans, D., & Yang, F. M. (2006). Intergenerational support to aging parents: The role of norms and needs. *Journal of Family Issues*, 27(8), 1068-1084.
- Silverstein, M., Cong, Z., & Li, S. (2007). Grandparents who care for their grandchildren in rural China: Benefactors and beneficiaries. In I. G. Cook & J. L. Powell (Eds.), *New perspectives on China and aging* (pp. 49-71). New York, NY: Nova Science.

- Stewart, A.L., Hays, R.D., & Ware, J. E. (1992). Methods of constructing health measure. In A.L. Stewart & J.E. Ware (Eds.), *Measuring function and well-being—The medical outcome study approach* (pp. 67–85). Durham, NC: Duke University Press.
- Treas, J., & Chen, J. M. (2000). Living arrangements, income pooling, and the life course in urban Chinese families. *Research on Aging*, 22, 238-261.
- United Nations Population Division (2013). *The world population prospects: the 2012 revision*. New York: United Nations.
- Whyte, M. K. (2004). Filial obligations in Chinese families: paradoxes of modernization. In C. Ikels (Ed.), *Filial piety: Practice and discourse in contemporary East Asia* (pp. 106-127). Stanford: Stanford University Press.
- Xie, Y., & Zhu, H. (2009). Do sons or daughters give more money to parents in urban China? *Journal of Marriage and Family*, 71, 174-186.
- Yang, K.-S., Yeh, K.-H., & Hwang, L.-L. (1989). A social attitudinal analysis of Chinese filial piety: Concepts and assessment. *Bulletin of the Institute of Ethnology, Academia Sinica*, 56, 171 - 227. (In Chinese)
- Yang, H. (1996). The distributive norm of monetary support to older parents: A look at a township in China. *Journal of Marriage and Family*, 58, 404-415.
- Yeh, K.-H., & Bedford, O. (2004). Filial belief and parent-child conflict. *International Journal of Psychology*, 39, 132 - 144.
- Zeng, Y. (2008). Introduction to the Chinese Longitudinal Healthy Longevity Survey. In Y. Zeng, D. L. Poston, D. A. Vlosky & D. Gu (Eds.), *Healthy longevity in China: Demographic, socioeconomic, and psychological dimensions* (pp. 23-37). Dordrecht: Springer.
- Zeng, Y., & Wang, Z. (2003). Dynamics of family and elderly living arrangements in China: New lessons learned from the 2000 census. *The China Review*, 3, 95-119.
- Zhan, H. (2004). Willingness and expectations: Intergenerational differences in attitudes toward filial responsibility in China. *Marriage and Family Review* 36, 175–200.
- Zhan, H. J., Feng, X., & Luo, B. (2008). Placing elderly parents in institutions in urban China: A reinterpretation of filial piety. *Research on Aging*, 30(5), 543-571.
- Zhang, Q. F. (2004). Economic transition and new patterns of parent-adult child coresidence in urban China. *Journal of Marriage and Family*, 66, 1231-1245.
- Zhang, Z. (2004). The effect of caregiving from children on health status of the elderly: Protection or selection. *Journal of Population Science, Special Issue*, 29-36. [in Chinese]
- Zimmer, Z., & Kwong, J. (2003). Family size and support of older adults in urban and rural China: Current effects and future implications. *Demography*, 40(1), 23-44.
- Zimmer, Z. (2005). Health and living arrangement transitions among China's oldest-old. *Research on Aging*, 27, 526-555.
- Zimmer, Z., Kwong, J., Fang, X., Kaneda, T., & Tang, Z. (2007). Child coresidence among older adults in Beijing, China: Trends, determinants and transitions. In I. Cook & J. Powell (Eds.), *New perspectives on China and aging* (pp. 5-28). New York, NY: Nova Science.

**Table 1.** Characteristics of Married Adult Children and Their Parents by Coresidence Status

Variables	Coresiding with Parents			P value <sup>a</sup>
	Total (N=3,938)	Yes (n=1763)	No (n=2175)	
Coresidence (%)	44.8			
<b>Key independent variables</b>				
Child's filial piety index (10-50)	36.4	36.7	36.2	**
Parent's financial dependence (%)	65.0	73.8	57.8	**
Parent's ADL limitations (0-6)	0.5	0.7	0.4	**
Parent unmarried (%)	63.8	78.0	52.3	**
Parent(s) as primary caregiver of grandchildren	31.0	39.7	24.0	**
Emotional closeness with parents (1-5)	4.2	4.3	4.2	n.s.
Received money from parents in the last decade (%)	9.9	10.8	9.2	**
Child's education (0-16 years)	7.3	7.5	7.2	*
Child's annual income in 2001 (0-240,000 yuan)	8,388	8,244	8,504	n.s.
Child owns current residence (%)	73.2	68.6	77.0	**
Parent's education (%)				**
0 years	56.4	61.4	52.4	
1-6 years	32.5	29.7	34.7	
≥7 years	11.1	9.0	12.9	
<b>Control variables</b>				
Child's age (35-65)	50.0	51.5	48.9	**
Child's gender (female=1) (%)	29.6	14.7	41.6	**
Child's no. of offspring (%)				**
0	1.0	1.3	0.7	
1 or 2	65.9	61.3	69.7	
≥3	33.1	37.4	29.7	
Child has no brother (%)	25.1	37.0	15.4	**
Child's no. of siblings (0-6)	3.0	2.6	3.3	**
Child's residence (urban=1) (%)	41.2	41.4	41.1	n.s.
Lived with parents after first marriage (%)	52.6	71.9	37.0	**
Child's self-reported health (%)				n.s.
Poor	3.7	4.3	3.3	
Fair	15.7	15.5	15.9	
Good	81.6	80.2	80.8	
Parents' age (65-105)	83.0	85.9	80.8	**
Parent's ethnicity (Han=1) (%)	90.5	89.2	91.5	*
Parent's gender (female=1) (%)	52.6	57.4	48.7	**

<sup>a</sup> significance test of the difference between "coresident" and "non-coresident": \* $p < .05$ . \*\* $p < .01$ .

**Table 2.** Odds Ratios from Logistic Regressions of Coreidence Between Married Adult Children and Elderly Parents on the Characteristics of the Children and Parents

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
<b>Key independent variables</b>						
Child's filial piety index (10-50)	1.03**				1.02*	1.02*
Parent's financial dependence		1.51**			1.66**	1.66**
Parent's ADL limitations (0-6)		1.08*			1.09*	1.08*
Parent unmarried		2.56**			2.88**	2.88**
Parent(s) as primary caregiver of grandchildren			1.75**		1.84**	1.63**
Emotional closeness with parents (1-5)			1.23**		1.22**	1.22**
Received money from parents in the last decade			1.50**		1.74**	1.95**
Child's education (0-16 years)				1.04**	1.04**	1.04**
Child's annual income in 2001 (logged)				1.02	1.02	1.01
Child owns current residence				0.66**	0.61**	0.62**
Parent's education						
0 years (reference)						
1-6 years				0.99	1.05	1.05
≥7 years				0.80	0.96	0.94
<b>Control variables</b>						
Child's age (35-65)	0.97**	0.96**	0.97**	0.97**	0.97**	0.96**
Child's gender (female=1)	0.29**	0.30**	0.30**	0.30**	0.31**	0.26**
Child's offspring						
1 or 2 (reference)						
0	1.77	1.78	2.18*	1.63	2.29*	2.27*
≥3	0.95	0.92	0.96	1.00	0.94	0.94
Child has no brother	2.57**	2.72**	2.53**	2.54**	2.63**	2.61**
Child's siblings (0-6)	0.86**	0.87**	0.86**	0.86**	0.86**	0.86**
Child's residence (urban=1)	1.26**	1.42**	1.20*	1.14	1.19	1.18
Lived with parents after first marriage	3.25**	3.36**	3.22**	3.25**	3.27**	3.24**



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Child's self-reported health						
Good (reference)						
Fair	0.95	0.96	0.95	0.94	0.96	0.95
Poor	1.32	1.29	1.35	1.36	1.39	1.39
Parents' age (65-105)	1.07**	1.05**	1.07**	1.07**	1.05**	1.05**
Parent's ethnicity (Han=1)	0.79	0.87	0.77	0.80	0.79	0.80
Parent's gender (female=1)	1.58**	1.16	1.55**	1.52**	1.09	1.12
Caregiver of grandchildren* daughter						1.78**
Received money from parents* daughter						0.78
-2log likelihood	4228.22	4101.07	4171.80	4205.41	3971.44	3962.70

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Note: N=3,938. The places where the adult children lived were controlled in all models (not shown in tables). These provinces/municipalities are Beijing, Shanghai, Jiangsu, Zhejiang, Fujian, Guangdong, Guangxi, Liaoning and Shangdong.

\* $p < .05$ , \*\* $p < .01$ .



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