THREE ESSAYS ON HEALTH, AGING AND THE FAMILY IN CONTEMPORARY CHINA

by

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To Mom and Dad

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CHAPTER 1

INTRODUCTION

This dissertation consists of three essays on health, aging and the family in contemporary China. The first essay addresses socioeconomic differentials in mortality among the oldest old Chinese. The other two essays examine intergenerational transfers between adult children and their elderly parents in urban China.

The first essay explores how socioeconomic status (SES) affects mortality among the oldest old in China. Previous literature suggests that socioeconomic differentials might disappear at very old ages. To delve more deeply into this issue, I used data from the 1998, 2000, and 2002 waves of "The Chinese Longitudinal Healthy Longevity Survey" to examine whether SES differentials disappear among the oldest old in China (those over eighty years old). I operationalized the oldest old ages as three groups, 80+, 90+, and 100+, to explore the effect of SES on mortality after certain ages. Findings from this study reveal that SES differentials persist among the oldest old Chinese, even for the extremely old group (100+).

The second essay examines whether or not children with high socioeconomic status buy out the obligation to live with their parents by providing greater financial support, using a recent dataset ("Study of Family Life in Urban China") collected in 1999 in three cities, Shanghai, Wuhan, and Xi'an. To account for the potential selection bias

associated with coresidence, coresidence and financial transfer are treated as joint outcomes by using endogenous switching regression models. The results show that children buy out of the familial obligations of living with their parents by providing more financial support; however, the observed buy-out pattern is driven by the selection into coresidence/non-coresidence on the basis of unobservable factors.

The third essay explores how the characteristics of adult children and their adult siblings affect their financial support of parents through estimating fixed-effects models. In particular, I test the following three hypotheses on the explanation of intergenerational transfer within the extended family: the traditional social norm hypothesis, the long-term exchange hypothesis, and the resource redistribution hypothesis. Results show that in urban China the long-term exchange and resource redistribution hypotheses still hold after controlling for unobserved family-level factors, but do not support the traditional social norm hypothesis.

CHAPTER 2

SOCIOECONOMIC DIFFERENTIALS IN MORTALITY AMONG THE OLDEST OLD IN CHINA

Abstract

While an inverse relationship between socioeconomic status (SES) and mortality has been well documented for many populations throughout the world, it remains unclear whether this relationship holds true for the oldest old. Most notably, some scholars have suggested that the relationship may disappear at the oldest ages. Using data from the 1998, 2000, and 2002 waves of "The Chinese Longitudinal Healthy Longevity Survey," this paper examines the relationship between socioeconomic status and mortality among the oldest old (80 years and older) population in China. Our results show the continuing prevalence of SES differentials in mortality--higher SES is significantly associated with lower mortality risks--among the oldest old in China. We further show that the relationship holds regardless of how the oldest old are operationalized as 80+, 90+, or 100+ years old.

Over the past five decades, numerous studies have explored the relationship between mortality and socioeconomic status (SES) (for example, see Bassuk et al. 2002; Kitagawa and Hauser 1973; Shkolnikov et al. 1998). In one of the earliest studies,

Moriyama and Guralnick (1956) examined occupational differentials in mortality in the U.S. and found substantial differences between laborers and non-laborers (see a review by Moore and Heyward 1990). Since that seminal study, researchers have extended the depth and scope of their inquiry by incorporating multiple SES measures and by examining mortality patterns across nations. Kitagawa and Hauser (1973), for example, considered mortality differentials by both educational and income levels, relying upon data matched between the 1960 U.S. Census and death certificates. In the early 1980's, the Black Report examined occupational differentials in health and mortality in England (Black et al. 1982). A prevailing view has emerged from these studies: there is an inverse relationship between SES and mortality (Robert and House 2000; Williams 1990).

Despite the consistency of this finding in almost all past studies, two qualifications have emerged. First, the causal nature of the relationship between SES and mortality is less than clear. Prior factors, such as a pre-existing medical condition, could account for the observed association between low SES outcomes and heightened mortality risks. However, the large extant literature in this area suggests that the relationship between SES and health inequality is primarily causal (Adler and Ostrove 1999; Goldman 2001). Second, the strength of this relationship may vary across populations and social contexts. In particular, whether this relationship holds true for the elderly population has been questioned. This paper focuses on the latter concern and considers the extent to which the prevailing wisdom concerning the SES-mortality relationship holds for the oldest old population in China. Although a strong inverse relationship between SES and mortality has been well documented for the adult population (see, for example, Moriyama and Guralnick 1956), studies that focus on the

elderly population (65 years and older) have produced far less consistent results, and even these studies have not adequately explored the oldest old population (80 years and older).

Two primary hypotheses have been advanced to describe the age pattern in the relationship between SES and mortality/health: the cumulative advantage and the convergence hypotheses. The cumulative advantage hypothesis predicts that the effect of SES, i.e. the SES gap, grows larger with age. According to Ross and Wu (1996:105), "educational attainment increases resources that accumulate throughout life, producing a larger SES gap in health among older persons than younger." However, except for their study, the current literature does not offer much evidence to substantiate this hypothesis.

In contrast, the convergence hypothesis asserts that the effect of SES begins small on health in early adulthood, expands in middle ages, and then narrows in old ages (House et al. 1994). This perspective predicts that the magnitude of this relationship at very old ages is minimal or even non-existent. A number of factors might explain such an age pattern of convergence (House et al. 1990; 1994). First, the oldest old are clearly detached from economic activities and thus immune to some causal mechanisms through which SES affects mortality, such as job hazards and work stress. Second, with age, biological determinants may become more important in determining health, gradually dominating social factors in affecting mortality for the oldest old. Third, the diminished or non-existent SES differentials in older ages may reflect the fact that less healthy people have died prior to certain old ages. In other words, those who survive to a very old age are already selected with respect to unobserved health traits that should compensate for the SES effects. Fourth, the exposure to health risk through unhealthy behaviors such as smoking and drinking is reduced among the elderly. Finally, in

developed countries such as the U.S., social welfare policies reduce SES inequalities among the elderly.

In support of the convergence hypothesis, several studies have found evidence suggesting that the effect of SES on health/mortality is smaller for the elderly than for adults (25-64) (Backlund, Sorlie, and Johnson 1996; House et al. 1990; 1994; Huisman et al. 2003; Kitagawa and Hauser 1973). For example, House et al. (1990; 1994) found that SES differentials in health inequality are smaller at later old ages (75 and older) than in middle ages (35-65) and early old ages (65-75). Regarding the pattern between SES and mortality, Kitagawa and Hauser (1973) found larger educational differentials in mortality among persons aged 25-64 than among older persons.

Our paper begins from the perspective that while many studies have been conducted to test the relationship between SES and mortality among adults, and even among the elderly, past research has not adequately addressed the oldest old population beyond 80 years old. Therefore, based on current research, we are left to ponder whether there are significant effects of SES on mortality among the oldest old, and particularly those at very old ages (100+). Our study of the oldest old is motivated by previous studies that found smaller SES differentials among the elderly than among adults. If SES differentials become smaller and smaller with age, we might expect them to eventually disappear among the oldest old populations.

In fact, to our knowledge, researchers have not paid adequate attention to the oldest old (say 80 and older), especially the extremely old (100 and older), due to a lack of sufficient data. Most studies to date do not differentiate the oldest-old from the younger old. However, this distinction is important, because the younger old and the

oldest old are different in several significant respects (Huisman et al. 2003). For example, the younger old are recently retired and some of them still engage in economic activities, while the oldest old usually have been detached from economic activities for more than 15 or 20 years.

In light of current demographic trends of postponed mortality and prolonged longevity, understanding the impact of SES on mortality for the oldest-old population (80+ years) has become increasingly important, as the total number of individuals in this age group begins to expand. For example, there were 8 million oldest old (80 and older) in 1990 in China; however, this number will be 114 million in 2050 based on the modest mortality assumption (Zeng and Vaupel 1989). Given this, China is an ideal place to study the oldest old population, especially for the 90+ and 100+ population. The oldest old population needs the most care, either from families or from society, and a steep increase in their relative population size has significant social policy implications.

In addition, it is important to understand how the relationship between SES and mortality might be different in developing countries than in the developed countries in which most of previous studies have been conducted. For example, findings from research in the U.S. may not be applicable to countries such as China, and especially to the oldest old in China, given markedly different socioeconomic and cultural contexts. There are substantial differences between China and developed countries in terms of population structure, societal system, and economic development (Liang et al. 2000). In China, the elderly are not well educated, about 60% of them being illiterate. Although China has begun to develop its social support systems for the elderly, most of them still rely on family for financial and material support. Also, while China is transitioning into a

market economy, the legacy of socialist planned economy lingers in some sectors. For historical reasons, the development in rural areas is far behind that of urban areas, further deepening an already sharp divide between the two. These factors make social stratification more complex in China than in developed countries.

In brief, the purpose of our study is to test whether SES differentials in mortality exist among the oldest old Chinese. Our research question is: For the oldest old Chinese, does SES still affect mortality significantly? More specifically, do SES differentials with respect to mortality disappear beyond a particular old age such as 80, 90, or 100?

Data and Methods

Data

A survey of the oldest old Chinese (Chinese Longitudinal Healthy Longevity Survey, "CLHLS") was conducted in 1998 as a baseline for a longitudinal project on health and longevity[1]. This was a multi-stage, stratified cluster survey with a response rate of around 88%. The survey, conducted in 631 randomly selected counties and cities of China's 22 provinces, oversampled extremely old persons (i.e. 100 and older) and oldest old men (Zeng et al. 2001). Nine provinces such as Xinjiang, Qinghai, and Gansu, where a large proportion of ethnic minorities live, were not included in this survey, in order to avoid "potentially inaccurate age-reporting" (Zeng et al. 2001: 97). Members of the Han ethnic group, the majority of Chinese, are more likely to accurately remember

[1] The sponsoring and supporting institutions for the CLHLS include: National Institute on Aging; United Nations Fund for Population Activities (UNFPA), China National Foundation for Social Sciences, Peking University, Duke University, and Max Planck Institute for Demographic Research (Gu 2005a).

their birth dates (Wang et al. 1998), largely because of their use of the 12–year cycle animal zodiac[2]. The respondents were recontacted in follow-up surveys conducted in 2000 and 2002 respectively. The baseline (i.e., 1998) survey included 8,959 respondents aged 80 and above. Of these, 3,355 persons died between the first and second waves, and 1,591 persons died between the second and the third waves. Because the survey included detailed demographic and socioeconomic status variables, we are able to analyze the relationship between SES and mortality among people at the oldest ages.

Age misreporting may be significant among respondents who reported extremely old ages (Wang et al. 1998). The CLHLS incorporated a few strategies to reduce age misreporting. For example, birthdates in both lunar and solar calendars were asked; The interviewers also checked the ages of the respondent's parents, siblings, and children or grandchildren (Gu 2005b)[3]. To further protect against potential biases associated with extreme outliers due to age misreporting, we consider only respondents who were under age 105 in the base year of 1998. After excluding invalid or incomplete cases, the baseline sample includes 7,390 people between ages 80 and 105, of which 4,827 people died before the 2002 follow-up survey.

Measures

In this analysis, mortality due to all causes is the dependent variable. Deaths between the baseline survey and the follow-up surveys as well as the death date were

[2] The age reporting for the Han oldest old population younger than 105 is almost as good as in developed countries, see Zeng et al. 2001 and Wang et al. 1998.

[3] Gu (2005b) shows that the age reporting in the CLHLS is valid by examining age heaping, age progressive ratio, and density of centenarians.

recorded by interviewers. The information was obtained from the appropriate proxy respondent, usually the next kin, and was verified by family members or neighbors. This method has been validated as an appropriate way to collect quality data for mortality research (George 2002), as it yields more updated information than checking household registration.

The socioeconomic predictor is a composite of education and urbanity at the baseline. In most previous studies, education, income, and occupation have been used as important SES indicators in predicting mortality and health status (Anson & Sun 2004; Bassuk et al. 2002; House et al. 1990; House et al. 1994; Lantz et al. 1998; Liang et al. 2002). However, it is not clear that these measures are equally applicable in developing countries, and particularly for the oldest old populations. In developing countries, information about older persons' education level is more easily accessible and constitutes a more valid indicator of SES than income or occupation because older people may have more than one financial resource, and many of them have retired and may have held multiple jobs in the past (Zimmer et al. 1998). For our study, occupation is a poor measure of SES, although it usually works well for employed populations (Robert and House 2000). This is because more than half of the oldest old in our sample were farmers and never had other occupations. Therefore, there is not much variation in this variable. In addition, income would not be a good measure because the oldest old rely on multiple sources of financial and material support, especially from family members. In the data we use for this study, income is unavailable.

We rely on education as a primary measure of SES in our analysis. A large literature on social stratification in the U.S. has overwhelmingly shown that education is

a very strong predictor of a person's socioeconomic status in adult life (e.g., Blau and Duncan 1967; Hauser and Warren 1997). Buchmann and Hannum's (2001) recent review indicates that education's role in determining SES is no less important in developing countries. For example, education can change an individual's occupational status, labor market participation, and social mobility. Some prior research on SES and health/mortality in China has used education as an SES measure (Anson and Sun 2004; Liang et al. 2000; Zimmer et al. 2005). For example, based on a sample of working-age respondents (16-60) in rural areas of the Hubei province, Anson and Sun (2004) report that education significantly predicts health, and this pattern resembles that in western countries. The study by Liang et al. (2000) shows that education significantly affects old age mortality in Wuhan, China. Two studies on Taiwan by Liu et al. (1998) and Zimmer et al. (2005) also find educational differentials in old age mortality. In this study, education is defined as a dummy variable, non-educated (i.e., schooling years=0) versus educated (schooling years>0).

Urban versus rural residence presents another important dimension of SES in China. Since the establishment of the household registration system in 1955, the Chinese population has been divided into agricultural (rural) and nonagricultural (urban) sectors. This system limits the migration from rural to urban areas and has created large disparities between sectors in strong favor of the urbanites. In fact, as Wu and Treiman (2004:363) point out, status in the household registration system largely determines "access to good jobs, education for one's children, housing, health care, and even the right to move to a city." People who live in rural areas are severely disadvantaged relative to those who live in urban areas in terms of income, health care resources, etc. (Liang et

al. 2000). In this study, residence is defined as a dummy variable, with rural coded 0 and urban coded 1.

We create an SES variable with four categories composed of the dual conditions of education and urbanity: (1) non-educated and living in a rural area, (2) non- educated and living in an urban area, (3) educated and living in a rural area, and (4) educated and living in an urban area. Therefore, in the analysis, we divided the oldest old into 4 socioeconomic groups based on two dimensions of education and urbanity. We discuss in more detail the reasons behind this parameterization of the SES variable in the appendix. While our SES measure is composed of two dimensions, education and urban/rural residence, it is still very crude, as it ignores heterogeneity in socioeconomic status within a category of the classification. However, the crudeness of the measure should introduce a conservative bias. If we indeed find mortality differentials by our SES measure, it is likely that such differentials would be more pronounced with a more refined SES measure.

The covariates include age, sex, ethnicity, region, activities of daily living (ADL), and self-reported health. Age and sex are important determinants of mortality. Age is a continuous time-varying variable, and sex is a dummy variable (female is coded as 1). In addition, we include a time-varying variable that represents the lapsed time from the baseline survey of 1998 ("time interval"). The inclusion of this variable in our analysis does not affect our conclusions, but it points out an issue in data quality, as will be discussed below. Ethnicity is categorized as Han (coded as 1) or minority (coded as 0). Region is a four-category classification: northern, middle, southern, and western.

We also consider ADL and self-reported health at the baseline survey as two important confounding variables. It is difficult to directly gauge the objective health status of old people, especially the oldest old people, in developing countries such as China, because medical diagnoses and records are very poor (Zeng et al. 2000). Thus, ADL provides a better indicator of the objective health status of the oldest old Chinese than the chronic conditions that often have been used in previous studies. Self-reported health is another health status indicator, a mixed measure of objective health status and subjective feelings about health (Maddox and Douglass 1973). Previous studies show that self-reported health is a good predictor of mortality and physical functional decline of the elderly (Benyamini 1997; Idler and Benyamini et al. 1999).

In this study, functional abilities--including eating, dressing, transferring, using the toilet, bathing, and continence--are used to generate a baseline (1998) ADL variable, which is coded 0 for impaired and 1 for not impaired. Self-reported health at the baseline is measured by an interview question that asks respondents to rate their health on a 5-point scale--very bad, bad, fair, good, and very good. Very bad and bad are combined and coded as 0, and fair, good, and very good are combined and coded as 1 in our analysis.

We construct three alternative age groups in order to examine whether SES differentials disappear beyond an old age: the entire group (80 and older), and two subsets -- 90 and older, and 100 and older**.** Correspondingly, the first step in our analysis is to examine whether SES differentials in mortality exist among the elderly, 80 and older. We then apply more stringent definitions of the elderly age to age 90 and then to age 100. We repeat the statistical analyses in the more restricted elderly subpopulations

to examine if the relationship between SES and mortality disappears beyond an advanced age at 90 or 100.

Table 2.1 displays the basic information on the study population. Overall, there are more women (60%) than men (40%), and almost half of them (49%) are rural non-educated. The distribution of deaths indicates that as age increases, mortality increases. For any given age group, women have lower mortality than men. The oldest old in higher SES strata have lower mortality than people in lower SES strata. For females in the 80+ and 90+ age groups, the rural non-educated and urban educated gap in percentages of deaths is close to 10%: 43.4% versus 34.5% for those over 80, and 69% versus 61.3% for those over 90. However, the percentages are close (83.5% versus 84.4%) among females over 100. Among males of every age group, the percentages of deaths are higher for the rural non-educated group than urban educated group.

Table 2.1 about here

Analysis

We conduct discrete time, proportional hazard analysis involving time-varying covariates to examine the impact of SES on mortality risk. More specifically, we estimate the effects of SES using logit models after we restructured the data into person-periods. The discrete time used to divide the data is month[4]. Our analysis involves three steps. First, we estimate the effect of SES on mortality among all respondents (i.e. 80 and

[4] We also estimated Cox models based on exact death dates, and the results are very similar to those from the logit models. We decided to report the logit model results, noting that date of deaths of the deceased respondents may not be recalled accurately by proxy reporters.

older). Second, we analyze the effect of SES on mortality among those aged 90 and older. Third, we focus on the age group 100 and older. For each step, we present two models--one without and one with health status at the baseline as control variables.

Our analytic strategy has two advantages. First, since we do not know at what old age SES differentials in mortality and health begin to converge, analysis with three alternative target populations (i.e., 80 and older, 90 and older, and 100 and older) sheds new empirical light on how the effect of SES on mortality changes with increasing old age. Second, using health variables as controls in the mortality analysis enables us to further understand and interpret the relationship between SES and mortality.

Results

We begin by estimating the effects of SES without controlling for health status. Table 2.2 shows the significant effects of SES on mortality for all age groups and SES categories. As shown in column 1, the risk of dying for the educated urban elderly is about 24 percent less than the risk for the reference group--the uneducated rural elderly (odds ratio=0.763). The odds of dying for the educated rural elderly is about 8.2 percent lower than that of the uneducated rural elderly (odds ratio=0.918). Additionally, the mortality risk for the urban non-educated does not differ significantly from the reference group, the rural non-educated, though it is less than 1 (odds ratio=.989). In summary, the evidence from Table 2.2, suggests that SES differentials do not disappear after 80.

Turning now to the 90 and older sub-population (column 2), we find that the rural educated have slightly lower odds of dying than the rural non-educated (odds ratio=.961), though the difference is not significant at the .05 level. The urban educated, however,

have a 23.3 percent lower mortality risk than the rural non-educated (odds ratio= .767), and the results are significant at the 0.001 level. Akin to the 80+ population, differences between the rural and urban non-educated are neither substantively nor statistically significant (odds ratio=.977). Thus, for the population aged 90 and older, higher SES continues to offer a pronounced protective effect on mortality.

We now consider the extremely old age groups, those aged 100 or more years, an age range only a very small proportion of the world population today can attain. Column 3 in Table 2.2 reveals SES effects that are similar to those found for the 90+ population. Differences by residence status among the non-educated continue to be small and insignificant (odds ratio=.991), and the 1.7% higher risk of dying for the rural educated than the rural non-educated (odds ratio=1.017) is also statistically insignificant. However, the SES premium for the urban educated still exists and only decreased a little, from a 23.3% mortality risk reduction observed for respondents aged 90 and older to a 22.9% risk reduction (odds ratio=.771) for those 100 and older.[5]

Table 2.2 about here

Table 2.2 also details the effects of sex and age on mortality. As expected, women exhibit lower mortality than men at every age group. Although mortality increases with age, the rate of increase also dwindles with age. Comparing the magnitude of effects, however, we observe that the differentials in mortality across some SES groups are even larger than the sex differential in the 90+ and 100+ subgroups.

[5] Differences in the coefficients across the three samples, however, are not statistically significant for models reported in Tables 2.2 and 2.3.

One point worth noting in Table 2.2 is that *time interval* has significant effects even with time-varying age included in the model. Though we expected that time-varying age would show the effects of the force of mortality over time (mortality increases with age), the *observation time* during the survey period also affects the likelihood of dying (mortality increases with observation time, *independent of age*). This finding is unexpected, as it suggests that the mortality risk at every age is *higher* for those from younger cohorts.

This finding is inconsistent with recent studies that would expect lower mortality risk for younger cohorts. To account for this seeming discrepancy, we consider the role of interview selection. At the first wave interview, respondents would probably need some adequate level of health that would allow them to be interviewed with/without family members' help. In other words, the elderly who were particularly sick at the beginning of the study would have likely been excluded from the respondent sample.

Consider two groups, group A, which *entered* the sample at the age of 84, and group B, which *aged* to 84 by the second wave (i.e., age 82 at baseline). Given the minimal adequate health expectation noted above, members of group A are on average selectively healthier than members of group B at the same age of 84, since really sick persons were included in group B but not in group A. Therefore, even though the underlying age patterns of health are the same for the two groups, the health status of *observed* members in group A are healthier than that for members in group B. In other words, respondents from both groups should have a sufficiently favorable health status at Wave I in order to be included in the sample. During the next two years, both groups will experience health declines and mortality due to the aging process, and the health of group

B individuals *as they age to 84* may in fact fall below the baseline levels of group A individuals (who *started* at 84). Further, since there are no sample selection criteria (i.e., the minimal adequate health expectation) at later waves, members of group B would still be included even if their health declined to levels below what would have been necessary for sample inclusion at wave I. Thus, *at every age* (e.g., 84), respondents who have spent *more* time in the survey have higher mortality than those who have spent less time in the survey, due to this selection process. This process would lead to positive age *and* interval (observation time) effects simultaneously. In other words, the actual mortality among the older cohorts in our sample is likely underestimated.

Table 2.3 about here

Table 2.3 replicates the models from Table 2.2, now controlling the health status at baseline. We note that SES continues to have a large and significant influence on mortality. Health status at the baseline does not explain away the relationship between SES and mortality, and in some cases, the results from Table 2.2 actually become more pronounced. The educated urban elderly continue to have a lower risk of dying than those without education and living in the countryside, regardless of age group. The effects are particularly striking for the extremely old (100+) among the urban educated, for whom we observe a 28.5% reduction in mortality risk (odds ratio=.715), which is significant at the 0.01 level. For other categories of SES, some minor crossovers exist: compared to the rural non-educated, for example, the urban non-educated have a slightly higher risk of mortality (odds ratio= 1.019) throughout the 90+ age group, and in the 100+ group even the rural educated have a slightly higher risk of mortality (odds ratio=1.077).

Additionally, both health indicators substantially influence mortality, as shown in Table 2.3. For those with good self-rated health in the entire group, the odds of dying are 34% lower than for those with poor self-rated health. Similarly, people who are ADL-unimpaired at the baseline are less likely to die than those who are impaired (odds ratio = .575). Furthermore, the mortality reduction associated with self-rated health declines with age, as the odds ratio increases from .66 for 80 and older to .71 for 100 and older. However, the effect of ADL changes little from the 80+ to the 100+ groups. These results reveal that ADL and self-reported health, especially the former, have profound effects on the mortality of China's oldest age groups[6]. Finally, as the results in Table 2.2 demonstrate, the time interval in Table 2.3 remains still significant, and its effects increase with age.

In short, Table 2.2 and Table 2.3 provide three key insights. First, SES has substantial and significant effects on the mortality of China's oldest old. Second, the SES differential is large, comparable in magnitude to the sex differential, particularly for the extremely old (100+). Third, the SES effects that we document are quite robust, whether

[6] A possible limitation for the ADL measure in this study is that activities used to generate the ADL variable may not be comparable between rural and urban areas. We found that the rural oldest old need less help in bathing and continence, such that we found rural persons have better ADL status than urban persons. However, rural people may bathe less frequently than urban people, and thus report less difficulty bathing. In addition, lack of awareness of certain types of care-giving devices and procedures in rural areas may result in responses that elders "do not need help."

we change the target population to the 80+, 90+, or 100+ elderly. These effects persist, or even strengthen[7], after we control for health status at the baseline.

Conclusion

This study demonstrates the relationship between SES and mortality among the oldest old Chinese. We show that SES retains significant effects on mortality regardless of whether we operationalize the oldest old as those 80+, 90+, or 100+ years of age. We found that higher SES reduces the risk of mortality, with the urban educated having a much lower risk of dying than the rural uneducated. This pattern is consistent with the literature on SES and adult mortality.

Most notably, our study found SES-based mortality differentials among the extremely old age group, and we found that the SES premium is even more pronounced after controlling for the baseline health status. The current literature suggests that SES may only have a minimal effect or no effects at all on mortality/health for people at late old ages (House et al. 1990; 1994), although the issues of magnitude and age of convergence have not been solved (Zimmer et al. 1998). For all three age groups in our study, 80+, 90+, and 100+, SES differentials do not disappear either before or after adjustment for baseline health status.

[7] Surprisingly we observed a negative relationship between SES and health. We think this might be due to the biases in the measurement of health. Footnote 5 gives one illustration of the limitation of health measures. "Health and illness are culturally defined, the inclination to report disease and discomfort are culturally embedded" (Anson & Sun 2004:77). Health indicators may differ in their cultural meanings between rural and urban places.

However, our results do not shed new light on whether or not there is a convergence or divergence trend in China, since the SES differentials may have declined from a higher level or increased from a lower level in an earlier age. We do not have data on persons younger than 80 years with which to examine the effects of our SES measure on younger groups. However, our findings present clear evidence that SES differentials in mortality do not disappear altogether among the oldest old Chinese, especially for those 100+ years of age.

A possible limitation to this study is that the SES measure is limited by the survey data. As discussed in previous literature, multiple indicators representing different dimensions should be used in studies of the SES effects on mortality and health. In this study, the baseline data do not provide SES indicators such as access to medical care, house assets, and luxury products (TV, refrigerator, etc.), which can reflect financial status in developing countries. In addition, since elderly Chinese derive much of their financial support from their children or relatives, their financial situation might depend more on their children's SES than on their own. In a study of the relationship between children's education and parents' physical functioning in Taiwan, Zimmer et al. (2001) demonstrate that both children's and parents' education significantly affect parents' physical functioning. Therefore, examining children's SES and intergenerational transfer should help us to further understand their socioeconomic status. In this paper, our SES variable is crude, with a combination of binary measures of education and urban residence, necessarily masking a great amount of heterogeneity *within* the four groups cross-classified by the two variables. Although the SES measure is not ideal, our conclusion still holds because the crudeness of our SES measure tends to exert a

conservative bias – diminishing, rather than exaggerating, the SES differentials we can observe.

In addition, mortality is likely to be underestimated in this study. As discussed above, the significant effect of the interval variable indicates that the elderly in poor health are more likely to be selectively excluded from this study than those in good health. Another possibility is that sample attrition in the follow-up survey is partly attributable to respondent deaths[8]. Some respondents who were absent in the follow-up survey may have already died. Gu (2005b) reports that in this dataset there might be 10-15% underestimation of mortality for both males and females before age 90 between the 1998 baseline and 2000 surveys. Our results pertaining to the interval variable further confirm the underestimation.

In summary, this study helps clarify the question of whether SES still affects mortality after a certain advanced age. Despite good reasons to expect the relationship to diminish and perhaps disappear altogether after a particular age, our results reveal significant SES-based mortality differentials among very old persons. Based on this study, we propose several possible future directions in studying the SES-mortality relationship among the oldest old. First, multiple SES indicators such as access to medical care, assets and wealth should be employed in further research. Second, an underlying mechanism between SES and mortality should be addressed. In this paper, we focus on whether or not mortality differentials still persist among the oldest old in China. Given this limited research objective, we only included demographic controls of age and

[8] According to Gu (2005a), the attrition rates in the dataset are normal compared to those in certain developed countries.

sex but not mediating factors such as social support, marital status, and health behaviors. Now that we have established the existence of SES mortality differentials among the oldest old, it calls for the inclusion, in future studies, of mediating factors that may explain the observed SES mortality differentials.

Appendix

To further explain why we use the composite measure of SES based on education and residence, we estimate four additional models for all respondents (i.e., 80 and older), presented in Table 2.A. In the first model, education is the only SES variable; its coefficient shows that educated elderly have a 16% significantly lower mortality than non-educated elderly. Residence is the only SES variable in the second model, and its coefficient indicates that urban residents are more likely to survive than rural residents. In the third model, we use both education and residence as SES measures. The results indicate that educated and urban residents have a lower risk of dying in comparison to their counterparts. To further explore the interaction effect of these two measures, we include in the fourth model an interaction term. The significant interaction effect means that the effect of education depends on residence and that the fourth model is preferred. Our composite measure with four categories in the analyses is an alternative parameterization of the interaction effect in the fourth model.

Table 2.A about here

Table 2.1: Distribution of SES and Death Rate by SES

		Number in 1998	Percentage	Deaths 1998-2002	Death (%)
Females					
Age=80+					
SES	1 Non-educated, rural	2785	63.9	1942	43.4
	2 Non-educated, urban	1179	20.6	778	44.4
	3 Educated, rural	187	7.6	105	30.2
	4 Educated, urban	295	7.9	149	34.5
Age=90+					
SES	1 Non-educated, rural	2068	62.4	1641	69.0
	2 Non-educated, urban	786	27.4	609	65.1
	3 Educated, rural	99	4.5	78	65.4
	4 Educated, urban	133	5.7	94	61.3
Age=100+					
SES	1 Non-educated, rural	1171	63.4	979	83.5
	2 Non-educated, urban	355	29.8	303	85.3
	3 Educated, rural	47	2.6	39	82.2
	4 Educated, urban	48	4.2	40	84.4
Males					
Age=80+					
SES	1 Non-educated, rural	855	29.4	585	51.1
	2 Non-educated, urban	285	5.7	204	58.8
	3 Educated, rural	1031	43.4	645	44.8
	4 Educated, urban	773	21.5	419	40.2
Age=90+					
SES	1 Non-educated, rural	504	30.9	402	70.7
	2 Non-educated, urban	169	9.0	138	75.82
	3 Educated, rural	531	37.1	406	65.66
	4 Educated, urban	336	23.0	238	66.15
Age=100+					
SES	1 Non-educated, rural	153	34.2	141	92.4
	2 Non-educated, urban	55	14.7	49	88.5
	3 Educated, rural	148	33.3	131	88.4
	4 Educated, urban	65	17.8	54	82.8

Table 2.2: Effects of SES on Mortality

	Mortality		
	Age=80+	Age=90+	Age=100+
Variable	(model 1)	(model 2)	(model 3)
Sex			
Female	.794***	.839***	.884†
Age (time-varying)	1.075***	1.067***	1.050***
Interval	1.007*	1.006***	1.008***
SES			
Non-educated, rural	omitted	omitted	omitted
Non-educated, urban	.989	.977	.991
Educated, rural	.918*	.961	1.017
Educated, urban	.763***	.767***	.771**
Model Chi-squared	1305.47***	379.09***	62.46***
Degree of freedom	6	6	6

Note: † p<0.1; * p<.05; ** p<.01; *** p<.001. Also included in the models are region and ethnicity. The model Chi-squared statistics presented are the differences in model Chi-squared between the models presented and the baseline models in which only region and ethnicity are included as covariates.

Table 2.3: Effects of SES on Mortality (Controlling for Health)

	Mortality		
	Age=80+	Age=90+	Age=100+
Variable	(model 1)	(model 2)	(model 3)
Sex			
Female	.731***	.770**	.800**
Age (time-varying)	1.062***	1.053***	1.043**
Interval	1.005***	1.009**	1.012***
SES			
Non-educated, rural	omitted	omitted	omitted
Non-educated, urban	.977	.957	.958
Educated, rural	.960	1.019	1.077
Educated, urban	.744***	.743***	.715**
Self-reported health	.664***	.685***	.713***
ADL	.575***	.584***	.587***
Model Chi-squared	1656.54***	678.79***	227.88***
Degree of freedom	8	8	8

Note: * p<.05; ** p<.01; *** p<.001. Also included in the models are region and ethnicity. The model Chi-squared statistics presented are the differences in model Chi-squared between the models presented and the baseline models in which only region and ethnicity are included as covariates.

Appendix Table 2.A: Effects of Education and Urban/Rural residence on Mortality

Variable	Model 1	Model 2	Model 3	Model 4
Education				
Non-educated	omitted		omitted	omitted
Educated	.844**		.856*	.918*
Residence				
Rural		Omitted	omitted	omitted
Urban		.913**	.935*	.989
Education*Rural				.841*
Sex				
Female	.786***	.852***	.792***	.794***
Age (time-varying)	1.075***	1.076***	1.075***	1.075***
Interval	1.007***	1.006***	1.007***	1.007***
Model Chi-squared	1294.94***	1283.76***	1299.02***	1305.47***
Degree of freedom	4	4	5	6

Note: * p<.05; ** p<.01; *** p<.001. Also included in the models are region and ethnicity. The model Chi-squared statistics presented are the differences in model Chi-squared between the models presented and the baseline models in which only region and ethnicity are included as covariates.

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CHAPTER 3

BUYING OUT OF FAMILIAL OBLIGATION: THE TRADEOFF BETWEEN LIVING WITH VERSUS FINANCIALLY SUPPORTING ELDERLY IN URBAN

Abstract

For Chinese families, coresidence with elderly parents is both a form of support and a moderator of financial support. Previous literature on intergenerational support in Chinese societies has studied either coresidence or financial support, but not the joint nature of these two forms of support. Using a recent dataset ("Study of Family Life in Urban China") collected in 1999 in three cities, Shanghai, Wuhan, and Xi'an, we examine whether or not children with high socioeconomic status buy out the obligation to live with their parents by providing greater financial support. To account for the potential selection bias associated with coresidence, we treat coresidence and financial transfer as joint outcomes by using endogenous switching regression models. The results show that children buy out of the familial obligations of living with their parents by providing more financial support; however, the observed buy-out pattern is due to the selection into coresidence/non-coresidence.

Modernization and industrialization have shifted family structures from the traditional extended family to the nuclear family (Goode 1970), a process that weakens extended kinship ties and mutual aids, and decreases the level of intergenerational

support (Lin 2001). These transitions have occurred primarily in westernized societies. In some developing countries, however, this is not the case. In particular, in East Asian countries where support for the elderly relies primarily on family members, these shifts are still in process, due to strong patrilineal traditions and the lack of development of social support systems.

China, like many developing countries, has been experiencing shifts in family structure, particularly since the economic reform of 1978. During this transition period, China has witnessed dramatic demographic and socio-economic changes. These changes may have affected life styles, social norms, and values in many respects, thereby changing intergenerational relations (Sun 2002). The continuation of low birth rates, primarily due to the family planning policy, as well as socioeconomic and cultural changes, has resulted in accelerated population aging (Li et al. 2004). According to a report by the China Population and Development Center (2002), there were about 130 million persons in China aged 60 and older in 2002, accounting for 39.7 percent of the Asian elderly population and 21.34 percent of the elderly population worldwide. Providing support for such a large elderly population during a transition period in which modernization and traditional life interweave has proven a challenge. This combination of rapid population aging and rapid socioeconomic change, however, make China an ideal place to explore intergenerational support (Lee and Xiao 1998).

Under the influence of the Confucian model of respect for the elderly, family members, particularly adult children, have traditionally been the primary support

providers, offering not only financial assistance but also social and emotional support. As a traditional essential support form, financial support is primarily important for the elderly parents' living expenses and medical care. Statistics from the Survey on Support Systems for the Elderly in China show that 49 percent of urban residents and 73 percent of rural residents received financial support from children in 1992 (Lee and Xiao 1998).

Another crucial part of family support in China has been adult children's coresidence with elderly parents, which plays an important role in affecting elderly parents' psychological, physical, and economic well-being (Knodel and Ofstedal 2002). Traditionally, the ideal family is patrilocal, multigenerational, and extended (Zavorevotti 2006). In this family system, married sons live with and care for their parents after marriage, while married daughters live with and contribute to their parents-in-law's household. According to the 2000 Census, 65.3%[9] of persons aged 60 and older lived with their children. If we break down the proportion by residence, 61.1% in urban areas, and 68.2%[10] in rural areas, of the elderly persons aged 60 and older live with their children. As previous studies suggest, significant gender differences exist in living arrangement patterns with parents: married sons are more likely to live with their parents than are married daughters (Lee et al. 1994; Logan and Bian 1999; Xie and Zhu 2006). From a survey in three large Chinese cities in 1999, Xie and Zhu (2006) found that 38.1% of married sons lived with parents while only 15.2% of married daughters lived with parents. The percentage of sons co-residing with parents in rural areas is even higher (Lee and Xiao 1998), given the stronger traditional obligation values dominant there.

[9] This percentage is calculated based on the 0.1% micro 2000 Census data.
[10] These two percentages are calculated based on the 0.1% micro 2000 Census data.

There are two major reasons as to why family support prevails over other support options in China. First, family support for the elderly has been a tradition for thousands years. The essence of this tradition is filial piety and family obligation; that is, grown children should care for their elderly parents, and, in particular, sons should take more responsibility than daughters (Whyte 2004; Whyte and Xu 2003). In general, daughters move to their husbands' families upon marriage, without obligation to live with and support their parents. Therefore, married sons rather than daughters are primarily expected to support their parents by providing financial transfer and/or co-residing (Xie and Zhu 2006). Given this tradition, married sons and daughters can be expected to behave differently in living arrangement patterns and in the provision of financial support.

The second reason for the prevalence of familial support is the under-development of private and governmental social support systems. As Leung (1997) points out, "the heart of the problem for China is that formal and professional personal social services for the elderly are extremely underdeveloped." As a result, the rate of institutionalization of the elderly is very low, at about only 0.5% in 1994 (Leung 1997). In other words, the majority of the elderly live in homes with their families. In addition, public pensions are available only to those in the higher social strata (Walder 1992), who are primarily urban residents (Lee and Xiao 1998). However, in urban areas, according to Lee and Xiao (1998), while the number of retired persons has increased greatly since the 1970s, retirement benefits have become unstable and the price of medical care has increased in the transition from a planned to a market economy. Therefore, adult children adopt the main responsibility in caring for their elderly parents.

Undoubtedly, rapid demographic, social, and economic changes have been eroding traditional values, particularly in urban areas, although family support continues to prevail (Whyte 2003). As a result, the level and form of family support to the elderly may be changing. An important change in family support is the decline of children's coresidence with parents (Logan and Bian 2003; Tsui 1989), as the traditional extended family system is in the process of shifting to the nuclear family system. Younger generations tend not to live with parents, as they increasingly prioritize their own life style and privacy. Moreover, increasing geographic mobility means that fewer adult children live nearby. A study conducted in the Philippines, Thailand, Taiwan, and Singapore finds that the percentage of children's coresidence with elderly parents declined from the 1980s to the 1990s (Knodel and Ofstedal 2002). For example, the percentage of elders co-residing with children decreased in Taiwan from 81.6 in 1980 to 69 in 1989. In China, Unger (1993) shows that even in the 1980s about 88% of younger adults preferred not to coreside with their parents after marriage. According to a 1993 survey in urban China, the proportion of elderly co-residing with adult children decreased from 71% in 1987 to 67% at the time of the study (Logan et al. 1998). The decline in coresidence is even more evident from 1991 to 2000 based on the China Health and Nutrition Survey (Giles and Mu 2006).

However, a seeming conflict exists: on the one hand, adult children prefer not to coreside with parents because they care about their own life styles and privacy; on the other hand, given the two reasons we discussed earlier, they are still responsible for supporting their parents, even if they do not coreside. The broad power/bargaining theory implies children's strategies in solving the seeming conflict: children "may use financial

resources to exempt themselves from coresiding with parents or other-intensive services," and "siblings with more resources may induce less well off siblings to accept a trade of money for time by housing a parent (Lee et al. 1994: 1012-1013). Therefore, non co-residential children, especially sons, may provide more compensation in the form of financial support compared to their coresidential counterparts (Logan and Bian 2003).

Previous research suggests that children may fulfill their support obligation by providing more financial support to parents rather than living with them (Lee et al. 1994; Xie and Zhu 2006). Lee, Parish, and Willis' study (1994: 1027) of intergenerational transfer in Taiwan shows that married sons in high socioeconomic strata are less likely to live with parents, and instead perhaps provide more financial assistance. Thus they argue that high-status sons in Taiwan may "buy" themselves out of the obligation of living with elderly parents by providing more financial support. Xie and Zhu's (2006) study on gender differences in financial support conducted in three large Chinese cities also suggests similar patterns with regard to gender differences in relation to coresidence and financial support. In this sense, coresidence and financial support should be treated as joint outcomes.

However, previous studies have not examined whether high-status children, especially sons, buy themselves out of the obligations to live with parents by providing more financial support**,** and no previous studies have considered the joint nature of coresidence and financial transfer (Xie and Zhu 2006). Although a number of studies have examined intergenerational transfers and coresidence in China (e.g., Lee and Xiao 1998; Li et al. 2004; Sun 2002; 2004), the common approach to analyzing coresidence and financial support from children to parents is to treat them as separate outcomes,

predicting the likelihood of coresidence and then estimating the effect of coresidence on financial support. Because of this common approach, the hypothesis that children with high SES may buy out of living with parents by providing more financial support has not been formally examined in the previous literature.

Yet, coresidence and financial support should be treated as joint outcomes. As Xie and Zhu (2006: 8) argue, in the sense that rich sons "may buy themselves out of the obligation of living with elderly parents by providing more financial support … [Thus,] coresidence and financial support are joint outcomes." Lee, Parish, and Willis' study (1994:1027) also indicates that coresidence and financial support are jointly determined in that "they are partial substitutes for each other, and the choice between them is made at a single point in time." [11] In other words, coresidence and financial support may be simultaneously related in a way that results in a selection bias because the assignment of children to live with or not live with parents is not random. On the one hand, lower SES children may choose to coreside with parents, since they can share resources with parents and may not provide more financial transfer; on the other hand, higher SES children may choose to provide more financial support to parents to fulfill the obligation of support, because they do not need to coreside. Given this fact, the decision as to whether children co-reside with parents is affected by the expected financial outcome — the financial obligation under different living arrangement patterns.

In addition, the choice of living arrangements may be affected by both observed and unobserved factors that also affect financial transfer. Methods employed by previous

[11] Lee, Parish, and Willis examined the consequences of the joint nature between coresidence and financial support among Taiwanese families by estimating a bivariate probit model of the two decisions with error terms correlated, but the results suggesting separate outcomes are also appropriate.

studies, such as OLS regression analysis predicting transfers assume that no unmeasured factors affect both financial transfer and coresidence, which may lead to omitted variable bias. Both simultaneity and omitted variable bias indicate that estimates based on OLS are inconsistent (Mare and Winship 1988). Therefore, results based on OLS models may be misleading.

The purpose of this study is to extend previous research by examining the hypothesis that children with high socioeconomic status buy themselves out of fulfilling the obligations to live with parents by providing greater financial support. We also highlight gender difference in relation to coresidence and financial support. To account for the bias associated with coresidential status, we consider coresidence and financial support *jointly* by estimating endogenous switching models which control for unmeasured variables that could affect both coresidential status and financial transfer.

Research Design

Data

The data come from a survey called "Study of Family Life in Urban China," which was conducted by Xie and his collaborators[12] in 1999 in three large cities: Shanghai, Wuhan, and Xi'an. The survey initially aimed to reach 1,300 households in each city using a two-stage probability sampling method, and an adult aged 18 or older was randomly selected in each chosen household. The survey used a unique matching design: if a respondent was younger than 60, he/she was interviewed using Questionnaire

[12] The principal investigators for this project include Yu Xie (University of Michigan), Zhongdang Pan (Chinese University of Hong Kong), and Xuejun Yu (Center of Population Information and Research, China), in collaboration with the Institute for Market Information and the Beijing Broadcasting Institute.

A, and his/her parent (if available) was also interviewed with Questionnaire A+, which is designed particularly for the elderly. If an initial respondent was 60 years or older, he/she was interviewed using Questionnaire B, which is similar to Questionnaire A+, and one of his/her children was randomly selected and interviewed using Questionnaire B+, which is similar to Questionnaire A[13]. Therefore, this study includes an adult children sample, a parent sample, and a matched sample with adult-parent pairs[14] based on the former two samples.

In this study, we use the adult sample to perform analyses, since it includes detailed information on demographic, socioeconomic, and intergenerational transfers of adult children; we also examine elderly support from the children's perspective. We restrict our analyses to married adults with at least one surviving parent, because gender differences in coresidence and financial support tend to increase significantly after marriage, as suggested by the previous literature (Lee et al. 1994; Xie and Zhu 2006). Marriage is the turning point at which daughters contribute to their husbands' families, but sons continue to support their own parents. The sample size of 1,801 includes 839 sons and 932 daughters.

Measures

On the adult children's questionnaire, respondents were asked how much money (including both cash and gifts) he or she provided to his or her elderly parents and how much he or she received from his or her parents in 1998. Financial transfer from children to parents is the net amount exchanged between the respondent and the respondent's

[13] For more detailed information on the survey design, see Xie and Zhu (2006)
[14] All parent-child pairs live in the same city.

parents, with parents' contribution subtracted from children's contribution. Coresidence is a dummy variable, with non-coresidence with parents coded 0 and coresidence with parents coded 1.

The independent variables are divided into three categories: parents' resources, children's resources, and other controls:

Parents' resources include father's socioeconomic status (SES), parental survival status (whether both parents or one parent alive), and whether the respondent child has siblings. Father's socioeconomic status is measured by the International Socioeconomic Index value of the respondent's occupation (SEI), which is created based on 3-digit occupational codes used in the statistical system by the China State Statistical Bureau (Xie and Zhu 2006). This variable is scored from 10 to 88.

Children's resources include both children's SES and spouses' SES. Children's SES is measured by three variables: education, personal income in 1998, and SEI. Education is measured by years of schooling. Spouses' SES is measured by spouse's education, that is, years of schooling.

Other Covariates include parents' average age, respondent's age, and city.

Table 3.1 shows descriptive statistics for dependent and independent variables. Mean and percentages are broken down by sex and coresidential status. Overall, the percentage of sons and daughters coresiding is 38.2% and 15.2%, respectively. This result shows a traditional pattern, consistent with previous literature, that married sons are more likely to live with their parents (Logan et al. 1998; Zhang 2004). The first three rows present the amount of transfer. The first row shows that the net transfer (-604 yuan and -143 yuan) for married sons is downward, implying that parents actually give more

than what sons give, while it is upward for married daughters (-30 yuan and 308 yuan), indicating that daughters, especially coresidential daughters, actually give more than what parents give. Further, the net transfer is decomposed into upward and downward flow. Correspondingly, we find that downward flow is larger than upward flow among both coresidential and non-coresidential sons, and non-coresidential daughters. In short, married daughters, especially those coresidential daughters, are likely to provide more financial support to their parents.

Table 3.1 also shows that among sons, on average, all three SES measures among the non-coresidential are higher than those among the coresidential. For example, the income gap in 1999 between non-coresidential and coresidential sons is about 2,500 yuan (12,113 versus 9,679), and the SEI gap is about 3.8 (44.6 versus 40.8). These statistics indicate that wealthier sons are less likely to live with parents. In terms of parents' resources, fathers' SEI is higher among non-coresidential sons than among coresidential sons. In addition, non-coresidential sons are slightly more likely to have both parents alive and to have siblings than are coresidential sons (43.2 versus 41.7 and 98 versus 94). These results imply that sons may be more likely to live with parents in situations where the parents' SES is lower, only one parent is alive, and parents do not have more than one child. However, the differences may not be significant. For daughters, we observe some opposite trends: coresidential daughters have higher SES than their counterparts, and their fathers' SES is also higher than that of their counterparts. For example, the income gap is 800 yuan (7,647 versus 6,818) and the SEI gap is 1.9 (44.7 versus 42.8). Therefore, in contrast to married sons, if married daughters coreside with their own parents, both they and their parents have higher SES. This observed trend is consistent with the

statistical findings of Xie and Zhu (2006). The fact that daughters have higher SES and their parents have higher SES may indicate that they have more power in the family than their husbands, thus leading to their living with their own parents.

Table 3.1 about here

Methods

Our analyses involve two steps. In the first step, following the traditional analytic approach, we treat coresidence and financial support as separate outcomes, without taking into account selection bias associated with coresidence. We perform the analyses with two models: one model with coresidence as the outcome variable and the other with the amount of transfer as the outcome variable. In the coresidence model, we run separate probit models for sons and daughters. In the financial support model, we run an OLS model. The purpose of this step is to predict the likelihood of living with parents and further examine the differences in financial support between children who live with parents and those who do not, given children's SES and relevant covariates. To answer our research questions, in the financial support model we also include interaction terms between children's sex and SES to examine whether or not the effect of one depends on the other. In the second step, we treat coresidence and financial support as joint dependent variables by estimating an endogenous switching regression model. We use the same independent variables in both steps, but in the second step include several instrumental variables such as city, length of stay in city, and the interactions between these two variables.

The key statistical approach in this study is estimating endogenous switching regression models. According to Mare and Winship (1988), based on this method, we can model both the assignment of children's coresidential status and the effect of coresidential status, and estimate the effect of unmeasured variables.

The general endogenous switching regression is defined as follows (Maddala 1983; Gamoran and Mare 1989; Mare and Winship 1988; Willis and Rosen 1979). For the *i*th child, let Y_{1i} denote the amount of financial transfer if he or she chooses to coreside with parents, and Y_{2i} denote the amount of financial transfer if he or she chooses not to coreside with parents. We only observe the outcome under one situation; that is, if children choose to coreside, we observe the amount of transfer under coresidence, and vice versa. Let X_{ki} represent the *k*th independent variable that affects the amount of financial transfer, or affects both the amount of financial transfer and coresidence decision.

$$Y_{1i} = \sum X_{ki}\beta_{1k} + \varepsilon_{1i} \quad \text{if } I = 1 \qquad (1) \text{ for children co-residing with parents}$$

$$Y_{2i} = \sum X_{ki}\beta_{2k} + \varepsilon_{2i} \quad \text{if } I = 0 \qquad (2) \text{ for children not co-residing with parents}$$

$$I_i^* = \sum X_{ki}\pi_k + \varepsilon_{3i} \qquad (3) \text{ coresidence decision function}$$

In Equations 1 and 2, β_{1k} and β_{2k} are parameters, and ε_{1i} and ε_{2i} are error terms. *I* is an indicator of whether the children coreside (*I*=1) or do not coreside (*I*=0). I* is a latent variable, representing the likelihood of children coresiding with parents. We observe that I_i=1 if I* >0; and I_i=0 if $I_i^* \le 0$. In fact, Equation 3 is in a reduced form, which can be estimated (Mare and Winship 1988). If ε_3 is uncorrelated with ε_1 and ε_2, then ordinary least squares (OLS) estimates are consistent (Mare and Winship 1988). Otherwise, OLS

estimates of β_{1k} and β_{2k} in Equations 1 and 2 are inconsistent due to individuals nonrandom selection into coresidence/non-coresidence. For the endogenous switching method, Equations 1 and 2 are estimated jointly with an equation predicting the likelihood of coresidence, Equation 3.

The distribution of the error terms of Equations 1, 2, and 3 are assumed to be trivariate normal, and maximum likelihood estimates of the parameters, β_{1k} and β_{2k}, can be obtained. Theoretically, the parameters can be identified by using the same independent variables in all three equations, although the identifying information is weak (Xie 2000). To improve model identification, it is useful to employ instrumental variables that affect the Equation 3 but not Equations 1 and 2. In this study, we use city, length of stay in city, and the interactions between these two variables as instrument variables. The city variable is associated with local housing market; both city and length of stay have direct effect on the likelihood of coresidence but indirectly affect financial transfer through coresidence. The two covariances, σ_{13} (i.e., $Cov(\varepsilon_{1,}\varepsilon_{3})$) and σ_{23} (i.e., $Cov(\varepsilon_{2,}\varepsilon_{3})$), indicate the direction and effect of unmeasured factors on both the amount of transfer and the likelihood of coresiding. The two correlation coefficients, ρ_{13} and ρ_{23}, are computed in terms of the covariances and variance, representing the correlations between both the error terms of Equations 1 and 3 as well as between the error terms of Equations 2 and 3 respectively. This also indicates the direction and magnitudes of the unmeasured selection effect. If ρ_{13} is positive, there is positive unmeasured selection into coresidence, meaning children who actually coreside with parents provide more financial transfer than children from a random sample with identical characteristics would if they

coresided. If ρ_{23} is negative, there is a negative selection into non-coresidence; that is, children who do not coreside with parents provide more financial support than would children from a random sample with the identical characteristics if they did not live with parents.

Results

Tables 3.2[15] and 3.3 present the results from the first step analysis. Table 3.2 shows the results of estimating the likelihood of coresiding with parents by sex. Columns 1 and 3 report the coefficients on the likelihood of coresiding with parents (b), and standard errors (SE) are reported in columns 2 and 4. Most notably, the estimated effects of SES differ between the sons and daughters. For example, all three SES measures (i.e., income, education, and SEI) show a negative relationship with the probability of coresiding, indicating that married sons with higher SES are less likely to live with their parents. In contrast, only one SES measure, education, proves positively significant among daughters. This result shows that the effects of SES among daughters are not as strongly significant as they are among sons. Yet the result shows that among all SES measures, daughters with higher education are more likely to live with their own parents: one year increase in education is associated with the transfer of 63 yuan. The findings for sons are consistent with the study by Lee, Parish, and Willis (1994). The findings for daughters are not consistent, however, because their study does not find daughters' SES associated with the likelihood of coresiding. Xie and Zhu (2006) give a reasonable explanation for these findings; they state that "it appears that there is a selection process into

[15] Table 2.2 basically replicates the analysis of Table 2 in Xie and Zhu's study (2006). However, due to slight difference in sample cases and variables, the results are slightly different.

coresidence that differs sharply by gender: whereas an unsuccessful son may stay at home with his parents after marriage because of his inability to live independently, a successful daughter may be able to break the traditional form of patrilocal living arrangement and bring her husband to live with *her* parents." Table 3.2 also shows that having only one parent alive and having no siblings is associated with a higher probability of living together. Among other controls, parents' average age is both significantly positive among sons and daughters, while children's age for both genders is significantly negative. In addition, city shows positive effects among sons but negative effects among daughters.

Table 3.2 about here

Table 3.3 shows the determinants of the net amount of money given to parents by coresidential status. To make the comparison between Tables 3.3 and 3.4 easier, we do not include cities as covariates as they will be instrumental variables in the endogenous switching regression discussed below. We first discuss the intercepts in both models because they present the amount of transfer when all the independent variables are scored zero; then we move on to the interpretations of coefficients. In both models, the intercepts are significantly negative, as shown in the last row. Based on the magnitudes (-.647 versus -2.125), non-coresidential children give more money to their parents than do those who coreside, and the difference is significant. This effect of coresidence on financial support can be directly shown from the pooled data[16] (see Appendix, Table 3.A). This finding implies that non-coresidential children provide more financial support compared to coresidential children. In terms of children's resources, we do not find that the

[16] To estimate the effect of coresidence on financial transfer, we use the entire sample to run a model, with coresidence as a predictor. See Appendix, Table 3.A.

interactions between all three SES measures and gender are significant, regardless of children's coresidential status. In other words, the effect of gender on the amount of transfer does not vary by children's SES. The separate models for coresiding and non-coresiding also show that the effects of having only one parent alive, having no siblings, respondents' age, and parents' age differ between these two groups. For example, having only one parent alive significantly increases the amount of transfer among non-coresidential children by 400 yuan, but this association is not significant among coresidential children. Father's SES is negatively associated with the transfer in both groups (-.011 versus -.019). In addition, children' age significantly increases the amount of transfer among both groups (.113 versus .207).

Table 3.3 about here

In summary, Table 3.3 provides two principal insights. First, we do not find significant interaction effects on financial support between gender and SES. Therefore, as observed in Table 3.2, sons with lower SES are more likely to live with their parents, but children's SES effect on transfer does not depend on gender. Second, in terms of the effect of coresidence, non-coresidential children provide more financial support than do coresidential children. As a result, this finding may indicate that children buy themselves out of living with their parents by providing more financial support. But this process is not associated with the interaction between gender and SES. Instead, gender and SES have separate effects on financial transfer: daughters are more likely to give more than sons, and children with higher SES are more likely to give more.

Table 3.4 shows the results based on the endogenous switching model. Columns 2, 4, and 6 present the coefficients from the selection function predicting the probability of coresiding, the outcome function under non-coresiding, and the outcome function under coresiding. In column 2, city, length of stay, and the interaction between city and length of stay serve as instrumental variables to improve the model identification. We discuss the results from the coresidence function first, then move on to the effect of unmeasured factors, and finally discuss the influence of measured variables.

The results from the coresiding function (Column 2) show that gender, income, interaction between gender and SEI, fathers' SEI, having one parent alive, and having no siblings are significantly associated with the likelihood of coresiding. Consistent with Table 3.2, we observe that daughters with higher SEI are more likely to live with their parents (i.e., rich sons are less likely to live with parents); higher income reduces the probability of living with parents; having no siblings and having only one parent alive increases the probability of living with parents.

We indeed find a significant selection bias, as shown in the last row in Table 3.4, indicating that the previous assumption that coresidence and financial support are separate outcomes is inappropriate. The negative value of ρ_{13} (-.904) shows a negative selection into coresiding, demonstrating that children who live with parents give *less* money than would a random sample of individuals with the identical characteristics had they coreside. On the other hand, ρ_{23} (.856) is a positive value, meaning that children who do not live with parents give *less* money than would individuals from a random sample with the identical characteristics had they not coreside with parents. Therefore, the OLS results in Table 3.3 actually overstate the difference in the amount of financial

transfer between coresidential and non-coresidential children. If we look at the selection bias in a counterfactual way, ρ_{13} means that if those from a random sample with the identical characteristics who did not live with parents, in fact, live with parents, they would have given more money to their parents; ρ_{23} means that if those who are from a random sample with the identical characteristics did not live with parents came to coreside with their parents, they would have given more. Since children who do not live with parents give less money to their parents and those who live with parents also give less money due to selection bias, parents do not benefit from either situation. In other words, parents' utility is not maximized based on the living arrangement pattern. This pattern may imply that it is children who decide whether or not to coreside with parents, not parents who decide whether or not to coreside with children. Based on the results, if parents' benefit is maximized, they would have selected those non-coresidential children who were shown to provide more financial support, thinking that if those children were to coreside, then they would provide parents with more financial support.

Table 3.4 about here

Next we move on to the interpretations of measured variables in Table 3.4. Most notably, the intercept for coresidential children does not differ significantly from that of non-coresidential children. After controlling for selection effect, they both increase, compared to those in Table 2.3, from -.647 to .432 and from -2.125 to .118, respectively. The reason for this is that the selection bias shows that children who self-select into coresidence transfer less than do the true population, but those who self-select into non-coresidence also transfer less than do the true population. Therefore, compared to the

intercepts in Table 3.3, Table 3.4 shows that children from the true population actually transfer more regardless of their coresidential status, and the difference in the transfer between the hypothetical children who coreside and those who do not coreside (i.e., when covariates are scored zero) is negligible, after assuming coresidence and financial transfer to be joint outcomes. This finding reveals that the observed difference in financial support in Table 3.3 is due to selection bias; that is, the assumption that coresidence and financial transfer are separate outcomes is not appropriate.

Table 3.4 also shows that the interaction effect of gender and SEI is significant among non-coresidential children (.023), controlling for selection effects. Unexpectedly, non-coresidential daughters with higher SES provide more financial support, compared to non-coresidential sons with higher SES, while Table 3.2 shows a non-significant effect. In addition, among non-coresidential children, the coefficient for parents' surviving status changes from .400 to .503, and the coefficient for having no siblings changes from -1.377 to -.476, but is no longer significant in the switching model. Among coresidential daughters, the coefficients for father's SES and respondent's age change from -.019 to -.020 and from .207 to .122, respectively.

To summarize, Table 3.4 reveals three findings. First, the observed difference in financial support between coresidential and non-coresidential children, reported in Table 3.3, is due to selection bias. Second, contrary to conventional wisdom, it is actually married daughters (if they do not coreside with parents), who are more likely to provide greater transfer to their parents after considering the selection effect. Third, the directions of the two correlation coefficients clearly indicate that, in urban areas (especially in large

cities) of China, the living arrangement pattern is in favor of children's benefit, and thus it is child-centered.

Conclusion

Using a data set collected in three large Chinese cities, this study examines whether or not children with higher SES buy out of their obligation to live with their elderly parents by providing more financial support. We treat coresidence and financial support as joint outcomes by using an endogenous switching model to account for a potential bias associated with coresidence. The analysis shows that the OLS results are biased for both coresidential and non-coresidential children, because it assumes that coresidence and financial support are separate outcomes. Based only on observed variables, children with high socioeconomics status opt to buy their way out of fulfilling the traditional obligation to live with their parents; however, net of selection effects, the findings show that the slight difference in financial support between coresidential and non-coresidential children disappears, implying that the observed significant difference is due to selection bias associated with coresidence. Therefore, the buy-out pattern observed in Table 3.3 is due to selection bias.

The analysis also indicates that married sons with higher SES are less likely to live with parents, but this pattern does not necessarily mean that they give more money to their parents after taking into account unobservable factors. The results further show that a significant interaction effect between gender and SES among non-coresidential children actually exists: married daughters with higher SES are likely to provide greater financial transfer if they do not coreside.

Additionally, the selection effects reveal that the child-parent coresidence pattern is still child-centered. As discussed above, children who do not live with parents give less money to their parents and those who live with parents also give less money. If the pattern were parent-centered, parents would have chosen to live with these current non-coresidents, maximizing the total upward transfer. Therefore, in urban China, especially in big cities, intergenerational support is actually downward. This finding is also supported by a negative net money transfer, as shown in Table 3.1. This pattern is inconsistent with previous studies. According to Logan et al. (1998), coresidence is mainly determined by parents' needs, rather than children's needs. Zhang (2004) also shows a parent-centered pattern, based on a survey of Life History and Social Change in Contemporary China. However, the present study does not support their conclusion. This inconsistency may arise from the fact that the data we used primarily come from a study of the three largest Chinese cities, which are much less traditional than China's smaller cities.

Table 3.1: Means and Percentages of Variables

	Men		Women	
	Coresiding (38.2%)	Non-coresiding (61.8%)	Coresiding (15.2%)	Non-coresiding (84.8%)
Amount of Transfer				
Net transfer	-604	-143	308	-30
Downward transfer (from parents to children)	1051	623	437	441
Upward transfer (from children to parents)	446	482	776	438
Parents' Resources				
Father's SEI	43.6	42.6	46.7	42.5
Parents' survival status				
Both alive (%)	56.8	58.3	51.1	60.5
Only father/mother alive (%)	43.2	41.7	48.9	39.5
Respondent has siblings				
Yes (%)	94.1	97.9	88.2	96.3
No (%)	5.9	2.1	12.8	3.7
Respondent's Resources				
Income in 1998 (yuan)	9,679	12,113	7,646	6,818
Education	10.9	11.4	11.7	10.8
SEI	40.8	44.6	44.7	42.8
Other controls				
Respondent's age	38.3	41.6	39.3	38.4
Parents' average age	69.5	69.9	68.2	69.3
City				
Shanghai (%)	35.1	32.2	35.5	29.4
Wuhan (%)	33.2	33.7	38.3	37.3
Xi'an (%)	31.7	34.1	26.2	33.3
N of observations	869		932	

Data source: "Study of Family Life in Urban China" conducted in Wuhan, Shanghai, and Xi'an, 1999.

Table 3.2: Determinants of Coresidence (logit models)

	Men		Women	
	b	SE	b	SE
Parents' Resources				
Father's SEI	.009*	.005	.014***	.006
Parents' survival status				
Both alive (omitted)				
Only father/mother alive	.304*	.173	.530**	.212
Respondent having siblings				
Yes(omitted)				
No	1.121**	.438	1.318***	.336
Respondent's Resources				
Income in 1998	-.025***	.010	-.010	.017
Education	-.012	.039	.063*	.047
SEI	-.013**	.006	-.001	.008
Spouse's Education	-.077**	.037	.103*	.042
Other controls				
Parents' average age	.315***	.081	.195*	.099
Respondent's age	-.688***	.082	-.223**	.099
City				
Shanghai (omitted)				
Wuhan	.519**	.203	-.340***	.241
Xi'an	.428**	.202	-.592***	.261
Constant	1.767***	.480	-4.094***	.601
Model Chi-squared	128.50		55.70	
Degree of freedom	14		14	

Note: *, <0.1; **, <0.05; ***<0.01. N=869 for men, and N=932 for women. Dummy variables representing missing for father's SEI, respondent's SEI, and parents' age are also included in the models.

Table 3.3: Determinants of Amount Given to Parents (OLS)

	Not coresiding		Coresiding	
	b	SE	b	SE
Sex				
Male (omitted)				
Female	.021*	.120	.290*	.162
Parents' Resources				
Father's SEI	-.011***	.004	-.019**	.008
Parents' survival status				
Both alive (omitted)				
Only father/mother alive	.400***	.125	.288	.284
Respondent having siblings				
Yes(omitted)				
No	-1.377***	.351	-.110	.473
Respondent's Resources				
Income in 1998	.031***	.007	.041**	.017
Education	.007	.040	.066	.079
SEI	-.004	.006	.000	.013
Spouse's education	.010	.026	.012	.061
Sex*Income	.010	.015	-.029	.038
Sex*education	.002	.048	-.010	.125
Sex*SEI	.012	.010	.024	.023
Other controls				
Parents' average age	.014	.053	-.010	.115
Respondent's age	.113**	.057	.207*	.124
Constant	-.647	.459	-2.215	.910

Note: *, <0.1; **, <0.05; ***<0.01. N=1801. Dummy variables representing missing for father's SEI, respondent's SEI, and parents' age are also included in the models.

Table 3.4: Switching Regression for Transfer

	Selection into coresiding		Not Coresiding		Coresiding	
	b	SE	b	SE	b	SE
Sex						
Male (omitted)						
Female	-1.668***	.308	-1.453***	.548	4.762***	1.364
Parents' Resources						
Father's SEI	.004**	.002	-.004	.004	-.020**	.008
Parents' survival status						
Both alive (omitted)						
Only father/mother alive	.167**	.073	.503***	.140	.162	.302
Respondent having siblings						
Yes(omitted)						
No	.564***	.146	.476	.351	-1.133**	.534
Respondent's Resources						
Income in 1998	-.019***	.005	.028***	.007	.076***	.018
Education	-.015	.021	.007	.042	.089	.082
SEI	-.010***	.004	-.011	.008	.028**	.014
Spouse's education	-.013	.004	.051	.028	.108	.062*
Sex*Income	.010	.009	.022	.016	-.049	.038
Sex*education	.044	.029	.003	.010	-.186	.124
Sex*SEI	.010*	.005	.023**	.010	.002	.024
Other controls						
Parents' average age	.022***	.006	.021*	.012	-.064**	.025
Respondent's age	-.050***	.007	-.017	.013	.122***	.026
City						
Shanghai (omitted)						
Wuhan	.085	.213				
Xi'an	.228	.206				
Length of stay	.021***	.004				
Length of stay*Wuhan	-.005*	.005				

(Table 3.4 continued)

(Table 3.4 Continued)

	Selection into coresiding		Not Coresiding		Coresiding	
	b	SE	b	SE	b	SE
Length of stay*Xian	-.009	.005				
Constant	-.391	.445	.432	.858	.118	1.688
Sigma(2,3)/(1,3)			2.383***	.0545	3.573**	.159
Rho(2,3)/(1,3)			.856**	.016	-.904***	.015

Note: *, <0.1; **, <0.05; ***<0.01. N=1801. Dummy variables representing missing for father's SEI, respondent's SEI, and parents' age are also included in the models.

Appendix Table 3.A: Determinants of Amount Given to Parents (OLS): Entire Sample

	b	SE
Coresiding		
No (omitted)		
Yes	-.013**	.006
Sex		
Male (omitted)		
Female	.505*	.275
Parents' Resources		
Father's SEI	-.016***	.006
Parents' survival status		
Both alive (omitted)		
Only father/mother alive	.411**	.202
Respondent having siblings		
Yes(omitted)		
No	-.486	.454
Respondent's Resources		
Income in 1998	.023**	.010
Education	.026	.006
SEI	-.012	.011
Spouse's education	.111	.040
Sex*Income	-.042*	.024
Sex*education	-.007	.074
Sex*SEI	.005	.015
Other controls		
Parents' average age	.084	.094
Respondent's age	.217**	.093
Constant	-1.779	.698

Note: *, <0.1; **, <0.05; ***<0.01. N=1801. Dummy variables representing missing for father's SEI, respondent's SEI, and parents' age are also included in the models.

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CHAPTER 4

FAMILY STRUCTURE AND INTERGENERATIONAL SUPPORT IN URBAN CHINA

Abstract

Previous studies suggest that arrangements for financial transfers between adult children and their elderly parents are complicated because they are affected by residential arrangements and the characteristics of not only the adult children and their elderly parents but also of the adult child's siblings. Thus, stakeholders making such arrangements can include multiple members of an extended family. Using data from the "Study of Family Life in Urban China," conducted in 1999 in the cities of Shanghai, Wuhan, and Xi'an, and relying on fixed-effects models, this paper examines how the characteristics of adult children and their adult siblings affect the financial support of their parents, with particular attention focused on gender and birth order differences (the traditional social norm hypothesis), educational differences (the long-term exchange hypothesis), and redistribution of resources within the family (the resource redistribution hypothesis). Results show that in urban China the long-term exchange and resource redistribution hypotheses still hold after controlling for unobserved family-level factors, but do not support the traditional social norm hypothesis.

Family support to the elderly has prevailed for thousands years in China. Filial responsibility for elder care has been the central cultural value in intergenerational support (Whyte 2003; Zhan and Montgomery 2003). As advocated by Confucian philosophy, adult children, especially sons, should respect and care for their elderly parents. Therefore, the elderly primarily rely on their children for support (Xie and Zhu 2006).

However, there is a growing concern that westernization and individualization has weakened the relationship between children and parents. The process of economic development and modernization may be changing traditional norms and values, and transitioning family structure from extended families to nuclear families (Chen and Silverstein 2000; Lin 2001). In particular, continued low fertility and internal migration reduce both the willingness and the capacity of adults to care for their elderly parents. For example, the household size in China decreased from 4.64 persons in 1978 to 3.74 persons in 1995 (Leung 1997). Moreover, women, who have been the primary care-givers, have been encouraged to participate in the labor force. These changes have been eroding the role of family in traditional intergenerational support. At the same time, low fertility and increased longevity increases the elderly population. It has been predicted that the elderly population will reach 168.8 million (or 12.42 percent of the total) in the year 2010, and 341.7 million (or 23.85 percent of the total population) in the year 2030 (Poston and Duan 2000). Providing support for such a large elderly population has been a challenge.

The practice of family support to elderly parents by adult children still prevails, which is mainly due to the influence of traditional culture, underdevelopment of social support,

and reinforcement of social policies (Sun 2004). Although social and economic transformations have weakened the role of family support, the influence of traditional values still exists, even in urban areas (Whyte 2003; Hermalin et al. 2003). In interviews with caregivers, Zhan and Montgomery (2003) found continued influence of traditional norms on intergenerational support. Thus, "it is safe to say that traditional values and practices of filial piety linger on or even may play a prominent role in at least some segments of contemporary Chinese society" (Xie and Zhu 2006). Moreover, social and commercial support systems are still underdeveloped (Leung 1997). According to Liang and Gu (1989), the majority of physically dependent elders were cared for by their family members and less than 5% were institutionalized. In addition, social policies such as the Law of Marriage and the Law on Protection of Rights and Interests of the Elderly reinforce the value and practice of family support (Giles and Mu 2006; Sun 2004; Zhang 1997). In particular, due to the unsuccessful implementation of welfare policies in recent years, the government started emphasizing the importance of family support to the elderly (Zavoretti 2006).

However, there is evidence showing that the traditional family support pattern has been changing in contemporary China, especially in urban areas (Thornton and Lin 1994; Whyte 2004), as younger generations today increasingly prioritize their own lifestyles. For example, contrary to the traditional pattern in which married sons carry the major responsibility for supporting their parents, Xie and Zhu (2006) find that married daughters, especially those living with parents, provide more financial support to parents than do sons in urban China. In terms of coresidential patterns, a 1993 survey in urban

China shows that the proportion of elderly living with adult children declined from 71% in 1987 to 67% in1993 (Logan et al. 1998).

Although a number of studies have examined intergenerational support patterns in China (for example, Lee and Xiao 1998; Logan and Bian 1998; 2003; Sun 2002; 2004), most of them are based on parent-child pairs across families. They either only examine the transfer between one particular adult child and her/his parents or look at family structure at the family level, ignoring transfers between the child's siblings and their parents. Undoubtedly, intergenerational transfers occur within a family context, and the arrangements for financial transfers between adult children and their elderly parents involve residential arrangement and the characteristics not only of the adult children and their elderly parents but also of the adult children's siblings. Thus, multiple members in an extended family can be involved in making such a decision (Hermalin et al. 1992a; Hermalin et al. 1992b; Knodel and Ofstedal 2002).

Moreover, the across-family models do not control for unobserved family background characteristics, such as a family's values, and these characteristics might be associated with both transfers and children's characteristics, such as financial status. These unobserved factors might suggest that the estimated coefficients in previous research are biased. For example, according to McGarry and Schoeni (1995), parents who have a particular interest on children's success may give them more financial assistance and help them perform better in their careers. Thus the unobserved factors can be positively associated with children's financial status, resulting in the estimated coefficients of financial status in previous research to be biased toward zero. In this research, we take

unobserved differences across families into account by estimating fixed-effects models, thus reducing selection bias.

The aim of this paper is to examine patterns of intergenerational transfer between adult children and their parents, focusing on the effects of the characteristics of adult children and their adult siblings with respect to their financial support of parents. In this study, family structure refers to siblings' characteristics, such as gender, birth order, co-residential status, marital status, and socioeconomic status. Specifically, we will test three hypotheses regarding intergenerational transfer: traditional social norms, exchange, and resource redistribution. We will primarily address the following questions: how children's gender and birth order affect intergenerational transfer between adult children and their parents (the traditional social norms hypothesis); how children's education correlates with financial transfer (the long-term exchange hypothesis); and how resources are redistributed within families through intergenerational financial transfer (the resource redistribution hypothesis). After exploring answers to these questions, we can better understand the underlying mechanisms of family support to the elderly in which siblings make different contributions. The findings also improve our understanding of the relations between children and their elderly parents. To control for unobserved family-level factors, fixed-effects models are used to perform the analysis.

Hypotheses

Many studies have investigated recent patterns of intergenerational support in China. Overall, in the majority of Chinese families, adult children are still the primary sources of elder support, though social and economic changes have been undermining

this traditional practice (Xu and Yuan 1997). Support of parents by children takes many forms, but financial and physical assistance are the most essential (Yuan and Whyte 2003). Family structure, such as family size, sibling gender composition, and coresidential status, is also examined in previous studies, and the findings show significant associations with elder care practices (Lin et al. 2003; Logan and Bian 2003; Zimmer and Kwong 2003).

To explain intergenerational transfers between parents and children, researchers have proposed a number of theoretical models based on motivations and family strategies (Lee, Parish, and Willis 1994; Lillard and Willis 1997). This study focuses on testing three hypotheses – traditional social norms, long-term exchange, and resource redistribution – derived from the standard explanations of gender and birth order pattern, the mutual aid model, and the altruism model respectively. Many hypotheses derived from these models have been empirically tested in western countries, but few systematic studies have been conducted in Chinese families. These three hypotheses play important roles in explaining patterns of intergenerational support, and also imply the underlying mechanisms of intergenerational relations.

Traditional social norm hypothesis

The traditional social norm hypothesis shows how gender and birth order matters for intergenerational transfer. More specifically, sons and the eldest child are expected to carry the major responsibilities for taking care of their elderly parents. The valuation and practice of these gender and birth-order orientated patterns is mainly due to the influence of traditional culture. Under the influence of Confucius over thousands of years,

traditional Chinese families are patrilocal and patrilineal (Thorton and Lin 1994). In this family system, as Xie and Zhu point out, "sons are permanent members of their natal families and retain life-time contractual relationships with their parents. Throughout their lives, they are expected to contribute to the economic well-being of their parents. In contrast, daughters are only transitory members of their natal families; after marriage, they begin to contribute to the family households of their parents-in-law" (2006: 1). Given this traditional gender ideology, we may expect a substantial gender difference in children's support to the elderly. Although social and economic changes may undermine this traditional gendered culture of filial piety, gender differences in intergenerational support can still be expected.

The previous literature particularly examines gender difference in supporting the elderly, and the findings are less than consistent (Lee et al. 1994; Lin et al. 2003; Xie and Zhu 2006; Whyte and Xu 2003). For example, Lee, Parish, and Willis's (1994) study shows that in Taiwan married sons provide greater financial transfer to their parents than do married daughters. Similarly, using data from the Survey of Health and Living Status of the Elderly in Taiwan in 1989, Lin et al. (2003) report that sons generally provide more support to their older parents than daughters do. However, another study conducted in urban China by Xie and Zhu (2006) suggests that married daughters are more likely to provide greater transfers than married sons do. This inconsistency may indicate social and cultural differences between Taiwan and mainland China (Xie and Zhu 2006), and that the gendered culture of filial piety has been changing, with daughters becoming the primary support providers in China, especially in urban areas (Davis 1993; Zhan and

Montgomery 2003). However, many studies that examine gender patterns are based only on inter-family models; thus evidence from intra-family analysis is still needed.

Birth order is another important factor in the traditional Chinese family system. Not only do male members have power over female members, but older members have power over younger members. Because of the patrilineal structure, the oldest child is expected to bear more responsibility in caring for parents. More importantly, birth order is often connected with gender. The interaction of these two plays an essential role in transfers; the oldest son carries major responsibilities in providing food and housing for his parents (Fricke, Chang and Yang 1994; Zhang and Goza 1996). In return, there is a cultural preference for the oldest son to be given a larger share of his parents' property or receive more financial or other support from them (Snug 1981).

Although birth order plays an important role in intergenerational support, it is often ignored in previous studies (Knodel and Ofstedal 2002), due in part to a lack of data. With information on all siblings, this study uses birth order, gender, and the interaction of birth order and gender to test the traditional social norm hypothesis.

Exchange Hypothesis

An alternative explanation for intergenerational support among family members is the exchange model, involving both long-term and short-term exchanges (Lee, Parish and Willis 1994). The essence of the exchange model is mutual assistance among family members of different generations. For example, in the short-term exchange, adult children may need their parents' help in childcare and household chores. In the long-term exchange, parents may invest in children's education in return for financial support in

later years (Lee, Parish, and Willis 1994). The long-term exchange hypothesis may be more important in Chinese context: parents' early investment may determine their children's future socioeconomic status, given that education is one of the most important factors in social stratification. Parents may receive more financial assistance in their old age from children with high educational attainment, and thus enjoy greater economic security. A number of studies find that children's education is positively associated with the amount of assistance to parents (e.g., Lee, Parish, and Willis 1994; Sun 2004; Xie and Zhu 2006), indicating that the extent to which parents receive support from their adult children may be based on the parents' investment in the children (Cox and Rank 1992; Hermalin et al. 1992b).

In examining the exchange hypothesis, this study looks at whether adult children with higher levels of schooling within a family are more likely than those with lower levels of schooling to provide financial support to their elderly parents. Similar to Lee, Parish and Willis's study in Taiwan (1994), we would also expect that adult children who have received more investment, such as higher education, are likely to provide greater financial support to their parents.

Resource Redistribution Hypothesis

The redistribution of resources within a family is also an implication of the altruism model. The altruism model assumes that a family head is altruistic and he or she cares about less well-off members by providing more financial support (Becker 1974; Lee et al. 1994). In the redistribution of resources through intergenerational transfers, parents manage the resource flow among the whole extended family. In a study on

redistribution of resources within the family, McGarry and Schoeni (1995: S184) found that parents "give greater financial assistance to their less well-off children than to their children with higher incomes," and that well-off children transfer more to their parents. Although this study was conducted in the U.S., we can infer that there may be a parallel case in China, with wealthy children transferring more to their parents, and parents giving more to their less wealthy children.

This study tests the resource redistribution hypothesis by examining downward (from parents to children) and upward (from children to parents) transfers within the extended family. Specifically, we examine whether wealthy children give greater financial assistance to their parents and whether parents give greater financial assistance to their less wealthy children. We use financial situation to measure children's wealth. Following McGarry and Schoeni's study (1995: S186), the question of whether parents make greater transfers to less wealthy children can be directly answered by examining intra-family differences in transfer behaviors after "unobserved differences in family generosity are controlled for."

In sum, this study extends previous research by examining three hypotheses regarding intergenerational transfer in China – traditional social norms, exchange, and resource redistribution – in an intra-family context. By estimating fixed-effects models, unobserved intra-family differences are taken into account.

Data

The dataset we use for this study draws from the survey "Study of Family Life in Urban China," conducted in 1999 in three large Chinese cities: Shanghai, Wuhan, and

Xi'an. The researchers used a two-stage probability sampling method and initially targeted a probability sample of 1,300 households. 50 neighborhood communities were randomly selected in the first stage, and 20 households were randomly chosen in each neighborhood community in the second stage. An adult respondent was chosen from each selected household based on a Kish table. The survey has a unique design, matching an adult respondent with one of his or her elderly parents. If the person who was interviewed was younger than 60, she or he was interviewed with Questionnaire A. Then one of his or her parents was interviewed with Questionnaire A+, in which questions were specially designed for the elderly. If the person who was interviewed was 60 years or older, she or he was interviewed with Questionnaire B, which is similar to Questionnaire A+. Then one of his or her children was randomly selected for interview with Questionnaire B+, which includes questions similar to Questionnaire A. Therefore, the study contains an adult child sample, a parent sample, and a matched sample with adult-parent pairs[17] based on the former two samples. Information on intergenerational support is collected from both the children's and parents' sides.

For this study, we use the elderly sample to perform analyses, pooling the respondents interviewed with questionnaires B and A+ (i.e., the parents), since this sample includes more family structure information such as children's genders, birth order, educational attainment and economic status. Information about financial support to parents was also collected, including both upward (from children to parents) and downward (from parents to children) in the year 1998. In addition, we restrict the analysis to families with more than one child and at least one surviving parent. Selecting for families with at least two adult children is for the estimation of fixed-effects models.

[17] Both members of any pair live in the same city.

Since after marriage, daughters are expected to care for their husbands' parents, we further restrict the sample to married children.[18] The final sample size is 4,813, including 2,320 sons and 2,493 daughters.

Measures and Methods

Dependent variables

Financial transfer between parents and children involves upward (from children to parents) as well as downward (from parents to children) flows. We study transfers in both directions in light of the hypotheses discussed above, especially the resource redistribution hypothesis. On the elderly parent's questionnaire (Questionnaires B and A+), respondents were asked how much money (including both cash and gifts) he or she received from each of his or her adult children and how much money he or she provided to his or her adult children in 1998. We use six dependent variables to perform the analyses. The first two dependent variables are dummy variables for whether an upward or downward transfer occurs, or, in other words, the likelihood of transfer from children to parents and parents to children, respectively. The third dependent variable, also a dummy variable, is the likelihood of transfer based on net transfer, with zero for non-positive net transfer and one for positive transfer. The other three dependent variables are amount of financial transfer from children to parents (upward), from parents to children (downward), and net transfer, with upward transfer subtracted by downward transfer.

Independent variables

[18] Among families with at least two adult children, about 90% of children are married. There is thus not much variation in the marital status variable.

The key independent variables are siblings' gender, birth order, education, and financial status.

Gender is a dummy variable. Male is coded as 1 and female is coded as 0.

Birth order is a dummy variable with the oldest coded as 1 and the other coded as 0. In the sample, birth order was originally coded from 1 to 9. Since this study only focuses on whether the eldest sons take more responsibility for supporting elderly parents, we recoded this variable as a dummy variable. With respect to the interaction of gender and birth order, we can make comparisons among four groups: the eldest sons, the eldest daughters, the younger sons, and the younger daughters.

Education is measured by years of schooling. This variable is used to test the long-term exchange hypothesis.

Financial situation is measured by an interview question that asks parents to rate their children's financial situation on a 5-point scale – excellent, good, fair, somewhat poor, and very poor. Very poor and somewhat poor are combined and coded as 1, fair is coded as 2, and good and excellent are combined and coded as 3. This variable is used to test the resource redistribution hypothesis.

Other covariates include siblings' age, co-residential status, and emotional closeness to parents. Co-residential status is a key covariate in this study. According to Xie and Zhu (2006), whether or not co-residence should be considered a form of adult children's support to parents or children's dependence on parents is not clear, because it may depend on the two generations' situations and life courses (Logan and Spitze1996; Ward, Logan and Spitze 1992). Following earlier studies (Lee, Parish, and Willis 1994; Xie and Zhu 2006), co-residence is treated as a moderator of financial transfer in the analysis, as

this strategy is more conservative. Emotional closeness is an important confounding variable in the analysis. It is a dummy variable. Closeness is coded as 1 and distance is coded as 0.

Methods

The major statistical approach in this analysis is the use of simple fixed-effects models. The fixed-effects models allow for unobserved family-level factors. Given the data structure – each family with several siblings, regular regressions relying on interfamily variation are problematic due to endogeneity bias.

The analysis involves three steps. For each step, we estimate two models: logit model predicting the likelihood of transfer and OLS model predicting the amount of transfer. In the first step, we analyze the upward transfer, that is, the transfer from children to parents. We begin with the dependent variable of likelihood of transfer by estimating logit models. In this step, the interaction of gender and birth order, educational attainment, and financial situation are included in the analysis. We next examine the relationship between siblings' characteristics and the amount of upward transfer by using OLS models. The purpose of this step is to test the traditional social norm hypothesis, the long-term exchange hypothesis, and part of the resource redistribution hypothesis – whether or not wealthy children are more likely to provide greater financial assistance to their parents. In the second step, we analyze downward transfer, i.e., transfer from parents to children. We perform the same analyses as those in the first step. This step tests the other part of the resource redistribution hypothesis – parents are more likely to give more to less well-off children. In the third and final step, we perform the analysis

based on the likelihood of positive net transfer and the amount of net transfer so as to further examine the relationships analyzed in the first two steps. All of these analyses are performed with fixed-effects models.

Results

Descriptive Results

Table 4.1 shows the means or percentages of our variables by gender. We first present our dependent variables in Panels A, B, and C. These three panels show the likelihood and the amount of downward transfer, upward transfer, and net transfer by gender respectively. Based on Panel A, daughters are more likely to make financial transfers to their parents than are sons (37.3% versus 31.9%), and in terms of amount, daughters provide greater support than sons do (343 versus 313 yuan). Panel B shows that sons are more likely to receive greater financial assistance from parents than are daughters (15% versus 9.4% and 198 versus 102 yuan). This pattern implies that, on the one hand, parents are traditional in that they are more likely to provide for sons than for daughters; on the other hand, the gendered responsibility of elder support has been shifting from sons to daughters. In terms of the net transfer, Panel C reveals that daughters are more likely to make positive net transfer and give more to parents than what parents give. These results further support the patterns observed in Panels A and B.

Panel D in Table 4.1 shows adult children's characteristics by gender. Among sons, 30.4% are the oldest child, while 26.9% of daughters are the oldest. The average years of schooling for sons and daughters are almost the same—9.7 versus 9.5 years. Overall, sons' financial situation is better than daughters', since the percentage with

excellent financial status is higher among sons. Sons are far more likely to live with their parents than are daughters (24% versus 6.9%). This coresidential pattern is consistent with previous literature that married sons are still more likely to live with parents than are married daughters (Lee et al. 1994; Logan and Bian 1999). In terms of emotional closeness and age, sons and daughters are not significantly different.

Table 4.1 about here

Multivariate Results

Table 4.2 presents the results based on the likelihood and amount of transfer from children to parents. Columns 1 and 3 are logit and OLS coefficients, respectively, regarding the likelihood and the amount of giving by children, with standard errors (SE) presented on the right side (i.e., Columns 2 and 4). In terms of the likelihood of transfer, Table 4.2 shows that although the interaction term of gender and birth order is positively associated with the likelihood of transfer (.140), it is insignificant, indicating that the effect of gender does not depend on birth order. That is, the eldest sons are no more likely than the other three groups (i.e., eldest daughters, younger daughters, and younger sons) to provide support. However, gender has a significantly separate effect on the likelihood of transfer. The negative effect (-.494) means that sons are less likely to transfer money to their parents than are daughters. In other words, daughters, rather than sons, are more likely to provide support. This finding confirms the descriptive results in Table 1. If we look at the amount of transfer, we find the same pattern with regard to gender and birth order: the effect of gender does not rely on birth order; daughters give more than sons do. Although this finding contradicts the traditional gender pattern in which sons are more

likely to give, and give more, it fits with previous literature suggesting that the traditional gender-oriented pattern has been changing (Davis 1993; Zhan and Montgomery 2003). Overall, the effects of gender, birth order, and their interaction do not support the traditional social norm hypothesis.

Table 4.2 also shows that education is positively associated with the likelihood (.062) and the amount of financial transfer (.030). The higher a child's education is, the more likely he or she is to give a greater amount of financial assistance. This finding empirically supports the long-term exchange hypothesis. As stated by the long-term exchange hypothesis, parents do receive returns from their early investment in their children's educations.

Regarding the resource redistribution hypothesis testing, we find positive relationships between children's financial situation and the likelihood that they engage in transfer, and their financial situation and the amount of transfer, as shown in Table 4.2. This finding shows that the better off a child is, the more likely he or she is to provide financial assistance to his or her parents. This result is expected because the altruism model predicts a negative relationship (McGarry and Schoeni 1995).

In addition, based on the control variables, Table 4.2 shows that children who are older, or who are emotionally closer to parents are more likely to provide greater financial transfer. In this analysis, coresidential status does not significantly affect the likelihood of transfer and the amount of transfer. Previous literature based on across-family models suggests that non-coresidential children may provide more support than coresidential children (Logan and Bian 2003). However, the within-family results do not support that pattern.

Table 4.2 about here

We now move to the results in Table 4.3. Table 4.3 shows the results concerning the likelihood and amount of transfer from parents to children. As in Table 4.2, Columns 1 and 3 are logit and OLS coefficients, respectively, on the likelihood and the amount, of giving by children, with standard errors (SE) presented in the right side (i.e., Columns 2 and 4). Since the major purpose of the analysis in this step is to test the resource redistribution hypothesis, we first discuss the relationships between the outcome variables and the children's financial situation. Regarding the likelihood of transfer, Table 3 shows that both fair and excellent categories of the financial situation variables are significantly negative, -1.499 for the group with fair financial situation and -2.729 for the group with excellent financial situation. Thus, the wealthier a child is, the less likely it is that he or she receives parents' help. In other words, poor children are more likely to get parents' financial help. Furthermore, the OLS model results in Table 4.3 also show a negative relationship between the amount of transfer and children's financial situation, meaning that the less well-off children receive more financial transfer. This result, taken in concert with those in Table 4.2, provides clear support for the resource redistribution hypothesis.

Notably, there are positive relationships between the likelihood of downward transfer and the interaction terms of gender and birth order. That is, parents prefer to give more financial help to the eldest son, and the eldest sons are more likely to receive transfer from his parents, compared to the other children. As discussed above, in accordance with the traditional patrilineal social structure, the eldest son is expected to

take on more responsibilities in caring for parents and younger siblings, and in return, parents provide more financial support to him. Although we do not find that the eldest sons bear more responsibilities than other children, parents may still follow the traditional pattern.

In Table 4.3, the effect of coresidential status is positively significant, meaning that coresidential children are more likely to receive greater financial assistance from parents. Lee, Parish, and Willis' study (1994) suggests that rich sons may buy their way out of living with parents by providing more financial support. Conversely, it is possible that children, especially sons, with lower socioeconomic status choose to live with parents and thus get more financial help by sharing resources. Likewise, parents may choose to live with children who they think may need help, or may offer more help to those children who live with them. In addition, both the effect of education and the effect of emotional closeness are insignificant. The effect of age is significantly negative, showing that children who are older are less likely to receive transfers from parents.

Table 4.3 about here

To explore whether the relationships shown in Tables 4.2 and 4.3 hold true if we consider both parents' and children's transfer behaviors, we further perform the analysis based on a summary measure – net transfer from children to parents, as shown in Table 4.4. Similar to the results in Table 4.2, the effect of interaction between gender and birth order is not significant, although the direction of this effect is negative (-.558). However, a significant gender difference still exists: sons are less likely to provide financial support to their parents in comparison with daughters. This negative relationship also holds for

the amount of net transfer. Thus, the traditional social norm hypothesis is still not supported when we examine net flow. Consistent with the results in Table 4.2, daughters are still more likely to financially support their parents, while birth order does not matter. This may imply that rapid economic development and social changes have been changing the traditional support pattern with regard to gender and birth order.

The long-term exchange hypothesis is supported by Table 4.4. We find a positive effect of education on the likelihood of positive transfer: a one-year increase in education increases the odds of giving by 6.9 percent. The effect of education on the net amount is also significantly positive. These results may partly explain why nowadays Chinese parents still invest in children's education – they can get returns when they need the most support in their old age.

Financial situation is also positively associated with both the likelihood of positive net transfer and the amount of transfer. Well-off children are more likely to give than less well-off children are, and they also give more. Based on the net flow from parents to children, we can also derive the results based on the net flow from children to parents. The only difference in the results between the model based on the net flow given to children and the net flow given to parents is that the signs of the coefficients are opposite. Therefore, financial situation would be negatively associated with both the likelihood of positive net transfer and the amount of transfer from parents to children. That is, parents are less likely to give to their well-off children, and give less in terms of amount. In other words, parents are more likely to take care of their less well-off children by giving more. These results are consistent with those reported in Tables 4.2 and 4.3, and further support the resource redistribution hypothesis.

In addition, coresidence does not have a significant effect on either the likelihood of positive net transfer or the amount of net transfer, which suggests that children who live with their parents do not provide more support than those who live separately. Unlike the previous results in Table 4.2, showing children who are older providing more support, age is not significantly related to the net flow. Emotional closeness is still a strong predictor for net transfer: children who are emotionally closer to parents are more likely to provide greater financial transfer.

Table 4.4 about here

Conclusion

Based on the data from "Study of Family Life in Urban China," conducted in three large Chinese cities in 1999, this study examines how the characteristics of adult children and their adult siblings affect their financial support of parents through estimating fixed-effects models. Our intra-family results provide empirical support for the long-term exchange hypothesis. Children with higher educational attainment (i.e., who received more investment from parents) repay parents' earlier investment through more financial support. This finding is consistent with previous studies conducted both in Taiwan and mainland China (Lee et al. 1994; Xie and Zhu 2006). Children's repayment of parents' earlier investment has been an important motivation for financial support. This transfer behavior may be planned by parents, as argued by Lee et al. (1994), as parents invest in children's human capital such as education earlier and receive children's repayment later. Although economic and social changes have been weakening the degree

of family support, the long-term exchange model will continue to prevail, because it optimizes both children's and parents' interests in the long-run.

This study also supports the resource redistribution hypothesis. We find that better-off children transfer more to their parents and parents give more money to less well-off children. Therefore, in Chinese families, parents are altruistic, caring about the welfare of the whole extended family. By reallocating resource flow, parents manage to care about their less well-off children. This pattern is similar to that of studies conducted in the U.S., although the motivation and implication behind these transfer behaviors are different.

However, this study does not support the traditional social norm hypothesis. We find that the oldest sons do not bear more of the responsibility of caring for their parents. Instead, we find that birth order affects neither the likelihood nor the amount of transfer, but significant gender differences in transfer behaviors do exist. Contrary to the traditional gender pattern in which sons carry the major responsibility for caring for their parents, daughters are more likely to provide greater transfer to their parents than sons. Therefore, we may conclude that the gender- and birth order-oriented patterns no longer apply to family support in urban China.

Most notably, we find a new pattern regarding both children's and parents' transfer behaviors: sons make less financial transfer to parents but receive more from parents, while daughters give more but receive less. This pattern has not been reported in previous studies. This finding may imply that parents care more about their sons than daughters, which is more traditional in terms of parents' transfer behavior. As discussed by Xie and Zhu (2006), sons are traditionally treated as permanent family members by

their parents while daughters are transitory family members – once daughters marry out, they begin to support their husbands' families, without obligations to live with and support their own parents. Thus, parents' transfer behavior may indicate that they still emphasize the role of sons. However, in terms of children's transfer behavior, the fact that daughters rather than sons provide more financial support suggests that the traditional gender-oriented pattern has been changing, and that daughters play an important role in elder support. Why, then, are daughters more likely to give money than sons? In addition to the erosion of traditional norms among younger generations, Xie and Zhu (2006) argue that daughters are more likely to give money because they interact more with members of the extended family as they have larger social kinship networks than sons do.

Finally, there are limitations to the data. Due to the lack of information on children's conjugal families, we are unable to control for several key covariates such as grandchildren's and spouses' information. Also, we do not have information on elder care by children or child care by grandparents, two more forms of transfer. Previous research shows that time transfers might compensate for financial transfer (Lee et al. 1994).

To conclude, during the process of economic development and modernization, the practice of family support to elderly parents by adult children has undergone some changes in China. The traditional gender and birth order pattern no longer applies to urban China. Most notably, daughters begin to undertake the responsibility of caring for their elderly parents. However, the long-term exchange in which parents invest in children's education and children repay parents' investment by providing more financial support still plays an important role in intergenerational relations. Furthermore, Chinese

parents are altruistic, redistributing the resource flow within the extended family by receiving more from well-off children and giving more to less well-off children.

Table 4.1: Means/Percentages of Variables

	Male	Female
Panel A		
Financial Transfer to Parents		
Yes	31.9	37.3
No	68.1	62.7
Amount (yuan)	313	343
Panel B		
Financial Transfer to Children		
Yes	15.0	9.4
No	85.0	90.6
Amount (yuan)	198	102
Panel C		
Net Financial Transfer to Parents		
Yes	30.2	36.4
No	69.8	63.6
Amount (yuan)	116	237
Panel D		
Order		
Eldest	30.4	26.9
Other	69.6	73.1
Education	9.7	9.5
Financial status		
Poor	21.0	30.4
Fair	51.4	51.4
Excellent	27.6	18.2
Coresidence		
No	76.0	93.1
Yes	24.0	6.9
Emotional closeness		
Distant	4.9	3.3
Close	95.1	96.7
Age	41.4	40.5
N	2320	2493

Table 4.2: Financial Transfer Given to Parents: fixed-effects logit and OLS models

	Likelihood		Amount	
	Coefficient	SE	Coefficient	SE
Male	-.494**	.146	-.176**	.056
Order	-.081	.213	-.033	.081
Sex*order	.140	.288	.068	.108
Education	.062**	.032	.030***	.008
Financial status				
Poor	Omitted		Omitted	
Fair	1.759***	.206	.659***	.071
Excellent	3.699***	.273	1.654***	.085
Coresidence				
No	Omitted		Omitted	
Yes	.126	.173	.117	.071
Emotional closeness				
Distant	Omitted		Omitted	
Close	1.445***	.393	.645*	.152
Age	.030*	.016	.009	.006

Notes: * p<0.1, ** p<0.05, *** p<0.01

Table 4.3: Financial Transfer Given to Children: fixed-effects logit and OLS models

	Likelihood		Amount	
	Coefficient	SE	Coefficient	SE
Male	.780***	.199	.214***	.046
Order	1.172***	.282	.177**	.067
Sex*order	.042*	.374	-.070	.089
Education	.001	.026	.001	.007
Financial status				
Poor	Omitted		Omitted	
Fair	-1.499***	.210	-.626***	..058
Excellent	-2.729***	.303	-.938***	.070
Coresidence				
No	Omitted		Omitted	
Yes	1.214***	.215	-.381***	.058
Emotional closeness				
Distant	Omitted		Omitted	
Close	.104	.511	.098	.125
Age	-.053**	.024	-.013**	.005

Notes: * p<0.1, ** p<0.05, *** p<0.01

Table 4.4: Net Financial Transfer Given to Parents: fixed-effects logit and OLS models

	Likelihood		Amount	
	Coefficient	SE	Coefficient	SE
Male	-.558***	.146	-.129**	.051
Order	-.083	.213	-.095	.075
Sex*order	-.168	.286	.077	..098
Education	.069**	.032	.009*	.005
Financial status				
Poor	Omitted		Omitted	
Fair	1.671 ***	.209	.431***	.065
Excellent	3.549***	.268	.864***	.078
Coresidence				
No	Omitted		Omitted	
Yes	-.011	.174	.028	.065
Emotional closeness				
Distant	Omitted		Omitted	
Close	1.646***	.268	.252*	.138
Age	.032	.016	.004	..006

Notes: * p<0.1, ** p<0.05, *** p<0.01

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CHAPTER 5

CONCLUSION

China has experienced dramatic economic, social, and demographic changes in the last three decades. Since the economic reform of 1978, China's economy has been transforming from a socialist planned economy to a market-based one. The influence of westernization, modernization, and individualization has been changing people's life styles by eroding traditional social norms and values. The rapid decline in birth rates and gradual increase in longevity have resulted in accelerated population aging (Xie and Zhu 2006)). These economic, social and demographic changes have important implications for the elderly population in contemporary China

The objective of this dissertation is to understand the socioeconomic inequalities in health among the elderly and the continuation of practice of family support to the elderly. The first essay in this dissertation has shown that the well-documented inverse relationship between socioeconomic status and mortality holds for the oldest old Chinese. The second and third essays have explored the patterns of intergenerational support between adult children and their elderly parents. While the second focuses on whether high-status children use economic resources to exempt fulfilling their obligation of living with their elderly parents, the third one focuses on how sibling's characteristics affect financial transfer.

This dissertation has shown that the inverse relationship between socioeconomic status and mortality still persists among the oldest old Chinese, regardless of how the measurement of the oldest old are operationalized as 80+, 90+, or 100+ years old. Since the existence SES mortality differentials among the oldest old has been established in the dissertation, it calls for investigating underlying mechanisms by including mediating factors that may explain the observed SES mortality differentials in future studies.

This dissertation has also shown that, although the practice of family support to the elderly continues to prevail, intergenerational support patterns have been changing in contemporary China. Consistent with traditional patterns, parents invest in children's human capital such as education, and children repay it based on how much investment they received from their parents earlier. Parents are still altruistic, seeking to maximize the welfare of the whole extended family by managing the resource flow: they receive more from well-off children and give more to less well-off children. However, contrary to traditional patterns, in urban China, the living arrangement pattern is child-centered as it maximizes children's utility: intergenerational transfers are mainly downward. Furthermore, the traditional gender and birth order pattern no longer applies to urban China, as daughters begin to play an important role in supporting their elderly parents.

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