End-of-Life Co-residence of Older Parents and Their Sons in Rural China*

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RÉSUMÉ

Cette étude a examiné comment les échanges intergénérationnels avec des fils et des filles prédit la probabilité des parents âgés vivant ensemble avec un fils avant de mourir, dans une zone rurale de la province de l'Anhui de la Chine. Notre enquête puise des théories de la co-résidence dépendante, la modernisation et l'échange social; il a conceptualisé la co-résidence comme ayant une importance pratique et symbolique dans la culture chinoise rurale. L'échantillon comprenait 470 parents âgés qui ont été rapportés défunts au cours de la période 2001-2009, et leurs informateurs posthumes. Nous avons utilisé la régression logistique pour évaluer le soutien et la cohésion intergénérationnel entre les générations comme facteurs prédictifs de la co-résidence avec un fils juste avant la mort. Les parents âgés qui ont fourni soutien matériel à, et ont reçu soutien matériel de leur fils, et avait de meilleures relations affectives avec leurs fils, étaient plus susceptibles que leurs homologues de vivre avec un fils à la fin de la vie. Vivre avec les fils démontre la piété filiale pour les parents âgés à la fin de la vie, mais sa réalisation est sensible aux échanges entre les générations.

ABSTRACT

This study examined how intergenerational exchanges with sons and daughters predicted older parents' likelihood of co-residing with a son prior to death in a rural area of China's Anhui Province. Our investigation drew on theories of contingent co-residence, modernization, and social exchange, conceptualizing co-residence as having practical and symbolic importance in rural Chinese culture. The sample included 470 older parents, reported as deceased during 2001–2009, and their posthumous informants. We used logistic regression to assess intergenerational support and cohesion as predictors of co-residence with a son just prior to death. Older parents who provided instrumental support to, and received instrumental support from, sons and had better emotional relationships with sons were more likely than their counterparts to co-reside with a son at the end of life. Living with sons demonstrates filial piety for older parents at the end of life, but its realization is sensitive to intergenerational transactions.

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Intergenerational co-residence may be desirable for older parents at the end of life because such an arrangement optimizes needed support, relieves economic strain, and has important symbolic meaning by allowing closure with intimate family members. These benefits may be more obvious in cultures where filial norms are strong, such as in rural China where having adult children – particularly sons – physically present before death is strongly expected. However, change in family structure and rising rates of labor migration may have

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made this cultural preference more difficult to fulfill in recent years. Yet despite its cultural and practical importance, the household composition of older adults at the end of life has rarely been investigated in China (for an exception, see Zimmer & Korinek, 2010). In this study, we examined whether the propensity of older parents to live with their sons at the time of death has changed over historical time and whether past intergenerational exchanges promote co-residence.

Contingent Co-residence and Modernization Theories

Family involvement with a dying relative is considered an important prerequisite for experiencing a "good" death among older individuals in China (Chan, Tse, & Chan, 2006). Sons are explicitly obligated to be present at their parent's death and subsequently manage funeral arrangements, and failure to attend to this responsibility is regarded as a serious violation of the code of filial piety (Chao, 1983). In rural China, virtually all deaths occur at home, where it is believed that the decedent's soul will find greater peace (Gu, Liu, Vlosky, & Zeng, 2007).

Among older adults in rural China, co-residence with sons remains an important cultural ideal, deriving from a patrilineal family system and Confucian values emphasizing the obligations of adult children towards their aging parents (Sung, 1998). In a patriarchal society, such as China, sons and their families are normatively endorsed as preferred co-residential partners for older parents (Yan, Chen, & Yang, 2003); co-residence with adult daughters occurs so infrequently as to prevent any meaningful gender comparison (Cong & Silverstein, 2008).

In practical terms, intergenerational co-residence greatly increases the chances that older parents will receive instrumental assistance, even when compared to those who only have children living nearby (Yan et al., 2003). The period just before death is critical to the timing of co-residence because it is a time with dramatically increased need (Zimmer & Korinek, 2010). The need to rely on children for support is more acute for older adults in rural areas of China where they have limited access to long-term care and hospice alternatives (Gu et al., 2007; Tang, 2000). Rural elders also possess few personal resources from which they can pay for care (Zimmer, Kaneda, Tang, & Fang, 2010).

The model of *contingent co-residence* has been advanced to explain the continuation of relatively high rates of co-residence in several East Asian societies despite high rates of migration that have separated adult children from their older parents (Cong & Silverstein, 2010; Takagi, Silverstein, & Crimmins, 2007). The key argument of this model is that co-residence is compressed into the time when parents are most vulnerable, often the period just prior to death. In this way "families modify, but do not violate, the tradition of filial piety by delaying the timing of coresidence" (Takagi et al., 2007, p. S330). Such a flexible arrangement is rooted in the general functional form of the modified-extended family in which family members serve as latent resources and are mobilized when the needs of older relatives become acute (Litwak & Kulis, 1987). Studies in China have shown that migrant children often return from their destinations when their parents' health deteriorates (Giles & Mu, 2007; Zimmer & Korinek, 2010) to fulfill their obligation to co-reside with parents.

Yet intergenerational co-residence has been greatly challenged by the forces of modernization that have promoted rural-to-urban migration of the working-age population (Cogwill, 1974). In rural China, one fourth of the labor force has left their natal villages in search of employment in rapidly developing cities (Cai, 2006; Giles & Mu, 2007), reducing the likelihood that older parents will co-reside with an adult child (Silverstein, Cong, & Li, 2006). Migrants are unlikely to bring their parents with them because of higher living expenses, restricted living spaces, and a household registration system that inhibits permanent residence status in urban areas (Wang & Fan, 2006; Yan, 2003; Zeng & George, 2001). Over the past two decades, China has modernized at an accelerating rate, a process that has nucleated families and reduced the prevalence of traditional forms of intergenerational co-residence (Lee, 2000; Silverstein et al., 2006; Zeng & Wang, 2003).

Given the opportunities and challenges to achieving intergenerational co-residence in rural China, we advance the following two hypotheses:

H1: Based on the precepts of contingent co-residence theory, we expect that older parents will be more likely to co-reside with at least one son at the end of life compared to earlier periods.

H2: However, based on modernization theory, we expect that the prevalence of co-residing with a son at the end of life will decline over historical time.

Intergenerational Exchanges and End-of-Life Co-residence

Co-residence with adult children can also be understood as an intergenerational resource from which older parents benefit as compensation for the support they might have earlier provided to their children (Cox, 1987; Frankenberg, Lillard, & Willis, 2002; Lee & Xiao, 1998; Lillard & Willis, 1997; Secondi, 1997; Yang, 1996). This reciprocal dynamic is likely to be found in rural areas of China where grandparents care for grandchildren left behind by migrant children in exchange for remittances (Silverstein et al., 2006). Although the principle of reciprocity is based on theories of rational

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choice in social exchanges (Coleman, 1990), the two-way flow of resources across generations in an East Asian context is often considered less a rational calculation than one emerging out of a corporate or mutual aid model of family functioning (Sun, 2002). In this framework, family members are involved in continuous exchanges with each other as insurance against unmet need. In addition, a lengthy literature suggests that the anticipation of a bequest enhances the solicitousness of adult children towards their aging parents (Bernheim, Shleifer, & Summers, 1985; Lee, Parish, & Willis, 1994; Yamada, 2006), and thus may increase the likelihood of co-residence at the end of life as a form of implicit reciprocity.

Therefore, we advance the following hypotheses:

H3: Older parents who previously provided help to their sons – including care for grandchildren, household assistance, and economic support – will be more likely to co-reside with at least one son at the end of life compared to parents who did not provide such help.

H4: Older parents who provided a bequest to their children will be more likely to co-reside with at least one son at the end of life compared to parents who did not provide a bequest to their children.

In addition, literature shows that older parents express the desire for continuity in their source of care and are likely to name children who previously provided support to them as their preferred caregivers (Karantzas, Evans, & Foddy, 2010; Pillemer & Suitor, 2006). Thus, we hypothesize the following:

H5: Older parents who received support from sons and who were emotionally closer with sons will be more likely to co-reside with at least one son at the end of life compared to parents who received no support and were emotionally more distant from sons.

Although daughters tend not to live with their older parents, they may still play an important indirect role in structuring the household composition of a parent whose death is imminent (Zhang & Wang, 2010). Studies have shown that family decisions about the care and living arrangements are best understood from an extended family perspective involving negotiations among multiple children (Cong & Silverstein, 2012; Pezzin, Pollak, & Schone, 2007). Evidence suggests that daughters in aging Chinese families serve as family "watchdogs", ensuring that their brothers do not neglect their filial duties (Zhang & Wang, 2010). We expect that daughters will more aggressively fulfill this monitoring function the more they feel indebted to their parents and motivate their brothers to co-reside with their mutual parents at the end of life (Silverstein, Conroy, Wang, Giarrusso, & Bengtson, 2002). Thus, we make the following hypothesis:

H6: Older parents who provided support to their daughters will be more likely to co-reside with at least one son at the end of life compared to parents who did not provide support to daughters.

Method

Sample

The sample for this investigation derived from Anhui Province, a mostly rural and relatively poor province that was chosen for its density of older adults and high levels of out-migration of working age adults. Baseline data were collected in 2001 from a sample of 1,715 adults age 60 and older living in rural townships within Chaohu, a primarily agricultural municipal district of 4.5 million people located on the north bank of the Yangtze River (Chaohu Statistical Bureau, 2001). The sample was identified using a stratified multistage method that yielded a response rate of 95.3 per cent (see Silverstein et al., 2006). Interviews were conducted at respondents' homes by staff and students from the Institute for Population and Development Studies at Xi'an Jiaotong University in conjunction with local social workers who were trained by university personnel.

Follow-up surveys were conducted in 2003 (n = 1,368), 2006 (n = 1,067), and 2009 (n = 1,224, including a replenishment sample of 416). Non-mortality follow-up rates exceeded 90 per cent across consecutive surveys. Among 649 respondents identified as deceased between 2001 and 2009, information about residential status at time of death and date of death was obtained for 622 decedents from posthumous interviews of key informants. Informants included family members, neighbors, friends, and village administrators. We constrained our working sample to 482 decedents who had at least one living son and one living daughter, enabling us to examine transfers to and from each type of child, and finally to 470 decedents with valid data on key predictor variables.

The analytic design made use of the most recent survey of each decedent (labelled "baseline") paired with information about that decedent's residential status at the time of death, yielding three paired intervals (2001–2003; 2003–2006; 2006–2009) that were stacked for our analyses. For example, for the 2006–2009 interval, 2006 was the time when self-reported survey data were collected (i.e., baseline), and 2009 was the time when posthumous data were collected from informants.

Measures

Dependent Variable

Based on the posthumous survey on informants, we ascertained the household arrangement of each decedent just before death based on the gender composition of

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co-residing children. (Information about the presence of specific children was deemed too unreliable for our purpose.) Based on this, we categorized elderly parents' living arrangements before death into living alone, living only with sons, living with both sons and daughters, and living only with daughters. As seen in Table 1, very few parents lived only with daughters or lived both with sons and daughters, leading us to consider only two categories as our dependent variable: living with at least one son (n = 232) and not living with any child (n = 222).

Independent Variables

Historical Time. We constructed two dichotomous variables indicating whether data derived from the 2003–2006 interval or the 2006–2009 interval, with the 2001–2003 interval serving as the reference group.

Baseline Instrumental Support. Respondents were asked whether and from whom they received assistance with household chores (e.g., cleaning the house, washing clothes) and personal care tasks (e.g., bathing and dressing) during the past 12 months. We constructed two dichotomous variables indicating whether either type of help was provided to at least one son (or daughter-in-law) and to at least one daughter (or son-in-law). Based on questions about whether and to whom respondents provided assistance with household chores, we similarly constructed two dichotomous variables indicating whether either type of help was received from at least one son (or daughter-in-law) and from at least one daughter (or son-in-law).

Baseline Emotional Closeness. We used three questions to assess emotional closeness of each parent-child relationship. These questions were adapted from the intergenerational solidarity inventory (Mangen, Bengtson, & Landry, 1988) that assesses emotional cohesion between generations: (1) "Taking everything into consideration, how close do you feel to (this child)?" (2) How much do you feel that (this child) would be willing to listen when you need to talk about your worries and problems? (3) "Overall, how well do you and (this child) get along together?" The items were coded as follows: 0 = *not at all close/not at all/not at all well*, 1 = *somewhat close/somewhat/somewhat well*, 2 = *very close/very much/very well*. An additive scale was computed for each child, ranging from 0–6. We took the highest total score across all sons to indicate emotional closeness to sons and the highest total score across all daughters to indicate emotional closeness to daughters.

Baseline Financial Transfers. Financial transfers at baseline were based on parents' reports of the amount of money provided to and received from each child during the past 12 months. Parents were first asked to report the actual amount provided and received, and, if they could not give an exact amount, were asked to choose among nine categories from which the median category value was used.

Because financial transfers provided to children was sparsely distributed, they were assessed with two dichotomous variables indicating whether any financial support was provided to at least one son and whether any financial support was provided to at least one daughter.

Financial transfers received from children were assessed with two variables indicating the total amount of money received from all sons and the total amount received from all daughters, with each variable log-transformed due to skewness in the distribution.

Baseline Grandchild Care. Care for grandchildren was based on self-reported frequency of providing care for the children of each adult child based on seven categories, ranging from no care to daily full-time care. We calculated variables for grandchild care using a different strategy for the children of sons and daughters because of distributional differences. For the children of sons, child care was indicated by two dichotomous variables: whether daily care (full-time or part-time) was provided to the children of at least one son and whether some, but less than daily, care was provided across all sons, with the reference group signifying that no care was provided. For the children of daughters, child care was indicated by whether any care was provided.

Table 1: Co-residence with sons and daughters before death

			Interval of Death					
	Total		2001–2003		2003–2006		2006–2009	
Co-residence before death	*n*	%	*n*	%	*n*	%	*n*	%
Lived with no child	222	47.23	71	40.80	80	47.34	71	55.91
Lived only with sons	232	49.36	96	55.17	87	51.48	49	38.58
Lived only with daughters	9	1.91	4	2.30	1	0.59	4	3.15
Lived both with sons and daughters	7	1.49	3	1.72	1	0.59	3	2.36
Total	470	100.00	174	100.00	169	100.00	127	100.00

Note: **Due to rounding, percentages may not add to 100%.**

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Bequest Allocation. In the posthumous survey, informants were asked how decedents allocated their assets and created two dummy variables based on this information: *left no bequest* (= 1), *left all assets to children* (= 1), with *having made other arrangements* as the reference group.

Control Variables

Based on previous research on the living arrangements of older adults in China, we expected demographic, health, and economic characteristics of older parents to predict their co-residence with sons (Knodel & Ofstedal, 2002; Korinek, Zimmer, & Gu, 2011; Zhang, 2004). We controlled for a series basic demographic characteristics reported by respondents at baseline including gender (0 = *male*, 1 = *female*), baseline marital status (0 = *unmarried*, 1 = *married*), education (0 = *no formal education*, 1 = *some education*), and number of sons and number of daughters, as well as age at death as recorded in the posthumous survey.

Baseline health status, assessed as the extent of functional impairment, was calculated as the sum of 11 items reflecting difficulties in performing personal activities of daily living and instrumental activities of daily living. Respondents indicated the level of difficulty performing each task: 0 = *no difficulty*, 1 = *some difficulty*, or 2 = *cannot do it without help*. Because these items were highly reliable (alpha = .93), we calculated a summed scale potentially ranging from 0 (*no difficulties*) to 22 (*unable to perform all tasks*). To account for the chronicity of health problems prior to death, we also controlled for the number of days that respondents were reported by their informants to be bedridden prior to death. Because of severe skewness in its distribution, this variable was log transformed.

Economic resources included the log of household income and homeownership reported by older adults at baseline, measured as a dichotomous variable indicating whether respondents owned or jointly owned the home in which they were living, contrasted with not owning their home.

We also controlled for the time (in months) between the date of each respondent's death and the date of the informant's interview to account for possible memory biases associated with informant reports. Finally, we controlled for baseline co-residence status/proximity to sons with two dummy variables: *those who co-resided with a son* (= 1) and *those who did not co-reside with a son but had at least one son living in the village* (= 1), with *those who did not co-reside with a son and had no son living in the village* serving as the reference group. This set of variables controlled for the opportunity structure for providing and receiving baseline support as well as produced a form of residualized change analysis. Thus, the risk of endogeneity is reduced because predictor variables are conditioned on a given baseline residential status.

Results

Characteristics of the decedent sample are shown in Table 2. Forty-six per cent were female, 45 per cent were married at baseline, and 19 per cent had some formal education. The average age at death was 78.6 years (*SD* = 7.25), and the average amount of time between baseline survey and death was 17.1 months (*SD* = 9.10). On average, older parents in the sample had 2.2 sons (*SD* = 1.18) and 2.1 daughters (*SD* = 1.09). Baseline functional limitations averaged 7.8 out of a possible 22 (*SD* = 7.12). Average number of bedridden days was 247.6 (*SD* = 626.71). The average income was RMB 463.8, where RMB 100 = USD $17 (*SD* = 1,475.57). Thirty-eight per cent owned their own homes at baseline. Seventy-eight per cent of decedents did not leave a bequest, 9 per cent left all their assets to children, and 13 per cent made other bequest arrangements.

In terms of support exchanged between parents and their adult children, 52 per cent of older parents received instrumental help from a son or daughter-in-law, and 29 per cent received instrumental help from a daughter or son-in-law. In contrast, only 15 per cent provided instrumental help to a son or daughter-in-law, and only 3 per cent provided instrumental help to a daughter or son-in-law. The average emotional closeness with sons was 4.3 (*SD* = 1.80) and with daughters was 4.5 (*SD* = 1.80). Nineteen per cent of older parents provided money to sons at baseline whereas only 11 per cent provided money to daughters. The average amount of financial support received from sons was RMB 951.37 (*SD* = 2,701.55), and the average received from daughters was RMB 172.9 (*SD* = 212.09). Regarding care provided for the children of adult sons, 72 per cent provided no care, 8 per cent provided some but less than daily care, and 20 per cent provided daily care. Only 7 per cent provided any care for the children of adult daughters.

In terms of the historical data structure, 37 per cent of observations were from the 2001–2003 interval, 37 per cent were from the 2003–2006 interval, and 26 per cent were from the 2006–2009 interval. Finally, we note that co-residence rates showed a marked increase within intervals, going from 36 per cent with at least a son at baseline to 51 per cent with sons at the time of death. Forty-two per cent of older adults did not co-reside with any son but had at least one son living in the same village at baseline.

For our multivariate analysis, we used logistic regression to estimate the log odds of co-residing with sons just prior to death as a function of baseline predictors.

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Table 2: Description of analytic variables ($n = 446$)

Variable	Mean or Proportion	*SD*	Range
Co-resided with any son at death	0.51		
Baseline co-residence status			
Co-resided with any son	0.36		
Co-resided with no son but had at least one son in the village	0.42		
Co-resided with no son and had no son in the village	0.22		
Time intervals			
2001–2003	0.37		
2003–2006	0.37		
2006–2009	0.26		
Months between death and last survey	17.11	9.10	0–38
Female	0.46		
Married	0.45		
Any education	0.19		
Age at death	78.57	7.25	62–97
Baseline functional limitations	7.82	7.12	0–22
Bedridden days before death	247.58	626.71	0–4470
ln ((bedridden days/100) + 1)[a]	0.67	0.86	0–3.82
Homeownership (vs. no homeownership)	0.38		
Income (RMB)	463.80	1,474.32	0–15,300
Ln(income + 1)[a]	2.03	3.15	0–9.64
Number of sons	2.24	1.18	1–7
Number of daughters	2.10	1.09	1–6
Bequest allocation			
Other arrangements	0.13		
No bequest	0.78		
Children	0.09		
Baseline intergenerational interactions			
Received instrumental support from sons	0.52		
Received instrumental support from daughters	0.29		
Provided instrumental support to sons	0.15		
Provided instrumental support to daughters	0.03		
Maximum emotional closeness with sons	4.31	1.80	0–6
Maximum emotional closeness with daughters	4.45	1.80	0–6
Provided any financial support to sons	0.19		
Provided any financial support to daughters	0.11		
Financial support from sons (RMB)	951.37	2701.55	0–52,500
ln(financial support from sons + 1)[a]	5.56	2.27	0–10.87
Financial support from daughters (RMB)	172.89	212.09	0–2000
ln(financial support from daughters + 1)[a]	5.36	1.70	0–8.92
Provided grandchild care for sons			
No care	0.72		
Daily care	0.20		
Occasional care	0.08		
Provided grandchild care for daughters	0.07		

[a] **ln represents natural logarithm.**

In Table 3, odds ratios are presented. Examining historical change, we note that there was little in change the likelihood of co-residence before death in the 2003–2006 interval as compared to the 2001–2003 interval; however, there was a significant decline in the 2006–2009 interval with the risk less than half that of the initial interval (*OR* = 0.36).

Parents who left all their assets to their children and parents who made no bequest were five to six times more likely than parents who made other bequest arrangements to live with a son prior to death (*OR* = 5.24 and 5.93 respectively).

For receiving support from sons and daughters at baseline, parents who received instrumental support from sons were almost twice as likely as those who did not receive such support to live with a son prior to death (*OR* = 1.86). Receiving instrumental support from daughters did not predict co-residence with sons.

In terms of providing support to sons and daughters at baseline, parents who provided instrumental support

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Table 3: Logistic regression predicting co-residence with at least one son at time of death ($n = 446$)

Predictors	Odds Ratio	95% CI
Baseline co-residence status (reference: Co-resided with no son and had no son in the village)		
Co-residence with any son	1.89†	0.96–3.69
Co-residence with no son but had at least one son in the village	0.69	0.38–1.26
Time interval (reference: 2001–2003)		
2003–2006	0.93	0.53–0.61
2006–2009	0.36**	0.19–0.68
Months between death and initial survey	1.01	0.98–1.03
Female	0.96	0.57—1.61
Married	0.88	0.49—1.58
Education	0.89	0.47—1.68
Age at death	1.02	0.98—1.07
Functional limitations	1.02	0.98—1.06
Bedridden months before death	0.97	0.87—1.08
Homeownership (vs. no homeownership)	1.06	0.65—1.73
Income	1.04	0.95—1.13
Number of sons	0.71**	0.57—0.89
Number of daughters	1.10	0.88—1.39
Bequest allocation (ref: others)		
No bequest	5.93***	2.45—14.37
Children	5.24**	1.71—16.02
Baseline intergenerational transactions		
Received instrumental support from sons	1.86*	1.09—3.20
Received instrumental support from daughters	0.64	0.38—1.09
Provided instrumental support to sons	2.94**	1.43—6.04
Provided instrumental support to daughters	0.41	0.10—1.71
Maximum emotional closeness with sons	1.29**	1.08—1.55
Maximum emotional closeness with daughters	0.81*	0.68—0.97
Provided financial support to sons	1.90†	0.90—4.01
Provided financial support to daughters	0.43†	0.17—1.06
Amount financial support received from sons	0.97	0.86—1.10
Amount financial support received from daughters	1.06	0.91—1.24
Provided grandchild care for sons (ref: no care)		
Daily care	0.71	0.37—1.33
Occasional care	1.75	0.71—4.29
Provided grandchild care for daughters	4.29**	1.51—12.23
Constant	0.03†	0.00—1.14
LR χ^2	148.39	
df	29	
Pseudo R^2	0.24	

†$p < .1$, *$p < .05$, **$p < .01$, ***$p < .001$

to sons were almost three time more likely than those who did not provide such support to live with a son prior to death (*OR* = 2.94). A comparable effect was not observed for having provided instrumental support to daughters. Emotional closeness with sons at baseline was positively associated with co-residing with sons, with closer relationships increasing the likelihood of co-residence (*OR* = 1.29). However, emotional closeness with daughters at baseline reduced the likelihood of co-residing with sons (*OR* = 0.81).

Regarding the influence of grandchild care, providing care for the children of daughters increased the likelihood of co-residing with sons more than fourfold (*OR* = 4.29). However, no comparable effect was observed for providing care for the children of sons. Surprisingly, having more sons reduced the likelihood of co-residing with a son prior to death (*OR* = 0.71). None of the other control variables reached statistical significance in predicting co-residence.

Discussion

In this investigation, we examined family dynamics that serve as potential precursors to whether older rural Chinese parents co-reside with their sons just prior to death. We took a family exchange perspective, considering both direct reciprocity (with sons) and indirect reciprocity (with daughters). We also examined secular change in the prevalence of co-residence with

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sons at the end of life, by considering three time periods over an eight-year period.

We observed an absolute increase in co-residence between each baseline survey and the period just before death, supporting H1. This is consistent with previous findings from China that the risk of co-residence increases with the declining health of older parents (Giles & Mu, 2007; Zimmer & Kim, 2008). Zimmer & Korinek (2010), one of a few studies to have examined end-of-life co-residence in China, also found increases in co-residence before death, a trend partly driven by parents' need for care. Overall, our findings suggest that adult sons still transition into co-residence with their parents at the end of life, even as this family dynamic appears to be weakening in rural China.

Despite the increase in co-residence before death, our results indicated a secular decline in end-of-life co-residence that is consistent with modernization theory and the development of alternative non-residential approaches to care and support of parents at the end of life. This finding supported hypothesis H2 concerning historical change in co-residence. Given that the period we studied saw a rise in the labor force migration of the working-age population, this decline suggests either that return migration of sons has slowed or that returning sons are living in the same village but not necessarily the same household as their parents (an arrangement more characteristic of extended-family structures in developed Western countries).

We found support for several hypotheses about intergenerational reciprocity, including H3, H4, and H6. Earlier investments made by parents in their adult children appear to reinforce the cultural dictate that sons return to the parental home when death is imminent, providing partial support to H3. A return-on-investment was found for providing instrumental support to sons but not for caring for their dependent children. However, providing care for the children of adult daughters significantly increased the likelihood that sons will co-reside at the end of life, providing support for the "watchdog" hypothesis (H6). In patrilineal family systems, care for the children of adult sons is often regarded as an obligation, but care for the children of adult daughters is considered discretionary. Daughters who benefit from such care are unusual and may feel especially indebted to their parents. They may discharge their debt by assuring that the cultural ideal of co-residence with sons is fulfilled, even though they themselves are not regarded as desirable co-residing partners in a patrilineal family system. How the social influence of sisters operates is not possible to identify in this investigation and will require additional research into complex sibling dynamics. The finding that emotional closeness with daughters reduced parents' likelihood of having co-residing sons would appear to be in conflict with the watchdog hypothesis. However, it is possible that strong emotional ties with daughters signal relatively weaker emotional ties with sons, thereby suppressing co-residence.

The role of bequests was partially confirmed (hypothesis H4). Parents who left a bequest to their children were more likely than those who made other arrangements to live with a son before death. However, parents who left no bequest were also more likely to co-reside with a son. One explanation for this finding is that parents with little to bequeath their children have already transferred their assets (mostly land) to their sons through what is called "serial division", a process by which families subdivide after the marriage of children (Yan, 2003). Sons, being the main beneficiaries of such allocations, are obligated to later reciprocate by supporting the parent who now has few resources to transfer. This is also consistent with the finding that 78 per cent of older parents did not leave any bequest.

Finally, we found support for the principle of continuity with respect to receiving instrumental support from sons (hypothesis H5). Parents who previously received support from sons may have elevated expectations of them. Alternatively, sons who previously provided support may have elevated commitment to filial care. Both scenarios are indicative of the general stability inherent in intergenerational relationships over time.

Among the control variables, the number of sons was inversely related to the likelihood of co-residing with a son before death. We suggested earlier that a neo-local arrangement may be replacing co-residence as a response to parental need because it allows greater sharing of responsibilities among children and imposes fewer demands on any one child to be co-resident with a parent (Zhang & Wang, 2010). We found, further in support of this notion, in a supplemental analysis (not reported) that the number of sons was positively associated with having at least one son living in the same village, but not in the same household, as the older parent.

There are several limitations of this study that bear mentioning. First, the sampling frame for this study is geographically restricted to one region of one province. Although there is little to suggest that this area is substantially different from other rural areas of China, generalizations of our findings should be done with caution. Second, we ascertained co-residence status at the time of death using summary data for sons and daughters. Information about which specific child co-resided with the parent would be preferred, but was deemed unreliable in the posthumous data collected from informants. Future research that ties exchange dynamics to specific relationships would be informative. Third, the use of multiple posthumous informants

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represented a range of individuals who were variously related to the decedents but nevertheless provided important corroboration of living arrangements at the end of life. Fourth, we do not know from the posthumous survey when co-residence with a son began relative to the death, leaving open the question of whether the object of co-residence was to provide care over a protracted period or to make posthumous arrangements such as planning the funeral and taking care of administrative affairs of the deceased parent. Fifth, because the posthumous survey did not have information about where each child lived at the time of their parents' death, we were not able to consider whether proximate sons – those who moved to live nearer to, but not with, their parents – formed an alternative source of end-of-life care (Chen, 2005; Davis-Friedmann, 1991; Pimentel, 2005; Silverstein et al., 2006; Yan et al., 2003; Zhang & Wang, 2010).

In addition, alternative explanations for end-of-life co-residence cannot be excluded. While we included potential measures of parents' needs such as marital status, self-reported health, time spent bedridden, and homeownership, none of these factors was significantly related to co-residence in our models. The absence of findings related to need raises questions about whether adult children are aware that their parents are near death and suggest that socio-cultural factors, such as filial norms and expectations, deserve further examination.

Finally, we urge caution in making causal inferences based on our findings. Although controlling for family characteristics and earlier intergenerational transactions (including co-residence) provided statistical leverage for identifying important factors that predispose end-of-life co-residence with sons, it should be remembered that these controls are imperfect representations of the constructs they represent. However, we note that controlling for baseline co-residence and proximity provided the ability to treat end-of-life co-residence as a unique and distinctively achieved living arrangement.

In spite of the preceding limitations, this study provided a unique vantage point for better understanding the etiology of intergenerational transactions in a traditional yet rapidly developing part of the world. Conceptualizing co-residence with sons as a culturally sanctioned resource, we tested and confirmed several theoretical mechanisms showing how filial responsibilities are directly negotiated with sons and indirectly negotiated with daughters based on previous intergenerational interactions. In a culture where norms of filial piety are still strong, but under threat, and where extended-familism remains the rule, our findings demonstrated both adherence to prescribed forms of filial behavior towards older parents, as well as heterogeneity in kinship responses based on earlier family dynamics. Living with sons remains an important demonstration of filial piety for older parents at the end of life in rural China, but its realization is sensitive to various intergenerational transactions and is less than universally practiced.

Our investigation extends research by Zimmer and Korinek (2010) into near end-of-life co-residence in China by focusing on intergenerational exchange as a precursor to co-residence. Although our analysis is more narrowly cast by being based on a geographically localized rural sample and focusing only on co-residence with sons, we confirmed several theoretically informed hypotheses based on exchange, continuity, and gendered perspectives that explain how and why adult children in rural China respond to their older parents in the final stage of life.

Looking into the future, it is possible that the continued (de)evolution of filial piety may depress the importance of intergenerational exchange dynamics in the care of older parents in rural Chinese families. The extent to which rapid social change has weakened filial norms, as well as increased labor migration and reduced family size (including the number of sons), will be prime subjects for future investigation in this area of gerontological scholarship.

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