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Older parents' coresidence with adult daughters in contemporary China:

The role of individual and community characteristics

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The role of individual and community characteristics

In the traditional Chinese family, aged parents live together with a son and his wife, while daughters “marry out” and are members of their husbands’ families. Coresidence with a natal daughter is still rare in China, but it is more common in urban China (Lei et al 2015). As China experiences rapid population ageing, coresidence with a family member will remain a key source of support in a country with limited social welfare. As families grow smaller, it is likely that an increasing proportion of older adults will live with an adult daughter– the non-normative pattern. It is crucial to examine which factors determine coresidence patterns today in order to support ageing families in the future. In addition, social scientists are interested in the broad question of how family relationships are connected to a wider social context (Thornton and Fricke 1987) and how family is impacted by social change. In the present study I examine how both community context variables and individual/family characteristics are associated with daughter coresidence in a changing China.

Most previous research on living arrangements of older adults in China has compared coresidence with a son with living independently, and daughter coresidence is not analyzed because it is relatively rare. Since son coresidence is the normative pattern in China (culturally preferred) it is important to note that “residing nonnormatively requires deliberate choice and specific contexts that may not follow the same rules” (Pimentel & Liu 2004: p. 833).

Coresidence patterns can also be an overall indicator of shifts in social norms and traditional values (Chen, 2005). While many studies discuss the role that development and modernization play in influencing intergenerational relations in China, most are only able to broadly compare

rural and urban differences. This study examines community characteristics at the county level, permitting a more nuanced meaning of social context.

Using a nationally representative survey of Chinese older adults from both rural and urban areas (Chinese Longitudinal Healthy Longevity Survey [CLHLS] 2008 wave) and Chinese census data, I utilize multi-level models to examine both individual and community-level determinants of daughter coresidence. I aim to advance our understanding of how social change and development influence living arrangements, and also how the needs and resources of older parents are associated with non-normative (daughter) coresidence patterns. While a large body of research examines living arrangements of older Chinese, relatively little is known about determinants of daughter coresidence, and none to date have examined community-level determinants of coresidence patterns in China. In addition, in this manuscript I am bridging two bodies of research – one on intergenerational support and another on social context and individual behavior (Brauner-Otto, 2009).

Background

Living arrangements of older adults: theoretical considerations

Multiple theoretical perspectives have been applied to understand intergenerational coresidence patterns. This has included modernization theory, ideology, demographic patterns, and practical concerns. Most research compares intergenerational coresidence with independent living, but in this study I examine gendered patterns of coresidence – living with a son versus a daughter. In addition, previous research in developing countries has utilized the "family mode of social organization framework" to understand the connection between individual-level family

behavior and macro-level social change. This framework, however, has not previously been applied to understand coresidence patterns.

Modernization theory argues that as a society develops and modernizes, the strength of traditional values, particularly those associated with parental authority, will decrease and lead to an overall decline in intergenerational support (Goode, 1963). Modernization can lead towards a change in attitudes towards coresidence – including greater acceptance of coresidence with daughters. In addition, as women’s status rises, sons and daughters can share equal roles in family coresidence (Pimentel & Liu, 2004).

Sons were preferred to daughters in most societies for thousands of years and this preference continues in China, as well as many less developed countries in East and South Asia, as well as the Middle East (Almond, Edlund, & Milligan, 2013; Hesketh 2011). In a patriarchal society, sons provide old-age support. They can also command higher wages, provide physical protection, and continue the family line. Daughters, however, are often considered economic burdens and members of their husband’s family after marriage.

Within the Chinese context, Confucian ideology and traditional Chinese culture also play a major role in son preference and coresidence patterns. Confucianism has been the dominant moral philosophy in China for nearly 2,000 years. This ideology dictates that sons are responsible for their parents, while daughters are members of their husband’s family. A daughter’s expectations for old-age support are to her parents-in-law. However, emotional connections may be more equal between daughters (versus sons) and parents (Chen, Short, & Entwisle, 2000). In China, sons are preferred for a variety of reasons, including continuing the family line, old-age security, provision of labor, and performance of ancestral rites. The old

saying “*yang er fang lao*” – having a son prevents difficulties in old age, sums up son preference.

Chinese daughters face challenges in caring for parents. They may live elsewhere if they migrated for marriage. Rural daughters do not inherit family wealth and may be at a disadvantage economically in comparison with their brothers. On the other hand, in recent decades, with the strengthening of the nuclear family and free-choice marriage, men may have stronger bonds with their wives than parents (Zhang & Wang, 2010). In the case of actual hands-on care, it is not sons, but rather their wives (daughters-in-law) who provide for ageing parents. Ageing parents may have more conflicts with daughters-in-law than natal daughters (Meng, 2002; Pearson, 2002).

Demographic changes such as population ageing and diminished fertility reduces the number of adult children who are available for coresidence (Kane & Choi, 1999). Son preference in China (as previously mentioned) and the one-child policy has resulted in an imbalanced sex ratio at birth (SRB) which is now around 118 (Li, 2007), well above the normal range of 103-107. This trend will make it harder for men to find wives, particularly those of low SES, resulting in a lack of daughters-in-law to provide hands-on care. In addition, there will be fewer possible daughters with whom to coreside. It is important to note, however, that currently older adults, including the oldest-old in my sample, did not have their childbearing limited by the one-child policy.

Practical concerns, such as the resources and needs of multiple generations are also related to coresidence patterns. Shared living benefits parents through economic support, instrumental support for disabled elderly, and through realizing cultural expectations. Adult children can benefit from living in a parents’ home and receiving help with childcare and

housework responsibilities, enabling them to work for wages or even migrate (Chen, Liu, & Mair, 2011).

The family mode of social organization framework highlights the idea that as societies develop, more of life is spent in non-family institutions. I.e., an increasing proportion of life is organized outside of the family. This can lead to shifts in attitudes and behaviors (Axinn & Yabiku, 2001; Thornton & Fricke, 1987; Thornton & Lin, 1994). This change includes the potential to focus on the nuclear family or individual needs, and less on the extended family. As communities become more industrialized and urbanized, family is no longer the prime economic unit, and this can lead to a change in traditional family behaviors (Thornton & Fricke, 1987). Non-family employment and greater concentrations of workers through urbanization can expose people to new ideas. This framework has been used to study other family processes including fertility change (Entwisle & Mason, 1985; Axinn & Yasuda, 2001), spouse choice (Ghimire, Axinn, Yabiku, & Thornton, 2006), family formation (Perelli-Harris, 2008), and elder support (Brauner-Otto, 2009), among others. Within China, economic and social change make it possible for more of life to be spent in non-family institutions, which is the mechanism for social change according to this framework.

China has experienced broad social changes since economic reforms began in the late 1970s. The move from state-controlled to a market-driven economy led to increasingly individualistic attitudes and greater focus on the nuclear, rather than the extended family (Yan 2010). In contrast to the Mao era, individuals had more control about how to live and earn a living, due to less state intervention in private life (Liang and Luo 2017). At the same time, however, some traditional patterns of family life were revived (Xu et al 2015). For rural

individuals changing from collective to family farms, the extended family likely grew in importance.

In the post-reform era (1992 onwards) the Chinese economy has grown quickly, moving away from agricultural production, and growing numbers of Chinese live in cities. The education system has expanded and there is greater contact with Western products and values (Xu et al 2015). While the overall standard of living has increased, there has also been an increase in income inequality, particularly by region, including rural versus urban and interior versus coastal provinces (Treiman 2012; Xie and Zhou, 2014). This economic growth and urbanization has also accompanied massive outmigration from rural to urban areas. The *hukou* system, however, makes these moves only temporary and older people and children are often left behind in rural villages.

Intergenerational coresidence has decreased overall since the 1980s (Palmer & Deng, 2008; Meng & Luo, 2008; Xu et al 2015; Zeng & Wang, 2003) but still remains high compared to Western countries, such as the United States. This is due to an under-developed social welfare system and also cultural traditions. According to Chinese census data, coresidence rates for older adults (65+) were 68% for men and 74% for women in 1982. By 2000, this declined to 60% and 69% for men and women, respectively (Zeng and Wang 2003). In 2011, Lei and colleagues found that 41% of older people (60+) lived with an adult child, but the oldest-old were more likely to coreside (Lei, Strauss et al 2015). Coresidence rates may have fallen further in urban areas, however, if the cost of living were not so high – it is hard to purchase apartments in cities.

This movement away from the traditional family towards a focus on individual needs and preferences could lead to an increase in daughter coresidence for certain families. Instead of living with the oldest son as is traditional obligation in China, families could decide to not

coreside at all or to live with the child with whom they are most compatible, or for whom it makes economic sense. This could include daughters.

Determinants of coresidence in China

A large body of literature has examined living arrangements of older adults, but most studies from East Asia compare coresidence with a child versus living independently. Daughter coresidence is rare -- recent analysis of CHARLS data found that only 14% of coresident older adults live with daughters (Lei et al., 2015). Previous studies often combine son and daughter coresidence into the same group, or exclude those who non-normatively coreside with a daughter.

Among the limited body of research that examines daughter coresidence in China, several key determinants have been identified including health status, sibling availability, marital status, and socio-economic status (SES). Most research on this type of living arrangement has only been from the perspective of the adult child. Zhang (2004) found that for respondents whose parents were under age 60, wives were 10 times more likely to live with parents-in-law than their own parents, but for those with older adult parents (60+), the likelihood declined. This provides evidence that daughters are more likely to engage in non-normative coresidence when parents age and potentially experience health declines (Zhang, 2004). Living with the wife's parents is generally only an available option if the husband has a brother who can live with his own parents. Having more brothers lowered the likelihood of patrilocalⁱ coresidence (Chu et al., 2011; Pimentel & Liu, 2004). Couples were more likely to live with the wife's parents if she had no brothers (Logan, Bian, & Bian, 1998).

Previous research on marital status of adult children found that unmarried sons and daughters were more likely to coreside with a parent than married couples (Logan & Bian, 1998;

Zhang, 2004). Zhang (2004) was surprised to find that overall levels of coresidence were higher for unmarried sons than unmarried daughters throughout the life course. This may be evidence of parents (with multiple children), pushing the unmarried adult daughter “out of the nest” in order to provide housing and resources to sons.

Previous research highlighting the importance of SES found that adult couples with higher education were more likely to live with a wife’s parents (Chu et al., 2011; Logan, Bian, & Bian, 1998), perhaps indicating that higher SES enables urban families to achieve preferred living arrangements (Zhang, 2004) or that they are more open to non-traditional living arrangements. Higher SES parents were also less likely to prefer coresidence with adult children (Sereny, 2011). More educated women were also less likely to leave coresidence with their own parents (Pimentel & Liu, 2004). Regarding social context, research comparing East Asian societies found that patrilocal coresidence was more likely in Taiwan than in China (Yasuda et al., 2011; Chu et al., 2011). Although Taiwan has higher levels of economic development, they also have a more traditional Confucian culture. In the People’s Republic of China (PRC), matrilocal coresidence was more likely for urban than rural residents (Lei et al., 2015).

Ageing and community context

Research on ageing and “neighborhood effects” is scarce, particularly in a developing country context. One notable exception is work by Brauner-Otto (2009) which utilized the family mode of social organization framework to examine financial support to ageing parents in Nepal (a developing country), focusing specifically on the role of exposure to education. This study found that in couples where the husband was more educated the likelihood of providing financial and material support to the husband's parents was higher. Couples who were exposed to education in their neighborhood had a lower likelihood of providing support to a wife's parents.

Some prior research from the US has examined independent living versus coresidence with children. Community context matters for older adults because of inequality in the spatial distribution of the ageing population, and health-promoting social ties are often embedded in neighborhoods (Robert, 2002; Wen, Browning, & Cagney, 2007). Research on community context and living alone in the US found that demographic environment (Burr, Mutchler, & Gerst, 2013; Krivo & Mutchler, 1989), housing (Kim & Lauderdale, 2002), normative environment (Krivo & Mutchler, 1989), and social service supports (Burr, Mutchler, & Gerst, 2013; Mutchler & Burr, 2003) were all important factors. As outlined earlier, the demographic and normative environment in China is quite different from the US.

This study will contribute to our understanding of coresidence patterns. First, it will look at coresidence as a comparison between living with a son versus a daughter, whereas previous research has focused on intergenerational coresidence versus independent living. Second, it applies the family mode of social organization framework within the unique context of China. Last, it utilizes multi-level models to examine both individual-level and community-level determinants of non-normative coresidence (daughter) in China.

Data and Methods

Data

Data used in this article are from the fifth wave of the Chinese Longitudinal Healthy Longevity Survey (CLHLS) conducted in 2008-2009. Details about the study design can be found elsewhere (Gu, 2008; Gu & Dupre, 2008; Zeng, 2008). The development indicators came from China's 2000 and 2005 (1%) census. All census data were accessed through the "China Data Online" database, housed at the University of Michigan.

I limited the analysis to older adults who coresided with adult sons or daughters. Out of 16,956 CLHLS respondents, 14,084 lived with a household member (the remainder lived alone or in an institution). Of those 14,084, 68.6% coresided with an adult child. As this research focuses on the coresidence choice between an adult son or daughter, I only examined those respondents “at risk” of coresidence with either a son or a daughter, i.e. those elderly respondents who had at least one son and one daughter. The sample size was thus first limited to 7,089 individuals (73% of all co-residers).

Measures

Individual-Level. The dependent variable is a binary variable of living arrangement with two categories: coresidence with an adult son (0) or coresidence with an adult daughter (1)ⁱⁱ. This information comes from the elderly respondent’s report of members of the household. Due to missing data on both individual level and community level variables, the final analytic sample was 6,742 (less than five per cent missing data).

Based on previous literature and data availability, the individual-level covariates in this study include demographics, SES, family, and health characteristics (Yasuda et al 2011; Zhang 2004; Zimmer and Korinek, 2010). Demographics include rural/urban status, age, and gender. Rural/urban status was an interviewer-assessed measure of whether a respondent lived in a rural or urban area. This is different than type of community or *hukou* (not measured in CLHLS). SES was measured by the older adult’s former occupation. This was a categorical variable including agriculture/fishing, white collar, service/industry, and other (includes military, government, housewife, etc.). Family characteristics included marital status, number of sons and daughters, and whether sons/daughters live nearby. Health status was measured by activities of daily living

(ADL) disability. Last, I added a covariate measuring whether the home was owned or rented in the respondent's own name.

Community-Level. Community-level data came from Chinese census data. Community is defined as city district (*shiqu*), county (*xian*), or county-level city (*xianjishi*) in the CLHLS dataset. Over time, China has developed an administrative system that recognizes four levels of administration: the province level (including provinces, autonomous regions, and municipalities), the prefecture level (including cities at prefecture level), the county level (including counties, autonomous counties, and cities at the county level, as well as districts under the jurisdiction of cities), and the township level. The communities in this study are those at the county level. The development indicators came from China's 2000 and 2005 (1 per cent) census.

To get at industrialization two indicators were used: the percentage of the population that is agricultural (as measured by *hukou* status) and region of residence. Percentage of agricultural population ranges from less than five per cent in a city district in a northeast city to more than 95 per cent in a rural county in Anhui province. Region includes living in a province in Western, Central, Eastern, and Northeastern China. Degree of industrialization can indicate access to wage labor employment, which has been examined in other studies utilizing the family mode of social organization framework (Axinn & Yabiku, 2001). A more general indicator of development is percent with no access to a toilet. This is similar to Hayford's study (2005) which looked at percent with piped water to measure level of development. Percentage without a toilet facility ranges from zero percent in an urban northeast city district to 90 per cent in a rural county in Jiangxi province.

Urbanization can be measured by community type and percentage agricultural. Because of China's rapid modernization, places change over time. For example, a big city might annex

nearby rural areas. Some people might live in city districts but still have agricultural hukous. People originally from rural areas are likely to hold more traditional attitudes. Therefore it's worth looking at both type of community and also percent with agricultural hukou.

Previous research on community context (Barber, 2004; Krivo & Mutchler, 2003) has highlighted the importance of normative environment. To capture community norms regarding son preference, I included a measure of sex ratio at birth (SRB). Without intervention, the normal range of sex ratio at birth is 103-107 boys born for every 100 girls (Johansson & Nygren, 1991). In China, the SRB is much higher because of son preference, access to sex selective abortion, and low fertility rates. Analyzing the Chinese 2005 1 per cent census, Zhu, Lu, and Hesketh (2008) found the average SRB was 119 for the 2005 birth cohort. Communities with imbalanced sex ratios (more males born than females) may indicate that community norms value sons over daughters, a traditional view. People who live in such communities may be less likely to accept non-normative coresidence (coresidence with daughters). SRB was either provided directly or I derived it by dividing number of male births by the number of female births in a given year. I chose to analyze SRB as a continuous measure; the results in multivariate analysis were no different than from creating categories of SRB.

Analytic Strategy

Multilevel (or hierarchical) models enable us to estimate both individual level and community level effects. Multilevel models estimate unbiased coefficients and standard errors; standard logistic regression will produce biased results when observations are not independent. This study employed multi-level binary logistic regression analysis. The dependent variable was coresidence with a daughter versus a son.

The statistical model used in multilevel analysis of binary variables is similar to the standard logistic regression model. The observed outcome is y_{ij} – whether person i in community j coresided with a daughter (value of 1) or a son. The null model (no covariates) is modeled as

$$\log\left(\frac{\pi_{ij}}{1 - \pi_{ij}}\right) = \beta_0 + u_{0j}$$

where π is the response probability. The intercept β_0 is shared by all communities while the random effect u_{0j} is specific to community j . The random effect is assumed to follow a normal distribution with variance $\sigma_{u_0}^2$.

This paper will only look at the random intercept logit model. Additional analysis examined random effects of individual-level coefficients (random slopes) and also cross-level interactions and found no significant point-estimates. A model with one level 1 predictor and one level 2 predictor would look like this:

$$\log\left(\frac{\pi_{ij}}{1 - \pi_{ij}}\right) = \beta_0 + \beta_1 x_{1ij} + \beta_2 x_j + u_{0j}$$

β_1 is a level-1 coefficient and β_2 is a level-2 coefficient. β_0 is overall intercept in the linear relation between log-odds and x . The exponential of β_0 gives us the odds that $y=1$ when $x=0$ and $u=0$. β_1 is effect of 1-unit change in x on the log-odds that $y=1$ after adjusting for β_2 and group effect u_j . If u_j is held constant then β_1 can be referred to as cluster-specific effect. The intercept for a given group j is β_0 plus u_j , which will be higher or lower than overall intercept depending on value of u_j . u_j is the random effect (or level 2 residual). Variance of u_j is the between-group variance adjusted for covariates.

As is conventional in multilevel modeling, each continuous second-level variable was mean centered (this includes percentage agricultural *hukou*, percentage with toilet, and SRB). Percentages were calculated out of the number 100. The coefficient indicates the increase or decrease in the odds for a 1 per cent or 1 point increase in that covariate.

Similar to multilevel models with linear outcome, the proportion of the total residual variance that is due to between-group variation can be calculated by the variance partition component (VPC). In a logit model the value of σ_e^2 is approximately 3.29 (Guo and Zhao 2000; Steele 2009).

$$VPC = \frac{\sigma_u^2}{\sigma_u^2 + \sigma_e^2}$$

Each model in tables 3 and 4 report the VPC. All analyses were done with “meqrlogit” in Stata SE 13.1.

Results

Table 1 presents descriptive statistics for individual and community level covariates by son/daughter coresidence. Overall, among those who coresided with an adult child, the majority coresided with a son. In the analytical sample, only 12.9 per cent (N=872) overall coresided with an adult daughter. Compared to those who lived with an adult son, respondents who coresided with a daughter were older and had higher SES, greater number of daughters, and fewer sons. They were also more likely to have home in own name, ADL disability, a son living nearby, and to live in an urban community. They were less likely to have a daughter nearby. The mean age for the sample is 89 and ages range from 60 to 116. In the regressions, all models control for age and it is rarely significant.

Table 2 provides more information about the communities sampled in the CLHLS. For this study, 589 communities were included (out of a total of 842 in the full sample). The mean number of respondents in each community was 20.26. The majority of communities were in eastern provinces. Nearly half of the communities were city districts, similar to the overall sample of communities in the 2008 CLHLS. The mean SRB across communities was 119.37 – considerably above the normal SRB of 107 (Zhu, Lu & Hesketh, 2009).

Tables 3 and 4 provide coefficient estimates and standard errors for the five models. BIC statistics are also presented to compare differences in model fit between nested models. Model 1 includes only individual and family characteristics, and no community-level predictors. For this model, I begin by examining rural and urban sub-samples separately. Rural/urban is an individual-level variable. In the CLHLS, the interviewer assesses whether the respondent lives in a rural or urban area. Urban individuals are more likely to enjoy pensions, higher standards of living, and more social welfare. Rural older people are more likely to have experienced outmigration of adult children. In models 2, 3, and 4, community-level factors are added, and the rural and urban sub-samples are pooled because community-level development indicators are included. The final model (5) includes all individual covariates and three previously significant community-level factors. In the regressions examining in-home toilets and SRB, the coefficients were not significant and the models are not included here.

In the intercept only, null model (not shown), a chi-square test of the level-2 random intercept variance indicates that the between-community variance is non-zero, in other words, that the average probability of coresidence with a daughter varies by community. This makes multi-level models worthwhile to pursue. The calculated rho indicated that 16.1 per cent of the

variance in the probability of co-residing with a daughter was attributable to community level differences.

Table 3 contains the full sample and two sub-group analyses for rural and urban individuals. Odds ratios are reported. In the first model, many individual-level characteristics were significantly associated with the likelihood of coresidence with an adult daughter. SES was positively associated with daughter coresidence: those with higher status occupations (not agriculture or fishing) were more likely to live with an adult daughter than elderly with low SES. In the rural sample, it was only a significant difference between other (includes military, government, housewife, etc.) and agriculture/fishing. In the rural sample only, ADL disability increased the likelihood of coresidence with a daughter. Respondent's gender was not significant. Interestingly, only for the urban sub-sample, younger elderly (60-69) were less likely to live with a daughter than a centenarian. For both groups, each additional son reduced the likelihood of coresidence with a daughter, and each additional daughter raised the likelihood. The size of the odds ratio is larger for the urban sample. Having a son close by raised the likelihood of coresidence with a daughter, while having at least one daughter close by lowered the likelihood. For rural older adults, having a daughter close by reduced the odds by a factor of 5.586 (1/.179). Last, the percentage of variation at the community level was reduced to 5.7 per cent and 11.7 percent for the rural and urban sub-samples, respectively, after controlling for individual characteristics. This reduced variance gives evidence that the individual-level characteristics were distributed differently across communities.

Table 4 displays models 2-5, where I analyze the full sample (rural and urban) and added in variables for community characteristics. It is suitable to pool the samples because I am controlling for both individual SES and community-level development indicators. Based on the

BIC statistic, model 2 fits the data best (likelihood ratio tests showed no significant improvement between model 2 and the full model [model 5]). Table 4 only shows coefficients for variables relating to individual and community SES. Other independent variables are included in the regression are not shown here (available by request), but remain largely unchanged.

In model 2, I began by looking at the percentage in the community with an agricultural *hukou* (also referred to as rural population). Respondents in communities with higher levels of agricultural-*hukou* holders were less likely to coreside with a daughter. This variable was mean-centered. For each percentage point above the mean, the odds are reduced by a factor of 1.01 (1/.990). Examining predicted probabilities, on average, the predicted probability of living with a daughter is .12 for an individual in a median community¹ with the mean level of rural population (95% CI: .11, .13). Respondents who live in a community with the minimum percent of rural residents have a probability of .19 (95% CI: .15, .22). For an average rural person living in a community with a high percentage of rural people the predicted probability is .08 (95% CI: .07, .09) compared to a predicted probability of .23 (95% CI: .19, .27) for an urban person living in a community with a low percentage of rural people. Lastly, according to both the BIC statistic and a likelihood ratio test, model 2 improves the model fit from model 1 and variation at the community level still remained.

Model 3 adds a measure of community region. I found that respondents who lived in northeast provinces (Heilongjiang, Jilin, or Liaoning) were 50 percent more likely to coreside with a daughter than older adults residing in eastern, coastal provinces (comparison group).

¹ In a multi-level logistic regression in order to calculate the predicted probability of an outcome, we need to examine the coefficients for the variables and also examine the random variance. Because the community-level variance is fairly small, it is suitable to fix it at zero (the theoretical mean) and only examine the coefficients for the fixed effects. Therefore the "median" community refers to a predicted probability when the random variance equals zero (Centre for Multilevel Modelling, 2019; UCLA: IDRE, 2019).

There were no statistically significant differences between western and central provinces and the comparison category. Model 4 adds a variable for type of community: rural county, county-level city or city district. Those who lived in counties or county-level cities had lower odds of coresidence with a daughter than those living in city districts. In addition, even after controlling for type of community, individual SES still mattered.

The final model includes three of the previously significant community-level variables – percentage agricultural *hukou* holder, region, and community type. Only percent with agricultural *hukou* remained significant in the final model. Respondents in communities with a higher percent of rural population were less likely to coreside with a daughter and were more likely to coreside with a son. It may be that region and community type are picking up rurality, which is the most significant community predictor of daughter coresidence. For all the models, even after controlling for community characteristics, former occupation (SES) was still a significant predictor.

In each model shown in tables 3 and 4, the variance of the level-2 random effect was significantly different from zero. Even after controlling for an extensive set of individual and community characteristics, there was still some variation across communities in the likelihood of coresidence with a daughter. In the best-fitting model (model 2), the variance was reduced to 7.8 per cent. However, changes in rho should be treated with caution because the level-1 variables may have increased the between-community variance.

Discussion

Greater understanding of both the individual and community-level determinants of coresidence patterns can shed new light on gendered intergenerational support in a changing

China. Daughter coresidence will likely grow more common as the country continues to experience social, economic, political, and demographic change. In my analysis of CLHLS and census data, I found significant coefficients for both individual, family, and community-level predictors. My findings provide support for both modernization theory and the family mode of social organization framework. First, that coresidence patterns may increasingly match up with individual needs and preferences rather than being dictated by the traditional pattern of coresidence with a son only. Second, exposure to non-family institutions exposes individuals to new ideas, thus changing attitudes and behaviors, including being more willing to engage in the non-normative pattern – coresidence with an adult daughter.

Specifically I found that individual SES and community development indicators were significant predictors of daughter coresidence. Older adults who previously worked in non-agricultural occupations had higher likelihoods of living with a daughter. This held true even after controlling for community characteristics. This echoes previous research comparing Taiwan and Southeast China (Chu et al., 2011), which found that higher SES individuals were more likely to coreside with an adult daughter.

When examining community characteristics in separate models, I found that older adults who resided in communities with more agricultural *hukou* holders (rural population), and in counties and county-level cities, were less likely to coreside with a daughter. Those who live in less developed (i.e. more rural) communities may be more likely to hold more traditional family attitudes (Barber, 2004).

I also found that respondents who lived in northeast provinces (Heilongjiang, Jilin, or Liaoning) were more likely to coreside with a daughter than older adults residing in eastern, coastal provinces. This gives evidence that attitudes towards daughters may be more progressive

in the northeast than other places. I expected that the eastern provinces would have higher coresidence with a daughter as a result of modernization theory. However, further examination of Chinese census data found that the northeast provinces have a lower proportion of agricultural *hukou* holders than other regions of China (including eastern) likely because it was one of the earliest regions to industrialize in the twentieth century.

In addition, percentage agricultural population resulted in better model fit than other measures of development that were aggregated at higher levels (such as region of the country). This provides evidence that while there are broad levels of differential development across provinces and regions of China, there are also significant differences across smaller communities (here city districts, counties, and county-level cities). Percent rural population may be a better indicator of development and traditional attitudes than type of community, and may reflect the pace with which China's neighborhoods are developing.

Previous research on coresidence patterns puts forth that urbanization and modernization result in lower levels of intergenerational coresidence (Yasuda et al., 2011). This is confirmed here for a specific type of coresidence – more urbanized and industrialized areas have lower levels of coresidence with sons. Traditional ideology, which includes normative son coresidence, may be stronger in rural versus urban areas. The family mode of social organization framework highlights the idea that with development, more of life is spent in non-family institutions, leading to shifts in attitudes and behaviors (Axinn & Yabiku, 2001; Thornton & Fricke, 1987; Thornton & Lin, 1994).

This study also examined the role of normative environment, which I tried to capture by looking at each community's sex ratio at birth (SRB). I anticipated that SRB could tap into gender attitudes – son preference. The coefficient, however, was not significant. This may be

because there is little variation in SRB across community and also because present-day SRB may not reflect older adults' attitudes towards gender. Gender ideology, however, does still matter in the Chinese context. Probability of son coresidence is still high, even for respondents with multiple potential daughters. If behavior is a reflection of preference, many older adults prefer to live with sons, the traditional pattern. On average, even an urban person who lives in a non-rural community with a white-collar former occupation still has only a .27 predicted probability of living with a daughter versus a son (95% CI: .19, .35).

The other individual and family characteristics in the baseline model also shed light on determinants of daughter coresidence in China. Each additional son (above one) lowered the likelihood of daughter coresidence (and increased son coresidence) and each additional daughter raised the likelihood of daughter coresidence. This could be evidence that having more sons enables one to achieve the traditional ideal of son coresidence, while also perhaps living with the son with whom the older person is most compatible or for whom it makes economic sense. When examining predicted probabilities of different combinations of sons and daughters, I found that, on average, the predicted probability of living with a daughter is .11 for an individual with two sons and two daughters in a median community (95%CI: .10, .13). By contrast, a similar individual with three sons (and one daughter) has a predicted probability of .04 (95%CI: .03, .05). For a similar individual with three daughters and one son the predicted probability is much higher: .34 (95%CI: .30, .38). This echoes previous research that found a couple to be more likely to live with the wife's parents when the wife has no brothers (Logan, Bian, & Bian, 1998), but in this paper's case it is fewer brothers because we limited analysis to those older adults with at least one son and one daughter.

I also examined proximity of children. When at least one son lived close-by, the probability of daughter coresidence increased and when at least one daughter lived close-by the probability of daughter coresidence decreased. Those respondents who had a son living nearby had a greater likelihood of living with a daughter, whereas having a daughter living nearby lowered the likelihood. This relates to literature on quasi-coresidence – where parents can live close to a child and frequently interact (Chen, 2005). Perhaps this enables the best of both worlds – traditional son coresidence, but emotional and instrumental support from a daughter.

In the baseline model, rural older adults who reported having an ADL disability had a higher probability of daughter coresidence, but this was not found for urban elderly. Rural areas have limited access to nursing homes and home health aides. For rural families, coresidence is a way to provide hands-on care. This may reflect the increasing role of daughters as caregivers for sick or disabled elderly (Whyte, 2003), which may represent a Western influence – in other countries daughters are more likely to be caregivers for frail elderly than sons (Spitze & Logan, 1990).

While this study makes many innovative contributions, some limitations must be noted. The data used for this project are cross-sectional. We cannot assess causality, or know whether the adult child moved in with the parent or vice versa. Although I have utilized a measure of whether the home is owned in parent's own name (versus the child's), this is only a rough estimate of who moved in with whom. The CLHLS dataset has an over-sample of the oldest old. Older cohorts are more likely to have large families versus younger elderly. Previous research has demonstrated that living arrangements of the oldest-old change frequently (Chen, 2005; Zimmer, 2005). Here I focus on the idea that that overall willingness to reside with a daughter at any point in time is an indicator of social change, and the propensity to do so may vary by both

individual and community characteristics. Future studies should look at changes in community context and changes in coresidence patterns over time.

While many studies raise concerns about economic development and social change leading to an overall decline in intergenerational support, these data show high levels of intergenerational coresidence and overall strong persistence of norms of coresidence with sons. However, there were interesting differences by individual SES, community level of development, family structure, and health status. In the 21st century, China will experience rapid population ageing and continue to experience social and economic change. It is important to examine coresidence patterns in a setting with shrinking family size and limited social welfare. Moreover, as social scientists, we are interested in the broader phenomenon of how social change impacts behavior, including family processes such as intergenerational exchanges. Future research should further explore changes in overall coresidence patterns, including non-normative coresidence, and the role of social context in shaping the actions of individuals and families.

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Table 1. Descriptive statistics by coresidence status

	Coresidence with Son (N=5870)		Coresidence with Daughter (N=872)		Total (N=6742)	
	Mean/%	SD	Mean/%	SD	Mean/%	SD
Individual Covariates						
Age	89.24*	10.97	90.03	11.28	89.34	11.01
Female (%)	62.79%		64.22%		62.98%	
Marital Status						
married (%)	18.43%		18.00%		18.38%	
widowed (%)	79.28%		80.85%		79.49%	
Separated/Divorced (%)	2.28%		1.15%		2.14%	
# of daughters	2.11***	1.14	2.33	1.23	2.14	1.15
# of sons	2.16***	1.12	1.96	1.13	2.14	1.12
at least one son lives nearby (%)	61.84%***		75.31%		63.52%	
at least one daughter lives nearby (%)	89.29%***		65.48%		86.33%	
Respondent's former occupation						
Agriculture/Fishing (%)	72.83%***		49.77%		69.85%	
white collar (%)	4.68%		8.14%		5.13%	
service/industry (%)	10.48%		20.76%		11.81%	
other (%)	12.01%		21.33%		13.22%	
Rural resident	66.06%***		41.86%		62.93%	
home is purchased/rented in respondent's name (%)	26.66%**		32.68%		27.44%	
ADL disability (%)	26.64%***		35.38%		28.11%	
Community Level Variables:						
% in community with agricultural hukou	73.78%***	24.05%	59.30%	31.26%	72.93%	24.82%
% in community without in-home toilet	28.21%	25.32%	27.51%	23.97%	28.22%	25.36%
Type of Community						
Prefecture-level city district	33.20%***		51.83%		35.61%	
County	45.16%***		32.00%		43.46%	
County-level city	21.64%**		16.17%		20.93%	
Region of Residence						
Northeast	6.71%***		14.22%		7.68%	
Eastern	37.33%		38.53%		37.48%	
Central	26.75%*		22.13%		26.15%	
Western	29.22%		25.11%		28.69%	
Sex Ratio at Birth	117.96	9.17	117.76	9.32	117.94	9.19

Note: ADL = activities of daily living. *p<0.05, **p<0.01, ***p<0.001

Source: CLHLS 2008 survey, Chinese census data.

Table 2. Distribution of community-level variables

	N	%	Mean	SD	min	max
Number of communities	589					
# of respondents per community			20.26	37.52	1	466
<i>communities by region</i>						
Northeast	76	12.90%				
Eastern	206	34.97%				
Central	174	29.54%				
Western	133	22.58%				
<i>Type of Community</i>						
Prefecture-level city district	282	47.88%				
County	215	36.50%				
County-level city	92	15.62%				
SRB			119.37	9.64	98	137.96
% rural resident		65.58%			1.10%	95.60%
% without in-home toilets		26.78%			0.00%	93.73%

Table 3. Multilevel binary logistic models predicting coresidence with an adult daughter, separate analysis for rural and urban sub-samples, model 1 (N=6742 older adults nested within 589 communities)

Age	Total	Rural	Urban
60-69 ¹	0.889 (-0.188)	1.558 (-0.444)	0.492* (-0.162)
70-79 ¹	0.989 (-0.163)	1.205 (-0.277)	0.867 (-0.213)
80-89 ¹	0.837 (-0.11)	0.844 (-0.155)	0.849 (-0.167)
90-99 ¹	0.808 (-0.0945)	0.751 (-0.123)	0.892 (-0.156)
female	1.076 (-0.105)	0.994 (-0.139)	1.151 (-0.166)
married ²	0.928 (-0.123)	0.924 (-0.179)	0.961 (-0.18)
separated/divorced ²	0.390* (-0.149)	0.396 (-0.202)	0.288* (-0.17)
Number of sons two ³	0.238*** (-0.0288)	0.223*** (-0.0393)	0.232*** (-0.0407)
three ³	0.137*** (-0.0201)	0.159*** (-0.0326)	0.102*** (-0.0225)
4 or more ³	0.172*** (-0.0281)	0.170*** (-0.0403)	0.139*** (-0.0331)
Number of daughters two ³	2.336*** (-0.266)	1.683*** (-0.256)	3.642*** (-0.651)
three ³	3.138*** (-0.402)	1.622** (-0.29)	6.834*** (-1.368)
4 or more ³	3.646*** (-0.518)	2.228*** (-0.441)	6.692*** (-1.468)
Former occupation White collar ⁴	2.250*** (-0.402)	0.675 (-0.274)	2.489*** (-0.584)
service/industry ⁴	2.530*** (-0.32)	1.101 (-0.358)	2.138*** (-0.361)

other ⁴	2.250*** (-0.262)	1.773** (-0.331)	1.790*** (-0.305)
Home in respondent's name	1.231* (-0.125)	1.14 (-0.172)	1.217 (-0.176)
A son lives close by	8.176*** (-1.019)	8.138*** (-1.497)	9.992*** (-1.809)
A daughter lives close by	0.123*** (-0.0136)	0.179*** (-0.0266)	0.0732*** (-0.0132)
ADL disabled	1.342** (-0.134)	1.413* (-0.202)	1.182 (-0.17)
Random variance	0.349	0.199	0.435
Significance of χ^2 test	***	**	***
Rho	.096	.057	.117
Observations	6742	4243	2499
<i>BIC</i>	4405.0	2356.6	2103.8

Odds Ratios reported. Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; Notes: sample includes ever-married adults with at least one living son and one living daughter. 1: compared to 100+; 2: compared to widowed; 3: compared to 1. 4: compared to agriculture/fishing;

Table 4. Multilevel binary logistic models predicting coresidence with an adult daughter, models 2-5 (N=6742 older adults nested within 589 communities)

	Model 2	Model3	Model 4	Model 5
Individual characteristics				
Former occupation				
Agriculture/Fishing	0	0	0	0
White collar	1.530* (-0.283)	1.687** (-0.309)	1.639** (-0.301)	1.525* (-0.283)
Service/Industry	1.539** (-0.213)	1.778*** (-0.238)	1.701*** (-0.23)	1.540** (-0.213)
Other	1.620*** (-0.2)	1.753*** (-0.213)	1.710*** (-0.208)	1.626*** (-0.201)
Community characteristics				
% in community with agricultural <i>hukou</i>	0.990*** (-0.00198)			0.990** (-0.00297)
Region				
Western		1.028 (-0.139)		1.154 (-0.161)
Central		1.129 (-0.155)		1.206 (-0.167)
Eastern		0		0
northeast		1.506* (-0.251)		1.285 (-0.216)
Type of community				
district			0	0
county			0.698** (-0.0846)	1.015 (-0.17)
County-level city			0.700* (-0.109)	1.002 (-0.19)
Random variance	.246	.279	.269	.241
Significance of χ^2 test	***	***	***	***
Rho	.069	.078	.076	.068
Observations	6742	6742	6742	6742
<i>BIC</i>	4333.2	4367.6	4354.8	4373.8

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Notes: sample includes ever-married adults with at least one living son and one living daughter. Other level-1 variables are included in the regression models but not shown here (see table 3).

ⁱ Marriage pattern where couple settles in husband's home/community.

ⁱⁱ At first I examined four categories – coresidence with married son, with single son, with married daughter, and with single daughter – because of an expectation that parents might coreside with an unmarried daughter, but not a married daughter. Marital status of the coresident child was determined based on whether the spouse also coresided in the household. Unfortunately, the CLHLS does not directly ask about the marital status of adult children. Which means that I may have falsely assumed a child is unmarried if the spouse did not live in the household for any reason (perhaps due to labor migration). I found that among those who coreside with sons, 85% coreside with a married son. Among those who live with adult daughters, 67% coreside with a married daughter. I ran single-level multinomial logit model (excluding community factors) for the four coresidence groups and found similar patterns as I did when treating coresidence as a binary variable (son vs. daughter). One exception was that for elderly parents who lived with an unmarried child (either a sons or daughter), the home is owned in the parents' name, i.e. the child moved in with the parent, and not the other way around. Because of this, and also because of simplification in interpreting the multilevel models, I chose to limit my dependent variable to a binary variable.