The Household Structure Transition in China: 1982–2015

Ting Li[1] · Wenting Fan[2] · Jian Song[1]

Abstract

Chinese society has experienced a dramatic change over the past several decades, which has had a profound impact on its household system. Utilizing the Chinese national census and 1% population survey data from 1982 to 2015, this study demonstrates the transition of the Chinese household structure through typology analyses. Five typical regional household structure types—large lineal, large nuclear, small nuclear, mixed lineal, and small and diverse—are identified. Our findings demonstrate that since the 1980s, the household system in almost all Chinese regions has evolved from a large unitary model to a small diversified one. However, this evolutionary path diverged after 2000 and formed two distinct household structure systems. There are also significant regional differences in the transition trajectory. Influenced by developmental, cultural, and demographic factors, the regions exhibit four distinct transition paths: lineal tradition, nuclear retardation, smooth transition, and fast transition. On the basis of these results, we discuss family modernization and other theories in explaining the transition of the Chinese household structure.

Keywords Household structure transition · China · Regional difference · Typology analysis

Introduction

Over the past several decades, Chinese society has experienced dramatic changes. These changes have been intertwined with the modernization process, profoundly affecting social structure at the macro level and changing individuals' behaviors, ideas, and daily life modes at the micro level. As a basic functional unit connecting society and individuals, the Chinese family has also suffered an unprecedented impact during this

✉ Jian Song
songjian@ruc.edu.cn

[1] Center for Population and Development Studies, Renmin University of China, No. 59 Zhongguancun Ave, Beijing 100872, China

[2] School of Public Affairs & Law, Southwest Jiaotong University, Chengdu 610031 Sichuan, China

process (Thornton and Fricke 1987). Exploring the evolution of the Chinese family over the past few decades is a way to understand these social changes and their lasting influence in China.

In all aspects of family characteristics, the household structure reflecting the coresidential pattern of a family is an essential element for assessing family change because it usually sets the functional and relational foundation of a family. In addition, household structure is much easier to measure with clearer definition than other family characteristics, making it convenient for use in empirical research.

The current research on the change in the household structure mainly stems from two perspectives. The first is family modernization theory, a concrete presentation of modernization theory in the field of family that explains the evolution of household forms as a consequence of technological and economic development (Goode 1963; Nimkoff 1961; Parsons 1949). The second is demographic transition theory, which considers the change in the household structure as the consequence of demographic transition (Jiang and O'Neill 2007). Both theories were primarily derived from observations in Western society. An interesting question is whether the transition in the Chinese household is fully in line with these two theories, given that Chinese society has a few unique features that significantly differ from the West.

Studies on Chinese household change have typically relied on descriptive analyses to outline the overall trend (Hu and Peng 2014; Wang 2013). What they lack is a detailed analysis that can depict the process of household structure change and identify the unique features within the Chinese context.

The lack of detailed discussions on household structure change is reflected in three aspects. First, many studies have analyzed only a single measurement of household structure at a time (e.g., household size, proportion of nuclear households, or coresidence status) (Cheung and Yeung 2015; Hu and Peng 2014; Ruggles and Heggeness 2008) and thus have not provided an overall understanding of the joint characteristics of household structure change. Second, internal heterogeneity has largely been ignored in single-country studies. Most research has discussed only the urban-rural disparity while ignoring the heterogeneity in culture and development levels across different areas of China (Logan et al. 1998; Wang 2013). Third, although scholars generally agree that institutional, economic, cultural, and demographic factors all play important roles in shaping family structure, most work has reflected these connections only through descriptive analyses without quantifying their impact (Thornton and Fricke 1987; Wang 2008).

This study contributes to the literature by addressing these research gaps. We used the 1982, 1990, 2000, and 2010 Chinese population census data and 1% population survey data from 2015 to analyze household structure change in more than 300 prefecture-level cities in China. We considered the joint distribution of household structure characteristics by using clustering methods and determined the transition trajectory of household structure type for each of the prefecture-level areas. Following the research paradigm of the demographic transition theory, our aim is to address three questions. What is the path of Chinese household structure change? Is there a geographical difference in the transition path? How do economic, cultural, institutional, and demographic factors differentiate the path?

Household Structure and Regional Household Structure Type

Family is usually defined as a group of people united by kinship, marriage, or adoption (Burch 1979). *Household* is a related concept referring to a group of people living in the same dwelling unit. The term *household* is often used to refer to the people who coreside and may include nonfamily members. The information obtained from censuses usually better pertains to the concept of household, but we focus only on the residential patterns of kin members in this study.

Household structure refers to the relatively stable living patterns formed by family members. In practice, it includes two basic elements: household size and household type (indicated by the composition of various kinds of relatives per household) (Burch 1979). Although the classification of household type in Western society has been based primarily on the distinction between simple (nuclear/conjugal) and joint (extended) households (Castillo et al. 1968; Coale et al. 1965; Hajnal 1982; Hammel and Laslett 1974), scholars have developed a two-level typology system to capture the more complex household forms in China (Wang 2008, 2013).

The five primary-level Chinese household types include the *nuclear household*, consisting either of a married couple or a divorced/widowed parent and their unmarried children/no children; the *lineal household*, consisting of two or more generations with each generation comprising one married couple or a divorced/widowed person; the *joint household*, consisting of two or more married couples or divorced/widowed persons of the same generation; the *one-person household*, consisting of only one adult person; and *others*. The first three types can be further divided into a series of secondary categories. A list of secondary household types is presented in upcoming Table 2.

In contrast to the Western household system, the Chinese system separates the lineal type from the joint/extended category because it is an important household form in historical Chinese society. The tradition that the oldest son stays with his parents while the other children live apart after getting married ensures the important role of the lineal household in family inheritance and old-age care (Wang 2008). Moreover, early studies have demonstrated an increase of lineal households in recent years, whereas the other extended households are declining (Hu and Peng 2014; Wang 2013). All these considerations require an individual examination of the lineal household type.

As discussed earlier, previous studies focusing on one aspect of the household may hinder the understanding of the overall picture of household structure change. The indicators of household structure are strongly correlated. For example, when the proportion of lineal or joint households declines, household size will very likely also decrease. It is also meaningful to pay close attention to the correlated changes among different household structure indicators. According to the linkage patterns, we can classify regional household structure into various types through which the household structure characteristics of a region can be viewed as an ecological system and indicated by a single variable. We refer to the typology variable as the *regional household structure type*. The term differs from the concept of *household type* (e.g., nuclear or lineal). The former is measured for a region, and the latter is measured for a household.

Influence Mechanisms

As discussed in the introduction, the family modernization and demographic transition theories provide two important frameworks for studying the mechanisms of family change. However, to have a more complete picture of Chinese household transition, we introduce two more related perspectives in addition to the two classic theories in this section.

Family Modernization Theory

Despite debate, the theory of family modernization is still the most influential framework for explaining family change. As a product of evolutionism and structural functionalism, the theory argues that technological development has altered the social production and economic foundation of society, causing great changes in family functions and personal value systems and thus leading to household structure change (Goode 1963; Nimkoff 1961; Parsons 1949).

The influence of modernization on household structure can be perceived at two levels. Societal modernity maintains that the establishment of a more professional social division of labor enables the family to transfer its functions to the public sectors and thus weakens the functional foundations of the traditional large household (Ogburn and Nimkoff 1955; Parsons and Bales 1955). Personal modernity suggests that education and new modes of production help individuals cast off the shackles of the traditional family and cultivate more equal and individualistic values (Caldwell 1976; Thornton and Fricke 1987).

An essential argument of family modernization theory lies in the relationship between traditionalism and modernity, with the latter considered to be more advanced than the former. The early classic version of the theory considered the nuclear household to be the form that best suited industrialization and urbanization and promoted the values of individualism and egalitarianism (Goode 1963; Parsons and Bales 1955). Based on a later reflection, a revised theory of family modernization proposed that the nuclear household was not necessarily a construct of modernity and that modernity itself is full of complexity leading to a diversified household system (Cherlin 2012; Hareven 1976).

Despite divergence on whether the nuclear household would be the mainstream model in a modern society, both the classic and the revised family modernization theories predict a recession of traditional complex household forms. However, evidence from China shows an increase of the traditional lineal household in recent years. This trend is not unique to China; one study based on a few developing countries also failed to reveal an inverse association between economic development and household complexity (Ruggles and Heggeness 2008). These results challenge family modernization theory as a comprehensive explanation of family change in these countries.

The Cultural Influence Perspective

Cultural influence is not an independent perspective in explaining family change but is often proposed as being opposite to the family modernization theory in conjunction with the discussion on traditionalism and modernity. According to this perspective, the

European family already displays the so-called modern family model dominated by the nuclear household before industrialization (Hajnal 1982; Laslett 1973). That is, the impact of modernization is limited, and cultural origin plays a more important role in determining the household system. The influence of culture on household structure is usually achieved through constructing customs, morals, and social order, which help restrain individuals' behaviors (Wang 2008).

One prominent feature of Chinese society is the deeply rooted family culture. Compared with the West, China formed a series of patriarchal social norms during its long history of farming, establishing a comprehensive and rigorous family system. These norms affect household structure through defining the hierarchical order of family members, determining their obligations and responsibilities, controlling reproductive behaviors, establishing living arrangements, and deciding how family properties are distributed (Wang 2008). In this traditional cultural system, the preference for more children maintains a certain size of the household, and children's obligation to support their parents ensures that the latter live in a lineal or joint household (Fan 2000; Logan and Bian 1999). Although the modernization process is constantly dissolving the foundation of traditional culture, it is undeniable that these social norms still regulate Chinese families.

It is typically believed by Western society that all of China has inherited the same traditional Confucian culture. However, Chinese regions differ considerably in the degree of this inheritance. Generally speaking, the influence of family culture is roughly much stronger in southern China than in the north because of the frequent wars and the influence of nomadic culture in the north (Li et al. 2018; Talhelm et al. 2014; Wang 2007). This internal heterogeneity makes it possible to test the impact of culture on regional household structure type.

Demographic Transition Theory

The perspective based on demographic transition theory emphasizes the direct impact of changes in demographic traits on household structure (Jiang and O'Neill 2007). Almost all countries have experienced or are experiencing the demographic transition featured as a shift from high mortality and fertility rates to low mortality and fertility rates (Coale 1984). Previous studies have used the multistate family life table approach to explore the impact of demographic change on household structure (Jiang and O'Neill 2007; Yi 1986). The increase of life expectancy increases the proportion of couple nuclear households while decreasing one-person households. The impact of fertility decline is more complicated. As the fertility rate declines, household size decreases, but the change in the proportion of nuclear households is nonlinear. When the fertility rate is above the replacement level, the delayed effect of fertility decline reduces the proportion of nuclear households. Specifically, if the same family dissolution rate is maintained, the proportion of nuclear households that remains after children are separated from the family unit will naturally decline because of the decreased number of children. Only after the fertility rate is lower than the replacement level will the decline in fertility lead to an increased proportion of nuclear households (Yi 1986).

Clearly, demographic changes have a strong and direct impact on the household structure in all societies. However, discussions of the demographic transition in China cannot ignore these unique features that greatly affect the demographic traits and thereby indirectly affect the household structure. Institutional change is one such prominent factor.

Institutional Change

Institutional change usually means that as productivity develops, the content of individuals' social and economic activities changes, causing the transformation of the code of conduct that restricts people and their interactions (Kratochwil and Ruggie 1986; Wang 2016).

In recent decades, China's institutional change and demographic transition have been deeply integrated, profoundly changing the population characteristics. Fertility regulation policies that accelerated demographic transition resulted in a quick drop in the Chinese fertility rate as well as a significant shift in population age structure (Wang 2011). China's household registration system has greatly contributed to urban-rural disparity. Economic reforms since 1978 have largely improved the efficiency of rural labor production, enabled many rural surplus laborers to work in cities, and formed a large-scale internal migration (Liang and White 1996). These demographic changes lead to a continued decrease in household size, result in an increase of empty-nest households among older parents (Su et al. 2012), and form incomplete or skipped-generation families due to the geographic separation of family members (Wen and Hanley 2015). Additionally, although China faces the great challenge of population aging, the rapid development of the social security system is deconstructing the old-age care function of the traditional lineal household and allowing the Chinese elderly to live more independently (Yong and Yuan 2014).

The impact of institutional change through the demographic process seems to promote the transfer of the household system to a smaller and more diversified form. However, it can also affect other economic factors, thereby exerting opposite influence. The housing marketization associated with China's transition from a planned economy to a market economy provides a prominent example. With the initiation of housing privatization in the 1990s, China's housing reform has greatly pushed up housing prices, significantly increasing the cost of living (Yi and Huang 2014). Younger adults may have to remain with their parents in a lineal household merely because they cannot afford housing on their own.

These four theoretical perspectives—family modernization theory, the cultural influence perspective, demographic transition theory, and institutional change—are not mutually exclusive. In fact, they are correlated with one another, even though each has its own emphasis. One aim of the study is to empirically test these perspectives within the Chinese context.

Data, Measures, and Method

Data

We used the long-form data of the 1982, 1990, 2000, and 2010 Chinese census and 1% population sample survey data of 2015 to calculate the proportion of household types at each prefecture-level city. Notably, the administrative divisions of some prefecture-level cities were different in 1982 and 1990 than in later census years. We made small adjustments for these two censuses to ensure consistency with the following years. The analyses included 291, 323, 338, 362, and 362 prefecture-level cities for each census or survey.

Measures

The most important dependent variable in this study is the regional household structure type generated by cluster analysis. Following family modernization theory, we considered the following five indicators as the clustering criterion variables for each region: the average household size; the proportion of each of the three primary household types (i.e., one-person, nuclear, and lineal); and the household diversity index. The diversity index corresponding to the diversification of regional household types is a reflection of the revised family modernization theory. We borrowed the concept of *entropy*, which is used to indicate species diversity in ecology, to measure the variation in the major secondary household types, including the one-person, couple nuclear, standard nuclear, single parent, stem, and skipped-generation family. The general formula for entropy is $entropy = -\sum p_i \log(p_i)$, where p_i is the proportion for each of the included secondary household types (Shannon 1948).

According to the theories discussed earlier, we constructed a few independent variables to represent the socioeconomic, cultural, demographic, and institutional factors that could affect household structure. We measured the local social and economic development level by the gross domestic product (GDP) per capita, the urbanization rate, and the average years of education for each prefecture-level city at corresponding years.

Measuring culture is always a difficult task. We considered using the major dialect type in each region as an indicator of local culture. The classic demographic transition theory provides a good example of measuring the role of culture by observing the differences in fertility transition processes among different linguistic regions (Coale 1984; Leasure 1963). A common language represents a similar cultural origin and social tradition. Similarity in language can also facilitate communication and dissemination of information. It is easier to form a relatively homogeneous group of people when they use the same dialect (Coale 1984). Also, the ages of dialects vary, indicating the strength of traditional culture in the corresponding regions. In practice, we identified the main dialect of each region according to the Chinese Language Atlas (Institute of Linguistics et al. 2012), which identifies 14 primary Chinese dialects. The remaining ethnic minority areas were divided into four areas: Tibetan, northwest minority (Uygur and Hui); southwest minority; and northeast minority (Mongolian and Korean). We added one additional variable: the gender difference in education, calculated as the absolute difference in education years between the two sexes divided by men's education years. This variable indicates the degree of regional gender inequality, which is part of the patriarchal culture.

To reflect the influence of demographic change, we selected the proportion of the population under age 15 and above age 65 as two indicators of the population's age structure. Additionally, we used the emigration and immigration rates to denote the impact of cross-city migration. Because of the relatively small scale of population movements before 2000, we retained the migration rates for only 2000 and 2010. The proportion of the minority population in each region was included as a control variable.

As discussed earlier, the indirect impact of institutional change will be primarily reflected by the demographic variables. We also constructed an index of housing affordability to show the influence of house marketization. The variable was derived by dividing housing price per square meter over the per capita disposable income in a region for years 2000 and 2010. These measures were obtained from either the census data or China statistical yearbook for the regional economy of the corresponding year. The descriptive statistics of the main variables are shown in Table 1.

Method

We used *k*-means clustering analysis to obtain the regional household structure type. This fast clustering method sorts samples into discrete groups according to the distance of the sample in the multidimensional variable space, thus reflecting the inherent pattern of the sample as well as the interconnections among those regional household structure measures (Meyer et al. 1993). We named each type of the classification result in a post hoc manner based on the combined distribution of variable means. We conducted the *k*-means analysis for the pooled samples from 1982 to 2015 to ensure the consistency of classification criterion, allowing us to compare the regional household structure type among different periods.

After obtaining the regional household structure type, we first used a multinomial logistic regression to explore the influencing factors of regional household structure in each period. We then adopted the group-based trajectory model to describe the path of household structure transition from 1982 to 2015 and identified the heterogeneity in the trajectories among different regions. That is, we tracked the longitudinal change of regional household structure type for each area from 1982 to 2015 and recognized its unique trajectory. For example, one typical trajectory of an area may start from the large lineal type in 1982, shift to the large nuclear type in 1990, transfer to the small nuclear type in 2000, and finally merge to the mixed lineal type in 2010 and 2015. Of course, each area has its own trajectory. The purpose of the group-based trajectory model is to distinguish these different trajectories, sort them into a few homogenous groups, and represent each group by the group-mean trajectory (Nagin 1999). This typology method is widely used in criminology and aging studies to help avoid subjective classification of trajectories (Brame et al. 2012; Nagin and Odgers 2010). A detailed introduction to the principles and formulas of the model can be found in Nagin (2005). We used the *Traj* procedure in SAS 9.4 to implement the analysis.

Results

Basic Trend

Table 2 shows the change in the proportion of the major primary and secondary household types in China since 1982. The results are consistent with previous studies (Hu and Peng 2014; Wang 2013). The nuclear household was the dominant household type through all periods. However, the proportion of nuclear households first rose and then decreased. Scholars have normally attributed the decline of the nuclear household to the increase in the one-person household, the proportion of which increased from 8.5% in 2000 to 12.6% in 2015.

The proportion of lineal households was maintained at a relatively stable level. In recent years, this household type—especially the three-generation lineal household—has been on the rise. Early research attributed the rise in lineal households to the delayed effect of fertility decline (Yi 1986). However, for the post-1970s cohort, which experienced the fastest fertility decline in China, the delayed effect should have been reflected around 2000. Nevertheless, until 2015, the proportion of lineal households was still rising, and thus the increase cannot be fully explained by the delayed effect of fertility decline.

Table 1 Descriptive statistics for major variables: Means, with standard deviations shown in parentheses

Variable	1982	1990	2000	2010	2015
Household Structure Indicator					
Average household size	4.49	4.10	3.47	3.20	3.36
	(0.50)	(0.55)	(0.42)	(0.46)	(0.52)
One-person household proportion (%)	7.88	5.95	8.43	11.36	11.22
	(2.90)	(2.62)	(3.23)	(4.57)	(4.13)
Nuclear household proportion (%)	65.70	68.13	66.42	62.07	60.68
	(11.34)	(7.95)	(7.43)	(7.77)	(8.80)
Lineal household proportion (%)	18.20	19.74	20.89	22.20	24.47
	(5.93)	(6.00)	(6.19)	(7.84)	(9.46)
Household diversity index	1.21	1.16	1.29	1.40	1.41
	(0.20)	(0.11)	(0.11)	(0.09)	(0.07)
Independent Variable					
GDP per capita	590.37	1,907.57	7,743.36	30,389.44	49,736.58
	(388.76)	(1,638.42)	(6,366.31)	(21,820.66)	(29,478.17)
Urban rate (%)	19.23	23.90	36.45	47.09	—
	(17.25)	(18.46)	(18.85)	(16.94)	
Average years of education	5.33	6.15	7.34	8.75	—
	(1.43)	(1.45)	(1.21)	(1.08)	
Gender inequality index	0.30	0.24	0.15	0.10	
	(0.15)	(0.14)	(0.09)	(0.05)	
Housing affordability	—	—	0.20	0.22	—
			(0.07)	(0.12)	
Minority proportion (%)	14.87	15.14	15.66	16.14	—
	(25.81)	(26.68)	(26.24)	(26.19)	
Proportion aged ≤14 (%)	33.88	28.08	23.95	17.40	—
	(5.27)	(5.03)	(4.99)	(4.64)	
Proportion aged 65+ (%)	4.43	5.14	6.95	8.64	—
	(1.13)	(1.34)	(1.72)	(1.97)	
Emigration rate	—	—	6.06	9.09	—
			(5.61)	(4.89)	
Immigration rate	—	—	6.28	7.32	—
			(8.93)	(10.70)	

Regional Family Structure Type

We determined the number of clustering types based on the pseudo-F value. The model yielded the best fit when the regional family structure was classified into five types. Figure 1 presents the means of the criterion indicators for each of the regional family structure types. All the indicators were standardized to have a zero mean and a unit variance. An indicator greater than 0 for a certain type suggests that the region belonging to this type had a higher value on the indicator than the national average across all periods, and vice versa.

Table 2 Definitions and distributions of major household types in China, 1982–2015 (%)

| Primary Household Type	Secondary Household Type	Definition	1982	1990	2000	2010	2015
One-Person Household		One-person household	8.02	6.32	8.57	12.67	12.57
Nuclear Household	Couple nuclear	One married couple	4.79	6.49	12.93	19.10	18.97
	Standard nuclear	Couple + unmarried children	50.00	54.68	47.26	36.42	35.07
	Defect nuclear	Single father/mother + unmarried children	12.10	7.86	6.36	5.80	5.94
	Extended nuclear	Couple + unmarried siblings + unmarried children	0.00	0.00	0.44	0.36	0.33
Total			66.89	69.04	66.99	61.68	60.31
Lineal Household	Two-generation lineal	Parents + married children	2.44	2.56	2.24	2.48	2.28
	Three-generation lineal	Parents + children + grandchildren	15.40	15.70	16.23	16.49	18.22
	Four-generation lineal	Lineal household with four generations	0.73	0.79	0.83	0.81	0.83
	Skipped-generation lineal	Parents + grandchildren	0.64	0.63	1.85	2.20	2.11
Total			19.20	19.68	21.15	21.98	23.44
Extended Household	Two-generation extended	At least two couples in two generations	0.03	0.03	0.01	0.02	0.02
	Three-generation extended	At least two couples in three generations	0.28	0.47	0.32	0.39	0.47
	Four-generation extended	At least two couples in four generations	0.02	0.04	0.03	0.03	0.03
Total			0.33	0.54	0.36	0.44	0.52
Other Household			5.56	4.42	2.93	3.23	3.16
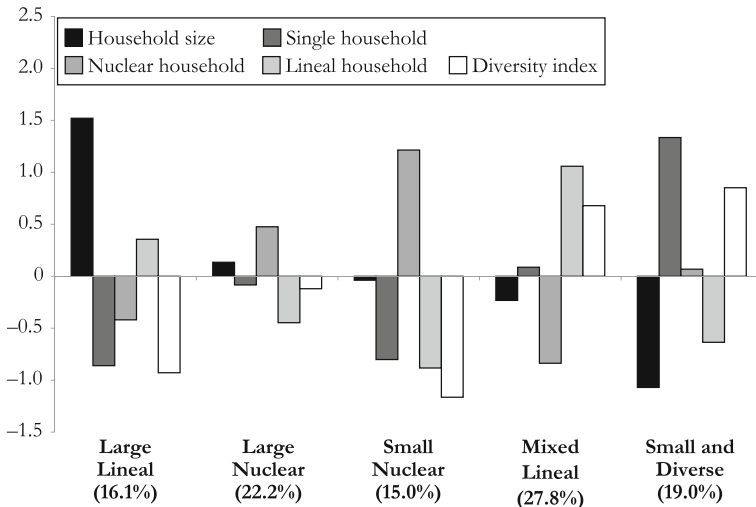
Fig. 1 *k*-means clustering results of regional household structure type

The household size and lineal household ratio of the first type were much higher than the sample average, and the other indicators were all lower than the average. This implies that the regions belonging to this type had large households but that the household forms were relatively simple, with a higher concentration of lineal households. We therefore name this cluster the *large lineal* type. The second regional type had the second-largest households, but the proportion of nuclear households was more prominent. We thus name it the *large nuclear* type. Compared with the second type, the households in the third type were concentrated even more on the nuclear form, but the household size was significantly smaller. We name the third type the *small nuclear*. The regions of the fourth and fifth types both had small-size households and a high diversity index. The only difference is that the proportion of lineal households in the fourth category was high, whereas in the regions of the fifth category, one-person and nuclear households were the leading types. We thus name the fourth category the *mixed lineal* type and refer to the fifth category as the *small and diverse* one. In a sense, the fifth type was very much in line with the regional forms predicted by family modernization theory.

The proportions of the five regional household structure types of the total sample were relatively close, at 16.1%, 22.2%, 15.0%, 27.8%, and 19.0% respectively. However, in terms of years, these types exhibited distinct distribution patterns. As shown in Fig. 2, the dominant regional household types in 1982 were large lineal (40%) and large nuclear (44%), with other types accounting for a very small proportion. By 1990, the proportion of the large lineal type remained large (38%), but the small nuclear type (36%) began to emerge and occupied the space of the large nuclear (22%). By 2000, the mixed lineal and the small and diverse type became notable. The five types shared a similar proportion in 2000. The distribution of type in 2010 and 2015 was quite similar. The mixed lineal type and the small and diverse type dominated, and the other three regional household structure types were diminished.

The preliminary trend shown in Fig. 2 indicates that the regional type of household structure in China gradually shifted from the domination of the large lineal and large
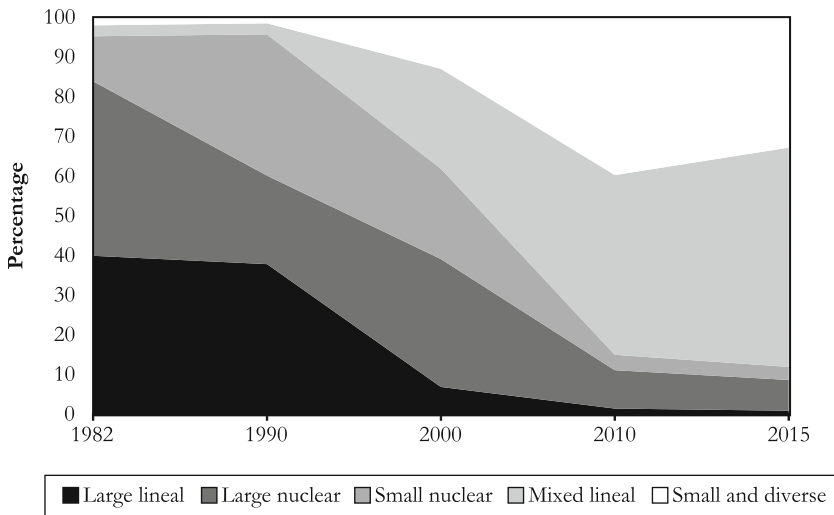
Fig. 2 Change in proportion distribution of regional household structure type over time

nuclear types in the 1980s to the domination of the mixed lineal and small and diverse types after 2010. This reflects the continuing miniaturization and diversification of household structure. However, it also indicates that the small and diverse type had not become the only dominant mode of household structure. Many prefecture areas still retained a relatively high proportion of lineal households.

Determinants of Regional Family Structure Type

We used a multinomial logistic regression to explore the influencing factors of regional household structure types and their differences across periods. Because explanatory variables in 2015 were incomplete, only the results from 1982 to 2010 are shown. For simplicity, Table 3 displays only the comparison results of the important types in each period. Additionally, we present only the significant dialectal and ethnic divisions.

For 1982, we focused on the differentiation between the large lineal and large nuclear regional types. The social economic variables did not exhibit significant impact in this period, whereas the dialect and ethnic minority divisions and demographic factors played a more important role. Compared with the southwestern Mandarin area, the areas primarily speaking Hakka, Cantonese, and Central Plain Mandarin were more likely to be the large lineal type. These areas were also known to have a strong clan culture. The most significant demographic variable is the proportion of population under age 15. The higher the proportion, the greater the possibility that the region belonged to the large lineal type, suggesting that caring for children was an important function for the lineal household. Meanwhile, the high proportion of children could also reflect the high fertility rate that is the part of the traditional culture (Li et al. 2018).

For 1990, we continued to look into the differences between the large lineal and large nuclear types, but we also examined how the small nuclear type contrasted with the large lineal one. We found that the increase in GDP per capita was conducive to an increase of the large nuclear type relative to the large lineal one. Compared with the southwestern Mandarin area, there were more lineal type regions in the Min Chinese,

Table 3 Relative risk ratios from multinomial logistic regressions for regional household structure type

Variable	1982 Large Nuclear (ref. = large lineal)	1990 Large Nuclear (ref. = large lineal)	1990 Small Nuclear (ref. = large lineal)	2000 Large Nuclear (ref. = mixed lineal)	2000 Small Nuclear (ref. = mixed lineal)	2010 Small and Diverse (ref. = mixed lineal)
Log GDP per capita	0.85	5.38**	2.61	1.17	2.25	1.77
Urban rate	1.05	1.01	1.03	1.12**	1.11**	1.14***
Average years of education	1.17	1.55	0.61	0.16**	0.08**	0.42
Gender inequality index	0.01	0.57	0.26	0.02*	0.04	0.01
Housing affordability	—	—	—	1.99	0.01	21.98
Minority proportion	1.01	1.01	1.01	1.03	1.02	1.00
Proportion aged ≤14	0.75**	0.84*	0.76***	1.06	1.09	1.20*
Proportion aged 65+	0.94	0.91	0.28***	0.62*	0.49**	1.50**
Emigration rate	—	—	—	0.94	0.97	1.11
Immigration rate	—	—	—	0.89	1.03	1.19***
Cultural Division (ref. = Southwestern Mandarin)						
Jin Chinese	NS	NS	NS	NS	NS	NS
Wu Chinese	NS	NS	NS	NS	NS	NS
Min Chinese	NS	0.14*	NS	NS	NS	NS
Hakka	0.05*	0.02*	NS	NS	NS	0.02*
Cantonese	0.14*	0.03*	NS	NS	NS	NS
Xiang	NS	NS	NS	NS	NS	NS
Komese	NS	NS	NS	20.59**	NS	NS
Ping	NS	NS	NS	NS	NS	NS
Northeastern Mandarin	NS	NS	NS	NS	NS	49.09***

Table 3 (continued)

	1982	1990		2000		2010
	Large Nuclear (ref. = large lineal)	Large Nuclear (ref. = large lineal)	Small Nuclear (ref. = large lineal)	Large Nuclear (ref. = mixed lineal)	Small Nuclear (ref. = mixed lineal)	Small and Diverse (ref. = mixed lineal)
Beijing Mandarin	NS	NS	NS	NS	NS	NS
Jilu Mandarin	NS	NS	NS	69.12**	40.30***	NS
Jiaoliao Mandarin	NS	NS	NS	NS	NS	NS
Central Plains Mandarin	0.08***	0.18*	0.13*	61.44***	74.73***	NS
Lanyin Mandarin	NS	0.02**	0.04**	NS	NS	NS
Lower Yangtze Mandarin	NS	NS	NS	NS	NS	0.16*
Tibetan	NS	NS	NS	0.01**	0.01*	NS
Northwestern Minority	NS	NS	NS	NS	NS	30.12*
Northeastern Minority	NS	NS	NS	NS	NS	NS
Southwestern Minority	NS	NS	NS	NS	NS	NS

Note: NS indicates nonsignificant coefficient.

$*p < .05; **p < .01; ***p < .001$

Hakka, Cantonese, Central Plains Mandarin, and Lanyin Mandarin dialect areas. The differentiation of large lineal and small nuclear types is mainly reflected in the two demographic variables. The more elderly people and children in these regions, the more likely they were to demonstrate the large lineal type.

The results for 2000 are more complicated because the proportion of each type became more balanced. Using the mixed lineal type as the reference group, we found that socioeconomic factors began to play a significant role in differentiating the regional type. The urbanization process mainly increased the proportion of nuclear households, including both large and small nuclear types, and the improvement in education primarily promoted a decrease in household size. The gender inequality index had a similar effect as the urbanization rate. The reduction of gender inequality led to a higher proportion of nuclear households, implying that if women were endowed with more equal rights, the nuclear household was more likely to form than the lineal one. The proportion of children is no longer significant, but the increase in the proportion of the elderly population reduced a region's possibility of becoming the nuclear type. The large nuclear type was more popular in the Komese dialect area, and both the large and small nuclear types were more common in the Jilu and Central Plains Mandarin areas. The Tibetan areas tended to have more mixed lineal type regions.

The most prominent contrast in 2010 is between the mixed lineal and small and diverse types. Referring to the mixed lineal type, the increase in the urbanization rate and the proportion of the elderly and children led to a greater likelihood of becoming the small and diverse regional type. Mobility factors began to show an impact. An area with a higher inflow rate was more likely to form the small and diverse type. Compared with the southwestern Mandarin area, the northeastern Mandarin and the northwestern minority areas had more opportunities to become the small and diverse type, but the Hakka and the Lower Yangtze Mandarin districts had more mixed lineal type regions. Notably, in this period, the proportion of the elderly population was no longer positively associated with the lineal household type.
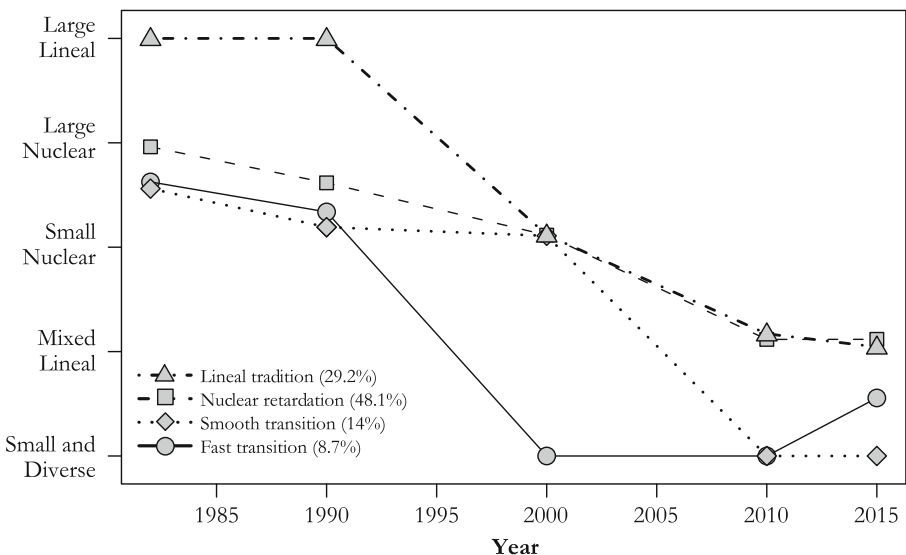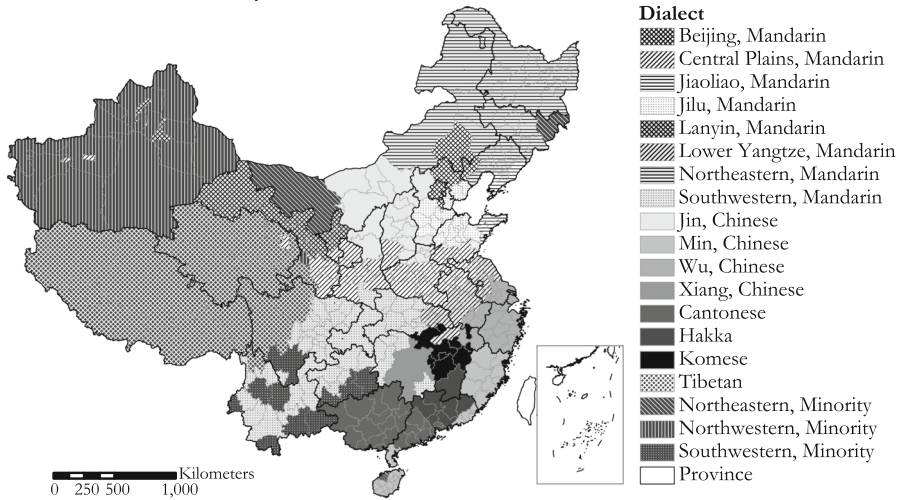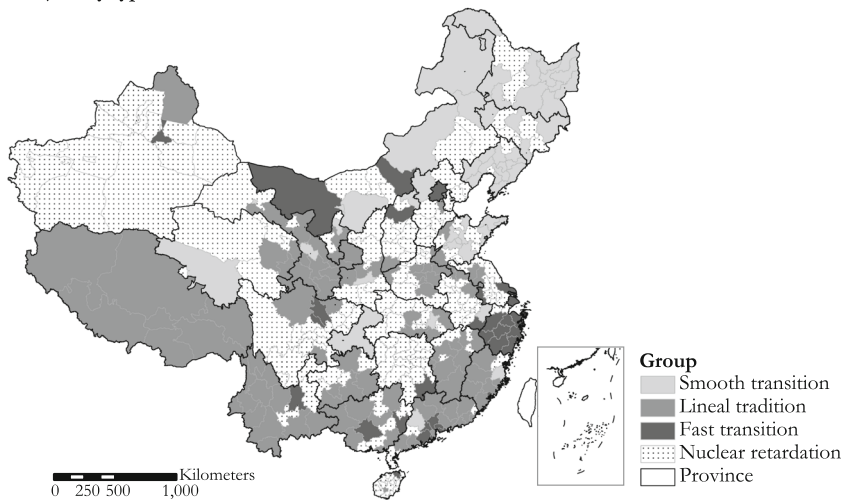

Fig. 3 The four household structure-type trajectory groups

a **Dialect and ethnic minority division**

Dialect
- Beijing, Mandarin
- Central Plains, Mandarin
- Jiaoliao, Mandarin
- Jilu, Mandarin
- Lanyin, Mandarin
- Lower Yangtze, Mandarin
- Northeastern, Mandarin
- Southwestern, Mandarin
- Jin, Chinese
- Min, Chinese
- Wu, Chinese
- Xiang, Chinese
- Cantonese
- Hakka
- Komese
- Tibetan
- Northeastern, Minority
- Northwestern, Minority
- Southwestern, Minority
- Province

Kilometers
0 250 500   1,000

b **Trajectory type distribution**

Group
- Smooth transition
- Lineal tradition
- Fast transition
- Nuclear retardation
- Province

Kilometers
0 250 500   1,000

Fig. 4 Regional distributions of dialect and ethnic minority divisions and trajectory types

Although the model results were complicated, we could still identify interesting patterns. The regional differences in household structure types in the 1980s were affected by cultural and demographic factors. After the 1990s, socioeconomic factors began to play a role. Institutional factors, such as migration rates, became increasingly important in the twenty-first century.

Transition Trajectory of Regional Household Structure Type

The cross-sectional analyses cannot depict the longitudinal change in regional household structure type. We used the group-based trajectory model for longitudinal path analysis.

Table 4 Relative risk ratios from multinomial logistic regression for household structure transition trajectories (ref. = smooth transition)

Variable (mean values across the period)	Fast Transition	Nuclear Retardation	Lineal Tradition
Log GDP per Capita	0.04	0.20	0.05
Urbanization Rate	0.90	0.88*	0.70**
Average Years of Education	0.78	0.59	8.10*
Gender Inequality Index	2.29	0.08	29.53**
Housing Affordability	89.16	0.11	0.01
Minority Proportion	0.96	1.01	0.95
Proportion aged ≤14	0.70	0.66	1.17
Proportion aged 65+	0.96	0.24*	0.53
Emigration Rate	1.01	0.84	0.71*
Immigration Rate	1.24†	1.17	1.12

Note: Regressions control for cultural divisions.

†$p < .10$; *$p < .05$; **$p < .01$

The group-based trajectory model generally deals with continuous or sequential data. Originally, these five regional types had no absolute order. For convenience, we sorted them according to the average household size, from large to small (Fig. 1), and assigned each a number from 5 to 1. In a sense, this also reflects the progression of family modernization from a more traditional style to a more Western one. The smaller the number, the higher the modernization tendency. We used the censored normal distribution of the group-based model to fit the trajectory of the regional family structure type (Nagin 2005). According to the Bayesian information criterion (BIC) value, when the trajectories were divided into four categories, the model yielded the optimal fit.

Figure 3 shows the mean trajectories of the four classified path groups. The areas belonging to Path 1 started from either a large nuclear or a small nuclear type in 1982 and then quickly shifted to a small and diverse type that indicated the highest degree of modernization in 2000. We name the group the *fast transition path*. Path 3 was very similar to Path 1; the only difference is that Path 3 shifted to the small nuclear type in 2000 and gradually switched to the small and diverse type in 2010. We therefore call it the *smooth transition path*. Paths 2 and 4 also formed similar routes, and the areas belonging to them converged into the mixed lineal type around 2010. The major difference is that Path 2 started from the large nuclear type, and Path 4 began with the large lineal one in 1982. We name Paths 2 and 4 the *nuclear retardation* and the *lineal tradition* path, respectively. The areas on the former path mainly started with the large nuclear type, but they did not end with the type dominated by nuclear households, and thus the transition to the modern style is considered to be retarded. The regions belonging to the latter path transitioned from the large lineal to the mixed lineal type.

These results show that although all the prefecture regions in China experienced a transition from a higher degree of family tradition to a higher degree of modernization, there were significant differences in the trajectory within the country. These differences are reflected in the beginning state in 1982, the ending state after 2010, and the speed of transition. More interestingly, almost all areas that originated from the large lineal type

eventually converted into the mixed lineal type, suggesting that the traditional preference for lineal households was maintained in these areas. In contrast, most of the small and diverse regions began with the nuclear family type, which implies the important role of culture during the process of household structure transformation in China.

To further demonstrate cultural influence, we present the geographical distribution of the dialect and ethnic minority divisions and the four trajectory groups identified in Fig. 3. The distribution of trajectory groups was regionally aggregated and highly correlated with the dialect and ethnic divisions (Fig. 4). A chi-square test confirmed the significant correlation between the linguistic groups and the trajectory groups ($p < .01$). Specifically, the Wu Chinese and Cantonese dialect divisions had more regions belonging to the fast transition path. The smooth transition path was mainly present in the northeastern Mandarin and Jiaoliao Mandarin areas, whereas the lineal tradition path was more evident in the Hakka, Min Chinese, Komese, Central Plains Mandarin, Lanyin Mandarin, Tibetan, and southwestern minority areas.

One of the shortcomings of the group-based trajectory model was the difficulty of incorporating time-varying variables. We simplified the analyses by adding the average measures of the independent variables from 1982 to 2010, and we conducted a multinomial logistic analysis of the trajectory group (Table 4). Taking the smooth transition path as the reference and controlling for cultural divisions, both the social economic and migration variables demonstrated significant impact on the path. The higher the average urbanization rate, the less likely that the area took a conservative path. Both a higher level of gender equality and emigration rate led to a lower likelihood of becoming the lineal tradition path. Immigration rate was the main factor driving regions to follow the fast transition rather than the smooth transition path.

Discussion and Conclusion

This study used the national census and 1% population survey data from 1982 to 2015 to demonstrate the transition of the Chinese household structure since China's reform and opening up based on two typology analyses. The biggest advantage of clustering household variables is the ability to explore the linkage mode among different household structure elements, such that the generated types representing the joint distribution can describe the regional household structure characteristics in a more-comprehensive but succinct way. For example, some areas appeared to have similar lineal household proportions in 1982 and 2010, but the ecosystem of the household structure in fact changed significantly. Meanwhile, the path groups of transition trajectory obtained by the group-based trajectory model helped demonstrate the patterns of household transition among prefectural regions.

Under the constructions of the two typologies, we can return to the three questions raised at the beginning of the article. First, what is the path of Chinese household structure transition? When we considered the household structure of each region as a composite ecosystem, almost all regions evolved from a large and unitary system to a small and diversified one. The small nuclear style was only an intermediate stage during the transition process. The path further diverged after 2000 and formed two distinct ecosystems: mixed lineal, and small and diverse.

To explore the second question regarding heterogeneity in Chinese household structure transition among different regions, we conducted a group-based trajectory model. We found four typical transition trajectories, representing the fast transition, smooth transition, nuclear retardation, and lineal tradition paths.

To answer the third question—namely, what factors influenced the transition path—we adopted both cross-sectional analyses and a transitional path-type regression. The former method helped identify the influencing factors for each period, and the latter explored the determinants of the trajectory. We found that socioeconomic, cultural, demographic, and institutional factors all affected the regional family structure types. However, the effectiveness of these factors varied across different periods. In terms of the path analysis, regional culture, urbanization rate, gender inequality index, and mobility rates were the important factors differentiating the trajectories.

On the basis of these results, we reexamined the applicability of different theories in explaining the transition of the Chinese household structure. Overall, family modernization was still the most powerful theory for predicting Chinese household change. In favor of the revised version of the theory, our analyses demonstrated that the miniaturization and diversification of the household was an irreversible process. The nuclear household was not necessarily the inevitable end of family modernization. The period dominated by nuclear households was only a transitional stage, which goes against the projection of classic family modernization theory. In general, the revised family modernization theory seems more appropriate for describing the household transition in China in which regions eventually shifted toward more-diversified household systems. However, neither versions predict the increase in lineal households.

Another essential argument of family modernization theory is that technological and economic developments are the decisive factors in household change. We found that social and economic development had an important impact on household structure change beginning in the 1990s. The better the rate of development, the more likely the region was to experience a rapid transition. However, it is obviously inappropriate to attribute the change in Chinese household structure to modernization theory alone. Regional culture made a lasting impact through the entire transition process.

In 1982, when the impact of development had not yet been exerted, culture was the dominant factor that differentiated the large lineal and nuclear type regions. The region belonging to the large lineal category had greater opportunities to be converted to the mixed lineal category after 2010, retaining a preference for the lineal family. The Hakka, Cantonese, Komese, Min Chinese, and Central Plains Mandarin dialect areas located in central and south China demonstrated a stronger lineal household tradition, and their process of transforming into the modern household form was also slower. In northeast China, the nuclear household was more popular. It was much easier for these areas to form the small and diverse regional type. In addition, the areas with stronger patriarchal culture indicated by higher gender inequality in education were more likely to adopt the more conservative lineal tradition path. One significant change in China is the rapid increase in women's education over the past decades, which causes a subsequent transformation of marriage, fertility and other family life practices. Our findings suggest that such changes played a significant role in dissolving traditional household forms.

Demographic factors clearly had a strong and direct impact on household structure as shown in our analyses. However, we are more interested in the indirect effect of

institutional change on household structure through the social demographic process. In a sense, institutional changes promoted the evolution of the household structure to a more modern style and accelerated the process of change. As discussed earlier, a very striking feature of China's institutional change was the transfer of rural surplus labor to the urban sector. It was difficult for regions with a high proportion of outflow population to maintain a large lineal household structure system, whereas regions with a high proportion of inflow population were more likely to form a small and diverse type. The former change occurred because the outflow of the younger generation forced the dissolution of lineal households and brought ideological changes. The latter change took place because the inflow population usually migrated alone or with very few family members, which increased the proportion of small and simple households in the destination regions (Fan et al. 2011).

Another interesting phenomenon is that the proportion of the elderly population before 2000 was positively related to the possibility that the area became a large lineal or a mixed lineal type, indicating that the lineal household played an important role in caring for the elderly during that period. However, since 2010, compared with the mixed lineal type, the increase of the elderly population proportion raises the possibility that an area would become the small and diverse type. In other words, the function of elderly care seemed to retreat from the lineal household during the past 10 years. This is consistent with other studies revealing that the elderly population has become increasingly independent in terms of living arrangements (Yang and Shen 2000). This change could be attributed to the fertility regulation policy. When both partners of a newly married couple are from single-child families, at least one pair of their older parents must live alone (Logan et al. 1998). In addition, the function of old-age care has gradually transferred from the family to the public. If we understand this from an institutional perspective, China is committed to constructing a modern social security system. Although there is still a long way to go, the coverage of pension insurance has reached more than 85% of the older population. More than 70% of the urban elderly can rely entirely on their pension (Du et al. 2016). The continuous improvement of the security system for the elderly can greatly increase their financial independence and reduce their care demands on the lineal household (Chen et al. 2018).

We did not find a significant impact of housing price on the household structure type. The relationship between these two variables may be more complex than the assumption, warranting future investigations.

In summary, we found that the transition of China's household structure was caused by a mixture of multiple mechanisms. The theory of family modernization determines the overall direction of the change, exerting a stronger effect after the 1990s. The cultural impact persisted throughout the process, manifesting the continuation and inheritance of tradition. Demographic factors directly affected the change, and institutional factors boosted the transition process and strengthened the differentiation among regions. These factors were combined and woven into a holistic picture depicting the transition of the Chinese family structure. Modernization and tradition do not need to be considered as contradictions. The reemergence of the lineal household system in China since the 2000s does not necessarily mean a return to the tradition. The kinship functional network cultivated by family culture serves as a safety net that helps Chinese families better adapt to the rapid changes associated with modernization and institutional transformation.

Authors' Contributions TL and JS designed the study. TL and WF collected data and conducted the analyses. TL wrote the manuscript. All authors commented on subsequent versions of the manuscript.

Data Availability All the census and 1% population survey data were provided by the National Bureau of Statistics of China.

Compliance With Ethical Standards

Ethics and Consent The authors report no ethical issues.

Conflict of Interest The authors declare no conflicts of interest.

References

Brame, R., Paternoster, R., & Piquero, A. R. (2012). Thoughts on the analysis of group-based developmental trajectories in criminology. *Justice Quarterly, 29*, 469–490.

Burch, T. K. (1979). Household and family demography: A bibliographic essay. *Population Index, 45*, 173–195.

Caldwell, J. C. (1976). Toward a restatement of demographic transition theory. *Population and Development Review, 2*, 321–366.

Castillo, G., Weisblat, A. M., & Villareal, F. R. (1968). The concepts of nuclear and extended family: An exploration of empirical referents. *International Journal of Comparative Sociology, 9*, 1–40.

Chen, X., Eggleston, K., & Sun, A. (2018). The impact of social pensions on intergenerational relationships: Comparative evidence from China. *Journal of the Economics of Ageing, 12*, 225–235.

Cherlin, A. J. (2012). Goode's world revolution and family patterns: A reconsideration at fifty years. *Population and Development Review, 38*, 577–607.

Cheung, A. K., & Yeung, W. J. (2015). Temporal-spatial patterns of one-person households in China, 1982–2005. *Demographic Research, 32*, 1209–1238. https://doi.org/10.4054/DemRes.2015.32.44

Coale, A. J. (1984). The demographic transition. *Pakistan Development Review, 23*, 531–552.

Coale, A. J., Fallers, L. A., & King, P. B. (1965). *Aspects of the analysis of family structure*. Princeton, NJ: Princeton University Press.

Du, P., Sun, J., Zhang, W., & Wang, X. (2016). The demands of old-age care and the family and social resources for the Chinese elderly: A study based on 2014 China Longitudinal Aging Social Survey. *Population Research, 40*(6), 49–61.

Fan, C. C., Sun, M., & Zheng, S. (2011). Migration and split households: A comparison of sole, couple, and family migrants in Beijing, China. *Environment and Planning A: Economy and Space, 43*, 2164–2185.

Fan, Y. (2000). A classification of Chinese culture. *Cross Cultural Management: An International Journal, 7*(2), 3–10.

Goode, W. J. (1963). *World revolution and family patterns*. Glencoe, IL: Free Press.

Hajnal, J. (1982). Two kinds of preindustrial household formation system. *Population and Development Review, 8*, 449–494.

Hammel, E. A., & Laslett, P. (1974). Comparing household structure over time and between cultures. *Comparative Studies in Society & History, 16*, 73–109.

Hareven, T. K. (1976). Modernization and family history: Perspectives on social change. *Signs: Journal of Women in Culture and Society, 2*, 190–206.

Hu, Z., & Peng, X. (2014). The change trend of Chinese household: Investigation based on the population census data. *Sociological Studies, 3*, 145–166.

Institute of Linguistics, Chinese Academy of Social Sciences, Institute of Ethonology and Anthropology, Chinese Academy of Social Sciences, & Language Information Sciences Research Center, City University of Hong Kong. (2012). *Language atlas of China*. Beijing, China: Commercial Press.

Jiang, L., & O'Neill, B. C. (2007). Impacts of demographic trends on US household size and structure. *Population and Development Review, 33*, 567–591.

Kratochwil, F., & Ruggie, J. G. (1986). International organization: A state of the art on an art of the state. *International Organization, 40*, 753–775.

Laslett, B. (1973). The family as a public and private institution: An historical perspective. *Journal of Marriage and the Family, 35*, 480–492.

Leasure, J. W. (1963). Factors involved in the decline of fertility in Spain, 1900–1950. *Population Studies, 16*, 271–285.

Li, T., Yang, Y. C., & Zhang, Y. (2018). Culture, economic development, social-network type, and mortality: Evidence from Chinese older adults. *Social Science & Medicine, 204*, 23–30.

Liang, Z., & White, M. J. (1996). Internal migration in China, 1950–1988. *Demography, 33*, 375–384.

Logan, J. R., & Bian, F. (1999). Family values and coresidence with married children in urban China. *Social Forces, 77*, 1253–1282.

Logan, J. R., Bian, F., & Bian, Y. (1998). Tradition and change in the urban Chinese family: The case of living arrangements. *Social Forces, 76*, 851–882.

Meyer, A. D., Tsui, A. S., & Hinings, C. R. (1993). Configurational approaches to organizational analysis. *Academy of Management Journal, 36*, 1175–1195.

Nagin, D. S. (1999). Analyzing developmental trajectories: A semiparametric, group-based approach. *Psychological Methods, 4*, 139–157.

Nagin, D. S. (2005). *Group-based modeling of development*. Cambridge, MA: Harvard University Press.

Nagin, D. S., & Odgers, C. L. (2010). Group-based trajectory modeling in clinical research. *Annual Review of Clinical Psychology, 6*, 109–138.

Nimkoff, M. F. (1961). Changing family relationships of older people in the United States during the last fifty years. *Gerontologist, 1*, 92–97.

Ogburn, W. F., & Nimkoff, M. F. (1955). *Technology and the changing family*. Boston, MA: Houghton Mifflin.

Parsons, T. (1949). The social structure of the family. In R. N. Anshen (Ed.), *The family: Its function and destiny* (pp. 173–201). New York, NY: Harper.

Parsons, T., & Bales, R. F. (1955). *Family socialization and interaction process*. Glencoe, IL: Free Press.

Ruggles, S., & Heggeness, M. (2008). Intergenerational coresidence in developing countries. *Population and Development Review, 34*, 253–281.

Shannon, C. E. (1948). A mathematical theory of communication. *Bell System Technical Journal, 27*, 379–423.

Su, D., Wu, X., Zhang, Y., Li, H., Wang, W., Zhang, J., & Zhou, L. (2012). Depression and social support between China's rural and urban empty-nest elderly. *Archives of Gerontology and Geriatrics, 55*, 564–569.

Talhelm, T., Zhang, X., Oishi, S., Shimin, C., Duan, D., Lan, X., & Kitayama, S. (2014). Large-scale psychological differences within China explained by rice versus wheat agriculture. *Science, 344*, 603–608.

Thornton, A., & Fricke, T. E. (1987). Social change and the family: Comparative perspectives from the West, China, and South Asia. *Sociological Forum, 2*, 746–779.

Wang, X. (2007). Explaining the differences in the clan residing pattern between southern and northern Han Chinese. *Research on Financial and Economic Issues, 288*(11), 20–30.

Wang, Y. (2008). The theoretical analysis for the family structure transition: Based on the historical and empirical evidence in rural China. *Journal of Social Science, 7*, 90–103.

Wang, F. (2011). The future of a demographic overachiever: Long-term implications of the demographic transition in China. *Population and Development Review, 37*, 173–190.

Wang, Y. (2013). The analysis of Chinese family structure change: Based on the 2010 population census data. *Social Science in China, 12*, 60–77.

Wang, F. (2016). *Institutions and institutional change in China: Premodernity and modernization*. London, UK: Palgrave Macmillan.

Wen, Y., & Hanley, J. (2015). Rural-to-urban migration, family resilience, and policy framework for social support in China. *Asian Social Work and Policy Review, 9*, 18–28.

Yang, S., & Shen, C. (2000). *Urban and rural family: The transition under the marketing economy and the non-agriculturization*. Hangzhou, China: Zhejiang People's Publishing House.

Yi, C., & Huang, Y. (2014). Housing consumption and housing inequality in Chinese cities during the first decade of the twenty-first century. *Housing Studies, 29*, 291–311.

Yi, Z. (1986). Changes in family structure in China: A simulation study. *Population and Development Review, 12*, 675–703.

Yong, C., & Yuan, C. (2014). Pension reform in China: Challenges and opportunities. *Journal of Economic Surveys, 28*, 636–651.