

# Household Consumption Pattern in the Context of China's Demographic Transition: 2010 — 2014

Extended Abstract

Liangliang Sun  
Asian Demographic Research Institute, Shanghai University

## 1. Motivation

Energy consumption is one of the most significant ways of the population to affect the environment. Over a long period of time, many studies and models have taken the industrial sector as the main source of energy consumption and carbon emissions, but now more and more scholars begin to realize that direct energy consumption and indirect energy consumption caused by household unit is also an important topic to research.

Many studies have shown that demographic heterogeneity between households has an important impact on the quantity and structure of household consumption. Considering the demographic transition taking place in China like population aging, urbanization, household shrinking, and the improvement of education level is changing the household characteristics significantly, we have reason to doubt that the overall consumption pattern of China will change with the demographic transition.

Unfortunately, till now the conclusions on the relationship between household demographic characteristics and consumption patterns are not consistent across studies of different regions and areas, which makes it hard to model indirect energy consumption from demographic perspectives.

## 2. Research Design

Therefore, this study tries to explore **“whether there are some stable relationships between household demographic characteristics and consumption structure in different regions and areas of China”** and **“what are the most important contributors to the change in consumption structure from 2010 to 2014 among all the household demographic characteristics”**.

The data of this study comes from the China Family Panel Studies (CFPS) 2010 and 2014, a nationwide microscopic follow-up survey carried out by the Chinese Social Science Research Center of Peking University (ISSS). It investigated 13946 households in more than 1800 villages (communities) in 29 provinces and covered 95% of the country's population.

In this research, the proportion of different levels of expenditure is taken as the dependent variable. Total household consumptive expenditure is divided into 6 categories. They are distinguished by the hierarchy of needs from level 1 to level 5 according to Maslow's hierarchy theory of needs, which can reflect the structure of human needs and the process of pursuit.

The variables used in this study are as follows:

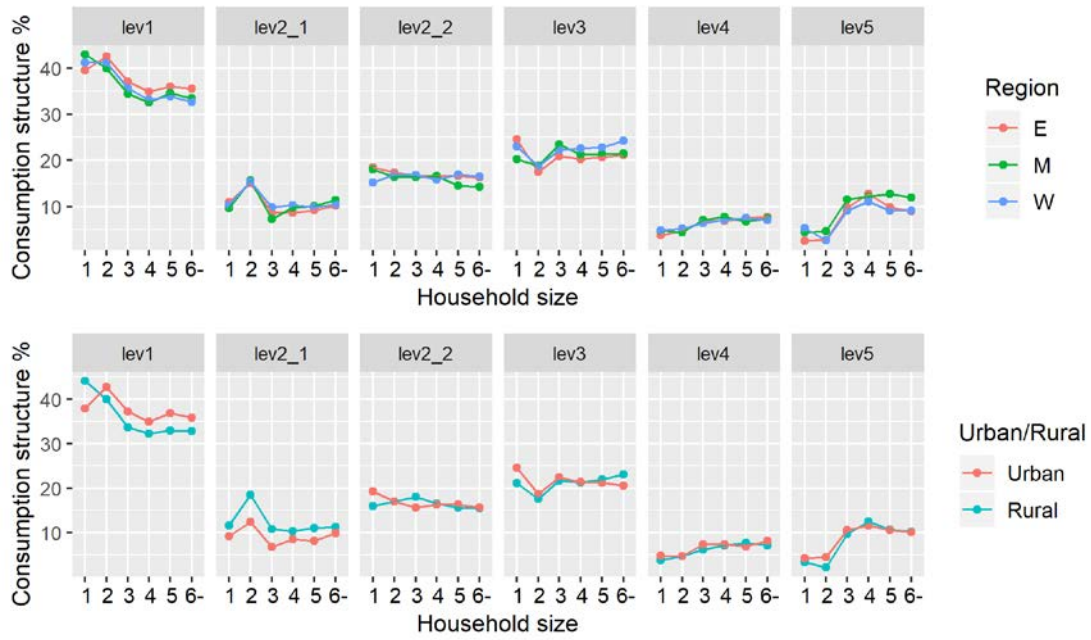
**Table 1 Variable Name**

	Type	Variable Name
Dependent Variables	Proportion of expenditure	Level 1: physiological needs (eat at home)
		Level 2-1: safety (comfortable) (medical treatment)
		Level 2-2: safety (comfortable) (housing, daily necessities)
		Level 3: belonging (social contact) (clothing, transportation, communication, eat outside, beauty products, etc.)
		Level 4: esteem (durable goods including car, vehicle, furniture, etc.)
		Level 5: self-actualization (education, culture, recreation, tourism)
Independent Variables	Regional	Region (east, midland, west)
		GDP (per capita GDP of county)
		Urban (urban=1; rural=0)
	Economic	Income (per capita)
	Demographic	Household size
		Proportion of old people (>65)
		Proportion children (<18)
		Family life cycle (form, develop, shrink, empty, other)
		Age of householder (18-30, 30-50, 50-65, 65-)
		Gender of householder (male=1; female=0)
Education level of householder (illiteracy, middle, high)		

### 3. The differences in consumption structure between households with different characteristics (2014)

There are significant differences in consumption between households with different characteristics. Due to the limited space, only the results of 2014 and a part of household demographic characteristics are showed here.

Figure 1 shows that the differences between one-person households, two-person households, and households in other sizes are significant, but there is no big difference between big families (three or more). We can see that one-person households and two-person households spend a higher proportion of expenditure on basic needs (food, medical treatment, housing). This phenomenon might be because one-person households include “single” and “widowed old people”, and two-person households include “couple before marriage” and “empty nest old people”. These kinds of households are incomplete families, which highly likely to have very differentiated consumption behavior. This figure actually reveals that the influence of household size on consumption structure is weaker than the influence of household composition.



**Figure 1 Consumption structure by household size**

As for the consumption structure by different groups of the age of householder, the pattern is quite clear: with the increase of the age of householder, the share of basic expenditure also increases, especially for level 1 expenditure and level 2-1 expenditure. At the same time, the share of level 3 expenditure and level 4 expenditure decline continuously, but the proportion of level 5 expenditure is much higher for the 30-50 age group of the householder.



**Figure 2 Consumption structure by age groups of householder**

#### 4. Model consumption structure based on the cross-section data of 2014

In this part, I try to confirm the influence of household demographic characteristics on

the consumption structure when other things are controlled by modeling

Because the dependent variable is “proportion” type, and its distribution is not a normal distribution, the generalized linear mix model and “logit link” are applied in this research. The model is designed as a two-level random intercept model. The households are grouped by counties, which means the mixed model in this research has two levels: household level and county level.

**Table 2 GLMM for the proportion of expenditure at different levels**

	Dependent variable:					
	Level 1 Model 10	Level 2-1 Model 11	Level 2-2 Model 12	Level3 Model 13	Level 4 Model 14	Level 5 Model 15
<b>Regional characteristics</b>						
Region: midland	-0.204	-0.166	-0.286**	0.06	0.774	0.726***
Region: west	-0.562***	0.114	-0.254**	0.105	1.551***	0.108
Per capita GDP of county (log)	-0.092***	-0.275***	-0.210***	0.080***	-0.031	-0.215***
Urban (1=urban; 0=rural)	0.151***	-0.113***	-0.135***	-0.029***	0.059***	-0.004***
<b>Household characteristics</b>						
<b>Economic</b>						
Income per capita (log)	-0.091***	-0.191***	0.069***	0.087***	0.247***	-0.045***
<b>Demographic</b>						
Householdsize	-0.011***	0.065	-0.046***	0.001	0.107*	0.032**
Proportion of children	-0.172***	-0.164***	0.050***	0.068***	-0.121***	0.384***
Proportion of old	0.290***	0.656***	0.116***	-0.431***	-0.969***	-0.226***
Head education: middle	-0.038***	-0.019***	0.046***	0.068***	-0.160***	0.125***
Head education: high	-0.127***	-0.212***	-0.197***	0.290***	-0.141***	0.438***
Head gender (1=male)	-0.024***	-0.092	0.01	0.022	0.128***	-0.046
Life cycle: develop	0.336***	0.172	-0.303***	-0.077***	0.693***	1.174***
Life cycle: shrink	0.318***	0.591***	-0.350***	-0.063***	-0.727***	-0.941***
Life cycle: empty	0.560***	0.882***	0.357***	-0.155***	-1.056***	-0.249***
Life cycle: other	0.239***	1.052	-0.391	0.24	-1.283	-0.528
Constant	0.696***	1.316***	0.588***	-3.023***	-5.422***	-1.447***
<b>Observations</b>	7019	7019	7019	7019	7019	7019
<b>ICC (null model)</b>	0.258	0.504	0.167	0.112	0.680	0.614
<b>Variance of fixed effects</b>	0.092	0.430	0.064	0.066	0.722	0.372
<b>Variance of random effects</b>	0.953	2.769	0.651	0.350	6.432	4.599
<b>Marignal R-squared</b>	0.021	0.066	0.016	0.018	0.069	0.045
<b>Bayesian Inf. Crit.</b>	55,188,925	58,452,934	77,398,161	35,963,336	63,837,722	47,842,971

Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

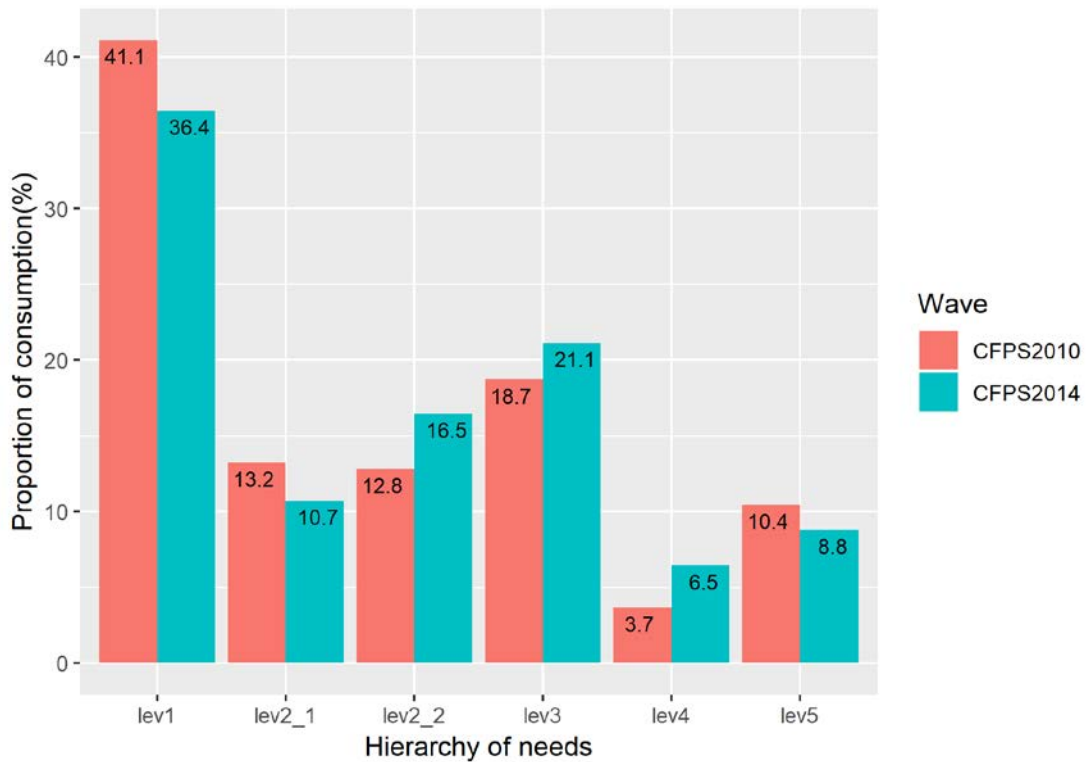
From the result of the model, we can tell that: according to the value of the ICC, grouping households by counties is necessary for all these models; the increase of income can upgrade consumption structure significantly; economies of scale in household only exist in the expenditure on food, housing, daily necessities; the relationship between the gender of the householder and consumption structure is not very significant; as the family life stages move forward, the consumption downward in general, but in the “empty” stage, the proportion of the level 5 expenditure increase again.

## 5. Following work: analyze the influencing factors of the change in consumption structure from 2010 to 2014

As is shown in table 3 and figure 3, the overall consumption structure change significantly from 2010 to 2014, while there are also big differences in household demographic characteristics between 2010 and 2014.

**Table 3 The change in household demographic characteristics**

Year	Average age of householder	Proportion of householder with high level education	Household size	Proportion of urban households
2010	53.54	21.6%	3.80	48.2%
2014	50.60	20.4%	3.68	49.5%



**Figure 3 The differences in consumption structure between 2010 and 2014**

To further identify the influence of household demographic characteristics on consumption structure, hierarchical linear model will be used to analyze two waves of data (2010, 2014) from this follow-up survey.

After all things completed, we expect to find some stable relationships between household demographic characteristics and consumption structure in different regions and areas and also distinguish the most important contributors to the change of consumption structure from 2010 to 2014 among all the household demographic characteristics.