

# **Analysis of the Effect of Demographic Structure on Rural Household Consumption in China**

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***Abstract.*** China has attracted increasing attention because it is the world's most populous nation and it has maintained phenomenal rates of economic growth in recent years. However, consumption in China is unusually low and has continued to decline as a share of GDP over the past decade. In this paper, we conduct a dynamic panel analysis of the determinants of the household consumption ratio in rural China by using panel data on Chinese provinces from years 1995-2009. Demographic factors, such as dependency ratio or sex ratio, cannot be overlooked in terms of their impact on consumption in rural China. The results suggest that the sex ratio and old dependency ratio have a strong negative impact on household consumption while the young dependency ratio appears to have a positive impact. Finally, we make some proposals to the policy-making of aging population consumption.

***Key words.*** Consumption ratio, dependency ratio, demographic, rural China, life cycle hypothesis, household saving, habit

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## ***I. Introduction***

With today's world economy plagued by the recession and sluggish performance, China stands out with its sustained high growth. This is in large part due to market-oriented economic reforms that began in 1978 whereby China opened up its doors by establishing and developing a socialist market economic system. These reforms have had a resounding impact: the per capita living standards of its citizens have greatly improved, as well as the overall life of its rural residents. Consumption is an important factor in a nation's economic growth. This growth has been accompanied by an explosion in China's household saving ratio, which has reached an impressive level in recent years, just when there has been a worldwide reduction in the private saving ratio (Modigliani, 2004).

Since China's reform and its embracing of trade with the outside world, China's economy has continued to grow; however, its consumption is unusually low and has continued to decline as a share of GDP over the past decade. In 2009, the GDP growth of China stood out with a 9.20% high growth. For the same year, the U.S GDP growth rate was -3.11%, and India's was 8.48%. In contrast, Chinese residents' consumption ratio<sup>1</sup> was only 33.94% in 2009(Figure 1), while at the same time, the consumption ratio of the U.S was higher than 70%, and India's was close to 58%. This is a clear indicator that households' consumption ratio in China is very low,

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<sup>1</sup> Consumption ratio in this paper is defined by proportion of households' consumption in gross domestic

compared to both developed and developing countries. More notably, the rural residents' consumption ratio in China was only 8% in 2009 (Table 1).

The changing consumption structure of urban and rural areas demonstrated by the fact that the per capita annual living expenditure by cash in the urban area was 3537.57 yuan (\$589)<sup>2</sup> in 1995, and it increased to 12264.60 yuan (\$2044) by the end of 2009. There was about 9000 yuan (\$1500) increase from 1995 to 2009. Meanwhile, the Engel's index<sup>3</sup> decreased from 50.09 to 36.50. On the other hand, the average consumption in rural areas was 1310.36 yuan (\$218) in 1995, with an increase to 3993.50 yuan (\$665) by the end of 2009. This was only about 2700 yuan (\$450) increase and Engel's index decreased from 58.62 to 41.00 (Table 3). Therefore, the condition of consumption structure in rural areas is much worse than urban area. Furthermore, the consumption level by those in rural areas still remains mostly on the consumption of goods rather than on services. The underdeveloped consumption structure of rural areas also indicates that the stability of consumption behavior was caused by the traditional culture and consumers' perception. Rural residents keep a stable consumption and this implies that rapid economic growth is accompanied with a decrease in the low share of household consumption to GDP.

Although the slow rate of increase in consumption in rural areas has been recognized by the society, few of people realize that this slow rate is caused by a bad demographic structure within rural areas such as aging, and the sex ratio imbalance.

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<sup>2</sup> Calculated by exchange rate between RMB and dollar is 1:6

<sup>3</sup> Engel's index (Engel coefficient) : Spending on food / Total expenditure. It reflects of the living standard of a country. As this proportion or "Engel coefficient" increases, the country is by nature poorer, conversely a low Engel coefficient indicates a higher standard of living.

The implementation of the family planning policy in the 1970s and an increase in overall life expectancy has accelerated the pace of population aging which will in turn change the saving-consumption behavior of individuals and greatly impact both the saving-consumption pattern and the consumption rate. According to estimates, the number of people over the age of 60 in China will surpass the number of those over 60 in Japan, making China the country with the largest aging population. By 2050, it is predicted that one third of China's total population will be over the age of 60 (Table 4). "The rapid aging of its population is a very serious economic problem for the Chinese," said Kenneth Pomeranz, professor of history at the University of Chicago whose work focuses on China.

According to the consumption theory (Zhu and Chen, 2010), the macro factors influencing rural area consumption are income, consumption price, interest rate, fiscal policies, social securities, and so forth. Research has shown how these factors stimulate or restrain the consumption decisions of rural households. However, there are many other factors nowadays that influence the level of rural household income and consumption, including the fallacious distribution mechanism of property income (Loren Brandt, Scott Rozelle, 2004), inefficient distribution of consumption allowance, etc. As a matter of fact, this consumption propensity is typically caused by the traditional consumption stereotypes (Ye and Lu, 2009) and the excessive sensitivity of periodical income (Yin and Liu, 2010). This paper will use the net income as fundamental independent variable and other factors such as consumption price index, real interest rate, and so forth as potential factors that have influences on

income. Additionally, demographic factors such as consumption habit, population, family culture, and consumption perception are also being utilized in this paper.

This paper is organized as follows: Section 2 is a review of the existing literature, focusing on sex ratio<sup>4</sup> and population age structure as two important determinants of consumption ratio; Section 3 introduces the econometric model and presents data on household consumption ratio and related variables; Section 4 discusses data sources and estimation method; Section 5 presents the model estimation and results; and Section 6 is the conclusion.

## ***II. Review of Existing Literature***

### Sex ratio and Household Consumption

Due to the one-child policy<sup>5</sup>, which formally launched in 1979, there has been a growing imbalance in the number of male and female births in China. With a stable sex ratio in the world – close to 105 from 1950 to 2005 – Asia has always had a higher percentage of males. In 2005, the estimated overall sex ratio was of 107.5 males per 100 females in India, with a ratio of 106.8 males to females in China. (Guilmoto, 2007) In contrast, the estimated sex ratio in rural areas of China is 122.85 males per 100 females (Wang, Yang and Yu, 2011).

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<sup>4</sup> Sex ratio is the ratio of males to females of population.

<sup>5</sup> Today, Chinese government imposes the fertility policy that a one-child limit on urban residents and allows many rural couples have a second or even third child. It is more clearly to explain this policy is that mothers of a daughter in some rural areas were allowed to give a birth to additional child, which is called “ a 1.5-child policy”.

According to Klasen and Wink (2002), the number of missing Chinese women has increased from 34.6 million in the 1980s to 40.9 million in the 1990s. It is obvious that the sex ratio imbalance in China is a hot issue in the field of demography. Until quite recently, the literature pointed to many possible explanations for the gender gap. For instant, sex ratio imbalance is partly determined by preconception environment that also affect child health and survival in utero and after birth (Pongou, 2013). His research provides that preconception environment play an important role in determining sex differences in mortality.

Several research papers explored the effect of an imbalanced sex ratio on marriage prospects (e.g., Angrist, 2002; Chiappori, Fortin, and Lacroix, 2002). These papers pointed out that people save their money in the hope of improving their relative attractiveness in the marriage market. Two researchers, Du and Wei (2010) studies the effect of an increase in the sex ratio on the aggregate savings rate in general equilibrium. They argue that as the sex ratio rises, a representative man raises his savings rate in order to improve his relative competitiveness for marriage. In contrast, a representative woman does not need to save more money because there is no intra-household bargaining within a marriage. Couples will share their wealth. For instant, they can use the same car or share the one house; the sum of the husband's and the wife's consumption can be more than their combined wealth. Therefore, a woman is expected to free-ride on her future husband's higher saving rate in response to rises in sex ratio.

Ebenstein (2008) shows that sex selection via abortion is the main explanation for the rising sex ratio in China. Since the early 1980s selection for males prenatally through the use of ultrasonography sex determination and sex selective abortion has been possible. Even in rural areas of China, it is widespread to determine the gender of fetuses by using ultrasonography. This technology has become widely available in many countries, leading to high sex ratios from birth. In China, where parental preference is to have a son, sex ratio imbalance is overwhelmingly a result of sex selective abortions at higher orders of birth<sup>6</sup>.

On the basis of previous studies, if a higher sex ratio leads to a higher cost of housing due to intensified competition by households with a son, then all other households also have to raise their savings in order to afford local houses. This is exacerbated in a country with an underdeveloped financial market. In rural areas of China, parents have more reasons to save money to improve a son's competitiveness in the marriage market. Due to intensified competition in the marriage market, households with a son ratchet up their savings rates in the hope of improving their son's odds of finding a wife (Wei and Zhang, 2009). Families with a daughter may not reduce their saving rate because a desire to avoid erosion of bargaining power by their daughter after marriage may offset a desire to free ride on a future son-in-law's savings.

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<sup>6</sup> Zhu, Lu and Hesketh (2009) in an article on sex ratio imbalance in China published in the British Medical Journal concludes that: "The sex ratio at birth was close to normal for first order births but rose steeply for second order births, especially in rural areas, where it reached 146 (in 2005)." This suggests that the first son (or daughter) is unlikely to result from a sex selective abortion.

## Age Structure of Population

Deaton (1992) empirically shows that population structure directly affects saving rate. The change of age structure influences consumption rate and saving rate in terms of macro and micro mechanisms. In terms of a micro mechanism, according to Modigliani and Brumberg's (1954) life-cycle hypothesis (LCH), consumers will optimize the allocation of total anticipated income in their different age stages so that they can get the optimal inter-period consumption solution. Besides their own consumptions, one part of the labor force's income will be used to raise their children, and the other part will be saved for daily life after retirement. In this case, the labor force will be regarded as the positive savings, whereas children and retirees will be regarded as the negative savings. Therefore, if one country's labor force rises, the country's total savings will be increased, and vice versa. However, some important factors that influence consumption and saving behaviors were neglected by LCH. For example, some retirees will bequeath a part of their money to their children and deposit a part of their money in case of emergency. Ergo, intention of bequeathing and intention of precaution will offset the decrease of total savings caused by the increased aging population (Hurd, 1990; Carroll and Summers, 1991; Haque et al, 1999). On the contrary, if a working force increases is accompanied by the increase in one's long-term average income, people will probably increase their consumption due to the anticipated increased income. Hence, this factor will offset the increased total savings caused by the increased labor force.

Another micro mechanism is called household saving demand model (HSDM) (Samuelson, 1958; Neher, 1971). Supposing children are regarded as the substitution of savings, endowment savings will correspondingly decrease if the number of children increases, and vice versa. However, another similar point of view suggests that there is a substitution relationship between the number of children and the quality of children. In this case, if the number of children decreases, the investment for children will increase (Becker, 1981). Therefore, both LCH and HSDM suggest that the change of age structure will influence both the consumption rate and the saving rate.

The change of age structure can also influence consumption rate in terms of macro mechanism (Cutler et al., 1990; Hock and Weil, 2006; Weil, 1999). For example, supposing the resource stock for each individual is constant, if the labor force decreases, the average consumption level will increase due to the fact that the investment saved from the decreased labor force can be transformed into consumption. Moreover, if the birth rate decreases, the rate of the aging population will increase. The former one is usually faster than the latter one. In this case, if the consumption rate increases due to the decrease in children's population, and decreases due to the increase of in the aging population, the average social consumption rate will also increase, and vice versa.

According to these theories, changes to the age structure will influence consumption behaviors of different individuals or groups of people. Foreign

researchers collected data from different areas and time periods for verification, but outcomes have always been different. After China's reform and opening-up to foreign markets, some economists have been focusing on the relationship between population structure and consumption. Thus, demographic factors, such as dependency ratio or sex ratio, cannot be overlooked in terms of their impact on consumption in both rural and urban China.

The famous empirical paper in China is written by Wenxing Li (2008), he conducts a dynamic panel analysis of the impacts of population age structure on household consumption using panel data from Chinese provinces between the years 1989-2004. His results show that the youth dependency ratio has a negative but small impact on the household consumption while the old dependency ratio does not have a significant impact on household consumption. Therefore, he does not believe that population age structure is the key reason to influence the consumption in China.

According to Yuan and Song's (2000) research, the change of age structure has a significant impact on the saving rate. Based on this research, in rural areas, the aging problem combined with a decrease in the birth rate due to the use of birth control is another important factor that will lead to a decrease in rural consumption. It is probably a rational choice for rural people to have high savings and low consumption under these circumstances. Furthermore, according to Dewen Wang's (2004) study, demographic transition would have a significant impact on the saving rate. A decrease in young dependency ratio will lead to a looser economic burden for the labor force

and an increase in the saving rate. Using data from year 1953 to 2000, Modigliani and Cao (2004) discovered that the saving rate had a co-integration relationship with the long-term income increasing rate and dependency ratio. Therefore, they thought that a high increasing rate and demographic change could explain why China had a high saving rate. Horioka and Wan (2006) injected the habit factor into that model, creating a new life cycle from year 1995 to 2004. This study found that a saving rate is typically affected by demographic change, real interest rate and one year lagged saving rate.

In general, most of the aforementioned researches validate the hypothesis that demographic structure has a relationship with consumption. However, due to the fact that there are many different methodologies and different selected targets, the effect of the influence of young and old dependency ratio influence on consumption remains controversial. In the meantime, there is not a lot of researches about rural population. Within the Chinese economic environment, there is a significant difference between urban and rural consumption. Therefore, it will be meaningful to study the impact on rural consumption caused by demographic change and establish appropriate and beneficial policies for rural residence.

In the early 1990s, in rural China the average young dependency ratio of the population was about 42% and the old dependency ratio was 9% (Table 1). This means that every 100 people in the labor force needed to provide for 42 children under 14-years of age as well as 9 elderly people over 64-years of age. By 2009, the

average young versus old dependency ratio had changed to 26% and 13%, respectively. This was higher than the same young-old dependency ratios in urban areas in the same year. Meanwhile, consumption rate in urban areas has shown a tendency to fluctuate in past years. In contrast, rural residents' consumption rate has tended to decrease year by year. In 2009, the consumption rate of rural areas was only 8%. When compared to the 27% urban consumption rate, there is a definitely a huge difference between rural and urban residents' rate of consumption. Therefore, this paper focus on how these demographic factors, such as dependency ratio or sex ratio, affect consumption ratio in rural China.

Different demographic structures may yield different consumption patterns. For instance, cultural interaction and integration lead to consumption assimilation, religious freedom, international marriage, family culture upgrade, etc. However, the demographic structure of China's rural area is confronting a big change. Firstly, China's demographic structure has shifted. The population has undergone significant changes in terms of the youth to older adult ratio, as well as changes in death and birth rates. It has become an aging population (Figure 2). Secondly, the patriarchal stereotype has always prevailed, and families prefer boys to girls in rural China. Moreover, it is a common practice to determine the gender of fetuses by using ultrasonography. Therefore, China has a significant sex ratio imbalance. According to Shangjin Wei (2009), one of the most important contributing factors to a high saving rate is the imbalanced sex ratio. The sex ratio in China's rural areas is significantly imbalanced, which undoubtedly leads to a decreased depository rate. However, almost

no studies have taken this into account. These changes in the demographic structure of rural areas will directly restrain the consumption of rural residents.

Based on previous studies, this paper will further examine how demographic structure influences the consumption of China's rural residents. This study includes the following parameters: The samples used in this paper include additional data from 2007 to 2009 (most previous studies just focus on these years before 2006). The three major parameters that need to be considered when discussing the influence of demographic structure are sex ratio, young dependency ratio and old dependency ratio. The General Fixed-Effect Model and One-step System-Generalized Method of Moments (GMM) methodologies will be used to analyze the effectiveness and significance of outcomes.

### ***III. Econometric Model***

There are multiple consumption functions and there are many conflicts among the assumptions of these functions. Hence, this paper will not use a specific consumption function given in advance. For instance, in the life cycle model created by Modigliani and Brumberg (1954), three groups of people have been identified as having different consumption and depository behaviors. These groups are children (0-14 years), labor force (15-64 years) and old people (above 65-years). However, in the model invented by Hall (1978), the assumption is that these three groups of people have similar consumption and depository behaviors. Obviously, if we decide to use the Random-Walk Model, the dependency ratio will not be appropriate in this case.

Meanwhile, during this period, China has launched reforms on housing policies, education policies, to name a few of the implemented changes. However, most of the consumption models have pre-assumptions such as stable social regimes and consumption environment. Therefore, using a specific consumption model is not appropriate in this case. With the above two reasons in mind, this paper will adopt the Reduced-Form-Approach econometric model. This model has the advantages of being independent of a specific theory and a specific economic environment (e.g. LCH theory needs a stable economic environment). In addition, this model can find the relationship between the change of demographic structure and the consumption ratio.

We define the regression model with rural area as follows:

$$CRRH_{it} = \beta_1 + \beta_2 CRRH(-1)_{it} + \beta_3 NI_{it} + \beta_4 RCPI_{it} + \beta_5 RATE_{it} + \beta_6 RFEA_{it} + \beta_7 SEXR_{it} + \beta_8 YDR_{it} + \beta_9 ODR_{it} + \mu_{it} + v_{it}$$

where  $i$  represents provinces,  $t$  is time,  $\mu_i$  is unobserved characteristics of provinces and  $v_{it}$  is a stochastic error.

The dependent variable is defined as consumption ratio of rural households ( $CRRH$ ); it represents the proportion of consumption of rural households in gross domestic product calculated with the expenditure approach. The explanatory variables are divided into three groups: basic variable, potential variables and observed variables. In this paper, basic variable is defined as growth rate of per capita annual net income of rural households ( $NI$ ); it reflects how the net income of rural residents influences their consumption. Potential variables are rate of consumer price index of rural households ( $RCPI$ ), real interest rate ( $RATE$ ) and ratio of fiscal expenditure on agriculture ( $RFEA$ ). In this article, ratio of fiscal expenditure on agriculture is

defined by the proportion of fiscal expenditure for supporting agriculture in primary industry output value calculated with production approach. It can reflect how the fluctuation of consumer price impact on consumption decisions of rural residents. By adding this factor, it can help eliminate deviations caused by the macro fluctuations such as inflation fluctuation. The observed variable is demographic structures that focus on sex ratio ( $SEXR$ ), young dependency ratio of population ( $YDR$ ) and old dependency ratio of population ( $ODR$ ). The young dependency rate defined as the ratio of the population aged 0-14 to the population aged 15-64. The old dependency rate defined as the ratio of the population aged 65 or older to the population aged 15-64.

Another regression model with urban areas is follows:

$$CRUH_{it} = \beta_1 + \beta_2 CRUH(-1)_{it} + \beta_3 NIUH_{it} + \beta_4 UCPI_{it} + \beta_5 RATE_{it} + \beta_6 SEXRU_{it} + \beta_7 YDRU_{it} + \beta_8 ODRU_{it} + v_{it} + \mu_{it}$$

where  $i$  represents provinces,  $t$  is time,  $\mu_{it}$  captures the unobserved characteristics of provinces and  $v_{it}$  is a stochastic error.

The dependent variable is defined as consumption ratio of urban households ( $CRUH$ ); it represents proportion of consumption of urban households in gross domestic product calculated with the expenditure approach.  $NIUH$  stands for growth rate of per capita annual disposable income of urban households. Rate of consumer price index of urban households is defined by  $UCPI$ . Injecting this parameter into the model is to determine whether the inflation rate caused by fluctuation of CPI has any impacts on consumption expectation. The demographic factors are sex ratio of urban ( $SEXRU$ ), young dependency ratio of population ( $YDRU$ ) and old dependency

ratio (*ODRU*) in urban areas.

The lagged consumption ratio is included to test for the presence of inertia or persistence. The real interest rate is included to test for the impact of financial variables, and we would expect its coefficient to be positive if the substitution effect more than offsets the income effect.

#### ***IV. Data and Method***

##### **Data Source**

The data used in this analysis are panel data for the years 1995-2009 in various Chinese provinces. All variables are available for urban, rural, and all households with the exception of the nominal interest rate, which is available only for the country as a whole. Thus, we are able to obtain separate results for both urban and rural. Beijing, Shanghai, and Tianjin have a high urbanization rate and consumption rate; therefore, it would be meaningless to study their rural consumption. Besides, Chong Qing was established too late as one of the municipalities. Additionally, due to the fact that there is no data for Tibet from before the year 2000, only 26 provinces out of a total of 31 provinces in China from year 1995 to year 2009, with the exception of Hong Kong, Taiwan, and Macao, can be used. However, the urban sample does include Beijing, Shanghai, and Tianjin, bringing the total provinces to 29. Data was mostly collected from the *China Statistical Yearbook* and *China's Population and Employment Statistical Yearbook*. Some of the typical data such as dependency ratio,

sex ratio, and rural consumption rate were collected from two sources, *China Commonly Used Population Data Set 1990* and *China Statistical Compilation 55 years*. Moreover, Parts of the data were collected from regional statistical yearbooks. Finally, we can get the entire sample data for the variables by processing and analyzing the data collected from those databases (Table 5 and Table 6). The increasing rate of rural net income and the change of CPI are fluctuating with years. In addition, rural consumption rate, sex ratio, and child dependency ratio has decreased since 1995, whereas fiscal expenditure on Agriculture and old dependency ratio have increased. As a matter of fact, these factors (including demographic structure) that influence consumption are differentiated from one another. For instance, the central government has different supportive policies for different regions (e.g. northwest area has more preferential policies and fiscal expenditure on agriculture.). Furthermore, the velocity of population and the degree of openness result in differences in family combination and age structures (e.g. Guangdong and Henan have an imbalanced sex ratio due to the high velocity of the population whereas Yangtze river delta region<sup>7</sup> has a relatively more stable structure).

### **The advantages of GMM method**

The GMM method has several advantages. First, in the likely presence of inertia in annual data, it seems desirable to use a dynamic specification to control for it. Second, some of the explanatory variables (such as *RATE* and *NI*) are likely to be jointly

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<sup>7</sup> The Yangtze River Delta (YRD) economic zone refers to 16 cities in Shanghai, southern Jiangsu, eastern and northern Zhejiang. They are Shanghai, Nanjing, Suzhou, Wuxi, Changzhou, Yangzhou, Zhenjiang, Nantong, Taizhou, Hangzhou, Ningbo, Huzhou, Jiaxing, Shaoxing, Zhoushan and Taizhou

determined with the consumption ratio, and it seems desirable to control for the potential joint endogeneity of these explanatory variables.

It worth noting that this paper will examine how demographic structure influences the consumption of China's rural residents. In order to analyze demographics of different areas demonstrate different impacts on the rural consumption ratio, rural China is separated into three regions: eastern, middle and western<sup>8</sup>. In addition, the estimation results by regions are not significant by using GMM method, thus the general fixed-effect method will be used to analyze the effectiveness and significance of outcomes (estimation results are present the Appendix Table 9). However, throughout the urban data, huge economic difference not exists in the eastern, middle and western areas. Thus, it would be meaningless to examine the estimation results of the urban households consumption ratio by regions.

## ***V. The Model Estimation and Results***

The estimation results are presented in Table 7 for rural areas and in Table 8 for urban areas. From the last two columns of Table 7, almost all variables have the same tendency and approximate coefficients whether the model is estimated using fixed-effect or system-GMM except *REFA* (ratio of fiscal expenditure on agriculture) variable. Although, the general fixed-effect model cannot reflect the dynamic of inter-provincial panel data, it yields statistically significant results for most variables.

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<sup>8</sup> Eastern (8 cities): Jilin, Liaoning, Heilongjiang, Hebei, Shandong, Fujian, Guangdong, Hainan; Middle (8 cities): Shanxi, Hainan, Hubei, Anhui, Hunan, Jiangxi, Jiangsu, Zhejiang, Western(10 cities): Xinjiang, Neimenggu, Ningxia, Shanxi, Gansu, Qinghai, Sichuan, Guangxi, Guizhou, Yunnan

Using one-step system GMM does yield a statistically significant effect of variables that reflect fluctuation of income or consumer price. Analyzing the characteristics of the GMM estimation results, the paper finds that GMM method can thoroughly reflect the influence of lagged consumption ratio of rural or urban residents. The study also finds that it is only significant on one period lagged consumption ratio and not significant on two or more periods of lagged variables. On the other side, it is inconsistent about the sign of the ratio of fiscal expenditure on supporting agriculture. Previous studies have developed the idea that crowding out affects of government expenditure for agriculture on inhabitant expense. However, others advanced an opposite perspective. The point is that the financial policies used to support agricultural development would cause crowding-in-effect to households' consumption in rural areas. Row 6 of Table 7 relates a positive but small coefficient between government policy of agriculture and consumption ratio of rural China. If we accepting the estimation results of the one-step system GMM means that fiscal expenditure on supporting agriculture has a positive impact on residents' consumption.

From row 3 of Table 7, one period lagged consumption ratio has a strongly positive effect on consumption ratio of the current period (with a point estimate of 0.905 on lagged consumption ratio, which is statistically significant at the 1% level), indicating strong inertia or persistence. The strongly positive relationship between lagged and present period consumption imply that rural residents have stable consumption patterns and habits. Furthermore, residents in rural China are generally

very cautious in terms of spending money since they believe in saving money for rainy days. Similarly, lagged consumption ratio of urban households also has a strongly significant effect on present consumption ratio, but the coefficient is smaller than for rural areas. Compared to the stable consumption habits of rural residents, urban people have more flexible and various consumption patterns. Still, while emerging market consumers are becoming wealthier, some consumption habits have been hard to change.

The variable of per capita annual net income of rural households appears to have a negative influence on consumption ratio. The coefficient is -0.049 which means net income of rural area has a small effect on consumption ratio in this model. However, in urban areas the results are opposite. Per capita annual disposable income of urban households has a positive effect on consumption ratio, even though the coefficient is small (with a point estimate of 0.193, which is statistically significant at the 5% level). These results imply that the growth of current rural residents' income is slow and the gap of income between rural and urban areas have seriously expanded. By any statistical measure, the average per capita annual disposable income in urban areas was 4283 yuan (\$713) in 1995, increased to 1,7175 yuan (\$2862) by the end of 2009. However, the average per capita annual net income of rural households was 1578 yuan (\$263) in 1995, increased to 5153 yuan (\$858) by the end of 2009. For rural China, there was only about 3575 yuan (\$595) increase (Table 3). As a matter of fact, the small increase of net income in rural areas cannot stimulate consumption of rural households efficiently. Rural residents prefer saving money when they facing a raise

in net income. That explains consumption as a share of GDP in China has steadily declined, and is quite low relative to other countries, but remains a high level household' saving rate. Therefore, the effects of per capita annual disposable income are not statistically significant on consumption ratio in urban and rural areas, respectively. We note that this is consistent with the notion that Chinese residents have a stable consumption habits and pattern, which consistent with the “smoothness of consumption” in both two areas (Campbell and Daeaton, 1989). CPI can be used to index (i.e., adjust for the effect of inflation) the real value of wages, salaries, and pensions, for regulating prices and for deflating monetary magnitudes to show changes in real values. In general, CPI is used as a measure of inflation. In Table 7, 8 and 9, the coefficient on rate of CPI is negative and not statistically significant. This means inflation caused by change of CPI cannot change residents' habits of consumption. To sum up, Chinese rural residents have stable consumption habits, conservative consumption and investment concepts. It indicates a strong inertia and persistence of consumption. These traditional views seriously limit potential level of consumption. Rural residents' consumption goes into a vicious cycle, which is “low income-low consumption-low income” (Figure 3).

In accordance with the requirements for balancing urban and rural development, central government has made efforts in order to promote the steady development of agriculture and a continuous increase in rural incomes in recent years. After the calculation, the share of expenditure for supporting agriculture in gross domestic product calculated with expenditure approach has been increased since 1995. In

Table 7, the coefficient of fiscal expenditure for supporting agriculture (*REFA*) is negative and it is statistically different from zero at the 10% level, even though the coefficient is very small. The concern is the negative coefficients of *REFA* in eastern and middle areas. In the eastern China, especially, the government policy for agriculture has a negative effect on residents' consumption. On the other side, the coefficient is positive on consumption ratio in the western region of China. It implies that government should invest and support relatively undeveloped western because *REFA* has a positive effect on consumption, even though the coefficient is small. It also represents that central government has different supportive policies for different regions (e.g. northwest area has more preferential policies and fiscal expenditure on agriculture.)

The effect of changes in the interest rate on savings behavior depends on the relative size of the two effects: substitution effect and income effect. Therefore, it is ambiguous that a change in the interest rate can lead to higher or lower savings. In Table 7, our results show that real interest rate (*RATE*) has a strongly positive effect on the consumption ratio of households. A one-point decrease in real interest rate is associated with a lower consumption ratio by 0.218% in the rural area. It is statically significant at the 10% level. However, in Table 8, it shows that there is a negative correlation between real interest rate and consumption ratio in the urban area (with a point estimate of -0.209, which is statistically significant at the 5% level). Therefore, we can infer that rural residents have strong precautionary-motive than urban

residents. On the other hand, it also shows that urban people prefer forward-looking consumption.

In this paper, we focus on how the demographic factors influence rural residents' consumption. The three observed variables are sex ratio, young dependency ratio and old dependency ratio. In the table of estimation output with two regression models, all these three demographic variables impact on consumption ratio in various degrees. To ease some of the confusion, this explanation is included below.

### **Sex ratio**

A key determinant of the sex ratio imbalance is the stringent family planning policy introduced in the early 1980s. In both table 7 and 8, the coefficients on sex ratio for rural or urban areas is negative, consistent with the interpretation that higher sex ratio leads to a low consumption ratio. In Table 7, we find that the sex ratio has a strongly negative effect on the household consumption ratio (with a point estimate of -3.4 on the sex ratio, which is statistically significant at the 5% level). An increase in the sex ratio from 1.05 to 1.14 (the mean increase in rural China from 1995 to 2009; see Figure 4 and Table 5) is associated with a higher savings rate by son-households by 12.1 percentage points, which is economically large (and is more than the actual increase in average rural household savings rate during the period). One possible explanation of this phenomenon would be that the increasing sex ratio leads to males' higher saving rate due to the marriage competition. Note first that the social norm in China is such that most unmarried young men or women live with their parents. In

particular, a groom's family is more likely than a bride's family to be expected to provide a house or an apartment for the newlyweds, or at least to contribute the biggest chunk of the cost for a domicile (Wei and Zhang, 2009) . In rural areas, virtually every household has a house, but the quality varies a great deal. A house built of concrete, bricks, or stones is likely to be of higher quality (and more expensive) than a house built of mud and straw. Therefore, men raise their saving rate in the hope of buying an expensive new house and improving their relative competitiveness in the marriage market. Yet, in the aggregate, number of men who cannot get married is independent of their savings rate. The saving rate is not the only important determinant for marriage. Nevertheless, the high savings lead to a low consumption when an imbalance sex ratio exists in rural China. Another explanation of this phenomenon is rural Chinese parents have historically preferred boys than girls. In recent efforts to make old-age insurance in rural areas available, parents without sons were more likely to participate, indicating that the value of sons will continue provided families expect more old-age support from sons than daughters (Ebenstein, 2008). It implies that traditional belief is unlikely to rapidly modify in an acceptably short period of time in rural China. It is a widespread practice to determine the gender of fetuses by using ultrasonography, even though it is illegal in China. The historical experience for China indicates that parents were disinclined to leave this chance to make a sex selective abortion. As a result, the phenomenon of an imbalance sex ratio is most serious in the rural area. The "desperate parents" willing to save more money to make their sons stand out as catches in an increasingly competitive marriage

market. Another widespread phenomenon is that a groom's family is often responsible for paying his bride's family a one-time transfer that compensates the latter for rearing their daughter (Wei and Zhang, 2009). Therefore, the resulting competitive marriage market has households wanting to save to outdo others.

We now turn to the discussion of the relationship between urban household consumption and sex ratio. Similar to the rural area, there is a negative correlation between sex ratio and consumption. Note that the more educated segment of the urban population could be more mobile. In this case, it would make the sex ratio statistics inferred from the population census less accurate. The noise in the sex ratio measure could induce a downward bias in the estimates. There are reasons for urban residents to react more strongly to a given rise in the sex ratio. First, urban Chinese people with high education support equality of men and women. Parents with daughters wish to preserve their daughter's bargaining power after marriage. In order to get the same equal status for daughters in marriage, parents may respond to an anticipated increase in their future husbands' wealth by raising their own savings rates. If a woman's family wealth improves her chance to be matched with a wealthy man, her parents' willingness to save also rises. Another possible reason is housing price. If a higher sex ratio leads to a higher cost of housing price by families with a son, then all other families have to raise their own savings in response to a rise in the sex ratio. Hence, they have to cut down non-housing consumption. More notably, urban children are receiving full and equitable investments in their futures by their families, regardless of their gender. Accumulating more wealth is not the only way for men to compete in

the marriage market. Parents may also invest more in their sons' education, and push them to work harder. Urban parents have more motives to save money to improve children's competitiveness. Even through, Zhang and Wei's (2009) paper still imposes that the saving rate by son-families rises with the high sex ratio, but the saving rate by daughter-families is insensitive to the sex ratio. However, in our estimation results, the consumption by urban household has a strongly reaction to sex ratio than for rural households.

The results of Table 9 show that sex ratio has a strongly negative impact on consumption ratio of rural China in eastern (with a point estimate of -4.21, which is statically significant on level 1% level). On the contrary, the coefficient on sex ratio is negative but not statically significant in western and middle areas. It may imply that saving response by son-families is moderately weaker for lower-income families. In particular, the net income of western and middle areas is smaller than in eastern areas. Some of these low-income families possibly give up their hope for marriage for their sons and therefore stop competing through savings. For this reason, a high sex ratio imbalance in underdeveloped middle and western area has a relatively small influence on consumption ratio compared with the developed eastern China.

Generally speaking, the negative relationship between household consumption ratio and sex ratio remains unchanged in the estimation results of Table 7, 8 and 9. The empirical literature most closely related to this paper has focused on the China's competitive saving motives. Parents with a son may attempt to improve their son's

competitiveness by buying a luxury and large house (Wei and Zhang, 2009). Ergo, with a high saving rate in present period, their consumption is relatively low.

### **Young Dependency Ratio**

The life cycle hypothesis predicts that the age structure of the population will have a significant effect on the consumption rate. In particular, the dependency ratios will have a positive impact on the consumption. The estimation results from Table 7 demonstrate that the effect of young dependency ratio (*YDR*) on consumption is positive: one basis point increase in the young dependency ratio is associated with a higher consumption ratio by 0.399%. The coefficient on young dependency ratio for rural residents' consumption is always positive and significant by accepting fixed-effect or one-step system GMM method. In other word, the higher *YDR*, the higher consumption ratio.

These results support the theory of HSDM as well as conclusions from Yuan and Song (2000). In our studying samples, China's rural young dependency ratio decreased from 41.87% in 1990s to 26.41% in 2009 (Table 1). This huge jump had a significant impact on rural residents' consumption. Moreover, the decreasing young dependent ratio is one of the most important aspects that lead to the decreasing rural consumption ratio. First reason is that the cost of raising children decreases when the number of children in the family decreases. In order to raise and educate children, families need to save more money. According to Yuan (2000), households have to rely on less labor force to resolve old-age care issues due to the one-child policy.

Families have to reduce their consumption spending in order to provide their children with more capital. Second, the analysis implies that rural areas in China with an acute imbalance of young men seeking wives from a high level of hard work and entrepreneurship. Parents want to make their sons stand out as catches in an increasingly competitive marriage market by using education and wealth. Young men who want to begin businesses have to turn to their families for start-up money; parents prepare for that by saving. Third, based on the theory of HSDM, the fewer children the families have, parents would tend to save more in order to alleviate their children's living burden due to the unexpected income. Fourth, in rural areas, children tend to work earlier than those in urban areas and they are less educated as well.

Now we turn to urban area, the coefficient on young dependency ratio for urban consumption ratio is always positive but not statically significant, no matter the estimation method we use. Moreover, both coefficients are smaller for urban than for rural area (with a point estimate of 0.011 on *YDR* for urban consumption and 0.399 for rural area). It implies that the effect of young dependency ratio on urban consumption is not significant. A possible explanation of this case is that education has long been viewed as sacred in the minds of ordinary Chinese parents of urban areas. Today, as urban residents' disposable incomes continue to rise, the value placed on education is at least as indisputable. School tuition can vary a great deal depending on the location and quality of schools; urban children are receiving full and equitable investments in their futures by their families. Therefore, many parents are willing to

spend extra money to send their children to superior schools that may be located in a different district (Laura A. Flurry and Ann Veeck, 2009).

While this piece of evidence comes from an urban location, the patterns revealed are consistent with the cultural norms in eastern China. Table 9 shows the coefficient on young dependency ratio for the three studied areas is always positive. In particular, the coefficients on *YDR* for eastern, middle and western rural areas are 0.217, 0.265 and 0.309, respectively. This result states that young dependency ratio has more significant impact on consumption ratio in underdeveloped areas. It implies that parents are more willing to invest in their children's education in more developed areas.

### **Old Dependency Ratio**

The estimation results show the effect of old dependency ratio on consumption ratio is negative: the higher old dependency ratio is, the lower consumption ratio will be. In Table 7, a one-point increase in the old dependency ratio is associated with 0.59 percentage points decrease in rural consumption ratio. The coefficient on the old-age dependency ratio is negative rather than positive, which is against the conclusion of LCH. This phenomenon has close relationship with features of current rural society. First, old-age care mechanism in rural areas has just established. By the end of 2008, the average rate of rural household who joined pension funds had only reached 5.63%. The highest was only 17.44%, which was much less than that for urban household

(76%)<sup>9</sup>. Due to the unsound social security system, households tend to have precautious savings for emergency. Under such circumstances, old people have no choice but cut their budgets in case of critical situation. It interprets this as a sign that saving are substitutes for retirement. Second, according to the explanation of bequeathal motive, old people tend to have a low consumption level in order to save for their next generations. Particularly in China's rural area, old people tend to save every single penny for raising children. Third, thanks to the conservative perception for consumption, most rural residents hardly purchase luxury goods or services besides daily necessities. This group of people is categorized into lower consumption level. Therefore, aging issue causes decreased consumption rate, which results from insufficient social security and outdated perception.

Relationship between old dependency ratio and consumption ratio is similar, however, the coefficient is smaller on *ODR* for urban consumption ratio. As the population ages, it will of course be necessary to devote more resources to the care and health of the elderly. Pension coverage is an arena in which governmental action may benefit the elderly. Rural areas are particularly bereft of this key element of social protection (Judith Banister et al,2010). In other words, it is not necessary to save more to provide a buffer against uncertain health expenditures for urban older households. This is a rational explanation that old dependency ratio appears an insignificant impact on urban consumption ratio.

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<sup>9</sup> Statistical Yearbook of China, 2009

The estimation results of Table 9 shows that the coefficients are -0.402, -0.154 and -0.078, respectively. This phenomenon has close relationship with features of age population structure and consumption pattern. China introduced a so-called “one-child policy” in 1979 as a way of controlling population growth. However, the one-child policy was applied more leniently to ethnic minorities. The policy also led to substantial variations among different areas in the age structures of their populations. This will enable us to more sharply estimate the impact of the age structure of the population on the household consumption ratio. Meanwhile, the related data manifests that the average old dependency ratio in eastern, middle and western is 12.01, 9.85 and 9.17<sup>10</sup>, respectively. The aging problem of east areas is the severest for now. Besides, aging problem is less severe in middle areas than in east areas, but it severer than in west areas. The demographic change of west areas is relatively slower; therefore, areas of minorities haven’t stepped into aging problems. Furthermore, the level of severity and the speed of aging are having different impacts on people’s consumption. East areas have the largest population base and the severest aging problem; therefore, aging problem has the most adverse effects on stimulating consumption for this area. In addition, compared to the east and the middle areas, west areas have income limitations due to the poor infrastructures and lower level of economic structures. People in west areas tend to spend their money more on necessities; therefore, there’s little decreasing space for their consumptions. Hence,

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<sup>10</sup> Statistical Yearbook of China, 1995-2010

although the ODR is increasing, it still has limitations of suppressing consumptions to some extent.

Depending on population policies, YDR of rural area has become more stable since 2003, whereas ODR of rural area keeps increasing. According to statistical figures, China's aging population has reached 160 million by the end of year 2008, consisting of 12% of total population. Furthermore, aging population is expected to be increasing to the acme which is about 436 million by the end of 2050, consisting of one third of China's total population (Table 4). Therefore, the increasing ODR will be the most influential factor for rural consumption. The decrease of labor force will influence the economy in a negative way.

The analysis demonstrates that demographic change is one of the reasons that cause lower rural consumption rate. Our results are different from Wenxing Li's (2008). Li chose consumption rate as a whole, but does not distinguish between urban and rural areas. Furthermore, urban and rural households have different lifestyles or consumption pattern. These aspects may be responsible for the different results we find.

## ***VI. Conclusion***

China is only different than other emerging economies because its economy is vastly larger, and has gotten much more scrutiny because of its role in the years leading up to the 2008 financial crisis and ensuing economic recession (Mees, 2012). The

findings of this paper are that China's share of private consumption in the GDP of rural areas is low when compared with benchmarks derived from international comparisons. Most research is based on income inequality and income uncertainty perspective. A major concern examined in this paper is how the changing demographic structures such as sex ratio, young dependency ratio and old dependency ratio, impact the consumption ratio in China's rural areas. The arguments presented in this paper show that China's low share of private consumption in GDP can be largely explained by its relatively high sex ratio, high old dependency ratio and low young dependency ratio. Meanwhile, households keep a stable habit of consumption and this implies that rapid economic growth is accompanied with a decrease in the share of households' consumption to GDP. Given the long historical preference for male heirs in Asia in general, particularly in rural China, the imbalanced sex ratio leads to a negative impact on rural household consumption. The implementation of the family planning policy in the 1970s and the increase in overall life expectancy have dramatically altered the make-up of the population; more and more people are living longer, well past their sixties. Research suggests that there is a positive relationship between the consumption ratio and young dependency ratio, as the younger members of the population tend to spend and consume more, while there is a negative relationship between the consumption ratio and old dependency ratio, as the older members of the population tend not to spend and consume as much as their younger counterparts. This indicates that China's rural population has its own unique characteristics, such as an inadequate social safety net, which includes a faulty social

security system, as well as incomplete education, medical and healthcare reforms. These factors have suppressed the ability for the rural populations to thrive and excel and essentially, to consume. In rural areas, people are more likely to save the extra money they make rather than spend it. On the one hand, they might save more due to their economic instability and uncertainty. On the other hand, they might save in order to provide for next generations, thus leaving behind a legacy. Additionally, factors such as interest rate, inflation rate, income ratio between urban and rural areas, and labor participation rate also significantly influences consumption decisions of rural populations. As such, all of these factors combined suppress China's overall consumption.

Research shows that one year lagged consumption has positive effects on current consumptions. It indicates that the consumption by rural people remains stable. Even as incomes increase within the rural population, the consumption levels within this group still tend to be lower as they maintain their current practice of not spending. They would rather save than spend. These results demonstrate that increasing income accompanies increasing savings. If there are no significant changes in consumption behaviors, this particular phenomenon will presumably last in the long run. Lower consumption rate of China's rural area is influenced by many different factors.

In recent years, China has been facing a steady increase in the aging population. The result has been a significant decline in consumption from this majority group. This has had long-lasting and far reaching effects which will not be reduced as long as

the population continues to grow and age, with the older members being in the majority. Another significant impact on consumption is the inadequate social security system. As the size of rural families is decreasing and land security systems are weakening, rural populations need increasingly more social security: education, medical, and pensions. With good education, good health and guaranteed pensions, their overall quality of life would vastly improve and it would be possible for them to spend the extra money they make. The motivation to save money for pensions is very strong for rural people; therefore, it is vitally important to put in place a complete social security system for this population. Since the low consumption rate is in part prompted by precautionary savings motives, especially for old age, China will face numerous choices in how to construct a financially viable pension system. Other mechanisms to raise household income and mitigate household-specific risk, such as by improving the healthcare and pension systems, also have a crucial role to play in China's future.

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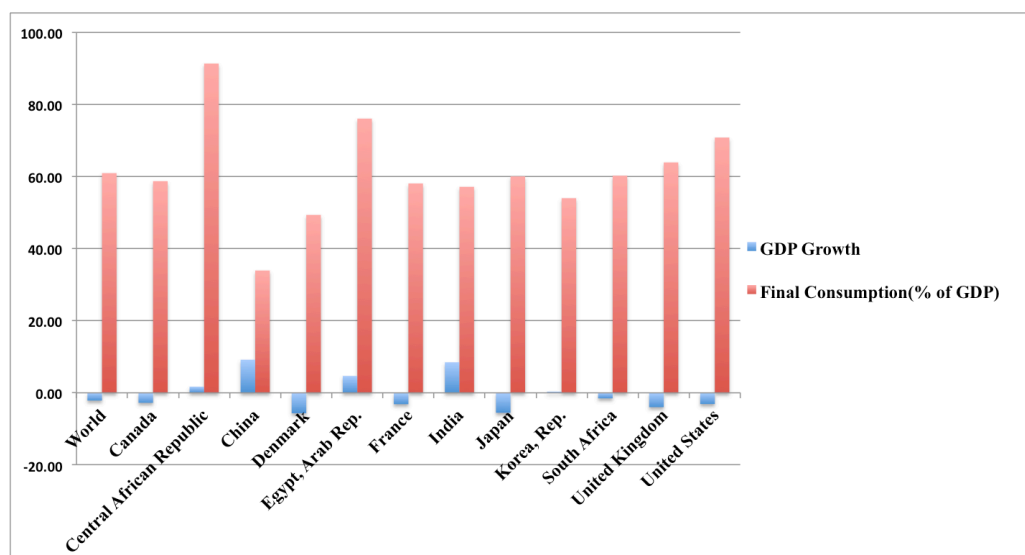
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## Appendix

Figure1 GDP Growth and Household Final Consumption (% of GDP), 2009



Source: The World Bank

Table 1 Dependency Ratio, Consumption Ratio in Urban and Rural, 1995-2009

Year	Urban Households				Rural Households			
	TDR	YDR	ODR	CR	TDR	YDR	ODR	CR
1995	39.87	30.46	9.41	21%	55.36	45.51	9.85	22%
1996	39.69	28.99	10.70	21%	53.58	43.91	9.67	22%
1997	37.75	27.19	10.56	23%	52.14	42.41	9.73	20%
1998	38.24	26.92	11.32	24%	51.15	41.02	10.13	19%
1999	38.28	26.45	11.83	26%	50.50	40.27	10.23	17%
2000	32.86	24.49	8.37	26%	49.19	38.54	10.65	17%
2001	35.85	25.15	10.70	26%	47.83	36.72	11.11	16%
2002	35.00	24.02	10.98	25%	45.61	34.23	11.38	16%
2003	34.76	23.08	11.68	23%	44.20	32.78	11.42	14%
2004	33.21	21.58	11.62	27%	42.14	30.65	11.49	13%
2005	33.59	22.26	11.33	24%	44.73	31.74	12.99	13%
2006	32.38	20.80	11.58	26%	41.97	29.18	12.79	11%
2007	32.21	20.28	11.93	23%	40.84	27.96	12.88	11%
2008	32.02	19.87	12.15	26%	41.22	27.40	13.82	9%
2009	32.40	19.71	12.69	27%	40.14	26.41	13.73	8%

Note: TDR=Total Dependency Ratio of Population, YDR=Young Dependency Ratio of Population, ODR=Old Dependency Ratio of Population, CR=Consumption Rate.

Source: Department of Population, Social, Science and Technology Statistics of National Bureau of Statistics of China, China Population Statistical Yearbooks, 1995-2010, China Statistics Press.

Table 3 Per Capita Annual Income, Expenditure and Engle Coefficient of Urban and Rural Households, 1995-2009

Year	Urban Households			Rural Households		
	Per Capita Annual Disposable Income (yuan)	Living Expenditure (yuan)	Engle Coefficient (%)	Per Capita Annual Net Income (yuan)	Living Expenditure (yuan)	Engle Coefficient (%)
1995	4283.00	3537.57	50.09	1577.74	1310.36	58.62
1996	4838.90	3919.47	48.76	1926.07	1572.08	56.34
1997	5160.30	4185.64	46.60	2090.13	1617.15	55.05
1998	5425.10	4331.61	44.66	2161.98	1590.33	53.43
1999	5854.00	4615.91	42.07	2210.34	1577.42	52.56
2000	6280.00	4998.00	39.44	2253.42	1670.13	49.13
2001	6859.60	5309.01	38.20	2366.40	1741.09	47.71
2002	7702.80	6029.88	37.68	2475.63	1834.31	46.25
2003	8472.20	6510.94	37.10	2622.24	1943.30	45.59
2004	9421.61	7182.10	37.70	2936.40	2184.65	47.23
2005	10493.00	7942.90	36.70	3254.93	2555.40	45.48
2006	11759.50	8696.60	35.80	3587.04	2829.02	43.02
2007	13785.80	9997.50	36.30	4140.36	3223.85	43.08
2008	15780.80	11242.90	37.90	4760.62	3660.68	43.67
2009	17174.70	12264.60	36.50	5153.20	3993.50	41.00

Source: Data for 2002 comes from National Bureau of Statistics, China Statistical Abstract, 2003; others are from National Bureau of Statistics, China Statistical Yearbooks.

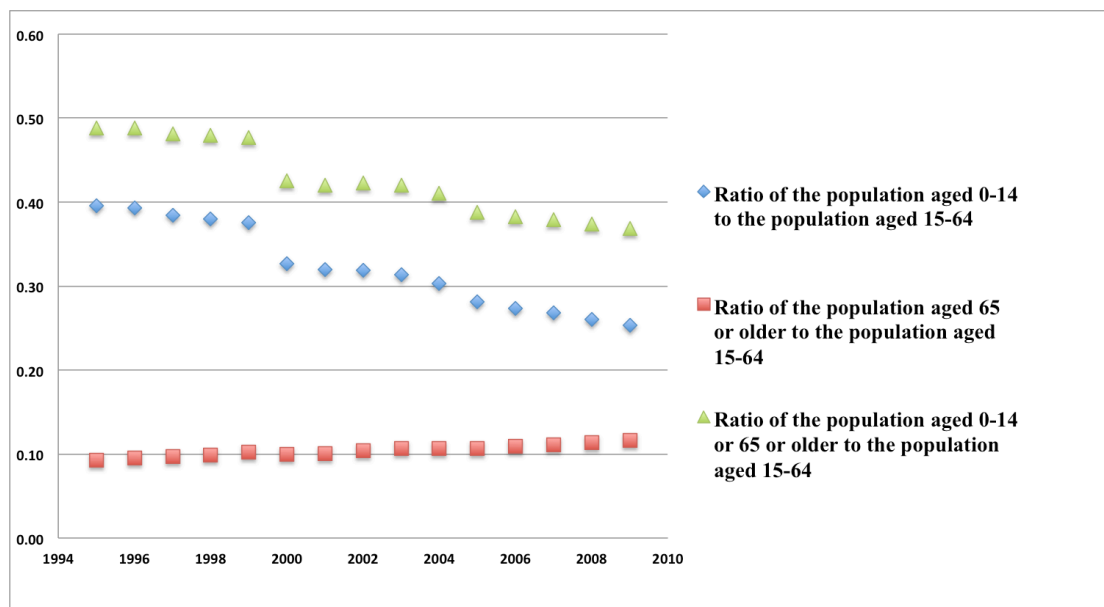
Table 4 Estimated and Projected Population Aged 60 and Over According to the Different Variants, 2015-2050 (100 million persons, %)

<b>Year</b>	<b>Population</b>	<b>% of Total Population</b>
<b>2015</b>	2.12	14.88
<b>2016</b>	2.20	15.38
<b>2017</b>	2.28	15.86
<b>2018</b>	2.34	16.19
<b>2019</b>	2.38	16.40
<b>2020</b>	2.41	16.53
<b>2021</b>	2.45	16.78
<b>2022</b>	2.55	17.41
<b>2023</b>	2.69	18.27
<b>2024</b>	2.81	19.08
<b>2025</b>	2.93	19.86
<b>2026</b>	3.04	20.56
<b>2027</b>	3.15	21.27
<b>2028</b>	3.27	22.05
<b>2029</b>	3.39	22.86
<b>2030</b>	3.51	23.65
<b>2031</b>	3.62	24.36
<b>2032</b>	3.71	24.98
<b>2033</b>	3.79	25.52
<b>2034</b>	3.86	25.96
<b>2035</b>	3.91	26.32
<b>2036</b>	3.94	26.56
<b>2037</b>	3.97	26.71
<b>2038</b>	3.98	26.86
<b>2039</b>	4.00	26.99
<b>2040</b>	4.01	27.11
<b>2041</b>	4.04	27.31
<b>2042</b>	4.07	27.58
<b>2043</b>	4.09	27.79
<b>2044</b>	4.10	27.96
<b>2045</b>	4.13	28.20
<b>2046</b>	4.17	28.58
<b>2047</b>	4.22	29.05
<b>2048</b>	4.27	29.51
<b>2049</b>	4.33	29.99
<b>2050</b>	4.36	30.39

Note: Calculated with TFR=1.8 ( TFR=Total Fertility Rate)

Source: Department of Planning and Finance of the State Family Planning Commission, 2002.

Figure 2 Age Structure and population in China, 1995-2009



Source: Department of Population, Social, Science and Technology Statistics of National Bureau of Statistics of China, China Population Statistical Yearbooks, 1995-2012, China Statistics Press.

Table 5 Summary Statistics of Variables in Rural China by regions, 1995-2009

	Variables	Unit	Mean	Std.	Min	Max
<b>CRRH</b>	Consumption Ratio of Rural households	%	17.00	7.92	4.86	47.76
<b>NI</b>	Growth Rate of Net Income of Rural Households	%	10.33	8.01	-10.60	50.71
<b>RCPI</b>	Ratio of Consumer Price Index of Rural Households	%	-1.08	3.79	-13.55	6.35
<b>RFEA</b>	Ratio of Fiscal Expenditure on Agriculture	%	14.27	13.00	2.86	103.49
<b>RATE</b>	Real Interest Rate	%	-0.22	5.21	-13.10	8.17
<b>SEXR</b>	Sex Ratio of Population	person	1.05	0.03	0.95	1.14
<b>YDR</b>	Young Dependency Ratio of Population	person	35.25	6.18	26.41	45.51
<b>ODR</b>	Old Dependency Ratio of Population	person	11.46	1.41	9.67	13.82

NOTE: Observation=26 Provinces; Samples Sizes= 390

Table 6 Summary Statistics of Variables in Urban China by regions, 1995-2009

	<b>Variables</b>	<b>Unit</b>	<b>Mean</b>	<b>Std.</b>	<b>Min</b>	<b>Max</b>
<b>CRUH</b>	Consumption Ratio of Urban households	%	25.02	5.39	11.89	42.41
<b>NIUH</b>	Growth Rate of Net Income of Urban Households	%	11.00	5.19	-1.54	32.72
<b>RCPI</b>	Ratio of Consumer Price Index of Rural Households	%	-1.00	3.38	-10.59	4.74
<b>RATE</b>	Real Interest Rate	%	0.22	5.21	-13.10	8.17
<b>SEXRU</b>	Sex Ratio in Urban	person	1.02	0.02	0.98	1.01
<b>YDRU</b>	Young Dependency Ratio of Population in Urban	person	24.08	3.29	19.71	30.46
<b>ODRU</b>	Old Dependency Ratio of Population in Urban	person	11.12	1.06	8.37	12.69

Note: Observations=29 Provinces; Sample Sizes=435.

Source: (Table 5 & Table 6) Department of Population, Social Science and Technology National Bureau of Statistics of China, *China Population Statistical Yearbook, 1995-2010*; *China's Population and Employment Statistical Yearbook*; *Finance Yearbook of China, 1995-2010*; Real Interest Rate calculated by benchmark one-year deposit rates, from *Almanac of China's Finance and Banking*. Data in the table are from the 1% national population sampling survey of 1995 and 2005. Population Sample Survey Office, Tabulation on the 1995 and 2005 Population Sample Survey of the People's Republic of China, China Statistics Press. Communiques on major figures of the 2000 population census and major figures on 2000 population census of China. Figures of the national population change survey of other years.

Table 7 Estimation of the Consumption Ratio of Rural Households

<b>Dependent Variable:</b> <b>CRRH</b>	<b>Fixed-effects</b>	<b>One-step system-GMM</b>
<b>Constant</b>	-72.928 (-7.35)***	-23.344 (-3.28)***
<b>CRRH (-1)</b>		0.905 (25.63)***
<b>NI</b>	-0.049 (-2.21)**	-0.0034 (-0.25)
<b>RCPI</b>	-0.025 (-0.56)	-0.0492 (-1.13)
<b>REFA</b>	-0.076 (-4.45)***	0.0058 (0.73)
<b>RATE</b>	0.218 (1.73)*	0.019 (0.45)
<b>SEXR</b>	-3.40 (-2.04)**	-2.02 (-1.91)**
<b>YDR</b>	0.207 (1.84)*	0.399 (2.11)**
<b>ODR</b>	-0.418 (1.78)**	-0.59 (2.41)**
<b>Sample Sizes</b>	390	390
<b>Number of Provinces</b>	26	26

Notes: The estimation of the model is performed using Stata11.0 software. The symbols \*, \*\*, and \*\*\* denote statistically significant at the 10%, 5% and 1% levels, respectively.

Table 8 Estimation of the Consumption Ratio of Urban Households

<b>Dependent Variable:</b> <b>CRUH</b>	<b>Fixed-effects</b>	<b>One-step system-GMM</b>
<b>Constant</b>	40.57 (2.24)**	20.96 (1.89)*
<b>CRUH (-1)</b>		0.451 (6.93)***
<b>NIUH</b>	0.193 (2.07)**	0.170 (1.86)*
<b>UCPI</b>	-0.075 (-0.26)	-0.0392 (-1.19)
<b>RATE</b>	-0.138 (0.67)	-0.209 (2.11)**
<b>SEXRU</b>	-5.40 (2.74)***	-3.52 (2.13)**
<b>YDRU</b>	0.021 (0.84)	0.011 (0.57)
<b>ODRU</b>	-0.0106 (-0.56)	-0.0098 (-0.24)
<b>Sample Sizes</b>	435	435
<b>Number of Provinces</b>	29	29

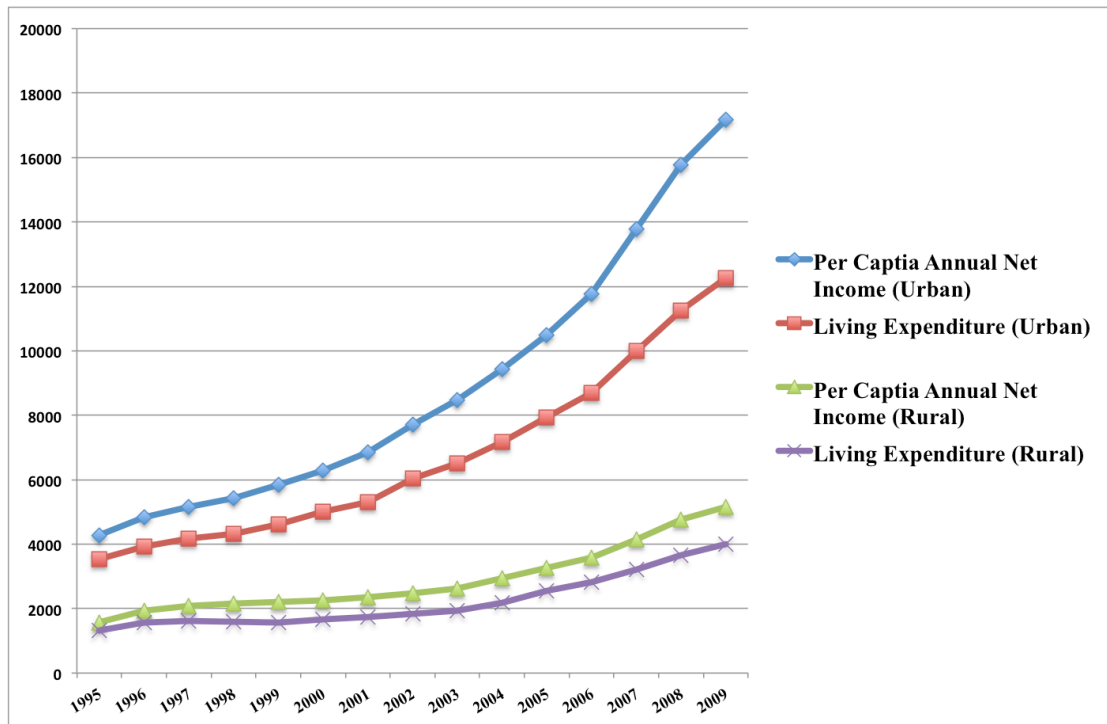
Notes: The estimation of the model is performed using Stata11.0 software. The symbols \*, \*\*, and \*\*\* denote statistically significant at the 10%, 5% and 1% levels, respectively.

Table 9 Estimation of the Consumption Ratio of Rural Households By Regions

<b>Dependent Variable:</b>	<b>Fixed-effects</b>		
	East Area	Middle Area	West Area
<b>CRRH</b>			
<b>Constant</b>	-76.87 (-5.11)***	-71.64 (3.31)***	-62.218 (-3.44)***
<b>NI</b>	-0.024 (-0.86)	0.013 (0.14)	-0.0782 (-2.02)**
<b>RCPI</b>	-0.022 (0.32)	0.011 (0.15)	0.089 (-1.11)
<b>REFA</b>	-0.276 (-5.28)***	-0.064 (-1.78)*	0.098 (-2.55)**
<b>SEXR</b>	-4.21 (3.54)***	-0.93 (1.32)	-0.32 (0.08)
<b>YDR</b>	0.217 (1.69)*	0.265 (2.13)**	0.309 (2.88)**
<b>ODR</b>	-0.402 (-2.98)***	-0.154 (-1.86)*	-0.137 (-1.71)*
<b>Sample Sizes</b>	120	120	150
<b>Number of Provinces</b>	8	8	10

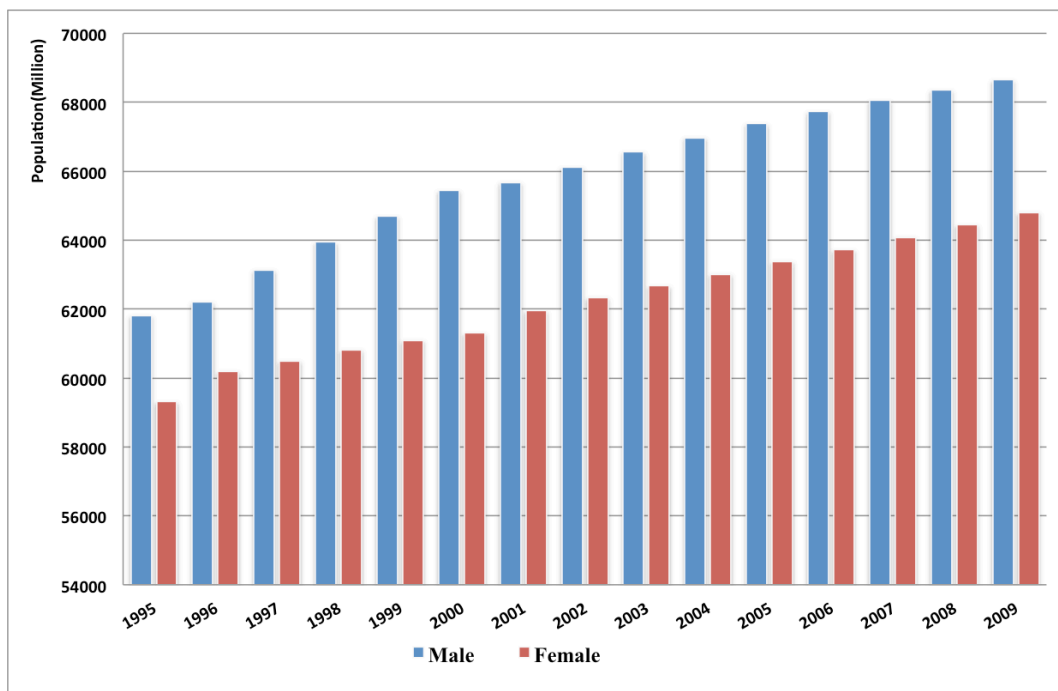
Notes: The estimation of the model is performed using Stata11.0 software. The symbols \*, \*\*, and \*\*\* denote statistically significant at the 10%, 5% and 1% levels, respectively.

Figure 3 Per Capita Annual Income, Expenditure of Urban and Rural Households, 1995-2009



Source: National Bureau of Statistics of China

Figure 4 Sex Ratio, 1995-2009



Source: National Bureau of Statistics of China