# The Average Propensity to Consume of the Urban Chinese Household: An Analysis by Income Level

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**ABSTRACT**

This study aims to measure the impact of Education, Health, Housing, Dependence and Income Growth on the Average Propensity to Consume (APC) of the Urban Chinese Households by Income Level. We use the Quantile Regression for analysis. Results show that Health has a negative impact on the APC; and that Education and Dependence has positive relation. For less wealthy households, "Income Growth" is positive related to the APC. "Housing Prices to Income" (PTI) has a negative impact on the APC for the majority of less wealthy households and national average. Therefore, policies that decrease uncertainties, the household expending on health and housing, and encourage stable growth, redistribute the existing wealth and increase of the size of the family may help to increase the APC in a long run. The government should take into account of issues of housing markets, education and taxation for future policy making of social and economic development.

## I.    INTRODUCTION

Since 2006, the premier Wen Jiabao has been calling the attention for the shift of the fundaments of the economy to have a sustainable growth in a long run (Wen, 2006), which originated the Rebalance the Chinese Economy[1]. It indicates that the Chinese government knew the necessity for changing the Chinese economic grand strategy from an export-oriented and investment driven economy to a consumption-led one. Many policy tools have thus been adopted by the government. However, the consumption expenditure as a percentage of the GDP has remained stable during the recent years[2]. The household consumption separately declined sharply as compared with previous decades, i.e., its participation in the GDP decreased from 52% (1980s) to 35% in 2008 (Baker and Orsmond, 2010). In other words, although the household consumption had a slight growth during the previous years, the growth of the GDP developed on a much faster path[3].

Since the world's economy is relatively dependent on the Chinese growth as well as its internal consumption in the long run, it is imperative to understand why Chinese Households consume less proportionally to their income during this period, i.e., why is the Average Propensity to Consume[4] (APC) decreasing?

The literature provides various reasons to explain this phenomenon. Despite of that, there is one consensus among these studies: the APC of the population is decreasing. The APC calculated from the National Household Survey (see Figure 1) shows that it decreased from 0.89 in 1985, passing through 0.81 in 1997, and achieved 0.62 in 2013.

In the meantime, a fast expansion of its economy and growth in wealth throughout its population and the concentration of wealth in a small section of society can be observed. According to the World Bank (2016), the Gini Index in China grew from 29.1 in 1981 to 42.1 in 2010. This concentration of wealth is also reflected in the development of the Average Propensity to Consume of the different groups shared by income level of the Chinese households, as shown in Figure 2. It is obvious that the National APC is close to the Upper-Middle Income level of the population.

**Figure 1**
National Average Propensity to Consume (APC) in China

**Figure 2**
The Average Propensity to Consume (APC) by Income Level in China
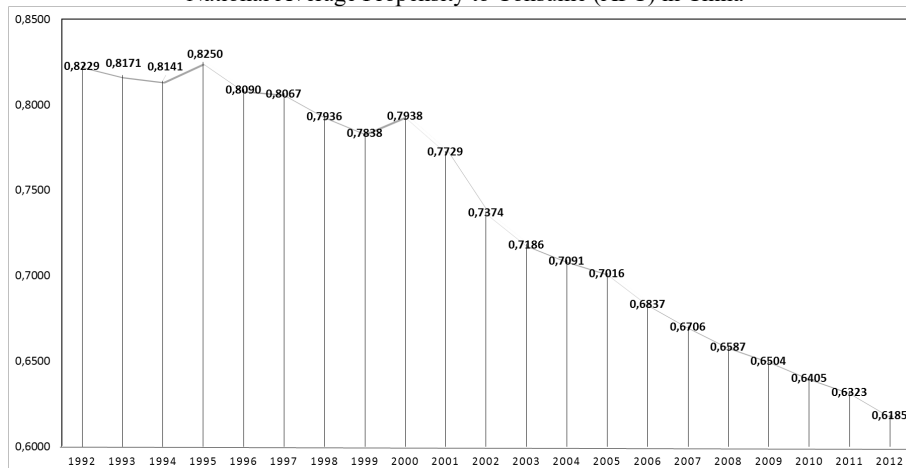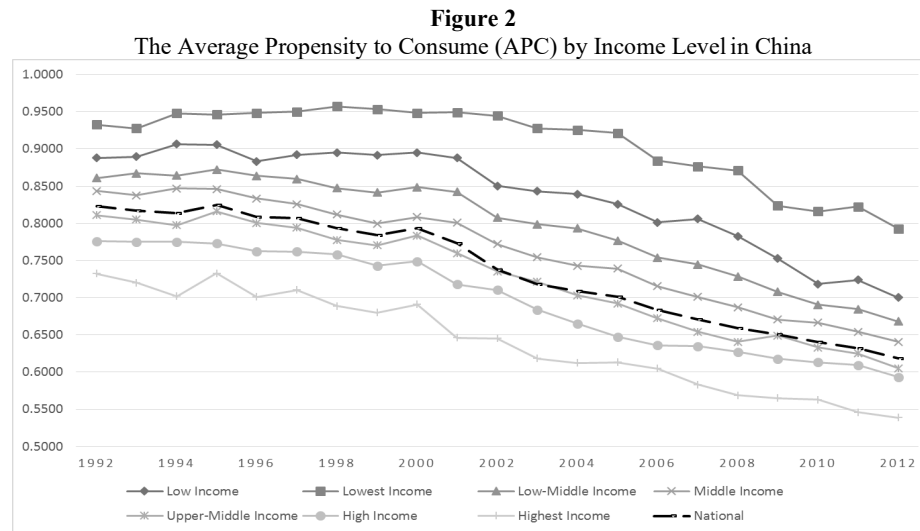


In order to explore why the consumption in China still remains small as compared with GDP, it is important to explain how the independent variables interfere with the APC in each segment of the population. Thus, it is believed that the APC is the best indicator to test the household consumption behavior instead of the total household consumption expenditure per capita because it aims to know the rate of consumption compared to the total income. This study therefore intends to measure the impact of Education, Health, Housing, Dependence and Income Growth over the Average Propensity to Consume (APC) of the Chinese Urban Households by Level of Income and at the National Level.

The focus on the levels of income of the Chinese households is because income inequality has a negative impact over the household consumption (Jin et al., 2011), however, there has been no prominent study on how these variables affect the APC of each income level. If the expected relationship is confirmed, the Chinese government may adopt new policies specifically for households of different income levels.

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## II.    LITERATURE REVIEW AND HYPOTHESES CONSTRUCTION

Both the "Precautionary Savings Model" and "Life Cycle Model" predict that households tend to increase their savings and decrease their consumption according to the greater income uncertainty (Carroll, 1994; Engen and Gruber, 2001; Meng, 2003; Modigliani and Cao, 2004).

Leland (1968) introduced the Precautionary Saving Theory explaining that the "Precautionary" demand for saving usually is described as the extra saving caused by future income being random rather than determinate", and argued that the function of

savings is positively related to the function of uncertainty. Sandmo (1970) indicated that the reasons causing someone to save more might vary due to uncertainty on the returns of investment and on the predictability of income.

As for the relationship between the health and consumption, Chou et al. (2003) found that uncertainty over future expenses in health leads people to save more. Meng (2003) indicated that after the State-owned Companies Reforms, the health-care system in China was not fully provided by the state. It has become a "two-tier system" in which the state and the families started to share all the costs of health-care, and thus, it might have impacted on the household consumption.

In concordance with their results, Barnett and Brooks (2010) also found that urban Chinese families tended to increase their consumption by 2 yuan for every additional yuan spent by the government in the healthcare system. They explained that urban households would decrease their private health-care expending with the increase of the governmental expenditures. Their results are consistent with the observed decrease of the urban health-care spending of the Chinese households in the second half of the 2000s while the government expenditure on health-care increased significantly. They did not find any relationship between governmental expending on education and household consumption[5].

Baldacci et al. (2010) indicated that the government's social spending had a non-linear impact on household savings; and governmental spending on health-care had the largest negative impact on household savings. The effects of government social expending on education, could only be observed when the "individual social spending" is considered separately. In that sense, expenditure on education might have a different relationship with the APC.

On the other hand, Rehman et al. (2011) employs micro-econometric method to study the socio economic and demographic factors influencing household savings of various income groups. They concluded that education, children's educational expenditure, family size, liabilities and value of house are reducing factors for household savings. In the study of Abid and Afridi (2010), they also find the same evidence that education is inversely related to savings. From this point of view, the household expenditures on education are dependent on savings, and this result compresses other expenditures in the household resulting in the decrease of APC.

The housing factor became significant especially after the "massive privatization of the housing stock" in China. In the 1980s, the housing sector started to be reformed, and as a result, the official rent increased and occupants of government housing were able to buy their own houses. Consequently, the great majority of the households were expecting to buy their own houses in late 1990s (Meng, 2003).

Chamon and Prasad (2010) suggested that "savings driven by the motive of home ownership could account for about 3 percentage of the increase in the household saving rate from 1995 to 2005", which may represent a great impact on the housing prices. In the beginning of 1990, only 17 percent of the households owned their own houses, and this proportion had increased to 86 percent in 2009. Therefore, Chamon and Prasad (2010) affirmed that the rise of the household saving rate can be in part explained by the massive privatization of the housing sector.

In addition, Ceritoglu (2017) also examines the relationship between house prices and household consumption in Turkey, their finding suggests that house price changes have a positive and significant effect on the growth of cohort consumption. Also in the

study of Alp and Seven (2019), they explore the issue about household final consumption in Turkey, consistent with Ceritoglu (2017), their finding reveals that housing wealth is positively associated with consumption. Shen (2018) stated that the increase and decrease of consumption propensity coexist for groups of different wealth levels. The APC tends to increase for households with more than one unit of houses, and management levels or owners of corporations as compared with households of non-homeownership or wage-level groups, especially as the economic growth and the housing prices accelerated in recent years. To cope with the decline of consumption and the house prices, the Department of Treasury upgraded the risk level of local government debts to risk free from its original 20% in order to stimulate economic growth through fiscal tools (Tsai, 2018).

Li (2019) also indicated that consumption is not just affected by the current income of households, but also the expected value change of their assets and wealth. He pointed out that real estate sector has accounted for over 30% of GDP growth in China since 2008. He therefore suggested that policy should prevent from the crisis in the real estate market, and the economic growth should reduce the dependence on the real estate sector.

According to the aforementioned studies, households' expenditures on education, health care and housing may have impact on consumption, we therefore intend to explore the trend of these factors for past two decades, and examine their influence on the APC. Thereby, the following three hypotheses related to education, health and housing factors are raised as follows for empirical analysis.

H1:  *The more the households' expenditures on health care, the larger the negative impact it has on the APC.*
H2:  *The more the households' expenditures on education, the larger the negative impact it has on the APC.*
H3:  *The higher the ratio of "Housing Price/Total Income (PTI)" for households, the larger the negative impact it has on the APC.*

From another perspective, the Theory of Consumption observed through the Life-Cycle Hypothesis (Modigliani and Brumberg, 1954) shows that the patterns of consumption may vary according to the stages of one`s life, future incomes and wealth accumulated, i.e., a person would tend to spend while young and old, but would accumulate savings during middle-ages. This is because a rational person wants to "maximize utility derived from his/her life resources by allocating them optimally between current and future consumption" (Modigliani and Cao, 2004), which means that rational consumers will tend to smooth their incomes over their life cycle.

Therefore, as "prudent consumers" encounter any factor of uncertainty related to their future income, they tend to increase their savings and/or decrease their consumption (Carroll, 1994) in order to smooth their spending throughout their life – which is also in accordance with the "Precautionary Saving Model." In other words, the consumption reacts to the variations in the market value of wealth (Ando and Modigliani, 1963), and consequently depends indirectly on the factors to the variations.

According to an empirical application of the "Life Cycle Hypothesis" (LCH) over Chinese households, Modigliani and Cao (2004) found that the reason for the Chinese households maintain the high savings rate is due to the "high growth of income and the demographic structure of the economy". When they referred to the demographic structure,

they meant that "minority" (E/M)[6] decreased drastically since the implementation of the One-Child Policy in China. In addition, this effect might be related to some demographical transformations in the core of the Chinese society since the families are more nuclearized (i.e., other relatives, i.e., grandparents, started to compose their own households) and the internal migration of the past decades started to develop an important role in the distributions of wealth, labor and size of the family.

In contrast, Chamon and Prasad (2010) found that the poorer, younger and older Chinese people would tend to save more in comparison with other sections of the population, and thus this part of the population would tend to increase savings. This is explained by the "rising private burden of expenditures on housing, education, and health care". They concluded that "… the risk of large health expenditures can explain high savings among households headed by older persons, and that savings are also higher for households whose composition portends large education expenditures in the future". Therefore, assuming that the young and elderly also belong to the group of "dependents" on the working members of their family, the following hypothesis is raised:

H4:    *The more the increase in the number of dependents in a household, the more this household would have incentives to save, and thus, decrease its consumption.*

The relationship between income and household expenditure are widely examined in the past researches. Based on Keynes' absolute income hypothesis, Alimi (2013) explored the link between consumption expenditure and income in Nigeria and their finding shows that income is negative to the APC. Similarly, Mallik and Pradhan (2012) analyze the causal relation between per capita consumption expenditure and personal income in India. Their empirical results indicate that there is a unidirectional causality runs from per capita consumption expenditure to personal disposal income. Collected data from 1981 to 2010, Akekere and Yousuo (2012) investigated the influence of change in gross domestic product (income) on private consumption expenditure in Nigeria, and they concluded that there is a significant relationship between gross domestic product (income) and private consumption expenditure. According to previous research aforementioned and on Modigliani`s findings about the relation between income-growth and consumption, the following hypothesis is proposed

H5:    *The higher the income growth, the larger the negative impact it has on the APC.*

### III.    DATA AND METHODOLOGY

**A.    Treatment of Variables and Data Information**

Most studies used the "aggregate consumption expenditure" as an independent variable to analyze the impact of the independent variables on consumption. This study aims to explore the factors leading the Chinese Households to consume less proportionally to the income along the time, the proportion of "consumption over income" is employed as the variable.

In order to find the income and expenditures (consumption, health and education) per household, we collected the data from CEIC database. The income and expenses per capita was multiplied by the number of people in a household, which generated the

Household Total Consumption Expenditure, Household Total Income and Consumption Exp. per Household on: (1) Recreation, Educational and Cultural Service; and on (2) Medicine and Medical Service[7].

For the housing variable, the ratio of "House Price to Income" (PTI) was obtained from the rate between the "Selling Prices of Commodity Buildings" versus the "Residential and Household Total Income" for each income level. For the variable "Dependence", the number of people in a household that economically depend on other members of the same household, which is obtained from the difference between the number of persons per household and the number of employees per household. The use of this indicator is to explore how the number of dependents in a household affects the APC.

All the data used in this research are secondary data from the National Bureau of Statistics of China through the National Household Survey and compiled/obtained from the CEIC Data Base by Euromoney Institutional Investor Company. Since the financial tsunami incepted in 2008, the United States, Europe, Japan and most other countries have implemented a series of quantitative easing (QE) monetary policies through open market operations or cutting the rediscount rate to stimulate the sluggish economy. Although China did not release any information regarding its figure of increased money supply, its one-year benchmark interest rate for loan dropped from 8.64% in 1991 to 6% in 2012. Therefore, the intertemporal analysis in this study are used from 1992 Q1 to 2012 Q4 to avoid the further impact of QE or interest rate reduction, and the observations are totally 84.

## B.    Methodology

The Ordinary Least Squares (OLS) regression is the most common method to test the models throughout most of the literature about theories of consumption (Meng, 2003; Modigliani and Cao, 2004; Chamon and Prasad, 2010; Jin et al., 2011). To identify the effect of the dependent variables over the consumption behavior, we established an empirical model as follows:

$$APC = \alpha + \beta E + \gamma H + \delta D + \omega PTI + \pi \Delta Y + \varepsilon \qquad (1)$$

where APC is the Average Propensity to Consume, E the Indicator for the variable Education; H, for health; D, for Dependence; PTI, for Housing; and $\Delta Y$, for the variation on the income. The coefficients $\beta$, $\gamma$, $\delta$, $\omega$ and $\pi$ are their respective coefficients. $\alpha$ is the intercept coefficient, $\varepsilon$ is the standard error.

In Eq. (1), each of the coefficients shows the impact their respective variables over the APC. The coefficient $\beta$ and $\gamma$ measure the impact over the APC for variables of "Consumption Expenditure per Household on Recreation, Educational and Cultural Service", and on "Consumption Exp. per Household on Medicine and Medical Service over Household Total Income", respectively. For the variable D, $\delta$ expresses the relationship between APC and the dependency rate for each household. For PTI, $\omega$ represents the impact of the burden on a family of purchasing a house on the APC. The value of $\pi$, in turn, shows the impact of variation of income on the APC.

The use of Quantile Regression (QR) provides a new perspective on understanding the relationship between the variables according to the variations in the APC along the

past 20 years in the Chinese economy by income and national levels. The traditional regression method estimates the parameters by OLS approach under the assumption that the error term is a normal distribution, and the principle of the regression is mainly to emphasize the average marginal effect of the independent variable on the dependent variable.

Unlike OLS, the assumption of distribution of error term is not required and the least absolute deviations (LAD) is used to estimate the margin effect of regression when the QR approach is applied. Thus, QR is more efficiency than OLS when the error term is not normal distribution (Buchinsky, 1998). The QR focuses not only on the conditional mean, but also on the whole conditional distribution of the variables. This means that the QR provides a robust analysis as the samples are not evenly distributed. This research thus divided the sample into five quantiles for each income level. Another advantage of the QR is the freedom from disturbance of the extreme value, and it can capture the effect of fat tails and heterogeneity in the financial data. Suppose a linear model is defined as

$$y_i = \acute{x}_i \beta + \varepsilon_i, \quad i = 1,2,3 \dots n \tag{2}$$

where $y_i$ is a dependent variable, $x_i$ is the vector of independent variables, $\beta$ is the vector of parameters, and $\varepsilon_i$ is error term. Following Koenker and Bassett (1978), the estimator of parameter $\beta$ at quantile $\tau$ is defined as

$$\hat{\beta}(\tau) = \min_{\beta} \left[ \sum_{y_i \geq \acute{x}_i \beta} \tau |y_i - \acute{x}\beta| + \sum_{y_i < \acute{x}_i \beta} (1 - \tau) |y_i - \acute{x}\beta| \right] \tag{3}$$

The QR of this study is specified as follows:

$$Q_\tau(APC|X) = \alpha_\tau + \beta_\tau E + \gamma_\tau H + \delta_\tau D + \varphi_\tau PTI + \pi_\tau \Delta Y + \varepsilon_{it} \tag{4}$$

where the independent variables such as E, H, D, PTI, and ΔY and the coefficients are defined the same as OLS regression model.

## IV.     EMPIRICAL RESULTS

The aim of this study is to examine the influence factors affecting APC, and thus we only focus on the explanation of the coefficients of independent variables. To save space, this study does not report the intercept in both OLS regression model and QR model. Panel A of Table 1 shows the results of the OLS regression. The variables Health (H), Housing Price (PTI) and the Variation of Total Income (ΔY) have a negative impact over the Average Propensity to Consume (APC) of the urban Chinese households. Their coefficients are approximately -11.08, -0.49 and -0.23, respectively, which means that the increase of the household expenses on health care per total household income had the strongest impact over the National APC. These results may vary with the increase of the housing price over the household total income (PTI), and the variation of the income. Considering the presence of heteroskedasticity, therefore, the results should especially be focused in the QR model.

**Table 1**
Results of the OLS and Quantile Regression on APC by Levels of Income and National Level

| Panel A OLS Regression | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| variables | Lowest Income | Low Income | Low-Middle Income | Middle Income | Upper-Middle Income | High Income | Highest Income | National |
| E | 3.6856 *** | 4.3476 *** | 5.0208 *** | 4.6417 *** | 5.8905 *** | 4.8895 *** | -0.4551 | 6.3992 *** |
| H | -3.6159 *** | -6.1267 *** | -8.9882 *** | -8.4130 *** | -9.1738 *** | -8.3884 *** | -1.5410 ** | -11.0838 *** |
| PTI | -3.4979 *** | -1.5302 ** | -3.5102 *** | -1.2208 ** | 0.4111 | 2.2560 *** | 6.5901 *** | -0.4937 *** |
| D | 0.5011 *** | 0.4751 *** | 0.5936 *** | 0.5517 *** | 0.4709 *** | 0.4985 *** | 0.6189 *** | 0.7034 *** |
| ΔY | 0.0116 | 0.0207 | 0.0948 * | 0.0893 | -0.0027 | -0.0946 | -0.1119 *** | -0.2287 *** |
| R-squared | 0.5532 | 0.7076 | 0.9001 | 0.8994 | 0.8701 | 0.8192 | 0.8249 | 0.9647 |
| Ad. R-sq | 0.5297 | 0.6922 | 0.8949 | 0.8941 | 0.8632 | 0.8096 | 0.8157 | 0.9627 |

| Panel B Quantile Regression | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| var. quant. | Lowest Income | Low Income | Low-Middle Income | Middle Income | Upper-Middle Income | High Income | Highest Income | National |
| E 0.200 | 4.6000 *** | 4.7572 *** | 5.8427 *** | 5.1134 *** | 6.4525 *** | 2.4161 ** | -0.7026 | 6.8388 *** |
| 0.400 | 3.5333 *** | 4.2593 *** | 5.9615 *** | 4.1105 *** | 4.8888 *** | 3.7099 *** | 1.5304 | 6.3345 *** |
| 0.500 | 3.0387 *** | 4.7637 *** | 4.9212 *** | 4.0142 *** | 5.1045 *** | 3.3931 *** | 2.3313 *** | 6.3701 *** |
| 0.600 | 2.9850 *** | 3.9937 *** | 4.4990 *** | 3.9663 *** | 5.1861 *** | 3.0110 *** | 2.4390 *** | 6.3965 *** |
| 0.800 | 3.0591 *** | 3.8356 *** | 3.4913 *** | 4.6111 *** | 6.0247 *** | 2.9873 *** | 1.9052 ** | 6.4667 *** |
| H 0.200 | -3.4925 *** | -4.3818 *** | -9.0281 *** | -8.0308 *** | -8.8618 *** | -2.6439 | 1.2012 | -12.0775 *** |
| 0.400 | -2.4105 *** | -3.9972 *** | -9.5685 *** | -7.6637 *** | -9.4784 *** | -8.8664 *** | -0.1116 | -12.2232 *** |
| 0.500 | -3.3198 | -5.2920 *** | -8.9364 *** | -7.7235 *** | -9.7640 *** | -8.6774 *** | -0.4497 | -12.0164 *** |
| 0.600 | -3.9418 *** | -6.5305 *** | -8.4191 *** | -8.4433 *** | -9.8456 *** | -7.7848 *** | -0.7851 ** | -11.9131 *** |
| 0.800 | -3.7743 ** | -6.0996 *** | -8.2234 *** | -8.8786 *** | -10.2117 *** | -5.8296 * | -1.6269 *** | -11.2738 *** |
| PTI 0.200 | -3.4374 *** | 0.4510 | -3.4126 *** | -0.5900 | 1.5422 | 3.9258 *** | 6.5463 *** | -0.6191 *** |
| 0.400 | -3.4656 *** | 0.3093 | -3.8894 *** | -1.2898 ** | -0.7877 | 1.5682 | 9.7691 *** | -0.7761 *** |
| 0.500 | -2.8361 | -2.7632 ** | -4.1979 *** | -0.8643 | -1.1000 * | 2.0576 | 10.8577 *** | -0.7688 *** |
| 0.600 | -2.8116 * | -3.1359 | -4.2539 *** | -1.8799 | -1.0654 * | 3.5568 | 11.3971 *** | -0.7609 *** |
| 0.800 | -3.9479 | -2.1456 | -2.2045 | -2.4982 *** | -1.3427 ** | 7.4097 | 11.8038 *** | -0.681 *** |
| D 0.200 | 0.4251 *** | 0.3075 *** | 0.5202 *** | 0.4800 *** | 0.3783 *** | 0.3792 *** | 0.5046 *** | 0.7211 *** |
| 0.400 | 0.4596 *** | 0.3539 *** | 0.5568 *** | 0.5705 *** | 0.5899 *** | 0.6300 *** | 0.3361 *** | 0.7608 *** |
| 0.500 | 0.5043 *** | 0.4593 *** | 0.6171 *** | 0.5713 *** | 0.5935 *** | 0.6447 *** | 0.2622 *** | 0.7552 *** |
| 0.600 | 0.5369 *** | 0.5774 *** | 0.6339 *** | 0.6279 *** | 0.5928 *** | 0.6158 *** | 0.2529 *** | 0.7515 *** |
| 0.800 | 0.5773 *** | 0.5488 *** | 0.6499 *** | 0.6120 *** | 0.5654 *** | 0.4706 | 0.3250 *** | 0.7281 *** |
| ΔY 0.200 | 0.2470 *** | 0.2966 ** | 0.2512 *** | 0.0880 | -0.0882 | 0.2029 | -0.0068 | -0.2391 *** |
| 0.400 | 0.2176 *** | 3.0830 ** | 0.1733 *** | 0.0069 | -0.0574 | -0.1584 | -0.1368 ** | -0.2569 *** |
| 0.500 | -0.0089 | 0.1722 | 0.1117 | -0.0283 | -0.0358 | -0.1830 ** | -0.1237 *** | -0.2518 *** |
| 0.600 | -0.1640 | -0.1379 | 0.0882 | 0.0199 | -0.0306 | -0.2045 *** | -0.0874 *** | -0.2484 *** |
| 0.800 | -0.2092 | -0.0981 | -0.0937 | 0.1552 ** | -0.0470 | -0.1774 *** | -0.0571 | -0.2327 *** |

The OLS results also show that the variable Education (E) and Dependence (D) have a positive relationship with the APC, which means that the greater the increase of the expenses of a household on education (relative to the total income), the greater is the propensity to consume of this family. The variable with the highest positive impact is "Education", with the coefficient value of 6.40; followed by "Dependence" 0.70, implying that higher education may lead to higher purchasing power, and more dependent family members require more spending. The Adjusted R-squared value is 0.96, which means that the model can explain the variation of the APC at the national level[8].

With the results of the Quantile Regression of Panel B in Table 1, findings related to the variables H, PTI and ΔY confirm our hypotheses 1, 3 and 5 at the national level. However, we cannot confirm the Hypothesis 2 since the variable "E" has a positive impact on APC. This interesting result is worth of discussion. As a high ratio of "Health-care spending" or "Housing Price to Income" tends to crowd out households' APC at the national level, why "Educational Spending" tends to have positive effect on APC? This phenomenon may be explained by the Chinese tradition emphasizing offspring's education. As children in the family earn the chances for higher education, the family tends to be better off, or be able to find finance sources to support them, and thus has positive effect on households' APC. The conclusions are consistent among OLS and Quantile Regression for national average and almost all quantiles of income levels.

As cited, a positive impact was found between "D" and APC, which means that the greater the number of dependents in a household, the greater is the APC. This is possible because the size of household has a positive relationship on its consumption. In other words, it would be impossible for a household to save if the number of dependents increased since each individual has a minimum required level of consumption. Therefore, the results at the national level reject the Hypothesis 4 stated as: "the more the increase of the number of dependents in a household, the less is its consumption."

The analysis by income level is presented in ascendant order of income. Considering the results for the lowest income of the Chinese society in the urban area, the variables H and PTI have a negative impact on the APC. The values of this impact in the OLS model are -3.62 and -3.50, respectively. The effect of ΔY shows no significance on the APC at the national level. But looking at the quintile 0.2 and 0.4 of ΔY in the QR model, there is a positive relationship with values of 0.25 and 0.22, respectively. This means that the increase of the variation of income (ΔY) for this low-income segment of the population increases the APC. This result presents a different scenario from that of the national level, but it is still in accordance with the "Life Cycle Hypothesis". This conclusion suggests that welfare policy should put more weight on the low-income groups.

As for the "PTI" variable, however, the results of Quantile Regression show interesting outcomes. The national average shows all negative impact on APC for all quantiles, as well as the income levels of upper-middle income levels and below. This means that higher ratio of house prices to income tends to lead to lower APC on national average and income below the upper-middle level. For the "high income" level, the effects are mostly insignificant, but the signs turned to positively significant for the highest income level, which implies that the highest-income level households may own more than one houses so as to have the "wealth effects" (i.e., spending more as house prices rise). The policy to boost up the property prices may be only welcomed by this specific wealthy group, but neither for the whole nation average nor the income levels below upper-middle income. Chinese governments should pay attention to the distinct difference as making policies in the housing sector and economic development in the future.

## V.    OVERALL INTERPRETATION OF THE RESULTS

Some results from this study are worth noting. As it can be seen, education expenditure has a positive impact over the APC, which is divergent to what was expected from the

findings of Baldacci et al. (2010). This may be explained as follows.

1.　Baldacci et al. (2010) did not consider the household expenditures on education, but only the governmental expending on education; thus both findings are not necessarily divergent. Besides, their results could only be observed when the "individual social spending" is considered separately. In addition, the results obtained by Barnett and Brooks (2010) are statistically insignificant, and any relationship could only be found between the household expenditures on education and consumption.

2.　Observing throughout the analyzed period as a whole, the share of expenditure on education out of total income (national level) increased from 3% in 1992 to 6% in 2000, and then decreased again to 3% in 2012, meaning that the total income per household had a faster growth than the growth of the expenditure on education by household. This implies that the expenditure on education for Chinese households was compensated by the growth of the total income, which might explain the positive impact on the APC.

3.　As the expenditure on education is seen by some authors (Jin et al., 2011) as an investment in the future or even a social-status seeking motivation, the growth of the household total income grew faster than the growth on expenditure on education. It is reasonable to affirm that the expenditure on education for the Chinese Households could be absorbed by the families, and didn't have a negative impact on the APC. Families of almost all income levels and national average tend to support the expenses in education and other consumption needs as their children were able to continue education.

4.　According to the aging of the Chinese population, the One-Child Policy and the decrease of the size of the Chinese household, the number of children in education per family is smaller than it was at the beginning of the studied period – this also helps to explain why the total income per household increased faster than their expenditures in education.

The results obtained from the variable H follows all the theories and empirical results presented on the literature review, which means that it presents a negative impact on the APC. The spending on health-care in comparison to the total incomes of a household is higher for less wealthy families. Figure 3 shows that the households of Lowest Income, Low Income, Low-Middle Income and Middle Income spend a higher percentage of their total budget on health-care than the national average, partly due to the basic need for households of these income levels. After year 2000, the H started to decrease, meaning that the growth of income was higher than the growth in health-care expenditure.

Figure 4 shows the trend of PTI, and Figure 5 is plotted from the average results of the QR model. We can conclude that the PTI presents a negative impact on the APC for the population between the Lowest and the Upper-Middle Income, but presents a positive impact for the High and Higher Levels of income. This means that the PTI has significant negative impact for the Low-Middle Income, Lowest Income and Low Income families, as well as the national average. Only approximately only 20% of the richest Chinese urban households tend to increase spending as housing prices rise, perhaps due to the ownership of more than one houses. As the housing prices may
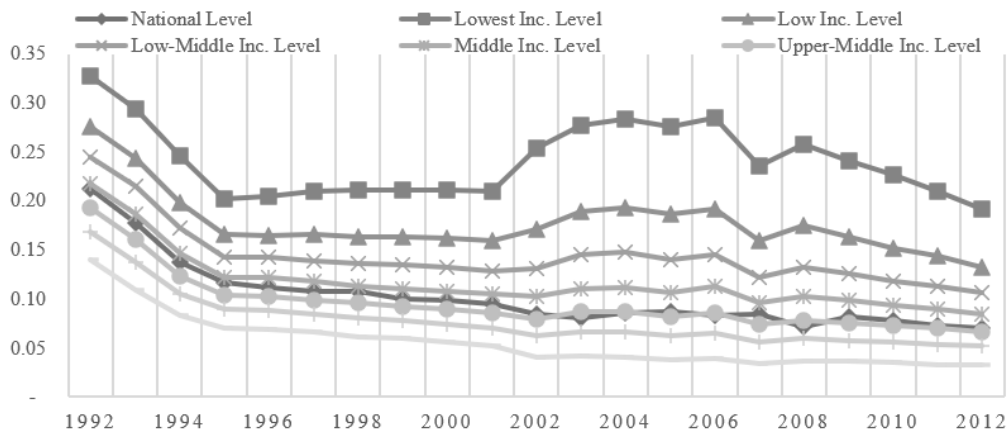
negatively affect the APC for most households, Chinese government should be engaged in policies preventing from the surge or bubble effect in the housing market.

Another interesting result comes from the impact of the variation in income, which presents a negative relationship to the APC for the High and Highest Income Levels (and for the national level). This finding is consistent with the LCH proposed by Modigliani. Therefore, we can conclude that the variation of income for the Chinese society just presents a negative relation to the APC for the High and Highest Income Level of the population. This is also a sign of concentration of wealth raised in the introduction – even the middle class presented a positive relation of this variable to the APC at the quantile 0.8. This finding is illustrated in Figure 6.
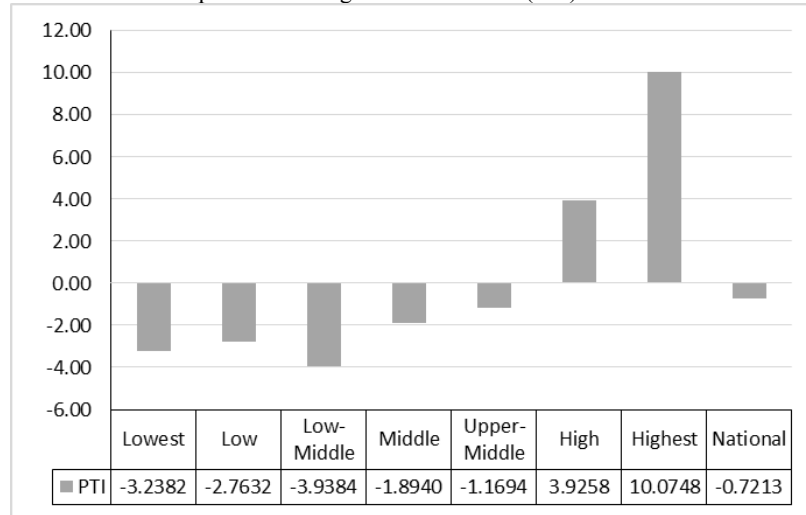
**Figure 3**
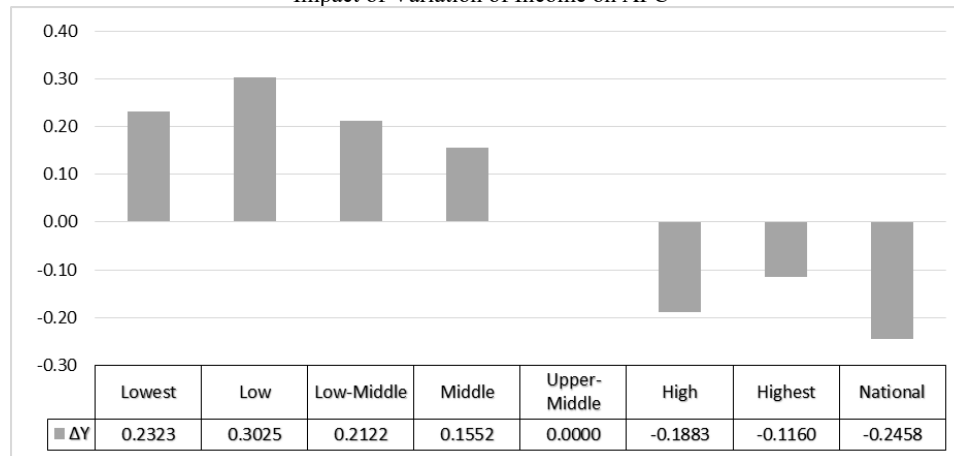The Trend of Health Expenditures (H) (1992 - 2012)
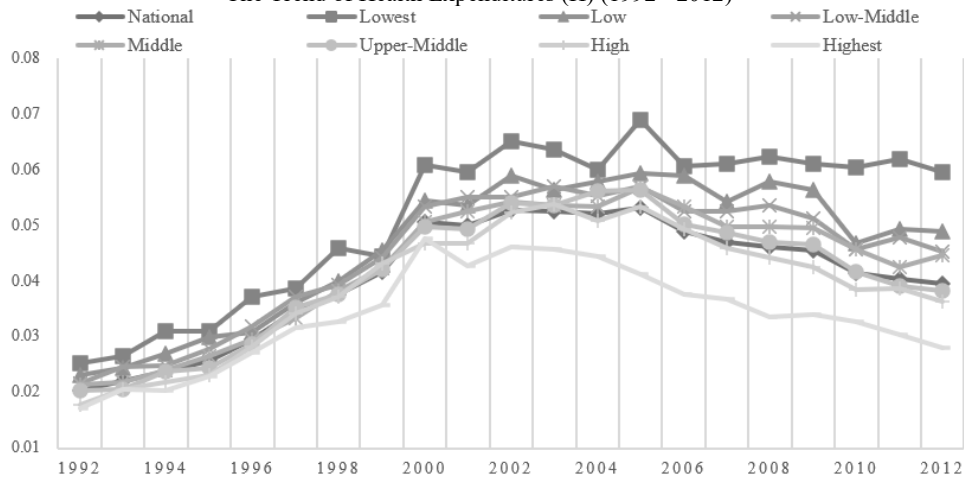


**Figure 4**
The Trend of Variable Housing Prices to Income PTI (1992 - 2012)

**Figure 5**
Impact of Housing Prices to Income (PTI) on APC



| | Lowest | Low | Low-Middle | Middle | Upper-Middle | High | Highest | National |
|---|---|---|---|---|---|---|---|---|
| ■ PTI | -3.2382 | -2.7632 | -3.9384 | -1.8940 | -1.1694 | 3.9258 | 10.0748 | -0.7213 |

**Figure 6**
Impact of Variation of Income on APC



| | Lowest | Low | Low-Middle | Middle | Upper-Middle | High | Highest | National |
|---|---|---|---|---|---|---|---|---|
| ■ ΔY | 0.2323 | 0.3025 | 0.2122 | 0.1552 | 0.0000 | -0.1883 | -0.1160 | -0.2458 |

This result presents a different scenario from the results at the National Level, but it is still consistent with the Life-Cycle Hypothesis. This is because the ratio of savings to income for wealthier families tends to be higher than that for the less wealthy households, or even negative among the lowest income level (Deaton, 2005). In other words, the margin for the poorer families to save is smaller since the entire income has to be spent on basic necessities, unlike from the other extracts of the population. This also means that the redistribution of the wealth, or ceteris paribus, the increase of ΔY for the Lowest, Low, Low-Middle and Middle-income levels of the Chinese households would tend to increase the Chinese APC. Therefore, policies regarding the income tax brackets may take into account of these interesting findings.

## VI.      CONCLUSION

Although most of the population have access to the public health insurance in China, the coverage is too shallow – the premium is too small and the patients usually have to pay heavy fees, especially for those with severe diseases (Wu and Jacobson, 2015). The government provides subsidies for low-income families, which helps explain why the negative impact of Health-care expenses (H) is heavier for Low-Middle, Middle, Upper-Middle and High Income Level households.

Therefore, policies that decrease the out-of-pocket health-care expenses of the families might have a strong effect on their consumption. Besides, the establishment of health insurance with bigger coverage or an increase in the incentives for the use of private health-care insurance might be also a good alternative.

After the establishment of the Basic Medical Insurance for Urban Employees in 1998 and Basic Medical Insurance for Urban Residents in 2007, the expenditure of the families on health-care diminished. Nonetheless, the intensity of the negative impact of the variable H over the APC still remained high, which means that other new reforms might be necessary beyond those already implemented by the 12th Five-Year Plan.

Since the housing prices presented a negative impact on the APC, policies supporting housing finance for Lowest, Low and Low-Middle income households would reduce the burden on these families, and consequently tend to increase their household consumption. Furthermore, policies regarding the control of the "irrational exuberance" in the housing market should be considered. Otherwise it may result in a catastrophic blow to the housing market like the subprime crisis in the United State at the end of 2008, and consequently, the sharp decline of the APC.

After 35 years of the implementation of One-Child Policy, the lax new policy to counteract the aging population may probably increase the number or the dependents (D) per household, which may impose a positive effect over the APC. Therefore, the effects of the end of this policy on the economy might be expected. On the other hand, the end of this policy does not necessarily mean a big demographic change in the long run – i.e., families may not be willing to have more than one child due to the high costs of raising children. In that case, if the fertility rate of 1.2-1.5 child per woman does not increase, then policies to incentivize young couples to have more than one child should be adopted (Lin, 2015).

Finally, since households of the Lowest, Low, and Low-Middle Income Level have a positive impact on the APC, policies of redistribution of wealth and increasing the minimal wage should be adopted to decrease the income inequality and increase consumption. Even though the effectiveness of these policies showed huge gaps/failures after the 2008 crisis, after which the global inequality has just increased, progressive redistribution of wealth policies (e.g., the tax rate brackets) are still the widely used tool of most countries to solve the problems of inequality. Besides, a progressive increase of the minimum wage above the national wages adjustments might bring real benefits to the lower income levels of the population, and thus increase the consumption (Dabla-Norris et al., 2015).

It was observed that the APC is liable to variation according to some specific scenarios. The decrease of uncertainties, stable growth and increase of the size of the family may attribute to the increase of the APC in a long run. In contrary, drastic decrease of income or the purchasing power of the families, also lead to the increase of the APC

in a short term due to the Duesenberry Effect and afterward to decrease in a long run. Through other perspective, unpredictability of future (such health-care spending of the families etc), huge income growth, increase of the housing prices and decreasing size of the family are also responsible for the decrease of the APC. From the results of this study, it is evident that macro- and micro-policies have significant impact over the Chinese APC. The government should take into account of issues of housing markets, education and taxation for the long-term planning on social and economic development.

## ENDNOTES

[1]  The Rebalance of the Chinese Economy is understood as the shift of the macroeconomic policy from exported and investment oriented-driven economy to a consumption-driven economy.

[2]  The Final Consumption Expenditure is composed by Household Consumption expenditure and Government Consumption Expenditure.

[3]  For example, Xu et al. (2010) explore the causes of decline of the final consumption rate in China during 1978 to 2008. The implication of their evidence shows that the decline of final consumption rate is caused by decrease of consumption propensity, adjustment of national income distribution structure, reform of urban housing system and slow growth of rural income.

[4]  Average Propensity to Consume (APC) is defined by Modigliani and Cao (2004) as the rate between Total Consumption Expenditures and Total Incomes.

[5]  Their results were statistically insignificant, but they argue that it might be because the data available counted just for the elementary and primary school, and that for the families, the most significant spending in education happens at the university level.

[6]  Modigliani understands "minority" (E/M) as "Number of persons employed / Number of persons 14 years and younger".

[7]  Due to limitation of availability, the data used to calculate the national level was "Consumption Exp. per Capita: Education". In contrast, the data used to make the calculus by Level of Income was "Consumption Exp. per Capita: Recreation, Educational and Cultural Service".

[8]  The adjusted R-squared values for all OLS models are between 0.53 and 0.96. This result shows that the independent variables can explain the large variation of the regression models, and the goodness of fit for all models are good. Because of the better goodness of fit for all models, we argue that the probability of omitted variables is small and the issue of omitted variables could be neglected in this study.

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