

China's Consumption Function: An Empirical Test of Absolute and Permanent Income Hypothesis

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Abstract

The study investigated the empirical rationale of Absolute and Permanent Income Hypothesis (AIH) & (PIH) for China by applying the yearly data from 1970-2016. The outcomes of the research study dismissed the validity of PIH, at the same time it reinforced the soundness of AIH in the country. The aftereffects of CMMI demonstrate that any change that occurs in expected income significantly affects the innovation in real private consumption. Moreover, the share of forward-looking households is genuinely lower than backward-looking households. Under the CMM the estimated value of $(1 - \lambda)$ for China is 0.25, which implies that by and large 25 percent of the households set their consumption base on permanent income, albeit the rest of the families take their consumption preferences are subject to current income, notwithstanding the outcomes of the study bring up a solid dismissal of PIH for China.

Key Words:

AIH, PIH, Campbell and Mankiw Model, Forward-looking Households, Backward-looking Households

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Introduction

Since the great depression, aggregate consumption has received great implications and shaped like a key macroeconomic variable. In 1936, in his book 'General Theory' Keynes postulated that aggregate consumption as a significant variable. According to him, the share of an individual's income that he steadfast to his consumption heavily relies on the degree of his present/current income. He further states that the proportion of an individual income dedicated to consumption changes as income changes. So, if the current income of any individual increases, the consumption will also increase but with a dissimilar degree. Technically, the average propensity to consume (APS) consistently diminishes with an upsurge in the current income and this situation is called Absolute Income Hypothesis (AIH). Later, Kuznets in 1946 established that AIH has empirical puzzles. To test his claim, he utilized time-series and cross-section data and measured APC both for the short-run and long-run in case of US. Nevertheless, his vigilant examination did not bolster AIH on the ground that the APC of US was steady and constant in long-run although diminishing for the short run. However, the information generated through cross-section data of households' families affirmed the validity of AIH for the short-run. Henceforth, to settle

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the consumption puzzle which was highlighted by Kuznets and to clarify the consumption pattern of the households, Friedman exhibited his peculiar consumption hypothesis which is known as PIH. As specified by PIH, that households set their consumption choices subject to their permanent income. This permanent income is a part of an individual income that is expected to obtain in future. In this manner, PIH dissects the current income of an individual in two parts; the transitory and permanent income.

In the current literature, there are some pivotal studies like; Khan (2010) verified the validity of AIH and PIH for Pakistan and found out that the PIH is invalid for Pakistan over the study period. Later, Nezhed (2011) estimated MPC under the study applies different kinds of nonlinear models to estimate the MPC of Iran. The outcomes of the study demonstrate that in Iran current income affects the household's consumption. Likewise, Manitsaris (2006) analyzed the AIH and PIH for the economies of European Union, the outcomes of the research study display that in all the European economies under the study, satisfy the PIH. Furthermore, the empirical outcomes of Manitsaris (2006) also reinforced the PIH. Zuchlke et al (1989) inquired the PIH for emerging economies and found out that PIH is not valid for the developing countries under study. Rao (2005) used Campbell and Mankiw (1990) models and verified the Hall's PIH for Fiji. The study results rejected the PIH for Fiji. Khan et al. (2012) tested the consumption hypotheses for Pakistan. The results support the AIH for Pakistan.

Furthermore, the connection between family consumption and different macroeconomic elements have been examined by various studies like Mishra (2011) examined the connection between consumption and financial development in India, and indicated that consumption is influenced by monetary development over the long-run rather than short-run. Akekere et al 2012 examined the effect of GDP on aggregate consumption in case of Nigeria, the outcomes of the study demonstrated that GDP has a critical positive effect on aggregate consumption. The results propose that an expansion in financial development would support family consumption. The same results were also affirmed by Ofwona (2013) that current income is a foremost element of family aggregate consumption in case of Kenya.

The connection between income and family aggregate consumption was likewise settled by different study, for example; Parker (1999) discovered that anticipated adjustments in current income have no impact on the increase in consumption. Alim (2013) examined the connection of consumption and current income are as per Keynes' theory in Nigeria and inferred that as current income expands, the APC is diminished. Guisan (2004) examined the causative connection of consumption and GDP in the US and Mexico and discovered no causation in Mexico, however, two-sided causality was observed in the US. Despite that, a few studies rejected to support the connection between family consumption and monetary development/ GDP growth. Pastor et al (2013) and Sprout (2009,) found it that greater inflation may also decrease consumption spending. Hausman et al (2014) studied financial facilitating in Bank of Japan and the aggressive fiscal approach, presumed that greater inflation spurs GDP and consumption. In this manner, experimental data shows that adjustments in prices and inflation anticipations may influence family consumption. Aruoba et al (2011) estimated the impact of interest rate on consumption relies upon presumptions with respect to what kind of cash is using by the household. In this manner, he concluded higher inflation could bring down aggregate economic activities including consumption

The rest of the study is prepared in a subsequent way: the next section illustrates methodology of the study while the forthcoming two sections offer results and discussion and then ultimately conclusion.

Methodology

There are various ways to deal with the estimation of the consumption function. Nevertheless, the Euler equation model (EUM) is well known in consumption literature to test the PIH and AIH simultaneously. Hall (1978) applied the rational expectation to EUM to test the validity of PIH and AIH.

Friedman (1947) quantified permanent income by incorporating the lags of present income. Similarly, Lucase (1976) clarified that the current income lags cannot be used to predict the current consumption. Equally, Hall (1978) further clarified that future consumption could be measured through the current consumption alone. Hall (1981) in his seminal study built up another methodology which is termed REPIH. In other words, he introduced the rational expectation in the context of LCPIH. According to him, the lifetime utility of a household can augment subject to his inter-temporal wealth requirement. Furthermore, a household can anticipate his utility even under the vulnerability condition.

As per the Permanent Income Hypothesis, a household maximizes his/her utility subject to the constraint:

$$\text{Max} E_t \sum_{i=0}^{T-t} (1 + \delta)^{-i} U(C_{t+i}) U' > 0, U'' < 0. \text{s.t.} \sum_{i=0}^{T-t} (1 + r)^{-i} (C_{t+i} - YL_{t+i}) = W_t \quad (1)$$

Whereas (C_t) represents the aggregate consumption, (E_t) expectations, (T) shows the lifespan of an individual, (W_t) household wealth, (YL_t) household disposable income and (δ) rate of individual time selection, (r) real interest rate. So, if any typical household on a given interest rate can make easy borrowing and lending, then the 1st order condition of two consecutive phases can be written (t and t+1) as under:

$$E_t U'(C_{t+1}) = \left(\frac{1+\delta}{1+r} \right) U'(C_t) \quad (2)$$

Presuming the linear marginal utility function and $r = \delta$, henceforth:

$$E_t(C_{t+1}) = C_t \quad (3)$$

Hence afterward it indicates;

$$\Delta C_t = \varepsilon_t \quad (4)$$

Whereas ε_t is a forecast error which perceives a change in permanent income. Along these lines, the adjustment in the consumption is unforecastable based on Permanent Income Hypothesis. Formally, the econometric model to test the AIH for China is as:

$$\Delta C_t = \alpha + \beta \Delta Y_t + \varepsilon_t \quad (5)$$

Whereas (ΔC_t) shows the log difference of real current consumption, (ΔY_t) is represents the log difference of current income, and the random error is represented through ε_t . If the coefficient $\beta = 0$, then it will indicate that PIH will be valid for China. The above model also assumes that all the households are basically FL and have a tendency to spend their permanent income. Although, this fact is not very much conceivable in real-world

scenarios. In this way, we can likewise utilize the Campbell and Mankiw Consumption Model (CMCM).

The CMCM expects that a specific proportion $(1 - \lambda)$ of consumers is FL and they have a tendency to consume their perpetual income while rest of the consumers (λ) are BL and frame their consumption choices subject to their current income.

The CMCM separates the entire economy into two sub-groups; the group one consumption is based on the Permanent Income Hypothesis while the second group follows current income. As indicated by PIH, change in consumption is innovation in permanent income which is " ε_t ", therefore the consumption pattern of the first group is as: $\Delta C_{1t} = \varepsilon_t$. Whereas the consumption pattern of second group is as: $C_{2t} = Y_{2t}$. Consequently, innovation in consumption is equivalent to $\Delta C_{2t} = \Delta Y_{2t}$. Therefore, the consumption of the entire economy is $C_t = C_{1t} + C_{2t}$. Then innovation in consumption is: $\Delta C_t = \Delta C_{1t} + \Delta C_{2t}$. By condition (6) and (8), we determine the accompanying condition:

$$\Delta C_t = \varepsilon_t + \Delta Y_{2t} \quad (6)$$

If we assume that λ indicates the proportion of those households who utilize their present income, then $1 - \lambda$ will include those households who utilize their permanent income. Thus, the adjusted type of condition (07) remains:

$$\Delta C_t = (1 - \lambda)\varepsilon_t + \lambda\Delta Y_t \quad (7)$$

The CMCM additionally used an elasticity parameter δ to fix the inter-temporal substitution made by the consumers that follow the permanent income hypothesis. Therefore, the altered type of condition (07) is as under:

$$\Delta C_t = \alpha + \lambda\Delta Y_t + (1 - \lambda)\delta.r + \varepsilon_t \quad (8)$$

Base on condition (08), the PIH & AIH can be straightforwardly estimated for the Chinese economy. As indicated by CMCM, Ordinary Least Square technique is inappropriate for the assessment of condition (08). This is because of the possible connection between the random error and the income of the households. The CMCM recommends the arrangement of this issue, the utilization of instrumental variables strategy, for example, Two Least Square (2SLS) method.

The study used time series data for the variables: GDP, households' consumption and discount rate for the period of 1970 to 2016. Nevertheless, GDP, households' consumption and discount rate are corrected by GDP deflator and CPI respectively.

Results and Discussion

Both Ordinary Least Square technique and instrumental variables (IV) approaches are used to estimate equation (5). Table 1 exhibits the evaluated outcomes of equation (5). The coefficients of α and β are significant, noteworthy, and appear with correct signs as postulated by consumption hypotheses. The results demonstrated a critical connection between the change in current consumption and income of households in China. These results show that the primary source of household consumption is present income for the Chinese economy. These results propose that Permanent Income Hypothesis is not substantial for China.

Table 1: Estimation of Hall’s Random Walk Hypothesis

Equations Models	$\Delta C_t = \alpha + \beta \Delta Y_t + \varepsilon_t$			
	α	β	R^2	DW
OLS	0.03201	0.7212**	0.31	2.12
IV 1	4.85E+08	0.7231*	0.29	2.42
IV 2	2.81+E06	0.7012*	0.39	2.21

Note: (*, **, and ***, show significance on 10%, 5%, 1%). However, models 1, 2 and 3 used different lists of IV.

IV= List of Instrumental Variables: **Model 2:** $\Delta y_{t-2}, \Delta y_{t-3}, \Delta y_{t-4},$

Model 3: $\Delta y_{t-2}, \Delta y_{t-3}, \Delta y_{t-4}; r_{t-2}, r_{t-3}, r_{t-4}$

Instrument list of model 4: $\Delta y_{t-2}, \Delta y_{t-3}, \Delta y_{t-4}; r_{t-2}, r_{t-3}, r_{t-4}, \Delta c_{t-2}, \Delta c_{t-3}, \Delta c_{t-4}$

The above outcomes demonstrate that by and large, the majority of the households in China are backward-looking. Notwithstanding, this may not be conceivable that all households in an economy satisfy only one consumption hypothesis simultaneously. The consumption model CMCM proposes that in an economy it is conceivable that two sorts of households can be found: FL and in back-ward looking. In this manner, the study also utilized the CMCM to estimate the proportion of both types of households distinctively.

The CMCM altered the HRWH of PIH and allow a share, (λ) of households whose consumption preference is based on current/present income while the consumption pattern of the rest of the consumers is conditional on permanent income i.e. $(1 - \lambda)$. Additionally, for FL households, the model permitted the inter-temporal substitution. The CMCM further specify there is the plausibility of a positive connection between ΔY_t and ε_t . Therefore, due to this correlation OLS estimates would turn out to be upward biased and may not give the right outcomes. Henceforward, to counter this problem the CMCM suggested the IV approach to test the hypotheses. The OLS and IV models are reported in table 2. The outcomes of the CMCM are very like Hall's model of Permanent Income Hypothesis. The coefficients of the variables have positive signs and show the positive connotation between current income and households’ consumption, which further establishes the proportion of FL households, which is less than BL households in the country.

Consequently, it demonstrates that in China current income exhibits vast control over households’ consumption and gives proof against Permanent Income Hypothesis validity (PIH). Therefore, the real interest rate has not demonstrated any strong impact on the consumption of the household.

Table2: Estimation of CMCM

	$\Delta C_t = \alpha + \lambda \Delta Y_t + (1 - \lambda) \delta r_t + \varepsilon_t$				
	α	λ	$(1 - \lambda) \delta$	R^2	DW
OLS	-193E+08	0.7612*	-0.3512	0.390	2.21
IV2	0.9211	0.7021	-0.0561	0.3701	2.11
IV3	0.2130	0.7821*	-0.0231	0.3481	2.42
IV4	0.1241	0.7213*	-0.0321	0.3213	2.01

Note: (*, **, and ***, show significance at 10 percent, 5percent, 1 percent). However, in Model 2, 3, and 4 different lists of IV is used.

IV= List of Instrumental Variables:

Model 2: $\Delta y_{t-2}, \Delta y_{t-3}, \Delta y_{t-4},$

Model 3: $\Delta y_{t-2}, \Delta y_{t-3}, \Delta y_{t-4}; r_{t-2}, r_{t-3}, r_{t-4}$

Instrument list of model 4: $\Delta y_{t-2}, \Delta y_{t-3}, \Delta y_{t-4}; r_{t-2}, r_{t-3}, r_{t-4}, \Delta c_{t-2}, \Delta c_{t-3}, \Delta c_{t-4}$

Conclusion

This research inspects the noteworthiness of AIH and PIH in China by applying HRWH and CMCM. The HRWH reveals that PIH is not valid in China. Nevertheless, the CMCM reveals that for the Chinese economy the share of BL household is predominant as compared to the FL households. The results of the rejection and validity of AIH and PIH respectively are reinforced by both HRWH and CMCM models. Furthermore, the CMCM uncovers that the FL households share is exceptionally smaller than BL households in China.

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