

Per capita consumption function for China - An empirical exercise -

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A*bstract.* An attempt is made in the present exercise to examine the empirical validity of the Keynesian consumption function for the Chinese economy for the period from 1978 to 2009 by fitting both linear and log linear per capita consumption functions underlying the assumption that there is one way causation between per capita consumption expenditure and per capita disposable income. The empirical results show that the Per capita Marginal propensity to consume is less than unity showing the pretence of marginal propensity to save. Further the results show that the Per capita elasticity of consumption expenditure with respect per capita disposable income is found to be unity both in linear and log linear per capita consumption functions in China.

Keywords: consumption function, incomes, Keynes.

Jel Classification: C10; E25; E12.

1. Introduction

It is known fact that the important contribution of Keynes to macro-economics was his absolute income hypothesis. The empirical validity of his absolute income hypothesis has been tested using both cross-section data and time series data for different countries in the world. The rate of change in consumption expenditure per unit change in disposable income varies from

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country to country. The empirical knowledge on marginal propensity to consume [mpc] and elasticity of consumption expenditure with respect to the changes in disposable income [Epcce.pcdi] are required to comprehend the behavior of the consumers of the Economy. An attempt is made in the present exercise to test the empirical validity of the Keynesian absolute income hypothesis for China Economy using time series data.

2. Empirical Model

The empirical validity of Keynesian absolute income hypothesis is tested by fitting the both linear and log-linear per capita consumption functions to the time series data. With a view to examine the impact of rising population on consumption expenditure for the Economy of China the following forms of per capital consumption functions have been fitted to the time series data under the assumption that there is a one way causation between per capita consumption expenditure and per capita disposable income by ordinary least squares method. In order to correct the problems of autocorrelation and heteroscedasticity newey-west HAC standard errors have been used.

1. Linear Per Capital Consumption Function

$$(C/P)_t = b_0 + b_1(Y/P)_t \quad (1)$$

2. Log Linear Per Capital Consumption Function

$$\log(C/P)_t = \log b_0 + b_1 \log(Y/P)_t \quad (2)$$

where:

$(C/P)_t$ = Per Capital Consumption Expenditure in current year [in RMB]

$(Y/P)_t$ = Per capita Disposable Income in current year [in RMB]

Per capita Marginal propensity to consume and per capita elasticity of consumption expenditure with respect per capita disposable income have been worked out as follow:

1. Linear per capita consumption function

$$MPC = d(C/P)_t / d(Y/P)_t = b_1 < 1 \quad (a)$$

Per Capital Elasticity of Consumption Expenditure with Respect to Per Capita Disposable Income

$$Epcce.pcdi = d(C/P)_t / d(Y/P)_t * (Y/P)_t / (C/P)_t \geq \text{ or } \leq \text{ unity}$$

2. Log Linear Per Capital Consumption Function

$$E_{pcce.pcdi} = d \log(C/P)_t / d \log(Y/P)_t = b_1 \geq \text{ or } \leq \text{ unity}$$

$$MPC = b_1 * (C/P)_t / (Y/P)_t = b_1 < 1$$

3. Data

Table 1. (1978-2009)

Years	Annual Per Capita Consumption Expenditure of Urban Households (RMB)	Annual Per Capita Disposable Income of Urban Households (RMB)
	PCCE	PCDI
1978	311	343
1979	353	405
1980	424	478
1981	457	500
1982	471	535
1983	506	564
1984	559	651
1985	673	739
1986	799	900
1987	884	1002
1988	1103	1181
1989	1211	1376
1990	1279	1510
1991	1570	1701
1992	1826	2027
1993	2337	2577
1994	3179	3496
1995	3538	4283
1996	3919	4839
1997	4186	5160
1998	4332	5426
1999	4616	5854
2000	4998	6280
2001	5309	6860
2002	6030	7703
2003	6511	8472
2004	7182	9422
2005	7943	10493
2006	8697	11759
2007	9997	13786
2008	11243	15781
2009	14537	17175

Source: Statistical Year Book - National Bureau of Statistics of China [2010].

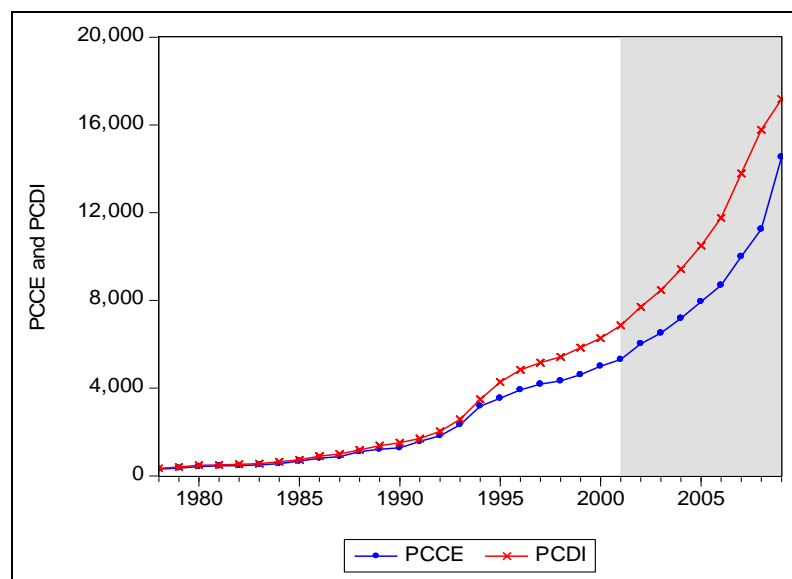
The required time series data on consumption expenditure, disposable income in current prices and population for the period from 1978 to 2009 has been collected from the National Bureau of Statistics of China. The data collected has been converted into per capita form to perceive the impact of rising population with the changes in disposable income on consumption expenditure of the urban households.

4. Per Capita Consumption Function for China: Empirical Results

Visual Plot

The movements in Per Capital Consumption Expenditure [PCCE] in the current year and Per Capital Disposable Income [PCDI] in the current year in China during the period from 1978 to 2009 can be observed in Figure 1.

Figure 1. In PCCE and PCDI in China: 1978-2009



Source: Author's calculations.

From the above figure it is clear that both Per Capital Consumption Expenditure in current year and Per Capital Disposable Income in current year in China during the period under consideration are moving in the same direction. The movements in Per Capital Consumption Expenditure are found to be somewhat as compared to the Per Capital Disposable Income in China during the period under consideration. The gap between Per Capital Consumption Expenditure and Per Capital Disposable Income is found to be increasing since 1994 leading to conclude that the per capita propensity to save of the households is rising in China.

Per capita Consumption Function

The regression results of the simple linear and log liner per capita consumption functions based on time series data are given in Table 2.

Table 2: Regression Results of Per Capita Consumption Function For China: 1978-2009

1	2	3	4	5	6
Form of Equation	Estimated per capita consumption function	mpc	Epcce.pcdi	Annual Growth rate of Per capita consumption expenditure	Annual Growth rate of Per capita disposable income
Linear	$(C/P)_t = 156.82 + 0.76 (Y/P)_t^*$ t = (2.17) (37.09) r ² = 0.991 d = 1.52	0.76	1.003	9.519%	9.89%
Log-Linear	$\log(PCCE/PCDI)_t = 0.23 + 0.95 \log(Y/P)_t^*$ t = (3.74) (119.91) r ² = 0.998 d = 1.06	0.74	0.95	12.41%	13.09%

Notes:

- * = Statistically significant at one percent level; 2. Figures within the brackets are t values based on Newey-West HAC standard errors and covariance; 3. Mpc = Per capita marginal propensity to consume; 4. Epcce.pcdi = Per capita elasticity of consumption expenditure with respect to per capita disposable income; 5. d = Durbin-Watson statistics

Source: Author's calculations.

The result is of the representation results shown in Table 2 show that the coefficients of per capita disposable income are found to be significant both in linear and log linear per capita consumption functions fitted to the time series data. The numerical values of the marginal propensity to consume both in linear and log linear consumption function are found to be less than unity confirming that these values are in line with consumption function. It is 0.76 in case of linear per capita consumption function and 0.74 in e of log linear per capita consumption function evincing the fact that a one unit in increase is per capita disposable income will lead to increase the per capita consumption expenditure by more than 0.74 units during the period under consideration in China. The proportion of explained variation in per capita consumption expenditure is very high due to per capita disposable income.

The responsiveness of the per capita consumption expenditure to the changes in per capita disposable income is found to be close to unity in case of log linear per capita consumption function and unity in case of linear per capita consumption function evincing the fact that a one percent increase in per capita disposable income will lead to increase the per capita consumption expenditure by the same one percent during the period under consideration in china. This shows that the annual growth rate of per capita consumption expenditure and per capita disposable income are found to be more or less equal.

Shift in the per capita consumption function

China joined the WTO in 2001 to have more freedom with foreign countries so far trade is concerned. There is a need to see the presence of structural shift [in terms of mpc and elasticity] in the per capita consumption function of the Chinese economy. Therefore chow break point test is calculated to search the presence of structural shift both in linear and log linear per capita consumption functions of the Chinese economy. The values of the chow test [F test] are given in Table 3.

Table 3: Chow test statistics

1	2	3
Form of equation fitted	F-test	Shift in the per capita consumption function
$(C/P)_t = b_0 + b_1(Y/P)_t$	1.26 ^{ns}	No Shift
$\log(C/P)_t = \log b_0 + b_1 \log(Y/P)_t$	2.14 ^{ns}	No Shift

Note: ns=Not significant.

Source: Author's calculations.

It is clear from the value of the F-Statistics that there is no shift in per capita consumption showing the presence of stability in the per capita consumption function in China during the period under consideration. Therefore there is no shift either in per capita marginal propensity to consume or per capita elasticity of consumption expenditure with respect to per capita disposable income in Chinese economy.

5. Conclusion

The present paper examines the empirical validity of the Keynesian consumption function for the Chinese economy for the period from 1978 to 2009 by fitting both linear and log linear per capita consumption functions underlying the assumption that there is one-way causation between per capita consumption expenditure and per capita disposable income. The results based on chow test show that there is no structural change in the per capita consumption function despite the fact that China joined the WTO in 2001 to have more freedom with foreign countries so far trade is concerned. The empirical results show that the per capita marginal propensity to consume is less than unity showing the presence of marginal propensity to save. Further the results show that the per capita elasticity of consumption expenditure with respect to per capita disposable income is found to be unity both in linear and log linear per capita consumption function showing that the proportionate change in per capita consumption expenditure is approximately equal to the proportionate change in per capita disposable income in China.

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