
Research

ESTIMATION OF CONSUMPTION FUNCTIONS: THE CASE OF BANGLADESH, INDIA, NEPAL, PAKISTAN AND SRI LANKA

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Abstract

The study uses annual data from 1971 to 2013 and applies Keynesian Consumption Function (KCF) and the Permanent Income Hypothesis (PIH) in order to estimate consumption functions of SAARC countries. The empirical results show that in the short run, the difference between KCF and PIH under Marginal Propensity to Consume (MPCs) is quite large. This difference, therefore, indicates that in the short run consumers' consumption decision are based on current income. However, another point worth noting is that, in the short run smaller values of MPCs under the PIH indicate that consumers are unable to anticipate their future income in developing countries, like Bangladesh, India, Nepal, Pakistan and Sri Lanka. Moreover, the study also estimates the MPCs under the PIH in the long run. The results demonstrate that in the long run the values of MPCs are higher than the MPCs while using PIH, which indicates that in the long run consumers anticipate their future income and accordingly make consumption decisions on the basis of permanent income.

Keywords: SAARC, Keynesian Consumption Function, Marginal Propensity to Consume, Permanent Income Hypothesis

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Introduction

Considering the importance of the Marginal Propensity to Consume (MPC) in consumption function, policy makers and macro economists invariably keep a vigilant eye on its nature and behavior of MPC. Another important variable in macroeconomics is the Marginal Propensity to Save (MPS), which is often considered as the counter part of MPC. The value MPS plays a key role in capital accumulation. In Bangladesh, India, Nepal, Pakistan and Sri Lanka private consumption take the majority share of the Gross Domestic Product (GDP) of each respective country: approximately 66 percent⁵ of the GDP goes to private consumption. Thus, it is plausible to believe private consumption as one of the key determinants of aggregate demand. Given the importance of the private consumption in macro economic context the policy makers and researchers therefore are interested to find out both the pattern of individuals' consumption and the correct values of MPC under the KCF and PIH. It is important to know the accurate value of both PIH and KCF because the latter supports high value of MPC while the former holds a smaller value of MPC compare to the KCF. Moreover, it is also important to know the value of MPC both in the short and the long run.

The survey of the related literature demonstrates that consumption function, its trend and behavior received a sizeable attention from economists and policy makers. Furthermore, the literature discusses the consumption function under the theoretical perspective of both PIH and KCF. However, the literature does not deal with two crucial issues related to the consumption function. First, the short run and the long run trend and behavior of the MPC under both the PIH and KCF has not been discussed. Second, the trend of MPC is applying the theoretical perspective of PIH and KCF has not been studied for developing countries, especially for South Asian countries. Thus, in order to fill this gap in the literature, this study aims at estimating the short run and long run MPC under the KCF and PIH for Bangladesh, India, Nepal, Pakistan and Sri Lanka.

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The concept of consumption function goes back as old as other major macro economic theories. Normally it is believed that the consumption function theory that the current macroeconomic deals with has begun with the startling work of J. M Keynes in 1936: the Keynesian Consumption Function. The Keynesian theory of Consumption was further followed by the Life Cycle Hypothesis (LCH) of Duesenberry (1948). Later the debate of consumption function came into limelight when the Melton Friedman (1957) presented his theory of consumption function: the Permanent Income Hypothesis, which was followed by the contentious consumption theory; the Random walk Hypothesis (RWH) of Hall (1978).

Looking at the available studies one may find the paper of Khan et al (2010) very interesting. They tested the PIH and Absolute Income Hypothesis (AIH) for Pakistan using a comprehensive annual data set from 1970 to 2010. The study concludes that PIH is not valid in Pakistan. The empirical results of the study are consistent with AIH theory based on Keynesian Consumption Function.

Another study worth mentioning is conducted by Nezhed et al (2011). They estimate MPC under the nonlinear framework for Iran. The aim of the study was to test the capacity of Iranian consumption function for nonlinear specified. And they use annual data from 1961 to 2009 to draw empirical results. The study applies various types of nonlinear models with the help of non linear least squares method in order to estimate the MPC of Iran. It is interesting to mention that the empirical findings support the nonlinear framework for Iranian MPC. Moreover the study also indicates that in Iran the current income has a greater power to explain private consumption than permanent income.

Similarly, Manitsaris (2006) examines the consumption function under the PIH for European Union countries, such as Austria, Belgium, France, Finland, Denmark, the Netherland, Luxembourg,

Germany, Greece, Spain, Sweden, Portugal, Ireland, Italy and the United Kingdom covers period from 1980 to 2005. The study uses partial adjustment and adaptive expectation model jointly. The findings of the study demonstrate that in all these European Countries, the Permanent Income Hypothesis practically holds. Thus, empirical results of Manitsaris (2006) support the PIH.

Likewise, Chow (1985) uses Rational Expectation Hypothesis (REH) in order to test the PIH for China. The findings of his study show that in China the PIH holds.

However, Zuchlke and Payne (1989) contend that the PIH may not hold all the time across all countries in the world. Zuchlke and Payne (1989) investigate the PIH for developing countries by using a rich data set. The study selects eight developing countries to test PIH alternatively for each one of them. It concludes that the PIH does not hold in any country in the sample. Thus, the paper rejects notion of the PIH for developing countries. Furthermore, their study reveals that because of the weak and dysfunctional financial institutions in developing countries, the validity of RWH is also doubtful.

Rao (2005) tested the Hall's PIH for Fiji. He applied the Campbell and Mankiw (1990) framework and showed that in Fiji two third of the households make their consumption decisions on the basis of current income. Rao (2007) tested the Hall's PIH hypothesis in Australia and Fiji. He partially rejected the PIH for both of the economies.

Gomes and Paz (2010) investigated the PIH for Brazil, Colombia, Peru and Venezuela. The results of the study indicated that PIH is not hold in Brazil and Colombia due to liquidity constrains because in these economies households are unable to smooth their consumption due to liquidity constraints while they found perverse asymmetry for Peru. However, in case of Venezuela the results are uninformative.

Khan et al. (2012) tested the Hall's Permanent Income Hypothesis and Campbell and Mankiw consumption hypothesis for Pakistan. The results of their study show that 68 percent of households in Pakistan are backwards looking while the remaining is forward looking. Such conclusion therefore, supports argument that current and disposable income is more crucial for the households in Pakistan rather than Permanent Income. Hence, it is plausible to hold that in a country like Pakistan, the PIH hardly holds.

The rest of the paper is organized as follows. Section 2 offers methodology while Section 3 presents the empirical results and discussions. Section 4 of the paper provides the conclusion.

Methodology

In order to estimate the consumption functions , there are several models in consumption literature that can be used. For instance the consumption functions proposed by Friedman (1959), Hall (1978), Campbell and Mankiw (1990) are more sophisticated models to be used. But for the sake of simplicity, we considered the simple form of consumption hypothesis that is based on KCF for our analysis. The model is presented as under:

$$C_t = \alpha_1 + \alpha_2 Y_t + u_t \quad (1)$$

Where C is private consumption, Y is disposable Income, t represents the given time period. The model also includes an error term, μ . The slope of equation (1) is called Marginal Propensity to Consume (MPC), and the value of the MPC ranges from 0 to 1; that is, $0 < MPC < 1$. According to PIH, consumption of households depends upon its permanent income while permanent income is the current and expected future income of the households. Mathematically the PIH can be expressed as below:

$$C_t = f(Y_t, Y_{t-1}, Y_{t-2}, \dots, Y_{t-n}) \quad C_t = f(Y_t, Y_{t-1}, Y_{t-2}, \dots, Y_{t-n}) \quad (2)$$

As elaborated earlier for equation (1), C_t is the private consumption, Y_t is disposable income, Y_{t-1} is the one period lag of disposable income and Y_{t-n} is the nth lag of the disposable income of the representative households. In our analysis the lag length goes up to 16, thus $n=16$. By applying Koyek's geometric lag Structure (1954) on equation (2) we can derive the following equation:

$$C_t = \beta_1 Y_t + \beta_2 C_{t-1} + \varepsilon_t \quad (3)$$

Where β_1 in equation (3) is the MPC of short run, whereas the long run MPC is $\beta_1 / (1 - \beta_2)$.

Empirical Results

Annual data of five SAARC countries, i.e. Bangladesh, India, Nepal, Pakistan and Sri Lanka are used for the empirical analysis. We exclude Afghanistan, Bhutan and Maldives from the analysis mainly because of the unavailability of data from the whole sample period that we choose. Likewise, Hence, the annual data from 1971 to 2013 of private aggregate consumption and the Gross Domestic Product (GDP) for these countries is extracted from the World Development Indicators (WDI). The study uses the aggregate private consumption as an endogenous variable while the GDP as exogenous variable. Both of the variables are adjusted for inflation using both the Consumer Price Index (CPI) and the GDP deflator respectively.

Table 1:

Average Propensity to Consume (APC) of Bangladesh, India, Nepal Pakistan and Sri Lanka

APC	Bangladesh	India	Nepal	Pakistan	Sri Lanka
1985	0.93	0.8	0.89	0.92	0.99
2095	0.83	0.8	0.90	0.90	0.99
2005	0.77	0.7	0.91	0.88	0.90
2006	0.74	0.6	0.97	0.88	0.86
2007	0.74	0.6	0.97	0.86	0.84
2008	0.74	0.6	0.92	0.85	0.78
2009	0.74	0.6	0.92	0.85	0.80
2010	0.74	0.6	0.95	0.80	0.87
2011	0.75	0.5	0.98	0.82	0.87
2012	0.75	0.5	0.96	0.84	0.86
2013	0.75	0.5	0.96	0.82	0.85
Average APC	0.80	0.74	0.91	0.81	0.95
S.D of APC	0.043	0.1092	0.05389	0.0412	0.1112

Note: Calculations are conducted by authors using annual data from 1975 to 2013.

Data source: The WDI

Table 1 offers the values of Average Propensity to Consume (APC) of Bangladesh, India, Nepal, Pakistan and Sri Lanka. row two, three and four present the average values of APC from 1975 to 2005 for each decade respectively, whereas in row five to row thirteen the values of APCs are demonstrated for each year. Similarly, the last and second last rows respectively offer the average values of APC and standard deviation for the whole sample period.

Table 1 furthermore gives us the general view about the consumption pattern through APC. The average values of APC of Bangladesh, India, Nepal, Pakistan and Sri Lanka are 0.80, .74, 0.91, 0.81 and 0.95 respectively, which show that on average consumers devoted 80%, 74%, 91%, 81% and 95% of their respective income to the consumption. A point worth noting from table 1 is that the APC of Bangladesh shows a decreasing trend still 2010 and increasing slightly after 2010. In the same vein the APC of Nepal and Pakistan maintains a decreasing till 2009 and 2010 respectively and begins to increase there after. While the APC of India is continuously decreasing till 2013, the APC of Sri Lanka shows very high volume initially, albeit begins to decrease gradually after that.

Table 2:
The estimates of the MPCs under the KCF

Coefficient	$C_t = \alpha_1 + \alpha_2 Y_t + u_t$						
	α_1	α_2	R^2	DW	LM(1)	JB	WH
Bangladesh	-2416**	1.40	0.66	1.24	1.893(0.1420)	0.152(0.412)	3.210(0.095)
India	18491	0.71***	0.65	1.79	2.034(0.1274)	0.215(0.301)	2.102(0.114)
Nepal	.443	0.86***	0.76	1.61	2.743(0.2100)	0.102(0.912)	4.512(0.1092)
Pakistan	3801	0.73*	0.68	1.71	2.153(0.1921)	0.170(0.201)	3.52(0.121)
Sri Lanka	4460***	0.79***	0.80	1.82	1.912(0.1102)	0.192(0.623)	3.286(0.147)

Note: ***p<0.01, **p<0.05, * p<0.10. However the p-value of the diagnostic tests in the parenthesis

Table 2 presents the values of MPCs under the KCF for Bangladesh, India, Nepal, Pakistan and Sri Lanka. As shown in the table 2, the MPC of Bangladesh is 1.40, which is indeed odd and does not adhere to the basic property of the KCF. However, the MPC of India, Nepal, Pakistan and Sri Lanka are recorded as 0.71, 0.86, 0.73 and 0.79 respectively, demonstrating that that current disposable income of house holds plays a critical role in the consumption decision of same households in India, Nepal and Sri Lanka.

Table 3:
The estimates of the MPCs under the PIH in the short run

Coefficient	$C_t = \beta_1 Y_t + \beta_2 C_{t-1} + \varepsilon_t$						
	β_1	β_2	R^2	DW	LM(1)	JB	WH
Bangladesh	0.27***	0.64***	0.89	1.76	1.021(0.201)	0.501(0.592)	2.110(0.101)
India	0.18***	0.75***	0.92	1.36	1.63(0.301)	0.231(0.211)	2.911(0.011)
Nepal	0.78***	0.13***	0.96	1.26	2.65(0.121)	0.310(0.131)	4.182(0.0611)
Pakistan	0.32*	0.61**	0.81	1.31	2.18(0.101)	0.300(0.125)	3.112(0.092)
Sri Lanka	0.49***	0.39***	0.95	2.03	1.532(0.412)	0.415(0.210)	2.413(0.0518)

Note: ***p<0.01, **p<0.05, * p<0.10. However the p-value of the diagnostic tests in the parenthesis

Table 3 shows that in case of Bangladesh, India, Nepal, Pakistan and Sri Lanka the MPCs under the PIH are recorded as 0.27, 0.18, 0.78, 0.32 and 0.49 respectively. Hence it reveals the fact that in every circumstance, the MPCs under the PIH are smaller compared to the MPCs under the KCF. It is relevant to highlight that the empirical results reported in table 3 support the empirical results that are already reported in table 02; that is, in the short run consumers follow current income when making their consumption choice. However, the PIH hardly holds for developing countries such as Bangladesh, India, Nepal, Pakistan and Sri Lanka. That is because in developing countries

the major part of the disposable income of median households is hardly enough to meet the expense of the consumable commodities. Therefore, it is very unlikely for them to make their decision on the basis of permanent income in the short run.

Table 4:

The estimates of MPCs under the PIH in the long run

Coefficient	MPC in the short run	$(1 - \beta_2)$	MPC in Long Run
Bangladesh	0.27	0.36	0.75
India	0.18	0.25	0.72
Nepal	0.78	0.87	0.89
Pakistan	0.32	0.39	0.82
Sri Lanka	0.49	0.51	0.96

Table 4 reports the values of the long run MPCs which are derived using the short run MPCs under the PIH. As shown in the table 4, the MPC under the PIH are 0.75, 0.72, 0.89, 0.82 and 0.96 respectively. So, the results demonstrate that in the long run consumers can anticipate their future income therefore they duly make their consumption choices considering their permanent income in the long run.

Conclusion

To sum up, this study estimates the MPCs for five SAARC countries, namely Bangladesh, India, Nepal, Pakistan and Sri Lanka. The MPCs under the PIH are estimated in both: short run and long run. Results of the study show that in the short run the MPCs using the PIH is very small for Bangladesh, India, Pakistan and Sri Lanka. Hence, it indicates that in the short runs it is difficult for households to predict their permanent income in developing countries like Bangladesh, India, Pakistan and Sri Lanka. However, our empirical results demonstrate that in case of Nepal the MPCs are high in short and as well long run. Thus, it is concluded that in a small though developing country like Nepal the households can predict the permanent income in both short and in the long run. Hence the PIH holds for such countries.

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