Estimation of Consumption Function under the Permanent Income Hypothesis: Evidence from Pakistan

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Abstract

This study estimates the consumption function for Pakistan under the permanent income hypothesis (PIH) using the annual data from 1970 to 2010. The consumption function under PIH is estimated through ordinary least square (OLS) method and instrumental variable (IV) approach. The results of both OLS and IV approach shows a small difference between marginal propensity to consume (MPC) out of current income and MPC out of permanent income. Therefore, these results indicate the invalidity of PIH and validity of Keynesian absolute income hypothesis in a case of Pakistan.

KEYWORDS: Permanent Income Hypothesis, Absolute Income Hypothesis, Ordinary Least Square Method, Instrumental Variables Approach, Marginal Propensity to Consume

1. Introduction

Despite the fact that consumption is one of the fundamental determinants of aggregate economic activities there is no consensus among the economists about the consumption hypothesis which represents the consumption behavior of typical individual. The most popular consumption hypotheses are: absolute income hypothesis (AIH), relative income hypothesis (RIH) and permanent income hypothesis (PIH) while PIH developed by Friedman (1957) is used most often and is more widely accepted.

According to PIH, the consumption decisions of individuals are not based on the income received in the current period but on their anticipated life time income. The PIH divides

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measured income and consumption into two parts: permanent income, transitory income, permanent consumption and transitory consumption respectively. Furthermore, it imposes some restriction on the permanent and transitory parts of income and consumption, not only that transitory and permanent components are uncorrelated but also there is no autocorrelation in transitory components. Thus, we can write the consumption function under the PIH as: $C_t^p = f(Y_t^p)$, which tells us that individuals consume a constant fraction of their permanent income.

Most significant work on the issue in modern literature has been done by Dewan et al (2001), Manitsaris (2006) and Dejuan et al (2006). Dewan et al (2001) tested the PIH over a cross countries data, their results show that PIH is valid in industrial countries but not in developing countries. Manitsaris (2006) examined the consumption function under the permanent income hypothesis for 15 European countries, his results show strong support for PIH in Europe. Dejuan et al (2006) tested the PIH for 11 West- German states but the results did not support the PIH for these states as well as for Germany as a whole. There is a gap in literature on PIH validity in Pakistan therefore the objective of the study is to estimate the consumption function for Pakistan under the PIH. The rest of the paper is structured is as follow: section two and section three offers methodology and empirical results respectively while section four provides summary and conclusion.

2. Methodology

We can summarize the PIH is as follow:

$$C_t^p = f(Y_t^p) \quad \text{.....(1)}$$

$$C_t^p = \alpha Y_t^p \quad \text{.....(2)}$$

$$Y_t = Y_t^p + Y_t^T \quad \text{.....(3)}$$

$$C_t = C_t^p + C_t^T \quad \text{.....(4)}$$

$$\rho_{Y_t^p Y_t^T} = 0 \rho_{C_t^p C_t^T} = 0 \rho_{Y_t^T C_t^T} = 0 \quad \text{.....(5)}$$

Thus, equation (2) describes that permanent consumption only depends on permanent income and not on transitory income. Palley (2005) defines permanent income as the annuity value of life time income and wealth. Moreover, from equation (2) and (5), we derive equation (7).

$$\rho_{C_t^p C_t^T} = \rho_{C_t^T C_t^p} = 0 \quad \text{.....(7)}$$

Where

Y_t = Measured income

Y_t^p = Permanent income

Y_t^T = Transitory income

C_t = Measured consumption

C_t^T = Transitory consumption

C_t^p = Permanent income

ρ_{xy} = Correlation between X and Y

Substitute equation (4) into (2) we arrive at equation (9):

$$C_t = \beta Y_t^p + C_t^T + \varepsilon_t \quad \text{……. (8)}$$

If $\nu_t = C_t^T + \varepsilon_t$

Then;

$$C_t = \beta Y_t^p + \nu_t \quad \text{…….. (9)}$$

By recalling the adaptive expectation model and on the basis of adaptive expectation model we obtain the equation (10)

$$Y_t^p - Y_{t-1}^p = \delta(Y_t - Y_{t-1}^p), 0 < \delta \leq 1 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots. (10)$$

Then we substitute equation (10) into equation (9) and obtaine equation (11) (Johnston 1984)

$$C_t = \beta\delta Y_t + (1-\delta)C_{t-1} + [v_t - (1-\delta)v_{t-1}] \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (11)$$

$$C_t = \phi_1 Y_t + \phi_2 C_{t-1} + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (12)$$

If $\phi_1 = \beta\delta$ is the short-run MPC while $\beta = \phi_1 / (1-\phi)$, is the long-run MPC (APC) because in the long run MPC = APC. Thus, the equation (12) represents the consumption function under the permanent income hypothesis and adeptative expectation model.

2.1. Data

The data for estimation of equation (12) was taken from international financial statistics (IFS) CD, ROM from 1971 to 2009, C_t represents is the household consumption and its real value was calculated by deflating it with consumer price index (CPI), while Y_t represents the Gross Domestic Product (GDP) and its real value was calculated by deflating it with GDP deflator.

3. Empirical results

Table 1 shows the results of the equation (12) The estimates of column two and four are estimated by ordinary least square (OLS) and instrumental variables (IV) method respectively. These results indicate that the value of MPC in short run is 0.699 while in the long run is 0.866. The 0.699 is MPC out of current income while 0.866 is MPC out of permanent income. The adaptive expectation coefficient is 0.807 which implies that three-fourth of the expectation of the consumers are realized in any given period. The MPC out of current income are implying that a 1 percent increase in the current income will increase the consumption by 0.699 percent on average. While the MPC out of permanent income is 0.866, implying that a 1 percent increase in permanent income would increase current

consumption by 0.866 percent on average, the results are confirmed by the IV approach as well.

TABLE: 1 Estimated results of $C_t = \phi_1 Y_t + \phi_2 C_{t-1} + \mu_t$

	ORDINARY LEAST SQUARE METHOD		INSTRUMENTAL VARIABLES(2SLS)	
	Coefficient	Probability	Coefficient	Probability
ϕ_1	0.699	(0.000)	0.739(0.000)	(0.000)
ϕ_2	0.066	(1.065)	0.004(0.946)	(0.946)
R^2	0.947	--------	0.932	--------
Adjusted R^2	0.964	--------	0.952	--------
DW	1.120	--------	1.013	--------
LM (1)	1.748	(0.172)	1.182	(0.285)
JB	0.159	(0.923)	0.130	(0.934)
WH	4.990	(0.003)	3.420	(0.210)

Note: y_{t-1}, y_{t-2} and y_{t-3} is used as instrument variables.

4. Conclusion

This study estimated the consumption function of Pakistan under the PIH and adaptive expectation model. The MPC of the short run was found to be 0.699 and MPC for long run was 0.86. This indicates that the individual's consumption in Pakistan rely on their current income because there is a very small difference between MPC out of current income and MPC out of permanent income. The expectation coefficient which is 0.807 also indicates that three-fourth of the consumer's expectation is based on the give period. Therefore, we conclude that PIH is not valid in Pakistan.

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